Independent Evaluation Design Document

Massachusetts 1115 Demonstration Extension 2017-2022

Prepared by

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for

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Submitted to CMS
December 2018

Draft Massachusetts 1115 Demonstration Evaluation Design Document

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I. Introduction: Demonstration Overview and Introduction to Evaluation Design

A. Demonstration overview

MassHealth, the Massachusetts Medicaid and CHIP program, serves over 1.8 million Massachusetts residents. Massachusetts uses a Section 1115 Demonstration Project ["Demonstration"] to pilot innovative strategies for delivering and financing health care for many of its MassHealth enrollees. Since its launch in 1997, the Demonstration has served as a vehicle for expanding coverage, encouraging better coordination and cost containment through managed care, and supporting safety net providers. The Demonstration played a key role during Massachusetts' 2006 health care reform (also known as Chapter 58) that made coverage available across the income spectrum through changes to the individual market and Medicaid and was a precursor to the coverage expansions under the Affordable Care Act.

In 2012, Massachusetts passed further legislation (Chapter 224) seeking to address the high cost of health care and the need for better care integration. The legislation set health care cost benchmarks for the state and created a new state agency, the Health Policy Commission (HPC), to monitor health care costs. The legislation also directed MassHealth to implement new ways of paying for and delivering more integrated care.

In the summer of 2016, Massachusetts sought an extension of the Section 1115 Demonstration for July 1, 2017 through June 30, 2022 to improve care delivery, control costs, and address the opioid epidemic. On November 4, 2016, the Centers for Medicare and Medicaid Services (CMS) approved the sixth extension of the Demonstration for the period July 1, 2017 through June 30, 2022. Amendments to the Demonstration were approved on December 14, 2017 and June 27, 2018.

The Demonstration extension seeks to transform the delivery of care for most MassHealth members through payment reform and support for developing Medicaid Accountable Care Organizations (ACOs) and two kinds of Community Partners (CPs) to address behavioral health (BH) and long-term services and supports (LTSS). These new entities will be jointly responsible for integrating care and moderating rising health care costs while maintaining or improving quality, thereby helping MassHealth fulfill its Chapter 224 legislative obligations. To date, MassHealth has contracted with 17 ACOs, 18 BH CPs, and 9 LTSS CPs (Appendix A1-A3). In addition to newly created ACOs, and CPs, the Demonstration will provide infrastructure and capacity-building funds for 19 Community Service Agencies (CSA), entities that currently provide support for children with serious emotional disturbance, including those enrolled in ACOs (Appendix A4). As of May 31, 2018, approximately 850,000 Massachusetts Medicaid members were enrolled in an ACO, representing approximately 75% of the overall managed care population of ~1.18 million members. CP supports will be available to members enrolled in ACOs and to the approximately 198,000 members enrolled in other managed care organizations (MCOs). About (~124,000) members were enrolled in MassHealth's directly managed primary care clinician (PCC) plan.

To fund delivery reform, Massachusetts was awarded expenditure authority up to a maximum of $1.8 billion through the Delivery System Reform Incentive Payment (DSRIP) Program over the 5-year Demonstration period. The goal of the

Massachusetts' DSRIP Program is to support the transition to value-based payments by ACOs and CPs. This transition is expected to lead to more integrated care, reduce costs while maintaining care quality, and better meet member needs. DSRIP program goals and implementation plans are described in detail in Section II of this document.

In response to the opioid epidemic, the Demonstration extension also allows coverage for more residential treatment services for substance use disorders (SUD) and supports both recovery support navigators (to coordinate clinical and non-clinical services for persons in recovery) and recovery coach services (support from a person with lived experience).

The Demonstration also provides expenditure authority for cost-sharing subsidies for Massachusetts residents on the Exchange, provides expenditure authority for the CommonHealth program for individuals over age 65, ensures continued healthcare access for certain individuals formerly in foster care, allows MassHealth to require certain students to enroll in their student health insurance plans, and refines provisional eligibility processes to promote MassHealth financial sustainability.

Through these changes, MassHealth seeks to advance seven goals:

- Goal 1: Enact payment and delivery system reforms that promote integrated, coordinated care and hold providers accountable for the quality and total cost of care
- Goal 2: Improve integration of physical, behavioral, and long-term services
- Goal 3: Maintain near-universal coverage
- Goal 4: Sustainably support safety net providers to ensure continued access to care for Medicaid and low-income, uninsured individuals
- Goal 5: Address the opioid addiction crisis by expanding access to a broad spectrum of recovery-oriented substance use disorder services
- Goal 6: Ensure access to Medicaid services for former foster care individuals between the ages of 18 and 26, who previously resided in another state
- Goal 7: Ensure the long-term financial sustainability of the MassHealth program through refinement of provisional eligibility and authorization for SHIP Premium Assistance

B. Introduction to Evaluation Design

Massachusetts submitted a draft evaluation design document (EDD) for the overall Demonstration in March 2017 and received CMS comments in January 2018. In February 2018, CMS approved Massachusetts' request to combine the overall Demonstration and DSRIP evaluation designs into a revised, unified EDD and extended the deadline for submitting the revised EDD to June 30, 2018. Massachusetts received comments on this combined evaluation design on July 27, 2018.

The development of this revised EDD has been guided by the Demonstration Special Terms and Conditions (STC), CMS comments on the previous drafts of the EDD, and subsequent communications with CMS. The revised EDD also incorporates feedback from MassHealth stakeholders and advisory groups and guidance from an independent Scientific Advisory Committee (SAC) comprised of national experts in health services

research and Medicaid transformation. The revised EDD addresses research questions and hypotheses suggested by CMS in the STCs and incorporates the evaluation design for DSRIP (see Section II).

Logic Model Frameworks for the Demonstration

Figures 1 and 2 below provide summary logic model frameworks for Goals 1 and 2 (inclusive of DSRIP – Figure 1) and Goals 3-7 (Figure 2). These logic models link the Demonstration Goals to the Demonstration initiatives to the specific desired Activities ("secondary drivers"), Outputs ("primary drivers"), and Outcomes ("purpose") of the Demonstration.

The introduction to the evaluation design below summarizes the quantitative and qualitative data that will be needed for the evaluation as well as potential data limitations. An overview of the methods that will be used to evaluate Demonstration initiatives and programs follows. More detail related to the evaluation approach for specific Demonstration goals, research questions and hypotheses are provided in subsequent sections of the EDD. Section II describes the evaluation design for Demonstration Goals 1 and 2 and the DSRIP Program. Sections III-VII of the EDD address Demonstration Goals 3 through 7.

For each Demonstration goal, an introductory section provides background and context for the goal prior to discussion of the evaluation data sources, analytic plans and outcome measures for the research questions related to that goal.

a. Summary of data needed for the evaluation:

Quantitative Data

Data from January 2015 through December 2022 will be examined, broadly using calendar years 2015 through 2017 as a pre-implementation baseline. Observations clearly affected by interventions occurring in 2017 (e.g., enrollees in pilot Medicaid ACOs) will be removed from the baseline. As requested by CMS, text descriptions and summary tables describing the target population(s), data sources, outcome measures, and planned analytic approaches for each research question are included; comparison groups for each analysis are specified, and a rationale for the proposed approach is provided. Technical specifications for all quantitative measures to be derived from existing data sources are in Appendix B.

Traditional administrative data: Data from the Medicaid Management Information System (MMIS) and MassHealth Data Warehouse will be used by the Independent Evaluation team to conduct a portion of its evaluation. MassHealth, working with actuaries, routinely conducts extensive quality checks and provides CMS with annual data quality reports on its MMIS data. Data in MMIS and the Data Warehouse are used in program administration, including: establishing program eligibility (for members and providers), setting rates, paying providers, and monitoring trends in utilization and costs.

MMIS and Data Warehouse data are well known to the Independent Evaluation team through longstanding collaboration with MassHealth on projects, including (1)

Figure 1. Demonstration Logic Model: Goals 1 and 2 and the DSRIP Program[1]

A. Demonstration Initiatives	B. Activities **Interventions/Programs[2] Delivery System Changes at the Organizational Level**	C. Outputs[3] **Improved Care Processes at the Organization Level**	D. Outcomes[3] **Improved Member Outcomes, Cost Trends, and Program Sustainability**
• DSRIP Funding (ACOs, BH CPs, LTSS CPs, CSAs, Statewide Investments) • State Operations and Implementation Funding (DSRIP and other sources) • Internal ACO and CP Program planning and investments	• ACO unique actions • CP unique actions • ACO, MCO, and CP common actions • Statewide Investments in: ○ Community-based workforce ○ Capacity building for ACOs and CPs (i.e. technical assistance and supporting APM adoption) ○ Addressing gaps in statewide care delivery (i.e. reducing emergency room boarding and improving accessibility for people with disabilities or for whom English is not a primary language)	• Identifying and addressing member needs • Access to care • Member engagement • Care plans and processes • Care integration • Cost management	• Improved member outcomes • Moderated cost trends • Program sustainability

[1]The DSRIP Interim Evaluation will use a mixed-methods design to evaluate delivery system actions, preliminary changes in care delivery, and preliminary outcomes during Performance Years PY0 to PY3 (07/01/2017 to 12/31/2020). The Summative Evaluation will use a mixed-methods design to evaluate delivery system actions, changes in care delivery, and outcomes for the entire Demonstration period PY0-PY5 (07/01/2017 to 12/31/2022)
[2]See Appendix D for full list of DSRIP Research Questions and Hypotheses for more detail
[3]See Appendix B for full list of access and quality measures

Figure 2. Demonstration Logic Model: Goals 3-7

A. Demonstration Initiatives	B. Activities Interventions/Programs	C. Outputs	D. Outcomes
Goal 3: Maintain near universal coverage			
• Student Health Insurance Program • CommonHealth 65+ • ConnectorCare • Employer Sponsored Insurance	• Implementation of new and modified initiatives • Continued operation of existing programs	• Progressive increases in SHIP and Commonwealth 65+ enrollment • Maintenance of enrollment in ESI • Increased LTSS utilization among CommonHealth 65+ members	• Overall insurance rate remains high • Decrease in percentage of MassHealth members with a gap in coverage 45 days or longer
Goal 4: Sustainably support safety net providers to ensure continued access to care			
• Public Hospital Transformation and Incentive Initiative • DSH Pool • UCC Pool	• Implementation of modified SNCP, including increased performance-based payments ○ Increased portion of at-risk funding under PHTII and SNPP to help improve care quality	• Improved care quality at SNCP hospitals • Uncompensated care costs do not increase	• SNCP hospitals exhibit quality improvement, including access measures • Delivery reform efficiencies lead to savings for hospitals that counter-balance reduced supplemental payments, without compromising patient care
Goal 5: Address the opioid addiction crisis by expanding access to a broad spectrum of recovery-oriented substance use disorder services			
Implementation of new SUD residential and recovery support services	• Improved SUD service capacity • Diversion from inpatient to outpatient services • New residential and recovery support services	• Improved SUD identification, treatment initiation, and engagement • Improved access to care for comorbid physical and mental health conditions for anyone with SUD diagnosis • Improved adherence to treatment among individuals with SUD diagnosis	• Decreased ED utilization and inpatient hospital settings • Fewer opioid related deaths
Goal 6: Ensure access to Medicaid services for former foster care members 18-26 years of age			
Strengthening coverage for former foster care youth	• Provide continuous coverage for foster care youth who previously resided in another state	• Continuous eligibility for health coverage for foster care youth • Foster care youth access care at rates comparable to other MassHealth members	• Former foster care individuals have positive health outcomes comparable to members with similar characteristics using established measures
Goal 7: Ensure long-term MassHealth sustainability			
• Updated Provisional Eligibility requirements • SHIP Premium Assistance	• MassHealth implements changes to provisional eligibility • MassHealth implements new SHIP Premium Assistance	• Fewer provisionally eligible individuals ultimately deemed ineligible • Progressive increase in SHIP enrollment	• Lower expenditures due to less provisional coverage unnecessarily provided to ineligible individuals • Cost savings due to SHIP • Improved member experiences and network access due to SHIP PA program

Developing risk adjustment models that inform MCO and ACO payments; (2) Developing risk adjustment models for quality measures; and (3) Developing models to predict LTSS costs. As part of these projects, UMMS researchers meet weekly or bi-weekly with MassHealth Program Directors and their teams (e.g., Director of Purchasing Strategy and Analytics and Associate Director for Payment and Care Delivery Innovation), and, when needed, with MassHealth's actuaries.

Thus, the Independent Evaluation team has great confidence in the administrative data that have been obtained and used for years relating to traditional services and benefits ("traditional data"), including:

- Member eligibility and enrollment: these files contain dates when a member is entitled to benefits from various programs, such as, when they are a client of the department of mental health (DMH), enrolled in a Senior Care Organization, or enrolled with a specific ACO or other health plan. The MMIS reads and interprets data from the state's Health Insurance Eligibility Verification Database and from other state agencies.
- Encounter records (claims or "dummy claims"), stored in the Data Warehouse: Both kinds of records use the same format and are regularly checked for completeness and accuracy. These records contain information about services rendered by whom and in what place, members' diagnoses and costs. They support determination of costs of care in total and within service categories, such as, hospital admissions, ambulatory care, ED visits, and LTSS. It is understood that the use and costs of some "traditional" services (such as translation for people with limited English proficiency) has not historically been captured in these records.
- Providers: These data indicate provider specialty and, for primary care doctors, the unique ACO with which they are affiliated. They are supplied by providers and verified by MassHealth, as part of the process for being accepted as a Medicaid provider.

It is important to note that there are significant limitations for some MMIS data fields; for example, "race" is missing for about 40 percent of members, "ethnicity" is missing for about 50% of members, and both "limited English proficiency" and "homelessness" are rarely coded.

New administrative data. The evaluation will also rely on Data relating to new relationships and services established and/or authorized through the Demonstration. In particular, there will be new data streams relating to Flexible Services (FS) and the activities of the BH CPs and LTSS CPs. Indeed, some relevant data specifications and work flows are still being finalized. The current, best assessment of what data will be available is described below.

Ideally, for each category of new service delivery, data would be available to identify 1) those who need these services, 2) referrals to CPs, 3) encounter records (or equivalent) describing the delivery of such supports, and 4) member outcomes (e.g., health, utilization and cost) during an appropriate follow up period with a clearly defined end. Each of these issues is addressed in turn, below.

1) Identifying need for services.
    a. Traditional data can be used to fairly comprehensively identify need for BH services through diagnoses and utilizations patterns. The algorithm used by MassHealth to identify members with LTSS or BH needs to receive LTSS or BH CP supports is included as Appendix A5. It may also be possible to identify a population rich in members with unmet LTSS need from a model built to predict LTSS utilization from existing MMIS data.
    b. The ACOs are being held accountable for screening for four health related social need domains (food, housing, transportation, utility), and are required to report to MassHealth whether the screening was performed and what the results of the screen were for a sample of the ACOs members. Additionally, ACOs will need to conduct Flexible Services Assessments (FSAs) in order to determine programmatic eligibility for the FS Program, and MassHealth is considering whether to collect such assessment data.
2) Identifying members during the period when CPs or ACOs are responsible for getting members these services.
    a. CPs will inform MassHealth when members enroll and disenroll from their programs, along with reason for disenrollment (for CPs).
    b. Enrollment with an ACO or other health plan is already tracked as described above for traditional administrative data.
3) Encounter records
    a. CPs will be required to provide dates of qualifying activities (e.g., care coordination supports) and the type of activity for the kinds of supports delivered to MassHealth members that fall within their respective scopes.
    b. Flexible services data, both housing and nutrional supports lie outside the scope of traditional administrative data. A new encounter tracking record (ETR) system is being considered to identify members and the housing and nutritional flexible services provided. The data that could be collected is expected to include cost data, and would allow the State to track the kinds of services that members receive, when and from which social service delivery entities. Additionally, the State may be collecting Flexible Services Assessment information from ACOs. Such assessment data would capture in broad categories the health needs and social risk factors that led to the referral.
4) Member outcomes (e.g., health, utilization and cost) for users of new programs will be evaluated during during an appropriate follow up period using data already in MMIS and the Data Warehouse

Publicly available and other data: The following publicly available data will be used: Massachusetts death records, the American Community Survey, Current Population Survey, and uncompensated care reports (containing cost data from Medicare cost reports, in addition to data provided by MassHealth on supplemental payments to safety-net hospitals). Enrollment data for out-of-state former foster care youth will be used, as well as Public Hospital Transformation and Incentive Initiative (PHTII) reports (tri-annual reports that hospitals under these programs will be required to submit, detailing key accomplishments in the reporting period towards specified metrics), and program enrollment reports (e.g., Student Health Insurance Program (SHIP), Employer

Sponsored Insurance (ESI), CommonHealth 65+, Health Connector subsidies). Also, Bureau of Substance Abuse Services (BSAS) data and state data on opiate overdoses collected under Chapter 55 of the Acts of 2015 and overseen by the Massachusetts Department of Public Health will be used, if available.

Qualitative data:

1. Document Review: A range of existing documents (e.g., participation plans, progress reports, state generated reports on DSRIP funding allocations) are expected to provide data on participating entities' progress implementing DSRIP initiatives and the state's progress implementing Statewide Investments (SWIs) and other delivery system transformation support. The Independent Evaluation team will work closely with the DSRIP Independent Assessor (IA) to leverage their DSRIP Mid-Point Assessment report and the underlying data as additional data sources.
2. Key Informant Interviews: Interviews will be conducted with three groups of stakeholders. These include:
    - Representatives of participating entities, to assess barriers to implementing DSRIP investments, progress adopting structures and processes to promote integrated and accountable care, and perceived effectiveness of state actions to support transformation
    - A range of state staff responsible for various aspects of DSRIP implementation, to understand DSRIP implementation from the state's perspective
    - MassHealth members, to understand how they experience delivery system transformation.
3. Case Studies: To obtain a more nuanced understanding of how DSRIP is operating, case studies of select ACOs and CPs will be conducted. Two waves of case study site visits are planned: The first, to examine in-depth a sub-sample of entities as they implement organizational change (i.e., implement DSRIP-funded investments, adopt core ACO and CP competencies) and the second, to study participating entities that represent high and low-levels of performance as defined by ACO and CP accountability scores.

Survey data:

1. Provider Staff Survey: In collaboration with the IA, the IE will develop and conduct a survey of ACO and CP front-line staff in two waves (mid-point and end-point of the overall evaluation) to assess how front-line staff experience delivery system transformation, including the degree to which implemented projects and ACO/CP formation translated into changes in care delivery from the perspective of front-line staff. Survey respondents are expected to be ACO/CP providers and staff (sampled at the ACO medical practice-level) representing medical doctors (MDs), nurse practitioners (NPs), registered nurses (RNs), physician assistants (PAs), medical assistants (MAs), and community health workers (CHWs).

   The Provider and Staff Perceptions of Integrated Care (PPICs), a validated survey instrument comprising 21 questions across 7 care integration constructs including within care team care coordination, across care team care coordination, and coordination between care teams and community resources is being explored. It is anticipated that validated survey questions will be supplemented with new questions

specifically tailored to the DSRIP evaluation (e.g., perceived effectiveness of CP and flexible services programs). For any new survey questions, the questions will be piloted with a convenience sample of provider staff (N of 10 to 15 anticipated) using cognitive testing and assessments for clarity, completeness and respondent burden. The survey sampling design will be stratified to collect information from provider staff at CPs and at the ACO provider practice site-level. Other details of the sampling plan remain under development and are discussed further in Section II, Domain 1.

2. Member surveys – MassHealth has contracted with Massachusetts Health Quality Partners (MHQP) to conduct three member surveys targeting the primary care, behavioral health (both CP and non-CP), and LTSS (both CP and non-CP) member populations. These surveys are critical to understanding, in a systematic manner, how the member's experience of care changes over the Demonstration period. While administrative data sources permit evaluation of quality and cost, only these member surveys will quantitatively address member experience, the third prong of the "Triple Aim" (Berwick, 2008).

   The survey sampling design will be stratified to collect information from adult members and from parents or guardians of pediatric members. Other details of the sampling strategy remain in development. At present, random sampling within the sampling frame is planned for Year 1. Items included on the primary care survey were drawn from the Clinician and Group Consumer Assessment of Healthcare Providers and Systems (CG-CAHPS) and CAHPS Patient-Centered Medical Home surveys. Items currently planned for the BH and LTSS surveys in development have been drawn from a number of existing surveys including the MassHealth One Care survey (of dual eligible members), the Massachusetts Department of Mental Health member experience survey, CAHPS, the Family Experiences with Care Coordination survey, and the Behavioral Risk Factor Surveillance Survey. Select additional customized questions that are developed will undergo cognitive testing and piloting.

   The primary care member survey will be fielded by web and mail annually in calendar years 2019 through 2022 to assess member experience for calendar years 2018 through 2021. The behavioral health and LTSS member surveys currently in development will also be fielded in calendar years 2019 through 2022 to assess member experience for calendar years 2018 through 2021.

A fourth member experience survey will be conducted among SHIP PA enrollees. The survey will include customized questions to directly address other goals of the SHIP PA program, which could include topics such as members' perceptions of their access to care prior to and after enrollment into the SHIP PA program, members' learned independence in coordination of benefits and services, and members' preparedness for a post-graduation transition to either MassHealth or coverage in a commercial network.

b. Summary of the evaluation plan:

Data Analysis: Evaluation methods and data analysis will vary by goal, research question, and related hypotheses and are detailed in subsequent sections of this EDD. Overall, the most appropriate qualitative, quantitative, and mixed-methods approaches

for each research question, including cost-effectiveness analysis where applicable, will be deployed.

Section II describes the evaluation plan for Demonstration Goals 1 and 2 and the DSRIP Program. In summary, mixed-methods will be used to evaluate the extent to which state, organizational, and provider-level actions promoted delivery system transformation in six domains. *Qualitative* approaches, including in-depth interviews, site visits, and surveys, will be used to understand how key stakeholders and provider staff experienced delivery system changes. *Quantitative* descriptive statistics will be used to characterize the demographic, clinical, and social characteristics of MassHealth populations (e.g., all managed care eligible members; all ACO enrollees) including specified groups of members with special health care needs (e.g., those with diabetes). Changes in member characteristics will be tracked from 2015 through 2022. Relevant available process and outcome measures will be calculated for each population group in each year. These will include quality metrics specified by the state for ACO and CP accountability and additional measures that can be derived from administrative data or collected from primary sources (e.g., member and provider/staff surveys). First, (raw/observed) changes in study populations and measures over time will be described. Multivariable modeling will be used to understand the extent to which observed changes can be accounted for by shifts in the demographics, medical complexity and other needs of the enrolled population.

Finally, outcomes of the Demonstration will be examined using one or more plausible "comparator" populations to address the question of how "what happened" compares to what "might have happened" in the absence of the Demonstration, both for the population overall and for those subject to specific intervention components. Quasi-experimental design methods, such as interrupted time series, will be used to look for changes that occur as interventions are rolled out, propensity-score methods to identify highly comparable comparison groups, and sensitivity analyses to examine the robustness of findings of alternative analytic approaches.

As requested by CMS, the revised EDD provides details of the analytic approaches for evaluating cost-effectiveness, when appropriate and feasible. In examining return on investment (ROI) and cost effectiveness, we will separately consider initial (non-repeating) DSRIP payments, MassHealth payments to ACOs and CPs for administrative costs, and ongoing MassHealth payments to ACOs and CPs (e.g., for delivery of health care to members).

Sections III-VII of the EDD address Demonstration Goals 3 through 7 and will apply similar quantitative methods as described for Goals 1 and 2. These quantitative analyses will be undertaken to understand the effects of Demonstration programs other than DSRIP on specific measures and subpopulations. Section III (Goal 3) will include an examination of whether near-universal levels of insurance coverage in Massachusetts were maintained during the Demonstration. Section IV (Goal 4) will focus on the effect of incentive-based payments for safety net hospitals on hospital performance and hospital sustainability. In Section V (Goal 5), the relationship between new substance use disorder (SUD) services and member access, utilization, healthcare costs, quality, and outcomes will be studied. Selected utilization and quality measures will also be studied for the subpopulation of former foster care individuals in Section VI

(Goal 6). Finally, Section VII (Goal 7) will consider changes over time in MassHealth expenditures for people ultimately deemed ineligible for MassHealth who received services during the provisional eligibility period as the new provisional eligibility rules kick in, and compare that to synthetic estimates of what those rates would have been had the rules not changed. Goal 7 will also evaluate the authorization for SHIP Premium Assistance.

Additional areas: MassHealth has identified subpopulations for whom the effects of the Demonstration are of particular interest because they are the target of new programs, such as, recipients of BH and LTSS CP supports, and FS, with a special interest in differences in services received and outcomes based on referral/non-referral to specific new programs – e.g., the BH and LTSS CPs. MassHealth is also seeking a deeper understanding of the effectiveness of specific approaches to promoting health system transformation (e.g. the effectiveness of requiring new collaborations between ACOs and CPs, the added value of CP care coordination supports for members with complex BH and LTSS needs, etc.). The effects of the Demonstration are expected to be most important and most visible among people with complex medical needs – another priority interest group that can be identified from administrative data. MassHealth is also interested in understanding the value added by, and sustainability of, the CP and FS models beyond the Demonstration period.

Evaluation Timeline: **Table 1** provides a timeline for major evaluation-related milestones including reports, tasks and activities. A draft Interim Evaluation Report covering the first 3.5 years (only the first 2.5 years for analyses relying on Medicaid administrative data) of the Demonstration will be completed and submitted for CMS review on June 30, 2021. The Final Interim Evaluation report will be submitted within 60 business days of receipt of CMS comments. The draft Summative Evaluation Report covering the full Demonstration Period will be submitted to CMS by December 31, 2023, and a Final Summative Report will be submitted within 60 days of receipt of CMS comments on the draft Summative Report.

C. Selection of the Independent Evaluator

In January 2017 MassHealth selected UMMS as the Independent Evaluator for the overall 1115 Demonstration and DSRIP Program. UMMS has expertise in the evaluation of Medicaid programs, having conducted extensive work on past 1115 demonstration projects, such as the Patient-Centered Medical Home Initiative. UMMS also has significant experience partnering with other health and human services agencies, not-for-profits and other organizations to evaluate programming and support evidence-based policy making. This experience and competency coupled with the cost benefit of working with a state partner uniquely positioned UMMS to perform this work for MassHealth. Faculty members and staff participating in the Demonstration Evaluation have been drawn from the Departments of Quantitative Health Sciences and the Center for Health Policy and Research. Biographical sketches describing the extensive experience of UMMS faculty scientists leading the evaluation can be found in Appendix C.

The Independent Evaluation will also be informed by review and guidance from a Scientific Advisory Committee, comprised of nationally recognized experts in Medicaid program evaluation and health services research (see Appendix C). In addition, an overview of the

evaluation approach has been shared with the Delivery System Reform Implementation Advisory Council (DSRIC) comprised of DSRIP stakeholders and member advocates selected and convened by the Executive Office of Health and Human Services. Initial meetings with the DSRIC have informed the evaluation design and DSRIC members will be consulted as the evaluation design is implemented.

MassHealth has executed an Interdepartmental Service Agreement (ISA) with UMMS to perform specific tasks related to the evaluation of the 1115 Demonstration and DSRIP Program. MassHealth is explicitly authorized[1] to enter into ISAs with UMMS for the purpose of obtaining, among other things, consulting services related to quality assurance and program evaluation and development for the MassHealth program. All ISAs are subject to state and federal laws and regulations.

The UMMS ISA for the Independent Evaluation of the 1115 Demonstration clarifies the roles and responsibilities of UMMS and MassHealth to assure the efficient completion of the evaluation and to assure no conflicts of interests (COI). With respect to COI, the ISA specifies that UMMS will be responsible for preparation of draft and final evaluation plans for CMS approval as well as the completion of interim and final evaluation reports for the Overall and DSRIP evaluations consistent with Demonstration STCs. UMMS will share preliminary versions of the interim and final evaluation reports to MassHealth for comments and correction of any factual errors. UMMS will correct factual errors, address issues of clarity and give due consideration to EOHHS comments and suggestions. UMMS will have final editorial control over the content of the Interim and Final Evaluation reports to CMS.

Evaluation Budget: The estimated budget for the Independent Evaluator for the period (FY19 - FY 24) is $5,939,321. The breakdown of anticipated staffing, administrative and other costs by evaluation year is included as Attachment 1. It is anticipated that approximately 15% of the total evaluation budget will be spent on survey and measure development, 30% on qualitative data collection, cleaning, and coding, 20% on quantitative data collection, cleaning and coding, and 35% on analyses and reports generation.

[1] See e.g. Chapter 133 of the Acts of 2016, line item 4000-0321.

Table 1. Timeline of Key Evaluation Milestones and Activities

	MassHealth Waiver Extension (7/1/17-6/30/22)																													
	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022													
	Demo Year 1				Demo Year 2				Demo Year 3				Demo Year 4				Demo Year 5													
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4										
	CY 2017				CY 2018				CY 2019				CY 2020				CY 2021				CY 2022				CY 2023				CY 2024	
Key Milestones	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Submit draft Evaluation Design Document to CMS	X																													
CMS Feedback to original Evaluation Design Document					X																									
Revised Evaluation Design Document due to CMS June 30,2018						X																								
Draft Interim Evaluation Report due to CMS June 30, 2021																		X												
Final Interim Evaluation Report due to CMS (date not confirmed)																				?										
Summative Evaluation Report due to CMS December 31, 2023																												X		
Final Summative Evaluation Report due to CMS (date not confirmed)																														?
Midpoint Assessment due to CMS September 30, 2020															X															
Task and Evaluation Activity																														
IRB																														
Develop/design protocols for IRB submission							X																							
IRB submission and annual reviews							X				X				X				X				X				X			
Qualitative and Survey Methods*																														
Key informant interviews																														
Develop interview protocols					X	X	X			X	X			X	X			X												
Schedule and perform Key Informant Interviews																														
State representatives											X								X											
ACOs/MCOs/CPs								X	X			X	X			X	X													
Member interviews								X	X			X	X			X	X													
Transcribe, code, and analyze interview text								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
Site visits																														
Develop site visit protocols										X	X	X			X			X	X											
Schedule and perform ACO site visits													X	X		X	X			X	X	X								
Schedule and perform CP site visits													X	X		X	X			X	X	X								
Transcribe, code, and analyze interview text from site visits													X	X	X	X	X	X	X	X	X	X	X	X						
Member surveys																														
Provide input into development of state's member experience surveys						X																								
MHQP fields member experience surveys									X	X			X	X			X	X			X	X								
Receive data collected from member experience surveys												X				X				X				X						
Analyze member survey data													X				X				X				X					
Provider Survey																														
Design/revise provider survey							X	X	X	X							X	X												
Administer provider survey											X								X											
Analyze provider survey data												X								X										
Receive, code, and analyze existing documents (e.g. participation plans)						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
Quantitative Methods																														
Administrative data																														
DUA for Medicaid and other data sources						X	X																							
Receive Medicaid administrative data							X				X				X				X				X				X			
Submit request for DPH, BSAS, and other data						X																								
Receive DPH, BSAS, and other data											X				X				X				X				X			
Data cleaning and preparation							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Data analysis								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		

*May change dependent on content of the Midpoint Assessment

II. Demonstration Goals 1 and 2 and DSRIP Program

Goal 1: Enact payment and delivery system reforms that promote integrated, coordinated care and hold providers accountable for the quality and total cost of care
Goal 2: Improve integration of physical, behavioral, and long-term services

A. Overview of Section II

This section begins with a synopsis of Demonstration Goals 1 and 2 and the Massachusetts Delivery System Reform Incentive Payment (DSRIP) Program. We provide a high-level overview of the mixed methods evaluation approaches and proposed analytic methods. We then provide detail with regard to data sources, measures, and analytic plans related to each of the evaluation domains, research questions and related hypotheses.

B. Demonstration Goals 1 and 2 and the Massachusetts DSRIP Program

Demonstration Goals 1 and 2 seek to transform the delivery of care for most MassHealth members through payment reform and support for developing Medicaid Accountable Care Organizations (ACOs) and two kinds of Community Partners (CPs) to address behavioral health (BH) and long-term services and supports (LTSS).

The primary goal of the Massachusetts' DSRIP Program is to support the transition to value-based payments within the health care delivery system that serves MassHealth members. DSRIP promotes practice and delivery system transformation through the support of ACOs, CPs, CSAs, and a variety of SWIs. DSRIP funding streams to support these changes over the five-year Demonstration are summarized in **Table 2** below.

As of June 2017, Massachusetts has contracted with 17 ACOs under this Demonstration, corresponding to one of three ACO models:

- Accountable Care Partnership Plans (Model A): Either a Managed Care Organization (MCO) with a designated ACO partner or a single, integrated entity that meets both the requirements of an MCO and ACO. Accountable Care Partnership Plans are vertically integrated between the health plan and ACO delivery system and take accountability for the cost and quality of care under prospective capitation.
- Primary Care ACOs (Model B): Provider-led health care system or other provider-based organization that contracts directly with MassHealth, with savings and risk shared retrospectively.
- MCO-Administered ACO (Model C): Provider-led healthcare system or other provider-based organization that contracts with MCOs and takes financial accountability for shared savings and risk as part of MCO networks.

ACOs will be held financially accountable for the cost and quality of care for attributed MassHealth members. DSRIP will also provide funding to ACOs for "Flexible Services" (FS) to help ACOs address health-related social needs by connecting their members to services that might not otherwise by covered by Medicaid, and may

include nutrition services and housing supports. Over time we expect ACOs to become better accustomed to how to identify need and refer members to FS, leading to increasing numbers of assessments completed and increasing numbers of members receiving Flexible Services.

MassHealth has also contracted with 27 CPs to provide highly-specialized coordination support to eligible members with complex BH and LTSS needs, including linkage to community resources. CPs will work with ACOs and MCOs to coordinate these supports and will be financially accountable for the quality of care and supports they provide. Initially MassHealth will apply a claims-based algorithm to identify members with BH and LTSS needs and enroll them with a CP. For BH CPs, the algorithm will identify members with a behavioral health diagnosis in combination with utilization and comorbidities indicative of a need for CP supports (Appendix A5). For LTSS CPs, MassHealth will apply a claims-based algorithm to identify members with a history of consistent utilization (>$300/month for 3 consecutive months) of LTSS State Plan services (Appendix A5). Members may also be referred to BH or LTSS CPs by the ACO/MCO. Recommendations for referral for CP supports to the ACO/MCO may be by a provider within the ACO/MCO network, by a family member, or by other entities (e.g., other state agencies, other providers) independent of the claims-based algorithm.

The DSRIP also includes Statewide Investments (SWI) to expand workforce capacity and infrastructure to support the ACO and CP programs, and overall DSRIP goals, through workforce development and training.

Table 2. DSRIP Anticipated Funding Streams by Demonstration Year[2]

Funding Stream	DY1	DY2	DY3	DY4	DY5	Total	% of Total
ACOs (including Flexible Services)	$329M	$290M	$229M	$152M	$65M	**$1,066M**	59%
CPs (including CSAs)	$57M	$96M	$132M	$134M	$128M	**$547M**	30%
SWIs	$24M	$25M	$24M	$25M	$17M	**$115M**	6%
State Operations and Implementation	$15M	$15M	$15M	$15M	$15M	**$73M**	4%
Total:	**$425M**	**$425M**	**$400M**	**$325M**	**$225M**	**$1,800M**	

[2] Table and descriptions taken and modified from the DSRIP protocol, accessed at http://www.mass.gov/eohhs/docs/eohhs/healthcare-reform/masshealth-innovations/dsrip-protocol.pdf

C. Overview of DSRIP Evaluation

The evaluation design described in this Section includes evaluation of the DSRIP program and Demonstration Goals 1 and 2. The broad goals of the Massachusetts DSRIP evaluation are to:

> 1) Measure progress towards meeting the following DSRIP goals: improve care integration; meet members' needs; and moderate cost trends while maintaining or improving care quality, and
> 2) Ascertain stakeholders' (i.e., members, clinicians, representatives from participating organizations, MassHealth employees) perspectives regarding DSRIP implementation, successes, and challenges.

In collaboration with MassHealth, UMMS identified six evaluation domains to align with major components of the logic model and to meet the broad goals of the DSRIP evaluation.

DOMAIN 1: State, organizational, and provider-level actions promoting delivery system transformation
DOMAIN 2: Changes in care processes
DOMAIN 3: Changes in member outcomes
DOMAIN 4: Changes in healthcare cost trends
DOMAIN 5: Sustainability of innovative delivery system changes, including ACOs, CPs, and Flexible Services
DOMAIN 6: Effects of Specific DSRIP Investments and Actions

Key programmatic elements of the DSRIP program will be evaluated at the member, provider, system, and state levels using qualitative and quantitative data relevant to each of the six evaluation domains. For example, ACO and CP investments and programs will be evaluated measuring inputs and activities (at the state and ACO/CP level), outputs such as improved care processes and integration (at the member/provider level), and outcomes such as improved health outcomes and moderated cost trends for participating entities and populations.

Research questions and hypotheses corresponding to each of the six Domains listed above are presented in Appendix D. Hypotheses include those suggested in the STCs, supplemented by a number of additional hypotheses developed to evaluate other important aspects of the Demonstration. Of the 11 concepts for which hypotheses were "to be considered in development of the evaluation design" per the STCs for the June 27, 2018 amendment, all have been addressed in this evaluation design. One suggested concept, "The strength of aggregate provider networks in the ACO and MCO programs (excluding Primary Care ACOs) relative to the PCC Plan, in first three years of demonstration, including: a) types of providers, b) breadth of providers, c) quality of services, and d) outcomes" is partially addressed in this design document. The quality of services and outcomes will be thoroughly evaluated; however, the types of providers and breadth of providers is not a focus of the evaluation because changing the provider types and breadth of providers is not a goal of the Demonstration. One of the management levers that is fundamental to the ACO model design is the ability to develop high-quality, cost-effective provider networks. MassHealth ensures that all

managed care networks comply with federally mandated network adequacy requirements.

Summary of Analytic Methods: Mixed qualitative and quantitative methods will be used to evaluate the extent to which state, organizational, and provider-level actions promoted delivery system transformation and improved outcomes across the six domains. Qualitative approaches described in Domain 1 (State, organizational, and provider-level actions promoting delivery system transformation) include review of existing documents, two rounds of semi-structured interviews with key stakeholders (i.e., MassHealth members and representatives from ACOs, CPs, and MassHealth), ACO and CP site visits in Demonstration Year 3 to provide a more nuanced understanding of DSRIP implementation and organizational operations, and surveys of providers/staff will enable us to understand how front-line staff in ACOs and CPs experience delivery system transformation. Building on information collected through the semi-structured interviews with ACOs and CPs, a second round of site visits to high and low performing ACOs and CPs in the final year of the Demonstration will evaluate sustainability and important factors influencing sustainability of DSRIP funded programs.

Quantitative analyses for Domains 2-6 will evaluate care processes, health outcomes, and costs. The primary populations of interest will be members exposed to key DSRIP innovations (i.e. those enrolled in ACOs and CPs). However, the implications of large-scale delivery system transformation for the entire managed care eligible population (comprised of members enrolled in traditional MCOs, the PCC plan, and those in ACOs) are also of interest. Furthermore, several important subpopulations have been identified for evaluation throughout Domains 2-6, including MassHealth members that receive FS to address certain health related social needs. For all populations and subpopulations, descriptive statistics will be used to characterize demographic, clinical, and social characteristics and to track changes in these characteristics across the years 2015 through 2022. The available social characteristics include family income, unstable housing (an ICD-9 code for homelessness or $\geq$3 addresses in a year), and a composite neighborhood stress score developed (using Census block group information from the American Community Survey) by members of the evaluation team (Ash, 2017) that is currently used by MassHealth for risk-adjusting payments. The baseline period for quantitative analyses will generally be calendar years 2015 to 2017; to ensure a comparison to a fully “pre-ACO system”, baseline comparison groups will exclude members enrolled in MassHealth pilot ACOs implemented in December 2016.

Process and outcome measures will be described by year for each population group and will include the quality metrics specified by the state for ACO and CP accountability, as well as additional measures that can be derived from administrative data or collected from primary sources (e.g., member and provider/staff surveys). After describing study populations and measures over time, we will then examine the relationships between Demonstration-related interventions and major outcomes of interest. For all measures where baseline data are available, risk-adjusted estimates of expected outcomes during the Demonstration will be compared with observed outcomes.

Quasi-experimental design methods will be used to rigorously examine associations between DSRIP programs and changes in key metrics. Broadly, we will seek to make

valid comparisons between similar groups of exposed and unexposed members by taking advantage of the absence of DSRIP initiatives in the baseline period and the implementation of programs for specific groups of members and not others during the Demonstration period. For example, we will compare changes in outcomes among members cared for by providers/staff who consistently remained in traditional MCOs with outcomes of comparable members cared for by providers/staff that affiliated with ACOs during the Demonstration, taking into account any changes that occur in the traditional MCOs, as well. Propensity score methods will be used to assemble highly similar comparison populations from MassHealth members in the baseline and Demonstration periods to attempt to isolate differences that may be attributable to the Demonstration. Difference in difference analyses will be used to remove the influence of background trends on estimates of program effects. For measures with sufficient data points before and after the intervention (e.g., utilization rates estimated monthly or quarterly rather than quality measures calculated annually), interrupted time series analyses will evaluate changes in measures at implementation and longitudinally. We will conduct return on investment and cost-effectiveness analyses for the ACO, CP, and Flexible Services programs. Finally, we will evaluate relationships between specific DSRIP investments, actions, and delivery system performance. A summary of the analytic approach is included below in **Table 3**.

Table 3. Summary of Analytic Approach by DSRIP Domain

Domain	Analyses
1: State, organizational, and provider-level actions promoting delivery system transformation	• Qualitative analysis of existing documents • Qualitative analysis of data collected through key informant interviews • Qualitative analysis of case study data • Survey of ACO and CP providers and staff
2: Changes in Care Processes **3: Changes in member outcomes** **4: Changes in healthcare cost trends**	• Descriptive analyses (to understand what happened and for whom) • Predictive modeling (to understand how what happened during the Demonstration compared to what would have been expected based on conditions in the baseline period) • Propensity score balanced difference in difference comparisons (to estimate the difference between what happened during the Demonstration and what would have been expected in the absence of the Demonstration, while accounting for background trends) • Member surveys
5. Sustainability of innovative delivery system changes	• Key informant interviews • Case studies with site visits • Cost-effectiveness and return on investment analyses
6. Effects of specific DSRIP effects and actions	• Contemporaneous propensity score balanced comparisons between Demonstration populations exposed and unexposed to key DSRIP programs and health system characteristics (to understand associations between specific elements of delivery system reform [e.g., care integration, FS] and member outcomes)

The DSRIP interim evaluation (covering the time period 07/01/2017 – 12/31/2020; with a focus on 07/01/2017 – 12/31/2019 for analyses of Medicaid administrative data) will rely on a mixed-methods approach to determine whether and how the investments made through the DSRIP program are contributing to achieving the demonstration goals as described in STC 57. The final evaluation (covering the full Demonstration period 07/01/2017 – 12/31/2022) will provide a summative overview of the DSRIP program and evaluate the extent to which the investments made through the DSRIP program contributed to achieving the Demonstration goals as described in STC 57.

The following sections provide details on the research questions (RQ), hypotheses (H), data sources and evaluation approach for each of the 6 evaluation domains. A summary table of DSRIP Domains, Research Questions, and Hypotheses is included as Appendix D.

D. DOMAIN 1: State, organizational, and provider-level actions promoting delivery system transformation

The four research questions (RQs) under Domain 1 are concerned with DSRIP program implementation, including actions taken by the state to facilitate delivery system transformation (RQ1), and actions taken by ACOs and CPs (hereafter referred to as "participating entities") to organizationally transform how care is delivered (RQ2 through RQ4). Collectively, findings from Domain 1 will: provide insight into factors facilitating and impeding delivery system transformation and performance; inform the interpretation of quantitative findings related to ACO cost and quality performance, and member experience; and provide the basis for examining the association between specific DSRIP-funded innovations and participating entity performance.

a. Data sources

We will rely on four sources of data to evaluate Domain 1, each addressing a different evaluation question. See description below and Table 4 for a summary of the added value of each of these four data sources.

1. Document Review: We expect a range of existing documents (e.g., participating entity participation plans and progress reports, state reports on DSRIP funding allocations) to provide data on participating entities' progress implementing DSRIP projects and the state's progress implementing SWIs and other delivery system transformation support. This data will include narrative descriptions provided by participating entities in their participation plans and progress reports; quantitative data on DSRIP funding amounts by initiative, also detailed as part of participating entities' participation plans and budgets; and the state's documentation of SWIs including participation rates and outcomes. We will work closely with the IA to leverage their DSRIP Mid-Point Assessment report and the underlying data as additional data sources.
2. Key Informant Interviews: We will conduct interviews with three groups of stakeholders. These include:
    - Representatives of participating entities to assess barriers to implementing DSRIP projects, progress adopting structures, and processes to promote integrated and accountable care, and perceived effectiveness of state actions to support transformation
    - A range of state staff responsible for various aspects of DSRIP implementation to understand DSRIP implementation from their perspective
    - MassHealth members to understand how they experience delivery system transformation.
3. Provider Staff Survey: We will conduct a survey of ACO and CP front-line staff in two waves (mid-point and end-point of the overall evaluation) to assess how front-line staff experience delivery system transformation, including the degree to which implemented projects and ACO/CP formation translated into changes in care delivery from the perspective of front-line staff.
4. Case Studies: To obtain a more nuanced understanding of how DSRIP is operating, we will conduct case studies of select ACOs and CPs. We plan for two waves of case study sites visits: The first, to examine in-depth a sub-sample of

entities as they implement organizational change (i.e., implement DSRIP-funded projects, adopt core ACO and CP competencies) and the second, to study participating entities that represent high and low-levels of performance as defined by ACO and CP accountability scores.

Table 4: Summary of Qualitative Data Sources

Data Source	Added Value
Document Review	Understand how participating entities are using their DSRIP investments (i.e., what DSRIP-funded programs and initiatives they are implementing)
Key Informant Interviews	Understand degree to which participating entities are adopting core ACO competencies; barriers to transformation; experience with state support for transformation
Provider/Staff Survey	Understand whether reported organizational transformation translates to more integrated care from the perspective of participating entity providers and staff; perceived effectiveness of other dimensions of DSRIP (i.e., CP program, flexible services, workforce development)
Case Studies	Understand the operational conditions associated with high and low performing participating entities

Table 5 below indicates the frequency and timing of each data source over the course of the evaluation. The sections that follow detail how each data source maps to each RQ and related hypotheses within Domain 1. The section is organized by RQ, but it is important to note that for several of the data sources - specifically, document review, interviews with ACO, CP, and state representatives, and provider/staff survey – the general analytic approach is similar across several RQs and thus repeated with each relevant RQ, though with some modifications (e.g., specific measures are tailored to each RQ). In contrast, the remaining data sources (i.e., member interviews and case studies) are presented as stand-alone sections. The case studies will follow a closely related methodological approach across RQs, but in each instance will include a broader scope of stakeholders and pursue more detailed understanding of factors influencing implementation of DSRIP activities. Similarly, the member interviews will gather a more in-depth understanding of how members experience delivery system transformation.

Table 5: Domain 1 Data Sources and Timeline

	FY19	FY 20	FY21	FY22
Document review	✓	✓	✓	✓
State interviews		✓		✓
ACO, CP and MCO interviews	✓		✓	
Consumer interviews	✓		✓	
Provider and staff survey		✓		✓
ACO and CP site visits		✓		✓

b. Roles and Responsibilities of the Independent Evaluator and Independent Assessor

The following assumptions are built into the evaluation design with respect to the responsibilities of the independent evaluator (IE) and independent assessor (IA):

- The IA will be responsible for abstracting information from existing documents to generate a report on DSRIP funding by participating entity and project; assess each participating entity on implementation progress, and report key SWI implementation activities and outcomes. The evaluation team will incorporate this data into the evaluation design;
- The IA will be responsible for generating the mid-point assessment, which will report on ACO/CP progress toward meeting DSRIP goals and provide rapid cycle feedback to entities and to MassHealth;
- The IE will be responsible for semi-structured interviews with state representatives, ACO and CP representatives, and members with the following support from the IA: The IA will be responsible for scheduling the ACO and CP key informant interviews and will also assist with conducting some of the ACO and CP interviews;
- The IE and IA will collaborate in developing a sampling plan that will support an administrator survey and a provider/staff survey. The IA will be responsible for developing, fielding and analyzing the administrator survey; the IE will be responsible for designing, fielding and analyzing the provider/staff survey;
- The IE will be responsible for conducting the case studies with the following assistance from the IA: For the wave one case studies, the IE will base site selection on the IA's findings related to ACO implementation progress, seeking a sample that represents high and low-levels of implementation progress.

c. Domain 1 Data Sources, Measures and Analytic Approach by Research Question

RQ1: To what extent did the state take actions to support delivery system transformation? State actions in this context refers to the ways in which the state supports delivery system transformation under DSRIP, including administering DSRIP funds to participating entities, managing the FS program, and managing SWIs aimed at readying the community-based workforce and participating entities to operate under the DSRIP care model

H1.1. DSRIP ACO and CP funding will support delivery system transformation
H1.2. SWI initiatives aimed at increasing the supply, preparedness, and retention of the community-based workforce (SWI 1 through 4) will support delivery system transformation
H1.3 SWI initiatives aimed at providing technical assistance to ACOs and CPs, supporting provider preparedness to enter alternative payment models, reducing emergency department boarding, and improving access for people with disabilities and for whom English is not a primary language (SWI 5 through 8) will support delivery system transformations

To address RQ1, we will rely on two data sources: document review and key informant interviews (see Table RQ1). Findings from RQ1 will describe the actions the state is taking to support delivery system transformation and the utility of these actions from the perspective of key stakeholders.

Document Review

Two sets of documents will be reviewed to address RQ1: 1) state summary tables of DSRIP funding, which will provide data on DSRIP funding amounts across participating entities and by project category (i.e. funding amount and for what operational categories DSRIP dollars are invested across participating entities); 2) state documentation of SWI activities, which will provide information on SWI implementation (e.g., how many providers participated in the student loan repayment program, how many primary care/behavioral health special projects program grants awarded, how many CHW training program grants awarded, etc.). The UMMS team will rely on the IA to secure, review, and tabulate data from both these documents and to make them available to the evaluation team on an annual basis in FY19 and FY20; the evaluation team will be responsible for reviewing these documents in FY21 and FY22. The evaluation team will use these data to characterize patterns across and within ACOs and CPs, with respect to the scope and scale of DSRIP funding; and to characterize the SWI initiatives achievements and assess the degree to which SWIs were implemented as planned.

Key Informant Interviews

We will conduct structured interviews with representatives of three stakeholder groups: 1) ACOs (up to three representatives at each of 17 ACOs); 2) CPs (up to two representatives at each of 27 CPs); and 3) MassHealth staff responsible for administering DSRIP (N=10 estimated). See Table 6. Proposed sample sizes are informed by the following:

- The ACO and CP sample sizes are intended to strike a balance between breadth and depth, while also minimizing respondent burden. With these interviews, we seek to understand high-level organizational activities across the entire program (17 ACOs and 27 CPs). We will rely as much as possible on existing documents and use KII to fill in data gaps. For more in-depth analyses, we will use case studies of select sites where we plan to gather data from a larger cross-section of staff at each case study site.
- For the MassHealth sample, we will identify and recruit MassHealth staff knowledgeable about DSRIP. MassHealth's division of Payment and Care Delivery Innovation (PCDI) is responsible for administering DSRIP. PCDI oversees various teams each focused on a specific aspect of DSRIP including: ACOs; CPs; Data Governance, Reporting, and Systems; Medical Directors (included clinical and quality improvement); Investments and Social Service Integration; and Analytics. In total, there are an estimated 55-65 MassHealth staff working across these units and teams. We will target unit and teams leads for the KII.

Interview guides will be designed to elicit stakeholder perspectives on state actions to support delivery system transformation and the effectiveness of these actions. We will conduct two waves of interviews with each stakeholder group (at approximate mid-and

end-points); we will aim to interview the same respondents in each wave to reduce the chance that reported changes actually reflect changes in evaluation participants.

We will use Atlas.ti to manage, code and analyze interview data. We will follow standard qualitative coding protocols: We will establish interrater reliability among coders (through a process of concurrent coding of an initial set of interviews, comparison of coding approach, and refinement of code definitions as needed) and then assign remaining interviews to be summarized independently; Once all data are coded, we will do secondary coding (combining codes and creating sub-codes) and then create analytic matrices with the final coded data to facilitate across- and within-stakeholder group analysis with respect to perceptions of state actions supporting delivery system transformation.

Table 6. Domain One | Study Sample

	FY19	FY20	FY21	FY22
KII (State reps)		N=10		N=10
KII (2 to 3 reps per ACO at 17 ACOs)	N=34 to 51		N=34 to 51	
KII (1 to 2 reps per CP at 27 CPs)	N=27 to 54		N=27 to 54	
KII (1 rep per MCO and 2 MCOs)	N=2		N=2	
Member Interviews	N=30		N=30	
Provider staff survey		TBD		TBD
ACO site visits		3 sites		5 sites
CP site visits		6 sites		6 sites

KII - Key Informant Interview

Table RQ1: State Actions to Support Delivery System and Transformation

Data Collected	Tools	Measures	Frequency
State financial support for delivery system transformation	Document Review	• DSRIP funding across ACOs and CPs, by project categories • SWI participation rates and outcomes	Annual
State representatives' experience administering DSRIP	Key Informant Interviews	• Experience/perceived effectiveness of CP and ACO DSRIP-funded investments to support transformation; • Experience/perceived effectiveness of SWIs aimed at readying the community-based workforce • Experience/perceived effectiveness of SWIs aimed at readying participating entities to operate as ACOs and CPs • Experience/perceived effectiveness of SWIs aimed at addressing ED boarding and improving accessibility for people with disabilities and for whom English is not a primary language • Experience/perceived effectiveness of Flexible Services; • Effect of other state-level factors on state actions to support delivery system transformation • Effect of other state-level factors on state actions to support delivery system transformation	2 waves (FY20 and FY22)
ACO and CP representatives' experience with state support for delivery system transformation	Key Informant Interviews	• Perceived effectiveness of DSRIP funding to support for system transformation; • Perceived effectiveness of state support for ACO/CP partnerships • Perceived effectiveness of SWIs • Perceived effectiveness of other state actions aimed at supporting delivery system transformation	2 waves (FY19, FY21)

RQ2: To what extent did ACOs take organizational-level actions to transform care delivery under an accountable and integrated care model?

H2.1. ACOs will vary with respect to governance structure (e.g., lead provider, role of provider and patients), service scope, and local conditions (e.g., experience participating in payment reforms, local context/market served)
H2.2. ACOs will engage providers (primary care and specialty) in delivery system change through financial (e.g., shared savings) and non-financial levers (e.g., data reports)
H.2.3. ACOs will implement Health Information Technology (HIT)/Health Information Exchange (HIE) infrastructure to support population health management (e.g., reporting, data analytics) and data exchange within and outside the ACO
H2.4 ACOs will implement non-CP-related population health management (PHM) activities including risk stratification, needs screenings and assessments, and programs to address identified needs
H2.5 ACOs will implement structures and processes to coordinate care across the care continuum
H2.6 ACOs will implement processes to identify and address health-related social needs (HRSN), including management of Flexible Services
H2.7 ACOs will implement strategies to reduce the total cost of care (e.g., utilization management, referral management, administrative cost reduction), excluding the population health management / care programs mentioned above
H2.8. Accountable Care Partnership Plans (Model A) will transition more of the care management responsibilities to their ACO partners over the course of the demonstration
H2.9 ACOs will establish processes to facilitate member engagement
H2.10 ACOs will monitor quality performance and establish mechanisms to support quality improvement efforts

To address RQ2, we will rely on three data sources: document review, key informant interviews, and surveys (see Table RQ2, next page). Findings from RQ2 will describe ACO experience operating under DSRIP; the organizational structures and processes ACOs adopt to operate as integrated and accountable delivery systems; and how implemented organizational-level actions affect the actual practice of care from the perspective of ACO providers and staff.

Document Review

ACO progress reports (bi-annual and annual) and state performance dashboards will provide data on each ACO's progress implementing DSRIP-funded projects in up to 12 project category areas. The IA will be responsible for securing, reviewing, and tabulating data from these reports, and for making them available to the evaluation team for FY19 and FY20; the evaluation team will be responsible for reviewing these documents in FY21 and FY22. For each ACO, a goal of the IA's review will be to assess implementation progress and ultimately assign a score to each ACO in each of five categories representing implementation progress. The five categories are: integration of systems and processes; organizational structure and engagement; workforce development; health information technology and exchange; and PHM and total cost of

care management. For each category, the IA will calculate (based on existing document reviews and key informant interviews) the entities' progress overall and progress towards self-identified milestones. The evaluation team will use these scores to inform site selection for the ACO case studies (sampling sites that represent high and low-levels of implementation). In addition, implementation progress will be one of several ACO organizational-level characteristics that we will use to develop typologies and then to qualitatively assess whether ACO cost and quality performance varies across typology categories. For example, the implementation scores may support a three-part typology (i.e., low, mid and advanced implementation). Using the DSRIP quality and cost accountability scores, we will assess how performance varies across the typology. The goal of this analysis is to explore possible relationships between organizational-level measures and claims-based performance measures (i.e., whether greater progress implementing DSRIP-funded projects is associated with better care quality, outcomes, and/or cost performance). This mixed methods approach is described further in Domain 6 (DSRIP Effects) below.

Key Informant Interviews (KII)

The evaluation team will use semi-structured interviews with ACO leads noted under RQ1 to gather data related to RQ2. For RQ2, the interview guide will include domains of inquiry related to each ACO's experience implementing DSRIP-funded projects and adopting core ACO competencies. These interviews will also be an opportunity to understand the factors that facilitate and impede organizational transformation, including an ACO's prior experience with payment reform and integrated delivery systems. Questions related to core ACO competencies will be informed by the ACO literature, the National Survey of Accountable Care Organizations (NSACO), and the Massachusetts Health Policy Commission standards for ACOs (Anderson, 2018; Colla, 2014; Fisher, 2012); questions related to integration will additionally be informed by the integration literature and existing integration survey measures. Collectively these sources point to a set of core competencies that define accountable and integrated care delivery systems. (See Table RQ2 for details.)

We define *integrated patient care* as "patient care that is coordinated across professional, facilities, and support systems; continuous over time and between visits; tailored to the patients' needs and preferences; and based on shared responsibility between patient and caregivers for optimizing health" (Singer et al. 2011). We envision each KII including a statement of how the evaluation team defines integrated patient care and asking respondents if they agree or disagree with this definition (and if disagree, how they disagree) and state that our subsequent questions are framed by this definition. Subsequent KII interview questions will then focus on the degree to which participating entities are structurally integrated organizations and characterize the nature of participating entity integration along several dimensions: functional integration (e.g., are key support functions such as financial management and quality improvement strategies integrated across participating entities); organizational (e.g., the mechanisms by which participating organizations are linked including governance, contracts, alliances); and clinical integration (e.g., organizational activities intended to coordinate patient care across the care continuum) (Singer et al. 2011).

To analyze interview data related to RQ2, we will follow the same approach detailed under RQ1: use Atlas.ti; establish inter-rater reliability; conduct primary and secondary coding, and; create analytic matrices to facilitate comparisons across ACOs with respect to experience implementing DSRIP-funded projects and adopting core ACO competencies. In addition to identifying themes and to the greatest extent possible, we will use the interview data to develop typologies for select organizational characteristics, such as standardization of care process across medical practices (e.g., complete, partial, none). For the summative evaluation, these variables in turn will be among several ACO organizational characteristics used to stratify the ACO sample and assess associations between ACO performance (i.e., care quality and cost performance) and ACO organizational form.

Provider Staff Survey

To understand how providers and staff experience delivery of care within the ACO model, we plan to conduct two waves of provider staff surveys (mid-point and end-point). In this way, we will assess the degree to which implemented projects and ACO/CP formation are translating into changes in how care is actually delivered from the perspective of front-line staff. Survey respondents will be ACO provider staff (sampled at the ACO medical practice-level), including MDs and NPs.

In collaboration with MassHealth, the IE and IA are currently developing the sampling plan. From the universe of medical practices participating in DSRIP, draw a random proportionate sample of practices within each ACO, and among selected practice sites pursue one of two options to identify provider respondents within each practice. The first, work with participating site practice managers to generate a list of all relevant providers on-staff at each medical practice (including provider staff name, provider type, and contact information); from that list, select a random sample; the IA then emails the survey to the selected sample. The second option is to rely on participating site practice site managers to both identify relevant provider staff to participate in the survey and directly email the survey to them. The first option is clearly preferable but will depend on the willingness of practice sites to make provider names and contact information available to the IA/IE. Either way, the required sample size will be determined (based on anticipated response rates and power calculations) prior to random selection and recruitment of medical practices, providers, and staff.

Table RQ2 lists the anticipated domains of inquiry for the survey. To measure perceptions of care integration, we are currently exploring the Provider and Staff Perceptions of Integrated Care (PPICs), a validated survey instrument comprising 21 questions across 7 care integration constructs including within care team care coordination, across care team care coordination, coordination between care teams and community resources. For the remaining measures, we continue to explore the availability of existing validated survey questions. In cases where we need to develop new questions (e.g., dimensions that are unique to DSRIP such as perceived effectiveness of CP and flexible services programs), we will initially pilot the questions with a convenience sample of provider staff (N of 10 to 15 anticipated) using cognitive testing and assessments for clarity, completeness and respondent burden For this purpose, we will outreach and recruit a convenience sample from UMass Medical School (UMMS) where the majority of the evaluation team has a faculty appointment

and thus relationships with clinical staff at UMass Medical Center. Importantly, UMass Medical Center is not currently participating in DSRIP and thus our pilot sample will not contaminate the final survey sample.

Survey results will be analyzed overall, by participating entity (ACO, CP), provider/staff type, and ACO/CP partnerships. Findings from the survey will be used to characterize the degree and direction by which stakeholders experience delivery transformation. Findings will also be used to assess the relationship between provider staffs' perceived experience of transformation and ACO/CP care quality and cost performance.

Although the sampling strategy is under development by the IA, potential limitations to the analysis can be anticipated. Bias can be introduced if we are unable to randomize at the medical practice level. It is also possible that providers and staff in certain roles will be more likely to respond than others based on their role, weighting responses to a particular perspective. There tends to be more turnover at lower paying positions, such as MAs or CHWs, which also may result in under-representation of the perspectives of people in these roles. Finally, it is possible that there will be multiple responses from some practices while others have no or few responses. We will attempt to address these potential limitations by further assessing the potential for response skew during piloting and planning analytically for management of differences in response rates across practices and ACOs.

Table RQ2: ACO organizational-level actions to transform care

Data Collected	Tools	Measures	Frequency
ACO progress implementing DSRIP-funded projects	Existing Document Review	• Progress implementing DSRIP-funded projects	Annual
ACO progress adopting core ACO competencies	Key Informant Interviews	• Leadership structure and provider network characteristics[3] • Provider engagement strategies across participating organizations • HIT/HIE use and functionality • Standardization across participating organizations • Extent and standardization of strategies for PHM, care management, and coordination • Extent and standardization of HRSN assessments and interventions • Extent and standardization of strategies to reduce total cost of care • Progress transitioning care management to ACO partner (Model A only) measured by estimated percent of members whose care is managed by ACO partner, as reported by key informants	2 waves (FY19, FY21)

[3] Potential provider network characteristics include: scale (i.e., care services included in ACO network vs. care services secured outside the network via formal or informal referral;); size (defined by provider FTEs and/or members serviced); percent Medicaid members; employed vs. affiliated providers; hospital-affiliated vs. independent practice association- or community health center- affiliated.

Data Collected	Tools	Measures	Frequency
		• Member engagement strategies and spread • Quality Improvement strategies and spread • Barriers to implementing ACO model and achieving performance metrics • Prior experience participating in payment reforms	
ACO provider staff experience delivering care within newly formed and evolving ACOs	Provider/staff Survey	• Perceived effectiveness of care integration • Perceived effectiveness of workforce development • Perceived effectiveness of CP program • Perceived effectiveness of HIT/HIE • Perceived effectiveness of Flexible Services program • Perceived effectiveness of provider engagement strategies	2 waves (FY20 and FY22)
Barriers/facilitators to operating as an ACO	Case Studies	• In-depth understanding of the contextual factors that facilitate and impede implementation and performance	2 waves (FY20, FY22)

RQ3: How and to what extent did CPs target resources and take actions to operate under an accountable and integrated care model?

H3.1 CPs will engage constituent entities in delivery system change
H3.2 CPs will recruit, train and/or retrain staff by leveraging SWIs and other supports
H3.3 CPs will develop HIT/HIE infrastructure and interoperability to support care coordination (e.g. reporting, data analytics) and data exchange (e.g., internally with ACOs & MCOs, and externally with BH, LTSS, specialty providers, and social service entities)
H3.4. CPs will develop systems to engage members and coordinate services across the care continuum that complement services provided by other state agencies (e.g., DMH)

RQ3 reproduces the aims, data sources, and methods described for RQ2, with a focus on CPs rather than ACOs (see Table RQ3). Findings from RQ3 will describe CP experience operating under DSRIP; the organizational structures and processes CPs adopt to facilitate integrated and coordinated care; and how implemented organizational-level actions affect the actual practice of care from the perspective of CP providers and staff.

Table RQ3: CP resources and actions towards integrated care

Data Collected	Tools	Measures	Frequency
CP progress implementing DSRIP-funded projects	Document Review	• Progress implementing workforce development projects • Progress implementing HIT/HIE projects; • Progress implementing operational infrastructure projects	Annual
CP experience adopting care coordination and care management capacities	Key Informant Interviews	• Constituent entity engagement strategies • Staff recruitment, training and engagement strategies • HIT/HIE use and functionality • Systems and structures for member engagement • Systems and structures for coordinating/ managing care • Experience with and barriers to implementing CP program and achieving performance metrics	2 waves (FY19, FY21)
CP staff experience delivering care within newly formed and evolving CPs	Survey	• Perceived effectiveness of workforce development strategies • Perceived effectiveness of HIT/HIE • Perceived effectiveness of member engagement strategies • Perceived effectiveness of structures and processes for coordinating care	2 waves (FY20 and FY22)
Barriers/facilitators to operating as a CP	Case Studies	• In-depth understanding of the contextual factors that facilitate and impede implementation and performance	2 waves (FY20, FY22)

Document Review

CP progress reports (bi-annual and annual) will provide data on each CP's progress implementing DSRIP-funded projects in the areas of workforce development, technology, and operational infrastructure. The IA will be responsible for securing, reviewing, and tabulating data from these reports, and for making available to the evaluation team for FY19 and FY20; the evaluation team will be responsible for reviewing these documents in FY21 and FY22. For each CP, the IA will assess implementation progress. The evaluation team will use the data to characterize both CP-specific and program-wide implementation progress, and to inform site selection (in combination with data gathered through key informant interviews) for the CP case studies. Implementation progress "ranking" will also be one of several CP organizational-level characteristics that we will use to assess the relationship between CP performance and CP organizational transformation – in this instance, assessing whether greater progress implementing DSRIP-funded projects is associated with better care quality.

Key Informant Interviews

The interviews with CP leads noted under RQ1 will additionally be used to gather data related to RQ3. For RQ3, the interview guide will include domains of inquiry related to each CP's experience implementing DSRIP-funded projects; adopting systems and structures to support the ACO/CP partnership; and coordinate and manage care for patients served by the CPs. We will follow the same approach detailed under RQ1: use Atlas.ti; establish inter-rater reliability; conduct primary and secondary coding, and; create analytic matrices to facilitate comparisons across CPs (and across CPs grouped by ACO affiliation); and, to the extent possible, use findings to develop typologies for select organizational characteristics, such as organizational form (e.g., consortium vs. single entity) and use these typologies to assess associations between CP performance (i.e., care quality) and CP organizational form.

Staff Survey

We will use the same survey mechanism described above for ACO provider staff under RQ2 to survey CP front-line staff, with the same goal of assessing the degree to which implementation at CPs is translating into changes in how services are delivered from the perspective of front-line CP staff. We anticipate a common set of survey questions across ACO and CP staff, as well as survey questions that are customized to each entity type (i.e., ACO vs. CP). We will follow the same approach for sample selection, survey development and administration, and data analysis as specified for RQ2.

RQ4: How and to what extent did ACOs, MCOs, and CPs align resources and take common actions to operate under an accountable and integrated care model?

> **H4.1** ACOs, MCOs, & CPs establish structures and processes to promote improved administrative coordination between organizations (e.g. enrollee assignment, engagement and outreach)
> **H4.2** ACOs, MCOs, & CPs establish structures and processes to promote improved clinical integration across their organizations (e.g., flow of patient and patient information across settings, integrated care plans)
> **H4.3:** ACOs, MCOs, & CPs establish structures and processes for joint management of performance, quality, and conflict resolution

RQ4 reproduces the aims, data sources, and methods described for RQ2 and RQ3, with a focus specifically on the interface between ACOs and CPs. We will rely primarily on key informant interviews and surveys to address RQ4. Findings from RQ4 will describe how ACO/CP partnerships implement integration strategies and the extent to which integration was achieved.

Table RQ4: Alignment of ACOs, MCOS, and CPs Resources and Actions:

Data Collected	Tools	Measures	Frequency
Formal partnership terms	Document Review	• ACO/CP contracts • ACO/CP documented processes	Annually (FY 19-FY22)
Administrative integration	Key Informant Interviews	• Structures and processes for enrollee assignment • Structures and processes for member outreach and engagement • Structures and processes for exchanging information about shared members, including shared IT contracts and other mechanisms • Barriers/facilitators for administrative integration	2 waves (FY19, FY21)
Care coordination	Key Informant Interviews	• Systems and structures for sharing member information across entities • Barriers/facilitators to care coordination	2 waves (FY19, FY21)
Joint management	Key Informant Interviews	• Systems for joint management of care quality and cost • Systems for managing conflict resolution • Barriers and facilitators to joint management	2 waves (FY19, FY21)
Provider staff experience of ACO/ CP partnership	Survey	• Perceived effectiveness of ACO/CP administrative integration • Perceived effectiveness of care coordination between ACOs and CPs • Perceived effectiveness of joint management of shared patients between ACOs and CPs	2 waves (FY20 and FY22)
Barriers/facilitators to operating as ACO/CP partnership	Case Studies	• In-depth understanding of the contextual factors that facilitate and impede implementation and performance	2 waves (FY20, FY22)

Document Review

Key documents such as ACO/CP contracts and select ACO/CP Documented Processes (DPs) will provide data on the formal agreements made between partnering ACOs and CPs, and the formal structures and processes they agree upon. Findings from this review will be used to characterize the nature of these partnerships and variation in these partnerships across ACOs/CPs.

Key Informant Interviews

We will use the interviews with ACO and CP leads noted under prior RQs also to gather data related to RQ4. For RQ4, the interview guide will include the domains detailed in Table RQ4, which relate to joint actions taken by ACO and CPs to coordinate and manage care for shared patients. We will use the interviews to complement data available from the document review and to understand barriers and facilitators to implementing formal structures and processes, modifications that are needed, etc. One additional stakeholder group will be included in the RQ4 interviews: representatives of MCOs (one interview each with the two MassHealth MCOs). MCOs are included in the

sample for RQ4 because the two MassHealth MCOs are also required to partner with CPs. We will follow the same analysis plan detailed under RQ1 and to the extent possible use interview findings to develop typologies for select ACO/CP relationship characteristics (e.g. use of joint staff training or not) and use these typologies to assess associations between CP performance (i.e., care quality) and ACO/CP relationship characteristics. Please note, for this analysis we will group the MCOs with the ACO sample yielding a total sample of 19 (17 ACOs plus 2 MCOs).

Provider/Staff Survey

The survey described in prior sections administered to CP and ACO front-line staff will include questions specific to RQ4. Specifically, we will assess whether the structures and processes that participating entities adopt to facilitate administrative and clinical integration between ACOs and CPs translate in changes in how care is actually managed across entities from the perspective of ACO and CP providers and front-line and staff. To the extent possible, we will leverage existing validated measures for integration such as selecting questions from the Provider and Staff Perceptions of Integrated Care (PSPIC) survey (Derret, 2017).

d. Case Studies

Case studies are ideal for a more in-depth understanding of the contextual factors that facilitate and impede implementation and performance (Yin, 2014). For the first wave of case studies, we will examine up to 4 ACOs and 4 CPs (2 BH CPs and 2 LTSS CPs) each representing various stages of implementation to understand more in-depth the specific innovations that ACOs and CPs are implementing and the conditions that facilitate and impede transformation to an integrated and accountable delivery system. Participating entities will be selected based on a combination of progress implementing DSRIP-funded projects and adoption of core competencies to operate as an integrated and accountable delivery system. The timing of the site visits will be determined by what we learn from the other data sources with respect to these two dimensions. For instance, if by FY19 we are able to identify provider entities that excel on transformation, and/or provider entities that are struggling, each could be the subject of a case study. At the same time, it may take until FY20 for such patterns to emerge. In sum, we will conduct up to 8 case studies between FY19 and FY20. For the second wave of case studies, we will examine up to 5 ACOs and 6 CPs, representing various levels of performance as defined by level of change and/or achievement related to accountability scores.

For both waves, the case studies will focus on the transformation activities ACO and CPs initiate and the barriers and facilitators to effective implementation and performance. The primary data source for the case studies will be semi-structured interviews and focus groups with provider staff who are deeply involved with DSRIP implementation and represent a range of functional roles. At ACOs, this will include: 1) clinical leads; 2) operational leads; 3) heads of HIT/HIE; 4) heads of quality improvement; 5) heads of support services including Flexible Services and case management. In addition, we will interview representatives of ACO governing boards, Patient and Family Advisory Committees, and the dominant CP with which the ACO is partnered. At CPs, we anticipate interviews with the following functional

roles: 1) clinical leads; 2) administrative director of CP programs; 3) heads of HIT/HIE.

Interview and focus group guides will be informed by the Consolidated Framework for Implementation Research (CFIR) (Varsi, 2015). CFIR integrates dissemination and integration theories into five implementation domains (Intervention Characteristics; Outer Setting; Inner Setting; Characteristics of Individuals; and Process). Each of the domains has between four to eight associated constructs (e.g., Structural Characteristics, Networks & Communication, Culture, and Implementation Climate for the Inner Setting Domain), which in turn have sub-constructs. When appropriate, we will conduct focus groups with ACO and CP key stakeholders to efficiently include the perspectives of as many stakeholders as possible.

We will use Atlas.ti to manage, code, and analyze the interview data, as well as any additional documentation collected during the site visits. We will develop a code book initially based on the interview guide; establish interrater reliability; conduct first- and second-level coding; categorize codes and develop themes. To analyze coded data, we will generate code reports that include coded data for each domain and sub-codes related to barriers and facilitators. We also will populate analytic matrices with this information to facilitate comparisons across ACOs and CPs with respect to care delivery experience under DSRIP. These data will provide both standalone important insights into contextual factors that may impact ACO and CP implementation and performance success, and data that informs the quantitative analytic aspect of the DSRIP evaluation.

e. Member Interviews

In addition to member experience surveys being conducted by Massachusetts Health Quality Partners and secondary data analyses to evaluate how well needs have been addressed, we will conduct two waves of semi-structured interviews with a purposeful sample of members with complex health needs attributed to an ACO (N=30 in each wave for a total sample of 60 members). We propose to sample on health complexity for two reasons: One, we believe this population is more likely to utilize services and by extension have more experience with the ACO delivery system than less complex counterparts, and; 2) Two, this population is more likely to use services across the care continuum and thus more likely to experience the degree to which care is or is not coordinated under DSRIP. Among members with complex health needs, the interview sample will include adult members as well as parents of MassHealth-enrolled children ages 0 to 17. We will use member interviews to provide more in-depth understanding of member experience and satisfaction with ACO services, as well as explore potential barriers in meeting member needs identified from the overall results of the member experience surveys.

We are still scoping out how best to identify and recruit a sample of members to participate in the member interviews. Options include:

- Recruiting through participating entities

  This approach would rely on participating entities to identify a sample of members who might be willing to participate in interviews. We could

target members with complex needs and use the interviews to understand how especially vulnerable populations experience the ACO.

- Use administrative data to identify a sample of members with complex needs and outreach directly.

Interviews will focus on the member's familiarity with the goals of the ACO; their personal experience with changes in care since ACO inception and/or changes experienced by family or friends; perceptions of changes in care quality, access, and patient-centeredness; and recommendations for improving members' experiences. For the analysis, we will use Atlas.ti to code, manage, analyze and identify themes in the data.

E. Populations, Data Sources, and Analytic Plans for Domains 2, 3, and 4 (RQs 5-13)

a. Populations

We will study the managed care eligible population (~1.18 million members) and its major subpopulations that are the targets of Demonstration reforms: ~850,000 ACO members and ~198,000 MCO members for all claims/encounter-based measures. Just over one-third of the managed care eligible population (34%) are children (age <18). For member survey measures (surveys of members and the parents of child members) and hybrid quality measures, data will be available only for samples of those enrolled with each ACO or CP. We will study members with BH and LTSS needs (including those receiving CP supports) as a subgroup of interest because integration of BH and LTSS care with medical care is a primary goal of the Demonstration. Some MassHealth members not enrolled in ACOs and MCOs (e.g., those enrolled for the Department of Mental Health's Adult Community Clinical Supports) can receive CP services. Although most of these members are outside the managed care eligible target population (due to dual eligibility with Medicare), we will report CP accountability measures for all CP enrolled members (as calculated by MassHealth analytics vendor) in addition to those within the managed care eligible population.

Under the demonstration, ACOs and MCOs are encouraged to identify and address health related social needs. While we cannot comprehensively identify everyone who needs these services, we hope to be able to document increasing numbers of people referred to the FS program to address housing and nutritional needs that have been identified. Members referred for FS form another subpopulation of key interest for the evaluation with respect to the timing and nature of help that they get, and to what effect.

Members with SUD are the focus of Demonstration Goal 5, and members with SUD and/or SMI are also of interest in the DSRIP evaluation. Due to the Demonstration's emphasis on improving integration and care coordination, we also expect to study members with complex needs (e.g., multi-morbidity, polypharmacy) for whom care coordination is expected to be particularly beneficial. To understand associations between Demonstration programs and a range of outcomes for members with specific health conditions that plans are held accountable for through quality measures, we will also study members with conditions that place them in the denominator of accountability measures (e.g., members with diabetes, children using antipsychotics).

b. Summary of Measures and Data Sources

Various process and outcome measures will be used to address research questions in Domains 2, 3, and 4 to evaluate changes in identifying member needs (RQ5), healthcare access (RQ6), member engagement (RQ7), care processes (RQ8), integration of care (RQ9), utilization patterns (RQ10), member outcomes (RQ11), member experience (RQ12), and healthcare costs (RQ13) over the course of the study period (2015-2022). A subset of these measures has been specified by MassHealth for use in calculating accountability scores for ACOs and CPs, others are being monitored by MassHealth, and the remainder are endorsed by the NQF

and/or were selected from sets of measures maintained by reputable stewards (e.g., AHRQ, NCQA. Measure selection was also informed by other states' 1115 Evaluations (e.g., Michigan, New Hampshire, Oregon) (Ayanian, 2014; Kushner, 2017; NH DHHS, 2017). Finally, a subset of measures will be operationalized by UMMS drawing from the peer-reviewed literature.

For all quantitative measures derived from existing data sources, measure status as either endorsed or not endorsed by NQF is listed in Appendix B. Examples of non-NQF endorsed measures used by other states in their 1115 Evaluations include ED and hospital utilization measures (Michigan) and adult well visits (New Hampshire). Similar to recent evaluations in other states, the set of measures considered here will provide a robust understanding of Demonstration programs. For measures with national benchmarks such as those included in the Medicare Shared Savings Program (CMS, 2017), NCQA HEDIS measures (HEDIS 2018), and the Medicaid-Eligible Adult and Child Core Sets of Health Care Quality Measures (CMS, 2018), we will interpret our findings in the context of these national benchmarks. For measures with national benchmarks, recent values are presented in Appendix B.

To implement the analyses described below for each research question, we will collect primary data and access other data sources maintained by MassHealth, other state agencies, and other third parties. There is an approximately 6-month lag in the availability of complete data for the administrative data sources described below; complete data for each calendar year are expected to become available in July of the following year.

Medicaid administrative data – This member-level database is comprised of eligibility, enrollment, and billing records for healthcare services for the MassHealth member population. The traditional services (e.g., medical, pharmacy, laboratory) included in this administrative database of claims and encounters will be supplemented with new data on enrollment with and supports delivered by CPs (i.e., qualifying activities). Information on payments for FS provided to ACO members will be available and may be linkable to other administrative files. Unique provider identification numbers included on billing records enable linkage to the MassHealth provider characteristics file, which contains information on provider type, demographics, and ACO affiliation. The MassHealth administrative data is of research quality and has been used previously by the evaluation team (Ash, 2017). The quality of records and claims submitted by ACOs and CPs under the demonstration is expected to be of research quality due to contractual obligations requiring submission of all qualifying activities performed.

Analytics vendor data – MassHealth has contracted with an outside vendor to develop datasets, conduct analyses, and produce reports to support monitoring and accountability measurement. The vendor will aggregate and maintain data submitted by ACOs and CPs with data obtained from MassHealth and CMS. We will obtain selected fields for evaluation, still to be determined in consultation with MassHealth, from the datasets maintained by the analytics vendor. The fields obtained from the analytics vendor will include individual level indicators of compliance with quality measures for a subset of each organization's members (~n=400 per each ACO and each CP) to calculate hybrid quality measures for accountability. Hybrid measures

require information extracted from medical charts and/or the Electronic Health Record (EHR) that cannot be calculated from administrative data sources alone. In cases where the analytics vendor has calculated claims-based measures for time periods and populations of interest for the evaluation, these will be used as well. As the CP program does not presently include hybrid quality measures, we will estimate improvements in applicable hybrid measures (Diabetes, Blood Pressure Control, Health-Related Social Needs Screening) across the entire CP program using the hybrid data collected from the ACOs, where feasible and appropriate. In the event that the CP program, in future years, includes hybrid data, the evaluation may add these metrics.

Flexible Services assessments – Using DSRIP, MassHealth will fund ACO spending on qualified FS up to an annual maximum allotment. To determine eligibility for the services, ACOs will perform FS assessments (FSAs). If these assessments are submitted to MassHealth, the evaluation team will plan to examine them. The assessment will be designed to identify the need for help with food or housing. By pairing FS administrative data with the potential FS Assessment information, the State could determine how many FS-receiving members actually received the FS they were "prescribed".

CP referral lists and enrollment records – MassHealth members may be enrolled to BH and LTSS CPs through multiple pathways. For BH CPs, MassHealth will apply a claims-based algorithm (Appendix A5) to identify members with a behavioral health diagnosis in combination with utilization and comorbidities indicative of a need for CP supports. For LTSS CPs, MassHealth will apply a claims-based algorithm to identify members with a history of consistent utilization (>$300/month for 3 consecutive months) of LTSS State Plan services (Appendix A5). The ACO/MCO will be notified of members identified by the state as meeting criteria for CP assignment, and for the first two quarters of SFY19, MassHealth will assign members to specific CPs. For subsequent quarters, MassHealth anticipates that ACO and MCOs will assign the members identified by MassHealth to a specific CP and notify MassHealth of the assignment. At the point of assignment to a CP, MassHealth will record the member as enrolled (i.e., the enrollment date) with the CP. Members may also be referred to the ACO/MCO for referral to a BH or LTSS CP by a provider within the ACO/MCO network, by a family member, or by other entities (e.g., other state agencies, other providers) independent of the claims-based algorithm. The evaluation team anticipates receiving information on the referral source (i.e., MassHealth versus other), the date of enrollment with the CP, and the date (and reason) for disenrollment.

ACO and CP provider/staff survey – As described in Domain 1, the IE and IA will jointly develop and conduct a survey of ACO and CP front-line staff in two waves (mid-point and end-point of the overall evaluation) to assess how front-line staff experience delivery system transformation, including the degree to which implemented projects and ACO/CP formation translated into changes in care delivery from the perspective of front-line staff. We are exploring use of the Provider and Staff Perceptions of Integrated Care (PPICs), a validated survey instrument comprising 21 questions across 7 care integration constructs including within care team care coordination, across care team care coordination, coordination between

care teams and community resources. We anticipate supplementing these validated survey questions with new questions (in a very few instances) specifically tailored to the DSRIP evaluation. Potential concepts to be addressed by new questions include perceived effectiveness of member engagement strategies and provider use of nontraditional encounters (e.g., telemedicine, email) to facilitate access to care.

Member surveys – MassHealth has contracted with Massachusetts Health Quality Partners (MHQP) to conduct three different member surveys targeting the primary care (adults and children), behavioral health, and LTSS (adults and children) member populations. These surveys are critical to understanding, in a systematic manner, how the member's experience of care changes over the Demonstration period. While administrative data sources permit evaluation of quality and cost, only these member surveys will quantitatively address the third prong of the "Triple Aim", member experience (Berwick, 2008). The survey sampling design will be stratified to collect information from adult members and from parents of pediatric members. Other details of the sampling strategy remain in development. At present, random sampling within the sampling frame reflecting populations of interest are planned for year 1 informed by response rates and responses from the pilot primary care survey. Items included on the primary care survey were drawn from the CG-CAHPS and CAHPS PCMH surveys. Items currently planned for the BH and LTSS surveys in development have been drawn from a number of existing surveys including the MassHealth One Care survey (of dual eligible members), the Massachusetts Department of Mental Health member experience survey, CAHPS, the Family Experiences with Care Coordination survey, and the Behavioral Risk Factor Surveillance Survey. Select additional customized questions that are developed will undergo cognitive testing and piloting. Administration modes include web and paper for the primary care survey, mail only for the BH survey, and phone only for the LTSS survey. MHQP will monitor response rates, assess the potential for bias from nonresponses, and check for measurement error (e.g., due to mode of administration, interviewer, inappropriate responses).

The primary care member survey will be fielded annually in calendar years 2019 through 2022 to assess member experience for calendar years 2018 through 2021. The behavioral health and LTSS member surveys currently in development will also be fielded in calendar years 2019 through 2022 to assess member experience for calendar years 2018 through 2021. Domains expected to be included in each survey are described as they relate to specific RQs below. The evaluation team will weight all analyses of survey responses to create an analytic sample that closely resembles the characteristics of the survey's entire sample (respondents and non-respondents), therein adjusting for potential bias from non-response (Seaman, 2013). However, there is the potential for residual bias if mechanisms of non-response are not identifiable or strongly correlated with observed data. Furthermore, self-reported data that are not missing are still subject to potential biases from measurement error (e.g., due to inaccurate recall of events, misinterpretation of questions, and intentional misrepresentation).

c. Analysis Plans

Descriptive – The demographic, clinical, and select social characteristics of the entire managed care eligible population and subpopulations of special interest (e.g., those enrolled in ACOs or in MCOs) will first be described in each calendar year. This will also be done within subpopulations to which certain measures apply (e.g., those with BH needs, including those with both serious mental illness and substance use disorders) and other subpopulations described above. Process and outcome measures will be calculated for each population in each calendar year. Cross-temporal comparisons (baseline versus Demonstration period) will not be made for survey and hybrid measures due to the lack of baseline data. However, contemporaneous comparisons (i.e., comparisons between similar groups within the ACO/MCO population during the same time period) will be implemented where feasible based on program implementation, as described in Domain 6 (DSRIP Effects).

Observed versus expected – The first type of comparison will be between observed and multivariable adjusted estimates of expected values of each measure for each calendar year of the Demonstration period. Expected values will be estimated from multivariable models developed to predict an individual's value for each measure based on a member's demographic and clinical characteristics (e.g., members with serious mental illness will have a higher probability of ED utilization). These expected values will serve as a type of historical benchmark against which performance during the Demonstration will be compared. For dichotomous (i.e., yes or no) measures the probability of success on a given measure will be predicted using logistic models. Rates (e.g., hospitalizations per 100 person-years) will be predicted using Poisson, negative binomial, or zero-inflated Poisson models, as appropriate. Continuous outcomes (e.g., expenditures) will be predicted using linear models. For each measure and year of the Demonstration period, the observed value for a measure will be divided by the expected value predicted by the model. When higher values of a measure are desired (e.g., a higher proportion of the population screened) a ratio of observed to predicted greater than one will suggest improved quality. When lower values of a measures are desired (e.g., readmission rates), a ratio of observed to predicted of less than one will suggest quality improvement.

This approach has several limitations. Predicted values for the Demonstration period assume a consistent relationship between a given characteristic and a particular measure over time. To the extent that such relationships change (for reasons other than the Demonstration) between baseline and the Demonstration period the predictive model will be less accurate (e.g., a highly effective new medication may attenuate the association between a clinical condition and the risk of hospitalization). Secondly, if a new category of members enters the study population who were not present at baseline, the model may be less accurate in making predictions for this new population. Stated more broadly, these two limitations can be summarized as an assumption that the conditions during the baseline period will remain consistent during the Demonstration period, except for those changes that occur due to the Demonstration. If violation of this assumption is observable, we can modify our design (e.g., restrict the population) or analysis (e.g., incorporate time-varying

parameters) to mitigate potential bias. However, the potential for unobserved time-varying factors cannot be excluded. Therefore, we will also implement more rigorous comparative designs, described below.

Quasi-experimental methods – In order to estimate associations that can support stronger inferences, analyses must address potential biases arising from 1) population and system characteristics that differ between plans and 2) unrelated secular trends occurring between the baseline (2015-17) and the Demonstration (2018-22) periods. Quasi-experimental design methods will be applied for this purpose, including propensity score methods (i.e., matching, weighting, or stratification) to balance population characteristics and difference in difference comparisons to address secular trends (Vats, 2013). Difference in difference comparisons will be combined with interrupted time series methods (Penfold 2013, Shadish 2001) for measures that can be calculated at quarterly or monthly frequencies, with seasonal adjustments.

Potential selection biases (i.e., that members enrolled with ACOs, MCOs, or CPs have different healthcare needs and utilization than the overall managed care eligible population) will be addressed with propensity score balanced comparisons between groups of members enrolled during the Demonstration period and groups of members enrolled during the 2015-2017 baseline period (i.e., members with similar demographics and risk profiles will be compared to estimate effects of the Demonstration). These comparisons will estimate the counterfactual outcomes that would have been observed in the absence of the Demonstration (D'Agostino, 1998; Rosenbaum, 1983). Bootstrap methods that reflect clustering adjustments will be used to calculate confidence intervals.

The implementation of the Demonstration involved assignment of members to ACOs, MCOs, or the Primary Care Clinician (PCC) plan, and this assignment was largely based on the decisions of members' primary care providers (PCPs) (i.e., the decision to join an ACO). Members were notified of their plan assignment in the fourth quarter of 2017, except for those members who remained with the same plan (e.g., PCC Plan members whose PCP remained in the PCC Plan). Notably, this assignment algorithm has already been applied retrospectively to baseline data from 2015 to 2017 based upon member PCP of record in MassHealth and MCO systems in those years. As described below, this assignment will be used to match members enrolled during Demonstration years to members enrolled in the same plan (i.e., the same ACO or MCO) during the baseline period. Because the assignment of a member to a plan was determined by the member's PCP, matching by plan will help account for potential selection bias associated with a PCP's or an organization's decision to participate in the ACO program.

The ACO program launched on March 1, 2018, marking the beginning of a 120-day plan selection period for existing MassHealth members, during which members can change between plans for any reason. A fixed enrollment period with limited permissible reasons for switching will begin at the end of the 120-day open enrollment period on July 1, 2018, and will run until the subsequent year's plan selection period, based on member eligibility status and enrollment date. Based upon demographic and clinical characteristics (e.g., health needs), certain types of

members are expected to select into or out of specific plans, and members that actively switch plans are likely to be systematically different from members that remain with their assigned plan.

To understand switching patterns and their relationship to member characteristics, we will first describe the demographic, clinical, and social characteristics of members in the overall managed care eligible population, by specific sector (ACO, MCO, PCC), and by plan. After describing switching patterns, we will use propensity scores to assemble a comparison group of members from the baseline period who were assigned retrospectively based upon PCP to the same plan and were highly similar to the group of members remaining in the plan at the end of the plan selection period. By balancing characteristics of baseline enrollees and Demonstration enrollees using the probability of being in a plan as of the end of the plan selection period, we will mitigate selection bias from observed factors associated with member switching and plan selection. This process will be repeated for each Demonstration year such that, to the extent the characteristics of the Demonstration populations change year to year, the comparison groups for each year will be selected to reflect these changes. We will examine balance between exposed and comparison groups by comparing distributions of demographic, clinical, and social characteristics and calculating standardized differences. Any residual differences between exposed and baseline populations after applying propensity score methods will be adjusted for using statistical models.

The matched cohorts of ACO and highly similar baseline “would be” ACO members contain the comparison of interest between exposed members and a similar historical group who would have been exposed had the Demonstration been implemented during the baseline. However, comparisons between similar groups of baseline and Demonstration members remain subject to potential biases from secular changes (i.e., long-term trends affecting the entire state) in populations and systems that may have occurred between the baseline and over the course of the Demonstration period. Therefore, we will conduct difference in difference analyses to attempt to isolate the effects of Demonstration programs (i.e., the ACO and CP programs). The difference-in-difference design will account for secular trends by contrasting changes observed for the matched ACO cohort to changes for the matched MCO cohort (Stuart, 2014). The general approach is summarized in Table 7.

For example, a cohort of ACO enrollees during the Demonstration will be matched to baseline enrollees who based upon their PCP affiliation would have been in an ACO had the Demonstration been implemented at that time. Similarly, a cohort of MCO enrollees during the Demonstration will be matched to baseline enrollees who would have been in an MCO based upon their PCP affiliation had the Demonstration been implemented at that time. The simple comparison of the Demonstration ACO enrollees to baseline would-be ACO enrollees estimates an effect that includes the effect of ACOs, CPs, and secular changes. By removing the effects of CPs (because CPs are available to the MCO population during the Demonstration) and secular changes, the difference in the differences between these cohorts (i.e., the ACO and would-be ACO, and the MCO and the would-be MCO) isolates the ACO effect from the effects of CPs and secular trends. This difference in difference design assumes

that the same secular trends affect the ACO and the MCO populations and that there are no other outside influences acting on only one population.

To isolate the effect of the CP program for the MCO population, there are a few potential populations that could be used for estimating the secular trend. The commercial population in Massachusetts is likely to be different from the MassHealth population in observed and unobserved ways. The Medicaid population in other states will be explored, but like the MassHealth population, other Medicaid populations are expected to be exposed to idiosyncratic state secular trends and policy reforms in those comparison states. For example, in Massachusetts programs such as Primary Care Payment Reform (which involved capitated payments and quality incentives for participating provider organizations caring for MassHealth members) and the Delivery System Transformation Initiative (a predecessor to DSRIP focused on safety net hospitals) were implemented during the baseline pre-Demonstration period. Use of a MassHealth comparison group is also important in light of other non-DSRIP changes being implemented during the Demonstration period across MassHealth such as the expansion of SUD services (see Goal 5 below) and the application of new payment models (Ash, 2017). Therefore, the MCO non-CP population is a preferred comparison group over these alternatives because these members will not be directly exposed to DSRIP initiatives but will be part of the same source population (i.e., managed care eligible) with similar historical and contemporaneous non-DSRIP experiences. However, this difference in difference approach assumes the effects of the CP program and any secular changes will be similar for the ACO and MCO populations.

Table 7. Overview of Difference in Difference Methods

Step 1	Assemble groups of Demonstration plan enrollees and would-be enrollees in that same type of plan during the baseline pre-Demonstration period based on their PCP affiliation, then use propensity score methods to balance patient characteristics.
Step 2	Stratify propensity-score balanced groups based upon plan or sector for difference in difference analyses. Use regression to adjust for residual differences between groups.
Step 3	Interpret stratifications to draw inferences on the effect of ACO and/or CP programs during the Demonstration.

Difference between Demonstration and Baseline (Exposed Group)	*Difference between Demonstration and Baseline (Unexposed Group)*	*Effect Estimated by DID*
1. $ACO_d - ACO_p$	$MCO_d - MCO_p$	ACO[1]
2. $ACO_d - ACO_p$	$MCO_{d0} - MCO_p$	ACO+CP
3. $MCO_d - MCO_p$	$MCO_{d0} - MCO_p$	CP[2]

Abbreviations: accountable care organization pre-Demonstration (ACO_p); difference in difference (DID); managed care organization pre-Demonstration (MCO_p); managed care organization with access to community partners through the Demonstration (MCO_d); managed care organization during Demonstration excluding community partner enrollees (MCO_{d0}); community partner (CP)

[1]Contrasting the ACO strata versus the MCO strata would estimate the effect of the Demonstration in the ACO population, abbreviated as the ACO effect
[2]Contrasting the MCO strata versus the MCO strata excluding CP enrollees during the Demonstration would estimate the CP effect

Continuous enrollee analysis –The stable population of continuous MassHealth enrollees has been identified as a subpopulation of interest, who may have disabilities or other criteria for eligibility for MassHealth that are likely to be permanent or semi-permanent. The stability of this population also affords the opportunity to perform a self-controlled comparison, which contrasts member outcomes during the Demonstration period with their own outcomes during the baseline period. A strength of this self-controlled design is that by comparing within individuals, it accounts for time-invariant member characteristics (i.e., those that do not change over time). As with the cross-temporal comparisons, we will use difference-in-difference analyses to remove secular effects, and statistical models will be fit to adjust for demographic (e.g., aging) and disease trends. For each year of the Demonstration, we will conduct a continuous enrollee subgroup analysis where members present in the population of interest during the Demonstration year will be evaluated if they were continuously enrolled in the MassHealth managed care eligible population beginning in 2015 or 2016.

F. **Domain 2:** Changes in care processes

RQ5 To what extent did the identification of member needs including physical, BH, LTSS, and social needs improve?

H5.1 The identification of individual members' unmet needs (including health-related social needs, BH, and LTSS needs) will improve

a. Measures and rationale

Both direct measures of member need and indicators of the needs identification process will be used to evaluate RQ5. Member reported measures from surveys will be used to track changes in unmet needs over the Demonstration period. Hybrid quality measures (Table RQ5) that address the needs identification process will also be tracked over the course of the Demonstration period. For example, needs identification, care planning, and member engagement activities must occur within 3 months of enrollment for compliance with the BH CP engagement and LTSS CP engagement measures. The member must first receive a person-centered comprehensive assessment of care needs, functional needs, accessibility needs, and goals of care, then a person-centered care plan must be developed that addresses these needs and goals, and finally the member and the member's PCP must each approve the care plan. The Health Related Social Needs Screening measure will capture changes in screening for unmet social needs that could benefit from services such as housing stabilization, utility assistance, transportation, and nutritional assistance. The ACOs are also required to provide the results of the Health Related Social Needs screening, which will enable tracking of changes in the prevalence of these needs over time.

To provide a fuller longitudinal view of the processes by which needs have been identified both before and during the Demonstration, we have also included select claims-based measures of processes expected to identify need in adult and pediatric populations that can be analyzed in the both pre- and post-demonstration periods (Table RQ5, next page). Additional measures of need and indicators of the needs identification process will be tracked where data are available. Recognizing that the identification of unmet need is inherently difficult using claims-based data sources because a need that is unmet will not be marked by a billing claim for a service, we expect the member survey data to better estimate the prevalence of unmet need in the broader ACO population. However, survey data are subject to potential biases due to response patterns and missing data, inaccurate recall, misinterpretation of questions, and misrepresentation in responses. Further, if the underlying level of need in the study population is changing due to unobserved factors (that cannot be accounted for analytically), we will not be able to separate Demonstration effects from such changes in the composition of the study population.

Table RQ5. Data Sources and Measures of Member Need

Population(s)	Data Source(s)	Measure[1]	Analysis
Physical Health Needs			
MC, ACO, MCO, SPs	Medicaid claims/ encounters, analytics vendor extract	Oral Health Evaluation[2]	1. Observed vs. Expected (O vs. E) 2. Cross-temporal PS-balanced DID
Needs of the Pediatric Population			
MC, ACO, MCO, SPs	Medicaid claims/ encounters, analytics vendor extract	Developmental screening[3]	1. O vs. E 2. Cross-temporal PS-balanced DID
MC, ACO, MO, Sss	Medicaid claims/ encounters, analytics vendor extract	Oral Health Evaluation[2]	1. O vs. E 2. Cross-temporal PS-balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters, analytics vendor extract	Adolescent wellcare[3]	1. O vs. E 2. Cross-temporal PS-balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters, analytics vendor extract	Lead screening[3]	1. O vs. E 2. Cross-temporal PS-balanced DID
Needs of BH Populations			
BH CP, SPs	Medicaid claims/ encounters, analytics vendor extract	BH CP Engagement[2,4]	Descriptive
MC, ACO, MCO, SPs	Medicaid claims/ encounters, analytics vendor extract	Initiation and Engagement of Alcohol, or Other Drug Abuse or Dependence Treatment[2]	1. O vs. E 2. Cross-temporal PS-balanced DID
ACO BH, BH CP	Member survey	Ability to get all needed services[5]	Descriptive
Needs of LTSS Population			
LTSS CP	Medicaid claims/ encounters, analytics vendor extract	LTSS CP Engagement[2,4]	1. O vs. E 2. Cross-temporal PS-balanced DID
ACO LTSS, LTSS CP	Member survey	Needs met for LTSS[5]	Descriptive
ACO LTSS, LTSS CP	Member survey	Needs met for other services[5]	Descriptive
Health Related Social Needs			
ACO, SPs	Analytics vendor extract	Health related social needs screening[2]	Descriptive
ACO, CPs, SPs	Analytics vendor extract	Health related nutritional need	Descriptive
ACO, CPs, SPs	Analytics vendor extract	Health related housing need	Descriptive
ACO, CPs, SPs	Analytics vendor extract	Health related transportation need	Descriptive
ACO, CPs, SPs	Analytics vendor extract	Health related utility need	Descriptive

[1]Measure specifications included as Appendix B
[2]ACO Quality Measures
[3]ACO Monitoring Measures
[4]CP Quality Measures
[5]BH and LTSS surveys are in development
Abbreviations: Difference in difference (DID), Managed Care Eligible (MC), Behavioral Health (BH), Long Term Services and Supports (LTSS), propensity score (PS), subpopulations (SPs)

RQ6 To what extent did access to physical care, BH care, and LTSS improve?

H6.1 Access to physical care services will improve or remain consistent for members
H6.2 Access to BH services will improve or remain consistent for members
H6.3 Access to LTSS will improve or remain consistent for members

Measures and rationale

Access to health care is commonly defined as "the timely use of personal health services to achieve the best health outcomes" (Institute of Medicine, 1993). Access to health care is grouped into three components by the Centers for Disease Control and Prevention: 1) insurance coverage, 2) health services, and 3) timeliness of care (HealthyPeople.gov).

All MassHealth members will have insurance, therefore we will focus on several measures of timeliness and ability to access to physical care services, BH services, and LTSS (Table RQ6). Although member-reported access measures are considered to have the highest construct validity, we will use claims/encounter based measures to describe populations (i.e., non-ACO) and time frames (i.e., baseline) not covered by the survey sampling frames. However, it is difficult to measure access using administrative data sources as claims and encounter records are traditionally only observed when a member receives a billable service from a healthcare provider. Therefore, scenarios where members who are incapable of or discouraged from utilizing services will not be observed in administrative data. Certain types of services may also not be reimbursed, such as telephone and electronic encounters, and these data would not be captured in administrative data. Even in instances where an administrative record is observed, substantial information on access is typically absent (e.g., wait time for the appointment, cultural and linguistic appropriateness). To partially address gaps in administrative data, we also may collect information through the ACO provider/staff survey on nontraditional means of providing access to services (e.g., telemedicine, email). Encounter data submitted by CPs are expected to include modifier codes indicating whether the encounter was in-person, over the phone, or by other means. These access measures may be supplemented with information on wait times, if available from MassHealth.

Member-reported measures of access: Member reported measures of access will include responses to the CG-CAHPS (http://www.ahrq.gov/cahps/surveys-guidance/cg/index.html) questions regarding timely access for adult and pediatric populations on the primary care member survey, as well as any relevant questions included on the yet to be finalized LTSS and BH member surveys. Current questions which may be included on access to BH and LTSS services are drawn from the Massachusetts Department of Mental Health survey and the Home Health CAHPS survey. As noted in the discussion of the member surveys above, member reported measures are subject to potential biases due to response patterns and missing data, inaccurate recall, misinterpretation of questions, and misrepresentation in responses.

Provider/staff reported measures of access: In the ACO survey, providers/staff may be asked about the types and frequency of encounters that may be unobserved in

administrative data sources that can facilitate member access to care (e.g., telemedicine, email).

Administrative measures of member access: A key component of improving the use of healthcare services is facilitating access and use of preventative services such as primary care, screening (see RQ5: Needs Identification) and protection of at-risk populations (see immunization and monitoring measures in RQ7: Care Processes). Administrative measures including the annual primary care visit and asthma medication ratio have been included in RQ6 as proxies of access, however, these measures are subject to typical limitations of claims data such as described above. Measurement error due to inconsistent or incomplete coding practices obscuring the type and purpose of an encounter could introduce bias into the primary care visit measure, while discrepancies between actual medication taking behavior and what can be expected from refill patterns could bias the asthma medication ratio measure. The use of evidence-based services that can prevent illness, such as through primary and preventative care, is often considered an indicator of access to care (HealthyPeople.gov).

Performance on the asthma medication ratio measure, which calculates the relative use of rescue medications and controller medications, may reflect a member's ability to access medical care for evaluation and prescription of appropriate controller medications, and the ability to then physically and financially access pharmacy services. Lower performance on the asthma medication ratio measure is associated with increased rates of ED visits and inpatient hospitalizations (Andrews, 2013). Medicaid ambulatory care clinics that promote cultural competence and establish policies to promote access and continuity of care have less underuse of preventive medications for pediatric asthma (Lieu, 2004). Therefore, although the asthma medication ratio measure is not directly measuring access, providers that facilitate member access to medical and pharmacy services are expected to achieve better performance on the measure. For BH, ED boarding of patients presenting with BH conditions is an indicator of access because such boarding is typically due to limited availability of inpatient beds and/or outpatient providers (Pearlmutter, 2017; Zeller, 2017). Measuring access to LTSS using administrative data is particularly challenging, therefore we will rely principally on the robust set of member survey measures quantifying how well LTSS needs are being met (Table RQ5) and the timeliness of access to LTSS services (Table RQ6). Utilization patterns for LTSS services will be described and evaluated in RQ10 "How did the volume and mix of services utilized by members change during the course of the Demonstration?".

Table RQ6. Data Sources and Measures of Access to Care

Population(s)	Data Source(s)	Measure[1]	Analysis
Access to Physical Care Services			
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Adult outpatient/ preventive visit	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Asthma Medication Ratio[2]	1. O vs. E 2. Cross-temporal PS balanced DID
ACO, SPs	Member survey	Timely access (routine, urgent, after hours)	Descriptive
ACO, SPs	Member survey	Access to specialist care	Descriptive
ACO, SPs	Provider/ staff survey	Experience with non-paid member encounters (e.g., telehealth)	Descriptive
Access for Pediatric Populations			
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Primary care provider visit (children)	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Asthma Medication Ratio[2]	1. O vs. E 2. Cross-temporal PS balanced DID
ACO, SPs	Member survey	Timely access (routine, urgent, after hours)	Descriptive
ACO, SPs	Member survey	Access to specialist care	Descriptive
Access For BH Population			
MC, ACO, MCO, BH CP	Medicaid claims/ encounters	Annual primary care visit[4]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, BH CP	Medicaid claims/ encounters	ED boarding for BH conditions	1. O vs. E 2. Cross-temporal PS balanced DID
ACO BH, BH CP	Member survey[3]	Timely access to BH services[3]	Descriptive
ACO BH, BH CP	Member survey[3]	Ability to access BH care as often as necessary[3]	Descriptive
Access for LTSS Populations			
MC, ACO, MCO, LTSS CP	Medicaid claims/ encounters	Annual primary care visit[4]	1. O vs. E 2. Cross-temporal PS balanced DID
ACO LTSS, LTSS CP	Member survey[3]	Timely access to LTSS services	Descriptive
ACO LTSS, LTSS CP	Member survey[3]	Ability to access LTSS as often as necessary[3]	Descriptive
ACO LTSS, LTSS CP	Member survey	Needs met for transportation to medical appointments[3]	Descriptive

[1]Measure specifications included as Appendix B
[2]ACO Quality Performance Measures
[3]BH and LTSS surveys are in development (measures contingent on finalized measure questions).
[4]CP Quality Measure
Abbreviations: Difference in difference (DID); Subpopulations (SPs), Total Cost of Care (TCOC)

RQ7 To what extent did member engagement with physical care, BH care, and LTSS improve?

H7.1 Engagement with physical care services will improve or remain consistent for members
H7.2 Engagement with BH services for will improve or remain consistent for members
H7.3 Engagement with LTSS will improve or remain consistent for members

Measures and rationale

Engaging members in healthcare has become a common strategy for improving the member experience and health outcomes. Defined broadly, member engagement encompasses "actions individuals must take to obtain the greatest benefit from the healthcare services available to them" (Grunman, 2010), which can also be narrowed to competency in self-care for members with chronic diseases (Jordan, 2008). To evaluate RQ7, information will be collected from member and provider/staff surveys on engagement and perceived effectiveness of member engagement strategies. Survey-based measures will be supplemented with administrative measures of member engagement and care continuity.

Member reported measures of engagement: Member reported measures will include responses to questions regarding engagement, including member participation in the treatment plan. These questions are expected to be drawn from existing surveys (the One Care member survey, the Massachusetts Department of Mental Health member survey) that have been piloted and fielded in similar Massachusetts populations. If additional questions are developed they will be piloted and validated with the appropriate MassHealth member population. As with other concepts (e.g., access) to be captured using the member surveys, resource constraints and survey burden limit the number of items to be included and inclusion of an entire tool for measuring member engagement is not feasible. Therefore, the included questions will only yield insight into specific aspects of engagement, which is a complex and difficult to measure concept.

Provider/staff reported measures of engagement: In the CP staff survey, provider/staff may be asked about the perceived effectiveness of member engagement strategies for the BH and LTSS member populations.

Administrative measures of member engagement and care continuity: Claims-based measures of medical and medication use, including the gap in HIV medical visits and antidepressant management measures, serve as surrogates for members being better informed and engaged with the health care services recommended for managing their clinical conditions. These measures will be evaluated as proxies of engagement, with the following rationale for each measure. The effective management of HIV requires member engagement in the form of adherence to multidrug antiretroviral regimens and regular attendance of clinic visits for monitoring of treatment effectiveness and adverse effects. Guidelines for management of patients with HIV specify that intervals between visits with viral monitoring should not exceed six months (Panel on Antiretroviral Guidelines for Adults and Adolescents, 2018), with longer gaps in therapy associated with the development of viral resistance and loss of viral suppression (Gardner, 2018).

The management of the acute phase of major depression is a critical period, where the goal of medical and pharmacologic management is to return the patient to baseline levels of functioning (APA, 2010). Because incomplete responses and adverse effects with initial pharmacotherapy are common, and due to the risk of harm associated with the clinical condition, careful and systematic monitoring is essential throughout the first few months of treatment (APA, 2010). Due to risk of relapse, patients treated with pharmacotherapy during this acute phase are recommended to remain on treatment. Patient adherence to therapy can be facilitated by incorporating patient preferences into treatment decisions and discussing patient concerns regarding adherence (APA, 2010).

Continuity of care for children with chronic conditions will be examined, as such measures are conceptualized as indicators of member confidence and ability to both access and engage with the healthcare system, in particular with the set of providers from whom the member obtains the greatest benefit from utilization of healthcare services. While engagement refers to actions taken by the member to get the most out of their healthcare, continuity of care more broadly encompasses the actions taken by the member and their providers to ensure care is coordinated for the member through provider continuity, information continuity, and management continuity (Reid, 2002). Although in theory the responsibility for continuity could rest firmly on the healthcare system, in practice the member is often responsible for taking actions (e.g., navigating insurance networks, scheduling appointments, updating personal health records) to maintain a relationship with the same provider and to facilitate information sharing between providers. A systematic review of the literature found continuity of care was associated with improved patient satisfaction, fewer hospitalizations and fewer ED visits (van Walraven, 2009).

Table RQ7. Data Sources and Measures of Engagement with and Continuity of Care

Population(s)	Data Source(s)	Measure[1]	Analysis
Engagement with Physical Care Services			
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Gap in HIV medical visits	1. O vs. E 2. Cross-temporal PS balanced DID
ACO	Provider/ staff survey	Perceptions of member engagement with physical care	Descriptive
Engagement for Pediatric Populations			
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Continuity of care for children with complex medical conditions	1. O vs. E 2. Cross-temporal PS balanced DID
Engagement for BH population			
MC, ACO, MCO, BH CP, SPs	Medicaid claims/ encounters	Antidepressant medication management	1. O vs. E 2. Cross-temporal PS balanced DID
ACO BH, ACO BH CP	Member survey[2]	Participation in treatment plan	Descriptive
ACO LTSS, ACO BH CP	Member survey[2]	Perceived effectiveness of BH care on member ability to manage needs, money, school/work, housing	Descriptive

Population(s)	Data Source(s)	Measure[1]	Analysis
ACO, CP	Provider/ staff survey	Perceived effectiveness of member engagement strategies	Descriptive
Engagement for LTSS population			
ACO LTSS, ACO LTSS CP	Member survey[2]	Participation in treatment plan	Descriptive
ACO LTSS, ACO LTSS CP	Member survey[2]	Perceived effectiveness of LTSS on member ability to manage needs, money, school/work, housing	Descriptive
ACO, CP	Provider/ staff survey	Perceived effectiveness of member engagement strategies	Descriptive

[1]Measure specifications included as Appendix B
[2] BH and LTSS surveys are in development
Abbreviations: Subpopulations (SPs)

RQ8 To what extent did care processes improve for physical, BH, and LTSS?

H8.1 Physical health care processes (e.g., wellness & prevention, chronic disease management) will improve for members
H8.2 BH care processes will improve for members
H8.3 LTSS processes will improve for members
H8.4 The management of health-related social needs will improve through use of Flexible Services and/or other social service interventions for members
H8.5 Provider staff will report an improved experience delivering healthcare services to members

Measures and rationale

For the purposes of the evaluation, we have conceptualized care processes as the delivery of evidence-based services in a member-centered manner. To evaluate care processes over the course of the study, we have selected a diverse set of measures (Table RQ8) covering physical, behavioral, LTSS, and social care processes. Measures derived from Medicaid administrative data will be complemented by member reported measures regarding their care experience. The physical care measures reflect a combination of preventive care (e.g., screening and immunizations) and management of chronic diseases (medical and pharmacologic). The behavioral health care processes include measures of medical management, care planning (for the BH CP population), and member reported measures of the care experience (expected to be drawn from CAHPS and Massachusetts Department of Mental Health surveys). Measures of LTSS processes include annual completion of a care plan for the LTSS CP member population and member reported measures of provider communication with the member (expected to be drawn from CAHPS) among those receiving LTSS services. Measurement of the management of health-related social needs focuses upon the utilization of flexible services, which may be supplemented from information from the Flexible Services assessment if available.

Table RQ8. Data Sources and Measures of Care Processes

Population(s)	Data Source(s)	Measure[1]	Analysis
Physical Care Processes			
ACO, SPs	Member survey	Provider communication, knowledge of member, self-management support	Descriptive
Care Processes for Maternal and Pediatric Populations			
ACO, SPs	Medicaid claims/ encounters, analytics vendor extract	Immunizations for Adolescents[2]	Descriptive
ACO, SPs	Medicaid claims/ encounters, analytics vendor extract	Timeliness of Prenatal Care[2]	Descriptive
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Multiple Antipsychotic Use in Children[3]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Follow-up care for children prescribed ADHD medication (Initiation[2] and Continuation Phase)	1. O vs. E 2. Cross-temporal PS balanced
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Metabolic Monitoring for Children and Adolescents on Antipsychotics[2]	1. O vs. E 2. Cross-temporal PS balanced DID
ACO, SPs	Member survey	Provider communication, knowledge of member, self-management support[4]	Descriptive
ACO	Provider/staff survey	Patient-centered care	Descriptive
BH Care Processes			
BH CP	Medicaid claims/ encounters, analytics vendor extract	Annual treatment plan completion[5]	Descriptive
ACO BH, BH CP	Member survey	Provider/staff communication with the member[4]	Descriptive
LTSS Care Processes			
LTSS CP	Medicaid claims/ encounters, analytics vendor extract	Annual care plan completion[5]	Descriptive
ACO LTSS, LTSS CP	Member survey	Provider/ staff communication with the member[4]	Descriptive
Management of Social Needs			
ACO	Medicaid claims/ encounters	Flexible services utilization[3]	Descriptive

[1]Measure specifications included as Appendix B
[2]ACO Quality Performance Measures
[3]ACO Quality Monitoring Measures
[4]BH and LTSS surveys are in development
Abbreviations: Attention Deficit Hyperactivity Disorder (ADHD)

RQ9 To what extent did integration between physical, behavioral, and long-term services increase?

> **H9.1** Integration across the care continuum (e.g., physical health, BH, LTSS, acute care, social services) will increase
> **H9.2** Provider staff will report increased care integration (within and between ACOs and CPs)

Measures and rationale

Increasing integration across the care continuum is **Goal 2** of the Massachusetts Demonstration. Heterogeneous definitions and models of integration in the healthcare and business literature limit extrapolation of earlier findings to current models and settings (Armitage, 2009). For example, integration has been described at multiple levels including within and between providers and organizations, for a variety of purposes (e.g., clinical, administrative).

As described in Domain 1, *integrated patient care* is defined as "patient care that is coordinated across professionals, facilities, and support systems; continuous over time and between visits; tailored to the patients' needs and preferences; and based on shared responsibility between patient and caregivers for optimizing health" (Singer et al. 2011).We will evaluate care coordination from the member and provider/staff perspectives based primarily upon member and provider survey responses in RQ9, building upon the information on clinical integration, care coordination, and administrative integration collected using qualitative methods in Domain 1 (State, organizational, and provider-level actions promoting delivery system transformation). Select administrative proxies for coordinated care will also be evaluated as quantitative measures in RQ9, including quality measures with physical and BH components (e.g., diabetes and cholesterol). Transitions of care represent a high-risk period of time for members, and a critical opportunity for coordination between inpatient and outpatient providers to translate into improved member outcomes and reduced healthcare expenditures. Therefore, we will examine multiple measures of timeliness of outpatient follow-up after an ED or inpatient visit across populations with physical, BH, and LTSS needs (e.g., follow-up with a CP within 3 days of inpatient discharge among CP enrollees).

Table RQ9. Data Sources and Measures of Care Integration

Population(s)	Data Source(s)	Measure[1]	Analysis
Outpatient Care Integration			
ACO, SPs	Member survey	Perceived integration of primary care and specialist care	Descriptive
ACO, SPs	Provider/staff survey	Care coordination within teams	Descriptive
ACO, SPs	Provider/staff survey	Care coordination with other providers	Descriptive
ACO, SPs	Provider/staff survey	Care coordination with other resources	Descriptive
Outpatient Care Integration for the Pediatric Population			
ACO, BH, LTSS	Member survey	Perceived integration of primary care and specialist care	Descriptive
Outpatient BH Care Integration			
MC, ACO, MCO, BH CP	Medicaid claims/ encounters	Diabetes Screening for People with Schizophrenia or Bipolar Disorder. Who Are Using Antipsychotic Medications[2]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, BH CP	Medicaid claims/ encounters	Cholesterol testing for members using antipsychotics	1. O vs. E 2. Cross-temporal PS balanced DID
ACO BH, BH CP	Member survey	Perceived integration between primary care and BH providers	Descriptive
ACO BH, BH CP	Member survey	Perceived integration across BH providers	Descriptive
ACO BH, BH CP	Member survey	Member experience with their care coordination	Descriptive
ACO LTSS, LTSS CP	Member survey	Member experience with transitions of care	Descriptive
LTSS Care Integration			
ACO LTSS, LTSS CP	Member survey	Perceived integration between primary care provider and LTSS	Descriptive
ACO LTSS, LTSS CP	Member survey	Perceived integration of LTSS services provided	Descriptive
ACO LTSS, LTSS CP	Member survey	Member experience with their care coordination	Descriptive
ACO LTSS, LTSS CP	Member survey	Member experience with transitions of care	Descriptive
Inpatient and Outpatient Integration (Care Transitions)			
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Physician visit within 30 days of hospital discharge	1. O vs. E 2. Cross-temporal PS balanced DID
BH CP, LTSS CP	Medicaid claims/ encounters	Follow-up with CP after acute or post-acute stay within 3 days[2]	1. O vs. E 2. Cross-temporal PS balanced DID
BH CP	Medicaid claims/ encounters	Follow-up with CP or any provider within 7 days of ED discharge[2]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Follow-Up After ED Visit for Mental Illness (7 days)[3]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, CPs, SPs	Medicaid claims/ encounters	Follow-Up After Hospitalization for Mental Illness (7 days)[2,3]	1. O vs. E 2. Cross-temporal PS balanced DID

[1]Measure specifications included as Appendix B
[2]CP Quality Performance Measure
[3]ACO Quality Performance Measure

RQ10 How did the volume and mix of services utilized by members change during the course of the Demonstration?

H10.1 The volume and mix of services utilized will shift, when clinically appropriate, in the direction of lower cost sites and types of care
H10.2 The utilization of low value care will decrease

Measures and rationale

To better understand changes in utilization patterns over time that may be driving total cost of care performance, we will first describe utilization by service categories such as inpatient (e.g., non-maternity physical health, maternity, behavioral health), ED visits, outpatient non-BH (lab and radiology, non-BH outpatient hospital), outpatient BH (e.g., Emergency Services Program, diversionary services), professional services, pharmacy, home health, durable medical equipment, emergency transportation, long-term care, other medical services, and services excluded from the TCOC (e.g., applied behavior analysis, Children's Behavioral Health Initiative, long term services and supports). The specific measures to be calculated will include crude and adjusted rates and percentages for each type of utilization. These utilization measures will be interpreted in the context of other relevant knowledge generated in the course of the evaluation. We simultaneously will be examining indicators of healthcare quality (RQs 5-9) and outcomes (Domain 3) for each of the populations in which we will be evaluating healthcare utilization patterns. The utilization measures described here will also inform whether additional analyses are warranted to understand the implications of observed utilization shifts. For example, if increased outpatient BH utilization is observed, we will evaluate the association between outpatient BH service utilization and rates of ED and acute inpatient utilization. Similarly, if the primary site of post-acute care shifts from institutional (skilled nursing or inpatient rehabilitation facilities) to home-based settings, we will evaluate hospital readmission rates among members discharged to these post-acute care settings. We will also evaluate changes in measures of low-value care.

The overarching rationale for our hypotheses is that shared risk and accountability provisions will motivate organizations and their providers to implement strategies to shift utilization to lower cost settings or services that will deliver equal or greater quality and experience for members. Progress implementing such strategies is expected to be incremental and may vary across organizations depending upon past experience managing risk and other factors (e.g., staffing and capital resources).

Post-acute care and LTSS: The proportion of hospital discharges resulting in any post-acute care (i.e., home care or institutional care) will be described. The proportion resulting specifically in institutional post-acute care (i.e., inpatient rehabilitation, skilled nursing facility, or long-term care hospital) will also be examined because, in addition to reducing the volume of post-acute care use, shifting care from higher cost institutional settings to lower cost home and community-based settings has been previously described as a mechanism for reducing spending in Medicare ACOs (McWilliams, 2017). The rate of home health and other forms of community-based LTSS utilization (e.g., durable medical equipment) will also be summarized.

Outpatient utilization and site of care: Rates of outpatient utilization will be described overall and by provider type in situations where the administrative encounter data are adequate. If the individual clinician is reliably identifiable in encounter records, outpatient utilization will be described separately for primary care, medical specialists, and behavioral health providers (including providers of diversionary services). Rates of outpatient utilization for services (e.g., laboratory services, imaging, surgical procedures) that can be provided in either a hospital outpatient department or a standalone outpatient setting will be described by site of care.

Inpatient site of care: For conditions considered to be appropriate for management in a community hospital setting, we will examine the proportion of hospitalizations occurring in academic medical centers and community hospitals (as classified in the American Hospital Association database) over time. Shifting utilization to community hospitals for community appropriate conditions has been identified as one of seven approaches to achieving healthcare savings in Massachusetts (Health Policy Commission, 2018). Inpatient and ED utilization will be evaluated more broadly as outcomes in Domain 3 (Changes in member outcomes).

Low value care: Measures of low-value care (Table RQ10) will be evaluated as indicators of both quality and opportunities to reduce medically unnecessary expenditures. National campaigns have been underway to define and eliminate low-value care utilization (Colla, 2015). The measures selected for this study were selected due to their relevance for Medicaid populations (Charlesworth, 2016) and to include a mixture of adult and pediatric measures.

Pharmacy: An increasing number of ACOs report using strategies to optimize medication use (Wilks, 2017). We will examine the proportion of members newly initiating branded oral medications to treat select conditions (e.g., diabetes, CHF, hyperlipidemia) for which generic medications are available and recommended as first line agents.

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Table RQ10. Data Sources and Measures of Utilization and Low-Value Care

Population(s)	Data Source(s)	Measure[1]	Analysis
Utilization			
MCE, ACO, MCO, SPs	Medicaid claims/ encounters	Outpatient service utilization by provider and service type (rate)	1. O vs. E 2. Cross-temporal PS balanced DID
MCE, ACO, MCO, SPs	Medicaid claims/ encounters	Post-acute care utilization (proportion, days)	1. O vs. E 2. Cross-temporal PS balanced DID
MCE, ACO, MCO, SPs	Medicaid claims/ encounters	Institutional post-acute care utilization (proportion, days)	1. O vs. E 2. Cross-temporal PS balanced DID
MCE, ACO, MCO, SPs	Medicaid claims/ encounters	Home and community based service utilization (rate, mix)	1. O vs. E 2. Cross-temporal PS balanced DID
MCE, ACO, MCO, SPs	Medicaid claims/ encounters	Home and community based service utilization (rate, mix)	1. O vs. E 2. Cross-temporal PS balanced DID
MCE, ACO, MCO, SPs	Medicaid claims/ encounters	Branded medication utilization for conditions with first-line generics	1. O vs. E 2. Cross-temporal PS balanced DID
MCE, ACO, MCO, SPs	Medicaid claims/ encounters	Hospitalizations in community hospitals for community appropriate conditions (proportion)	1. O vs. E 2. Cross-temporal PS balanced DID
Low Value Care			
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Imaging for low back pain	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Pre-operative chest radiography	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Head imaging for syncope	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Abdomen CT combined studies	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	CT/MRI for headache	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Antibiotics for acute bronchitis	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	CT without ultrasound for childhood appendicitis	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Strep test with antibiotic dispensing for childhood pharyngitis	1. O vs. E 2. Cross-temporal PS balanced DID

[1]Measure specifications included as Appendix B
Abbreviations: inpatient rehabilitation facilities (IRFs); emergency department (ED); computed tomography (CT); magnetic resonance imaging (MRI)

Domain 3: Changes in member outcomes

RQ11 To what extent did member outcomes improve?

H11.1 Inpatient and ED utilization rates will decrease overall
H11.2 Inpatient and ED utilization rates will decrease for adults and children with specific conditions including ambulatory care sensitive conditions
H11.3 Inpatient and ED utilization rates will decrease among adults with mental illness, substance addiction, co-occurring conditions, or LTSS needs
H11.4 Community tenure will increase
H11.5 Members will report improved ratings of health

Measures and rationale

As summarized in the Evaluation Logic Model (**Figure 1**), the effects of DSRIP investments on member outcomes are conceptually mediated through improvements in coordination, integration, and quality across the care continuum. If these hypothesized relationships hold, effects of the Demonstration initiatives will be of the largest magnitude within subgroups of members with clinical conditions where increased quality of care in the outpatient setting has the potential to prevent adverse health consequences that manifest in acute service utilization. Therefore, in addition to monitoring all-cause ED and inpatient utilization, we will examine primary care sensitive ED visits (Lines, 2017) and hospitalizations for acute and chronic ambulatory care sensitive conditions (ACSCs) (AHRQ, 2002). Because of the high risk for bounce back after a hospital stay, and in light of the Demonstration's efforts to improve transitions of care by integrating inpatient and outpatient providers, we will examine all-cause and ACSC readmissions in the 30-day period post-discharge. Pediatric, BH, and LTSS member outcomes to be evaluated are also consistent with the logic underlying the Massachusetts Demonstration. For example, the LTSS measures underscore the role of CPs in maintaining members in the community, outside of acute and long-term institutional settings. In the maternal and pediatric population, improvements in prenatal care may produce reductions in NICU utilization, while coordination and continuity of care in the outpatient setting for children with asthma may reduce asthma hospitalizations.

Beyond the proxy measures observable in administrative data, member reported measures of overall health and mental/emotional health will yield critical insights into member outcomes. However, self-rated health is acknowledged to be influenced by a complex confluence of factors related to health (e.g., conditions), psychological status (e.g., cognitive ability, mood), social status and experiences (e.g., socioeconomic status, cultural norms), and survey measurement methods (e.g., question wording, mode of administration) (Garbarski, 2016). Therefore, if we are interested in an "objective" measure of health, heterogeneity in self-rated health due to psychological, social, and survey measurement should be taken into account in the design and analysis. Concerns of response heterogeneity are generally greater when comparing across populations that vary in social experience (Subramian, 2010). We greatly reduce the potential for response heterogeneity by structuring our comparisons within the MassHealth ACO population, and to the extent that the characteristics of the ACO population are observed to change over time, we will adjust for these changes in the

analysis. If linkage of defined sub-populations' survey responses to administrative data is performed, we will use the administrative data to perform a validity check on the survey responses (e.g., were increasing levels of reported health status correlated with fewer acute services used).

Table RQ11. Data Sources and Measures of Health Outcomes

Population(s)	Data Source(s)	Measure[1]	Analysis
Physical Health Outcomes			
MC, ACO, MCO, CPs, SPs	Medicaid claims/ encounters, analytics vendor extract	All-cause inpatient admissions[2]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, CPs, SPs	Medicaid claims/ encounters, analytics vendor extract	All-cause hospital readmissions[3]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, CPs, SPs	Medicaid claims/ encounters, analytics vendor extract	All-cause ED visits[2]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, CPs, SPs	Medicaid claims/ encounters, analytics vendor extract	Acute unplanned admissions adult diabetes[3]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, CPs, SPs	Medicaid claims/ encounters, analytics vendor extract	Acute unplanned admissions adult (for chronic ACSCs)	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, CPs, SPs	Medicaid claims/ encounters, analytics vendor extract	Acute unplanned admissions adult (for acute ACSCs)	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, CPs, SPs	Medicaid claims/ encounters, analytics vendor extract	Primary care sensitive ED visits	1. O vs. E 2. Cross-temporal PS balanced DID
Physical Health Outcomes for the Pediatric Population			
MC, ACO, MCO, SPs	Medicaid claims/ encounters	NICU hospitalizations[2]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Pediatric asthma admissions[2]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Pediatric readmissions[2]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Pediatric ED visits (all-cause)	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, SPs	Medicaid claims/ encounters	Pediatric hospitalizations (all-cause)	1. O vs. E 2. Cross-temporal PS balanced DID
Outcomes for the BH Population			

Population(s)	Data Source(s)	Measure[1]	Analysis
MC, ACO, MCO, BH CP, SPs	Medicaid claims/ encounters, analytics vendor extract	ED visits for adults with mental illness, substance addiction, or co-occurring conditions[3]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, BH CP, SPs	Medicaid claims/ encounters, analytics vendor extract	Hospital admissions for adults with mental illness and/or substance addiction	1. O vs. E 2. Cross-temporal PS balanced DID
BH CP	Medicaid claims/ encounters, analytics vendor extract	All-cause readmissions among BH CP members[4]	1. O vs. E 2. Cross-temporal PS balanced DID
BH CP	Medicaid claims/ encounters, analytics vendor extract	Community tenure: BH CP members[4]	1. O vs. E 2. Cross-temporal PS balanced DID
Outcomes for the LTSS Population			
LTSS CP	Medicaid claims/ encounters, analytics vendor extract	Community tenure: LTSS CP members[4]	1. O vs. E 2. Cross-temporal PS balanced DID
LTSS CP	Medicaid claims/ encounters, analytics vendor extract	All-cause readmissions among LTSS CP members[4]	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, CPs, SPs	Medicaid claims/ encounters, analytics vendor extract	Long-term nursing home admissions	1. O vs. E 2. Cross-temporal PS balanced DID
Member Reported Health Outcomes (Adult and Pediatric)			
ACO, BH CP, LTSS CP	Member survey[5]	Overall rating of health	Descriptive
ACO, BH CP, LTSS CP	Member survey[5]	Overall rating of mental/ emotional health	Descriptive
ACO, BH CP, LTSS CP	Member survey[5]	Functioning	Descriptive

[1]Measure specifications included as Appendix B
[2]ACO Quality Monitoring Measures
[3]ACO Quality Performance Measures
[4]CP Quality Performance Measures
[5]BH and LTSS member surveys are in development and measures are subject to change
Abbreviations: Ambulatory care sensitive conditions (ACSCs)

RQ12 To what extent did member experience improve during the demonstration?

H12.1 Members will report improved overall ratings of their healthcare provider

Measures and rationale

The primary care survey includes questions on the member's overall rating of the provider and staff, as well as their willingness to recommend the provider. Although the BH and LTSS surveys have not been finalized, domains of inquiry are expected to encompass general satisfaction, overall rating of treatment, and engagement in the treatment plan for the BH survey, while the LTSS survey plans to collect information on choice of services, self-determination, personal safety, and community inclusion and empowerment.

Table RQ12. Data Sources and Measures of Member Experience

Population(s)	Data Source(s)	Measure	Analysis
Adult and Pediatric Member Experience: Primary Care			
ACO	Member survey	Overall rating of provider	Descriptive
ACO	Member survey	Willingness to recommend	Descriptive
ACO	Member survey	Office staff	Descriptive
Adult and Pediatric Member Experience: BH[1]			
ACO, BH CP	Member survey	General satisfaction	Descriptive
ACO, BH CP	Member survey	Overall rating of treatment	Descriptive
Adult and Pediatric Member Experience: LTSS[1]			
ACO, LTSS CP	Member survey	Choice of services	Descriptive
ACO, LTSS CP	Member survey	Personal safety	Descriptive
ACO, LTSS CP	Member survey	Self determination	Descriptive
ACO, LTSS CP	Member survey	Community inclusion and empowerment	Descriptive

[1]BH and LTSS member surveys in development and subject to change

G. **Domain 4:** Changes in healthcare cost trends

RQ13 To what extent were Medicaid total cost of care trends moderated for the ACO population?

H13.1 The rate of increase in the total cost of care for the ACO population will decrease

Measures and rationale

Healthcare costs will be quantified both in terms of the total dollars spent and in terms of per member per month expenditure rates. For each year, the expenditures will be described based on all MassHealth covered services and separately based on what services were included in the TCOC capitation rate (Model A ACOs and MCOs) or benchmark (Model B and C ACOs) for that year. When predicting and comparing expenditures across years, the common set of covered or TCOC services will be studied.

Model A ACOs (i.e., Accountable Care Partnership Plans) and MCOs will receive prospective capitated payments and will share risk for healthcare expenditures in excess or below the capitated rate. Model B (i.e., Primary Care ACOs) and Model C ACOs (MCO-Administered ACOs) will be at risk against a TCOC benchmark calculated for each year for a specified set of services. The ACOs TCOC performance (i.e., actual healthcare expenditures) will be compared against the benchmark to calculate shared savings or shared losses between the ACO and MassHealth. We will describe performance against the capitated rates for Model A ACOs and MCOs and we will describe performance against the TCOC benchmark for Model B and Model C ACOs, including the total amount of shared savings and losses payments, the number of organizations achieving shared savings and losses, and summary statistics describing the distribution of payments across organizations. The proportion of total payments to ACOs that are for administrative expenses versus member health care utilization will also be described. MassHealth payment rates to providers will also be described over the course of the baseline and Demonstration periods within healthcare utilization service categories.

To better understand changes in expenditure patterns over time that may be driving total cost of care performance, we will also evaluate expenditures by service categories such as inpatient (e.g., non-maternity physical health, maternity, behavioral health), ED visits, outpatient non-BH (lab and radiology, non-BH outpatient hospital), outpatient BH (e.g., Emergency Services Program, diversionary services), professional services, pharmacy, home health, durable medical equipment, emergency transportation, long-term care, other medical services, and services excluded from the TCOC (e.g., applied behavior analysis, Children's Behavioral Health Initiative, long term services and supports).

Table RQ13 Data Sources and Measures of Healthcare Costs

Population(s)	Data Source(s)	Measure	Analysis
MC, ACO, MCO, CPs, SPs	MassHealth reports; Medicaid claims/encounters	Total cost of care (all covered services)	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, CPs, SPs	MassHealth reports; Medicaid claims/encounters	Total cost of care (services included in TCOC cap/benchmark)	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO, CPs, SPs	Medicaid claims/encounters	Fee for service expenditures	Descriptive
ACO Model A, MCO	MassHealth reports	Capitated payments, actual healthcare expenditures, shared risk payments	Descriptive
ACO Model B and ACO Model C	MassHealth reports	Total cost of care versus benchmark, shared savings, and shared losses	Descriptive
MC, ACO, MCO, CPs, SPs	MassHealth reports; Medicaid claims/encounters	Expenditures for healthcare utilization by service category	1. O vs. E 2. Cross-temporal PS balanced DID
MC, ACO, MCO	Medicaid claims/encounters	Provider rates by healthcare utilization service category	Descriptive
MC, ACO, MCO	MassHealth reports	Payments to managed care entities for administrative expenses	Descriptive

H. Domain 5: Sustainability of innovative delivery system changes, including ACOs, Community Partners and Flexible Services

RQ14 To what extent will innovative delivery system changes including ACOs, CPs, and Flexible Services be sustainable without DSRIP funding?

H14.1 ACOs will develop strategies to continue to operate under an accountable and integrated care model after the Demonstration ends
H14.2 CPs will develop strategies to continue to operate under an accountable and integrated care model after the Demonstration ends
H14.3 ACOs will pursue strategies to continue to provide Flexible Services to members after the Demonstration ends
H14.4 The costs and effects of the ACO program will warrant continued investment
H14.5 The costs and effects of the CP program will warrant continued investment
H14.6 The costs and effects of the FS program will warrant continued investment

As outlined in the STCs and the DSRIP protocol, DSRIP is a 5-year investment to support the development and implementation of the ACO, CP, and Flexible Services initiatives, with the understanding that the state and CMS need to take a longer view than the demonstration period for the moderated cost growth to lead to accrual of large-enough cost savings to obtain breakeven point for DSRIP investments

The evaluation of the sustainability of the ACO (H14.1), CP (H14.2), and Flexible Services (H14.3) programs will involve a mix of qualitative and quantitative methods and data sources. The approach to addressing each of these hypotheses will be similar.

Data collected through annual phone-based interviews with ACO and CP representatives drawn from the entire universe of ACO and CP organizations will be enriched with data collected through in-person interviews with a more comprehensive set of respondents for a subset of ACOs and CPs. The interview protocols will be designed to identify and describe, from each organization's own perspective, the full spectrum of highly influential factors influencing ACO and CP plans for continuing to operate overall and for specific programs (e.g., Flexible Services) after the Demonstration. In contrast, the quantitative methods for evaluating program sustainability will be conducted from the perspective of MassHealth. Specifically, we will first examine return on investment (ROI) by estimating the extent to which DSRIP investments (e.g., $1.06 billion in the ACO program, $0.5 billion in the CP program) produced healthcare cost savings that partially offset or exceeded the investments during the five-year Demonstration period and over a ten-year period extending five years beyond the Demonstration. Secondly, we will conduct cost-effectiveness analyses for select outcomes expected to be beneficially affected by the Demonstration. We will estimate the incremental cost-effectiveness ratios (ICERs), the incremental investment required to obtain an additional beneficial outcome (e.g., additional dollars spent per hospitalization avoided).

a. Data sources and target population

Qualitative data will be collected through semi-structured interviews with ACO and CP representatives in FY21. These are the same interviews described under Domain 1 (one interview for each of 17 ACOs and one interview for each of 27 CPs) designed to track implementation across all ACOs and CPs. We will include specific interview questions in the key informant guides for FY21 to elicit responses about ACO and CP about plans for continuing to operate as accountable and integrated delivery systems absent DRSIP funding, and the factors that facilitate and impede sustainability of the model overall and its component parts, including Flexible Services and ACO/CP partnerships. In turn, the case studies of select high and low-performing ACOs and CPs in FY22 (the final year of the demonstration) described in more detail under Domain 1 will provide a more in-depth examination of sustainability issues and the full range of factors that will likely influence stakeholder decision-making on this front. The case studies will also be a chance to understand how ACOs and CPs with varying levels of performance (as defined by accountability scores) describe their approach to sustainability. As noted under Domain 1, we anticipate five case studies of ACOs and six case studies of CPs, purposefully sampled to reflect performance variation.

The aim of this two-pronged approach is to assess sustainability across all ACOs at a high-level (i.e., determine which ACOs plan to maintain CP partnerships and which do not) and to probe more deeply among a sub-sample of ACOs and CPs about decision-making related to maintaining DSRIP-funded innovations (i.e., barriers, facilitators, modifications). Questions about sustainability will be incorporated into a case study protocol designed to understand the operational conditions that distinguish high and low performing ACO/CP partnerships as defined by healthcare quality and cost performance. We may select ACOs with the largest amount of

shared savings and shared losses (standardized for the size of their attributed populations). The calculation of shared savings and losses involves both performance against the ACOs' TCOC benchmark and performance on the ACO quality measure slate.

Quantitative data will be used to measure costs and outcomes of ACOs, CPs, and Flexible services. Data sources include:

1) *Member-level Medicaid claims and encounter data,* including enrollment, claims, and encounter data for members enrolled in ACOs, CPs, those receiving Flexible Services, and comparison group members. Claims/encounter data will be used to identify individuals who participate in ACO, CP, and Flexible Services programs and to calculate costs and claims-based effectiveness measures in participant and comparison groups in each Demonstration year.
2) *Program costs*. Program costs for ACOs, BH CPs, LTSS CPs and Flexible Services will be obtained from MassHealth. State Operations and Implementation funding will be divided among the ACO, CP, and Flexible Services programs. Components of program costs for each program are detailed below.

Measures and rationale

Measures to be collected through qualitative interviews during ACO site visits are described in Table RQ14a, while quantitative measures are described in Table RQ14b.

Qualitative measures will capture information on the perceived value of operating as an ACO or CP, as well as the perceived value of ACO components including specific DSRIP-funded innovations and flexible services. Qualitative measures will also capture information on the perceived value of ACO and CP partnerships from the ACO and CP perspectives. For ACOs and CPs, we will examine the facilitators and barriers to maintaining the organizational structures and innovations established under DSRIP and plans for maintaining these innovations and with what modifications going forward. These data will provide insight into organizational decision-making. Although the costs and effects associated with various elements of DSRIP will be important inputs influencing decisions regarding program continuation, numerous other individual (e.g., characteristics of the decision-makers), organizational (e.g., financial stability, workforce dynamics), system (e.g., workforce capacity) and contextual factors (e.g., state and federal policy) feature prominently in sustainability decisions. The measures specified for this case study approach are expected to reveal these multifaceted and interacting factors.

Table RQ14a Qualitative Data Sources and Measures

Data Collected	Tools	Measures
ACO plans for continuing to operate as an ACO	Semi-structured interviews (FY21), site visits (FY22)	• Perceived value of operating as an ACO • Facilitators and barriers to continuing to operate as an ACO • If and how ACO status will be maintained
ACO plans for maintaining DSRIP-funded care delivery innovations	Semi-structured interviews (FY21), site visits (FY22)	• Perceived value of the care innovations funded by DSRIP • Facilitators and barriers to maintaining innovations funded by DSRIP • If and how DSRIP-funded innovations will be maintained
ACO plans for continuing to invest in flexible services	Semi-structured interviews (FY21), site visits (FY22)	• Perceived value of flexible services • Facilitators and barriers to maintaining Flexible Services • If and how Flexible Services will be maintained
ACO plans for continuing to partner with CPs	Semi-structured interviews (FY21), site visits (FY22)	• Perceived value of CP collaborations • Facilitators and barriers to maintaining CP collaborations • If and how CP collaboration will be maintained
CP plans for continuing to operate as a CP	Semi-structured interviews (FY21), site visits (FY22)	• Perceived value of operating as a CP • Facilitators and barriers to continuing to operate as a CP • If and how CP status will be maintained
CP plans for continuing to partner with ACOs	Semi-structured interviews (FY21), site visits (FY22)	• Perceived value of ACO partnerships • Facilitators and barriers to maintaining ACO partnerships • If and how ACO partnerships will be maintained

Quantitative measures of costs and effects at the program level will complement the information derived from ACO and CP case studies.

Costs will be calculated from the perspective of the state and are described separately for the ACO, CP, and Flexible Services programs below. Additional information on the ACO program and the member and program costs for each model type can be found in the model contracts and appendices[4] .

Member and program costs for ACOs will include several components that will differ by ACO model. Risk sharing and shared savings payments to ACOs were grouped as costs related to care delivered to members because the payments are directly tied to member expenditures, and we expect risk-sharing arrangements to be a necessary component of the ACO program beyond the Demonstration period.

[4] See https://www.commbuys.com/bso/external/bidDetail.sdo?docId=BD-17-1039-EHS01-EHS01-00000009207&external=true&parentUrl=bid

Model A (Accountable Care Partnership Plans)

Costs Related to Care Delivered to Members

- Capitated per member per month payments including administrative costs and post-hoc adjustments for risk corridors for specific service categories (Children's Behavioral Health Initiative, applied behavior analysis, hepatitis C drugs, non-HCV high cost drugs) as well as contract-wide risk sharing payments
- Payments for non-ACO covered services

Program Costs

- DSRIP ACO startup and ongoing payments (non-at-risk and earned at-risk)
- State Operations and Implementation funding

Model B (Primary Care ACOs)

Costs Related to Care Delivered to Members

- Member healthcare costs
- Administrative payments
- Shared savings for services included in the total cost of care benchmark

Program Costs

- DSRIP ACO startup and ongoing payments (non-at-risk and earned at-risk)
- State Operations and Implementation funding

Model C (MCO Administered ACOs)

Costs Related to Care Delivered to Members

- Member healthcare costs
- Administrative payments to MCOs
- Shared savings for services included in the total cost of care benchmark

Program Costs

- DSRIP ACO startup and ongoing payments (non-at-risk and earned at-risk)
- State Operations and Implementation funding

Member and program costs for BH and LTSS CPs

- Member healthcare costs
- CP Infrastructure investments
- CP Care coordination PMPM
- CP Outcomes based payments
- State Operations and Implementation Funding

Flexible Services program costs will be detailed when finalized by MassHealth. Member and program costs are expected to include:

- Member healthcare costs
- Flexible services DSRIP funding
- State Operations and Implementation Funding

Costs included in the evaluation of the ACO program will include costs for all ACO enrollees, including Flexible Services and CP program expenditures for ACO enrollees:

- Member healthcare costs
- ACO program costs as described for each model above
- DSRIP Flexible Services funds (upfront funding, DSRIP payments, Operations and Implementation funding)
  - CP program costs for ACO enrollees

Member outcomes to be evaluated as effectiveness measures (the denominator of cost-effectiveness analyses) will include a subset of the claims-based measures included for evaluation in Domain 3 (Table RQ14b).

Table RQ14b Data Sources and Measures for Cost-Effectiveness Analyses

Population(s)	Data Source(s)	Cost Measure	Effectiveness Measures[1]	Estimate
ACO, SPs	Medicaid claims/encounters	Member and program costs	1. All-cause hospitalizations 2. ACSC hospitalizations	ICER
ACO, SPs	Medicaid claims/encounters	Member costs	1. All-cause hospitalizations 2. ACSC hospitalizations	ICER
BH CP, SPs	Medicaid claims/encounters	Member and program costs	1. All-cause readmissions for BH CP members 2. Primary care sensitive ED visits	ICER
BH CP, SPs	Medicaid claims/encounters	Member costs	1. All-cause readmissions for BH CP members 2. Primary care sensitive ED visits	ICER
LTSS CP, SPs	Medicaid claims/encounters	Member and program costs	1. All-cause readmissions for LTSS CP members 2. Long-term nursing home admissions	ICER
LTSS CP, SPs	Medicaid claims/encounters	Member costs	1. All-cause readmissions for LTSS CP members 2. Long-term nursing home admissions	ICER
Flexible Services, SPs	Medicaid claims/encounters	Member and program costs	1. All-cause ED visits 2. Primary care sensitive ED visits	ICER
Flexible Services, SPs	Medicaid claims/encounters	Member costs	1. All-cause ED visits 2. Primary care sensitive ED visits	ICER

[1]Measure specifications included as Appendix B

The claims-based measures were selected based on the extent to which success on a measure is expected to track with success of the program and the broader goals of the Demonstration. For example, a reduction in nursing home admissions for LTSS CP enrolled members closely aligns with the goal of the LTSS CP program of increasing community tenure (i.e., residence outside of an institutional setting), and can be interpreted as supportive of the broader sustainability of the MassHealth program by averting expensive nursing home care ($92,000 annually) (Genworth Financial, 2016). Similarly, effectiveness measures selected for the ACO (all-cause hospitalizations), CP (all-cause readmissions for CP members), and Flexible Services programs (all-cause

and primary care sensitive ED visits for Flexible Services recipients) are outcomes germane to the mechanisms (e.g., care coordination, PHM, addressing health related social needs) by which each program is expected to improve the care, health, and functioning of members. In other words, better managing member needs in the community setting, including during high-risk periods such as care transitions, is expected to mitigate health and social causes of acute care utilization.

b. Analytic approach

Qualitative analyses will involve both quantifying ACO/CP actions with respect to maintaining DSRIP-funded innovations as well as thematic analysis. For the data gathered across all ACO and CPs, we will describe sustainability program- wide and by ACO/CP partnerships that differ on key attributes (e.g., ACO model type, CP structure) using frequencies and percentages. For the qualitative data gathered during the site visits, we will use standard qualitative techniques as described in earlier sections, including using Atlas.ti to manage, code, and analyze interview data; establishing a coding framework and interrater-reliability; and performing content analysis to determine the major themes present in the interviews. Once all data are coded, we will generate code reports and analytic matrices to understand decision-making related to sustainability and the conditions that foster and hinder sustainability.

We expect that higher-performing ACO/CP partnerships may be more likely to sustain DSRIP-funded innovations than their lower-performing counterparts, but this may not be the case as other organizational factors are likely to influence decision-making including leadership, other stakeholder buy-in, technical capacity, etc. The 5 ACO and 6 CP case studies will allow us to explore sustainability across high and lower performing ACO/CP partnerships from the perspective of ACOs and CPs.

Quantitative analyses will consist of ROI and cost-effectiveness analyses, calculated separately for the ACO, BH CP, LTSS CP, and Flexible Services programs. The goal is to isolate the ROI and cost-effectiveness of each program from other aspects of transformation. In other words, the ROI for BH CPs will compare BH CP program costs and healthcare costs of members receiving BH CP support within the ACO model to estimated healthcare costs for those members in a scenario in which they received care in an ACO but did not receive CP support. A similar approach will be undertaken to evaluate the ROI of the LTSS and Flexible Services programs, and to evaluate cost-effectiveness measures of each program. However, to estimate the net healthcare cost savings for the ACO program inclusive of the entire program (the level at which ACO accountability scores are calculated), we will include ACO enrolled members who received CP support and Flexible Services. Because investments in the CP and Flexible Services programs will affect healthcare costs for ACO enrollees, these program costs will be included along with the ACO program specific costs.

Return on Investment: We will calculate the ROI of each program from a MassHealth perspective over a 5-year horizon, using the following formula. We will then project the return on investment calculated over a ten-year horizon. The components of this formula are described in detail below for each program (ACO,

CP, Flexible Services). The ROI of the CP program will be calculated separately for the LTSS and BH CPs.

Net Healthcare cost savings for CPs will be calculated as the difference between healthcare costs for CP enrolled members during the Demonstration and an estimate of the healthcare costs that would have accrued for CP enrolled members in the absence of the CP program, calculated as:

- *Healthcare costs with CPs*: Total cost of care to MassHealth of members receiving CP supports during the period of time members are enrolled with CPs. The total cost of care will be calculated based upon actual observed expenditures annually and summed over the 5-year Demonstration period.
- *Healthcare costs without CPs*: Estimated total healthcare costs over the 5-year Demonstration period to MassHealth among members eligible for CPs but who did not receive CP supports. To estimate healthcare costs for CP-eligible members in the absence of the CP program, we will identify a comparison group - a 1:1 matched cohort of members who would have been likely to receive CP supports if CPs had been available during the baseline period prior to the implementation of CPs. Separate matched cohorts will be constructed for each year of the Demonstration to account for changes in CP enrollee characteristics over time. Because costs for CP enrollees will be calculated during the time period members are enrolled with the CP (i.e., all members will not be enrolled for the full Demonstration year for which costs are being calculated), we will match the observation period during which costs are accrued for comparison group members to the time period CP enrollees were actually enrolled with the CP. This approach ensures costs are counted during equal periods of time, while also accounting for potential bias from seasonal variation in utilization patterns.

We chose a matched baseline comparison design instead of a self-controlled analysis of CP enrollees because identification for enrollment in the CP program is based in part on prior utilization patterns, which fluctuate year to year. In other words, in order to be identified for CP supports, CP enrollees were confirmed to have high utilization in the Demonstration period, and this utilization pattern is not assured for that same individual in the pre-implementation period.

Because members may become enrolled with CPs through referral by either MassHealth or other mechanisms (e.g., self-referral, ACO provider referral), two parallel matching processes will be carried out to assemble the comparison cohort. Analyses will then first be conducted separately in each group, and if estimates are similar across the groups defined by referral mechanism, a pooled analysis will be conducted. Members identified for CP enrollment by MassHealth based on fulfillment of established inclusion and exclusion criteria will be matched to members who also fulfill these criteria from the baseline period. Members referred to CPs by other referral pathways (e.g., providers, self, family), who may not fulfill the diagnosis and utilization requirements of the MassHealth eligibility criteria, will be propensity matched to similar baseline members irrespective of fulfillment of these criteria. The use of propensity score balancing methods will assemble a comparison cohort that

is highly similar to the CP enrolled members on observed characteristics. Recognizing that propensity score methods cannot directly account for differences in unobserved characteristics, this approach will be modified as needed based on the numbers and observed characteristics of groups of members referred through different mechanisms. To the extent possible, we will try to best identify comparison cohorts for members referred outside of the algorithm. If residual selection biases are suspected, a pre-post analysis will be conducted.

In order to estimate the effect of CPs independent of the effect of ACOs (i.e., contrasting ACO+CP versus ACO), the costs for each baseline comparison group (whose costs were measured in 2015-2017) must be adjusted to reflect the expected cost trends that would have occurred had the comparison group entered and been exposed to the ACO program. Therefore, we will estimate the trajectory of healthcare costs over five years if the comparison group members did not receive CPs but did otherwise receive care in an ACO. In the base case, we will assume that these members experienced a similar percentage change in total healthcare costs over the Demonstration period as ACO enrolled members who were not eligible for and did not receive CP supports (weighted to account for any differences in risk profiles). We will perform sensitivity analyses to evaluate alternative assumptions about the trajectory of healthcare expenditures in this group.

CP program costs will be calculated as the sum of the costs to MassHealth of implementing the CP program (i.e., infrastructure, care coordination, outcome based payments, and State Operations and Implementation funding), as detailed in the "Measures" section. To inform whether MassHealth should continue to invest after DSRIP, we will perform a second analysis where CP program costs will be calculated as the sum of the costs to MassHealth for continuing the CP program (i.e., care coordination, State Operations and Implementation funding). Note that other ACO program costs are not included in the analysis because we are evaluating only the ROI of the CP program in this analysis, and not the ACO as a whole.

Net healthcare cost savings for Flexible Services–

- *Healthcare costs with Flexible Services*: Total cost of care to MassHealth of members receiving Flexible Services will be calculated beginning on the first day Flexible Services were delivered and extending one-year beyond the last date of receipt. Alternative observation periods may be examined, informed by actual Flexible Services utilization patterns. The total cost of care will be calculated based upon actual observed expenditures annually and summed over the 5-year Demonstration period.
- *Healthcare costs without Flexible Services*: Estimated total healthcare costs over the 5-year Demonstration period to MassHealth among members eligible for Flexible Services but who did not receive Flexible Services.
- *Flexible Services comparison group*: The approach to comparison group selection described here for Flexible Services users will be modified as needed once full plans for the implementation are finalized. The analytic approach for the Flexible Services program will depend on a few factors. The receipt of Flexible Services will be based on the results of a Flexible Services assessment. If the information collected in the assessment is available for the

evaluation, we will seek to identify a comparison population of members who were eligible for Flexible Services but did not receive services (or were delayed) for administrative reasons (attenuating concerns of selection bias). If either the assessment data or a similar population of eligible members is unavailable, we will seek to select a baseline comparison group that is highly similar to Flexible Services users. However, if the receipt of Flexible Services is not well predicted by observed characteristics in the Medicaid administrative data (i.e., without the assessment data), it will be challenging to identify a comparable group of members from the baseline period. In this scenario, a pre-post analysis will be conducted, and we will interpret findings cautiously if the receipt of Flexible Services was strongly determined by baseline member expenditures.

- *Flexible Services program costs* will be calculated as the sum of the costs to MassHealth of implementing the Flexible Services program (i.e., Flexible Services DSRIP funding, Operations and Implementation funding) as detailed in the "Measures" section. Note that other ACO program costs are not included in the analysis because we are evaluating only the ROI of the Flexible Services program in this analysis, and not the ACO as a whole.

Net Healthcare cost savings for ACOs will be calculated using the same approach described above for CPs (i.e., using separate matched cohorts for each year of the Demonstration to account for changes in the types of members enrolled with ACOs over time). The net healthcare cost savings calculations will account for the different payment structures for ACOs by model type.

Net healthcare cost savings will be calculated as the difference between:

- *Healthcare costs with ACOs*: Total cost to MassHealth related to delivery of care to members enrolled with ACOs. As described in the measures section, this will include the cost of Flexible Services and CP supports delivered to ACO enrollees. The cost of care delivered to members will be calculated differently for each ACO model, then these costs will be summed to arrive at the total costs at the ACO program level.
- *Healthcare costs without ACOs*: Estimated total healthcare costs to MassHealth among members likely to have been in an ACO but who were not exposed to ACO based care.
    1. *ACO Comparison group*: To estimate healthcare costs for would-be ACO members in the absence of the ACO program, we will identify a 1:1-matched cohort of members who would have been assigned to an ACO based on their PCP affiliation if the Demonstration had been implemented during the baseline period. We will further use propensity score balancing methods to account for differences in demographic and clinical characteristics between the matched populations. To approximate what would have occurred in the absence of the Demonstration, we will adjust the costs for the baseline comparison groups (whose costs were measured in 2015-2017) to reflect the expected cost trends that would have occurred had the comparison group continued to be enrolled in the delivery system as it existed during the baseline period. In other words, to

account for secular trends, we will multiply the costs calculated for the comparison group during baseline period by the percent change in costs during each Demonstration year for a similar group of members that is unexposed to the Demonstration. In the base case, we will assume that these members experienced a similar percentage change in total healthcare costs during the Demonstration period as MassHealth members enrolled in MCOs who do not receive CP supports during the Demonstration. Thus, if the non-CP MCO population experienced a 3% increase in costs from the baseline to Demonstration year 1, we would multiply the costs for the comparison group population by 1.03 to estimate what costs would have been for the ACO population in the absence of the Demonstration. We will perform sensitivity analyses to evaluate alternative assumptions (e.g., extrapolation of historical trends in the managed care eligible population, Medicaid expenditure trends in other states) about the trajectory of healthcare expenditures in this group.

ACO program costs will include program costs for all ACO enrollees, including ACO model specific program costs, Flexible Services program costs, and CP program Costs for ACO enrollees, as detailed in the “Measures” section.

Projected 10-year ROI will be estimated by describing the functional form (e.g., linear, constant, exponential) of net healthcare savings and the components of program costs that will continue after the Demonstration (listed below by program), then using this functional form to extrapolate observed trends in net healthcare savings and program costs during the Demonstration period to the five years after the Demonstration. Future projections require strong assumptions regarding continuation of observed trends, and therefore findings will be interpreted cautiously in light of this limitation. Sensitivity analyses will be performed based upon a current understanding of plans for program continuation as of the end of the Demonstration period. For example, either ACOs or MassHealth could be responsible for care coordination payments to CPs and for funding of Flexible Services after DSRIP. Therefore, we will perform analyses for both scenarios.

Program costs for the five-years post-Demonstration will include:

ACOs

- Operations component of Operations and Implementation funding

CPs

- Care coordination PMPM (if paid by MassHealth post-DSRIP)
- Outcomes based payments (if paid by MassHealth post-DSRIP)
- Operations component of Operations and Implementation funding

Flexible Services

- Payments for Flexible Services (if paid by MassHealth post-DSRIP)
- Operations component of Operations and Implementation funding

Cost effectiveness analysis: We will measure cost-effectiveness in terms of the incremental cost per difference in clinical outcomes between the program populations and the comparison populations. Incremental Cost Effectiveness Ratios (ICERs) will be calculated over a 5-year horizon from a MassHealth perspective, using the formula:

Where:

Total costs with the program (ACO, CP, Flexible Services): is the sum of program costs and healthcare costs over five years among members in the program (methodology detailed above in description of ROI analysis).

Total costs without the program are the estimated member healthcare costs without BH CPs, methodology detailed above in description of ROI analysis.

Total outcomes with the program will be calculated as rates for utilization measures for each effectiveness measure listed in Table RQ14b among members enrolled with CPs.

Total outcomes without the program will be estimated as rates for utilization measures As with costs, the outcome values calculated for baseline comparison populations will be adjusted to reflect the expected outcome trends that would have occurred had the comparison group entered and been exposed to the Demonstration.

Deterministic sensitivity analysis (e.g., varying one or two key inputs at a time to examine if the findings change enough to alter the interpretation) and probabilistic sensitivity analysis (i.e., repeatedly drawing from distributions of plausible values for key variables measured with uncertainty, simultaneously, to better understand the range of plausible findings) will be conducted to evaluate the range of plausible results for all cost-effectiveness analyses based on uncertainty in healthcare costs and outcomes. Subgroup analyses will be performed to identify possible groups of members for which the DSRIP initiatives were more or less cost effective. Because cost-effectiveness thresholds are not well defined, and cost-effectiveness is one of many factors influencing sustainability, all ICERs will be interpreted in the context of the totality of the evidence accumulated from Domains 1-6. For ICERs that do not indicate dominance of one group (i.e., where costs and outcomes are both better for the same group), we will conduct additional analyses calculating ICERs without sunk program costs to inform the cost-effectiveness of the program if it were to continue beyond the Demonstration period.

RQ15 To what extent did alternative and value-based payments constitute an increasingly larger proportion of the payments to organizations and providers managing the care of MassHealth members?

H15.1 The number of members cared for in ACOs will increase
H15.2 ACOs and MCOs will engage in value-based payment arrangements with specialist providers
H15.3 ACOs and MCOs will engage in alternative payment models and value-based payment arrangements with hospitals
H15.4 The number of primary care practices participating in ACOs will increase

Data sources and target population

The evaluation of RQ15 will utilize semi-structured interviews (described in Domain 1) and information from existing documents (MassHealth enrollment reports, MassHealth provider records). The population of interest will vary by measure and will include either the population of members enrolled with an ACO, MCO, or CP.

Measures, rationale, and analysis

The shift from fee-for-service and traditional managed care to accountable care organizations, a type of alternative payment model (APM), will be examined in the overall managed care eligible population. Another form of APM is bundled payments to a provider or group of providers. We will collect information on ACO/MCO bundled payment arrangements with specialist providers and hospitals through semi-structured interviews and existing documents.

Because both ACOs and MCOs have already accepted risk for their attributed populations, we will focus on evaluating the extent to which the organizations are able to realign the incentives for providers by tying payments to performance in the form of value-based payments. Specifically, we plan to collect information from ACO administrators through semi-structured interviews and existing documents on the size and scope of value-based payment arrangements with PCPs, specialist providers, hospitals, and other providers.

All analyses for RQ15 are planned as descriptive analyses, tracking changes in measures over the entire Demonstration period. To the extent that necessary data elements are available and consistent for each ACO and MCO in each year of the Demonstration we will summarize using quantitative metrics such as frequencies, percentages, and averages.

Due to the sensitivity of information relating to specific contracts, all information will be collected in a manner that maintains confidentiality of specific contractual relationships. All reporting will be in aggregate at the ACO or CP program level (e.g., percentages of ACOs or providers within ACOs) to ensure a specific organization cannot be connected to a specific contracting practice. While this limitation precludes discussion of contracting practices in the context of a case study of a specific organization, we expect it will facilitate collection of more detailed information on contracting practices throughout the program.

Table RQ15. Data Sources and Measures for Value-Based Payment (VBP) Arrangements

Population(s)	Data Source(s)	Measure	Analysis
MC	MassHealth enrollment reports	Percentage of managed care eligible members in ACOs	Descriptive
MC	MassHealth records	Percentage of primary care practices caring for MassHealth managed care members that are participating in an ACO	Descriptive
ACO, MCO	Semi-structured interviews, existing documents	Percentage of ACOs/MCOs paying specialist providers VBPs and the average amount at risk in such arrangements	Descriptive
ACO, MCO	Semi-structured interviews, existing documents	Average amount at risk in PCP VBP arrangements	Descriptive
ACO, MCO	Semi-structured interviews, existing documents	Percentage of ACO/MCOs using bundled payments and/or VBPs with hospitals	Descriptive

I. **DOMAIN 6**: Effects of Specific DSRIP Investments and Actions

RQ16 To what extent can observed changes in care processes, outcomes, and costs be attributed to DSRIP?

H16.1 Improvements in care processes will be associated with DSRIP funded delivery system changes at the organizational and state level
H16.2 Improvements in member outcomes will be associated with DSRIP funded delivery system changes at the organizational and state level
H16.3 Moderated total cost of care trends will be associated with DSRIP funded delivery system changes at the organizational and state level
H16.4 The State and local context will modify the relationship between DSRIP with DSRIP funded delivery system changes and ACO quality and cost performance

a. Data sources and target population

Several qualitative and quantitative data sources will be used to evaluate RQ16 for the summative evaluation. Qualitative and survey methods applied in Domain 1 will provide data on DSRIP investments and organizational progress in DSRIP implementation and ACO core competencies. As part of Domain 1, this data will be used to develop organizational typologies (i.e., dichotomous, ordinal, or categorical variables) that can serve as exposure measures for Domain 6. Specifically, we will address questions regarding the extent to which care quality and cost vary for members receiving care from organizations with different typologies. In this way, we will estimate associations between organizational characteristics, such as DSRIP funded organizational change, and delivery system performance. We will additionally use data collected during site visits for case studies of high and low performing ACO/CP partnerships (described in detail under Domain 1: State, organizational, and provider-level actions promoting delivery system transformation, and under Domain 5: Sustainability of Innovative Delivery System Changes).

Quantitative data sources will include Medicaid administrative data and data from MassHealth's analytics vendor for select hybrid quality measures. Surveys of members will also serve as data sources providing information on member experience and outcomes. The population of interest will consist of members considered exposed to the program or organizational characteristic under study.

Measures and rationale

The measures to be studied for RQ16 will include a subset of the physical, BH, LTSS, member reported, and cost outcomes evaluated for adult and pediatric members under RQ11 and RQ13, respectively (Table RQ16). These measures were chosen so as to have multiple outcomes for each population (i.e., adults, children, LTSS, BH) and to represent diverse types of outcomes (health, utilization, member reported, and cost) considered most relevant to these populations. This diversity in outcomes is considered important for understanding potentially complex relationships between the many programs, organizational typologies, interactions between them, and outcomes for different populations. Ultimately, associations identified between organizational typologies and each outcome will direct future study and identify areas potentially amenable to specific policy levers.

Table RQ16 Data Sources, Outcomes, and Cost Measures

Population(s)	Data Source(s)	Measure[1]	Analysis
Health Outcomes for Adults			
ACO, MCO, CPs, SPs	Medicaid claims/ encounters	All-cause hospitalization[2]	Contemporaneous Propensity Score (PS) balanced comparisons[5]
ACO, MCO, CPs, SPs	Medicaid claims/ encounters	All-cause hospital readmissions[3]	Contemporaneous Propensity Score (PS) balanced comparisons[5]
ACO, MCO, CPs, SPs	Medicaid claims/ encounters	All-cause ED visits[2]	Contemporaneous Propensity Score (PS) balanced comparisons[5]
ACO	Medicaid claims/ encounters, analytics vendor extract	Controlling High Blood Pressure[3]	Contemporaneous Propensity Score (PS) balanced comparisons[5]
ACO	Medicaid claims/ encounters, analytics vendor extract	Comprehensive Diabetes Care: A1c Poor Control[3]	Contemporaneous Propensity Score (PS) balanced comparisons[5]
Health Outcomes for Pediatric Populations			
ACO, MCO, SPs	Medicaid claims/ encounters	NICU utilization[2]	Contemporaneous PS balanced comparisons[5]
ACO, MCO, SPs	Medicaid claims/ encounters	Pediatric asthma admissions[2]	Contemporaneous PS balanced comparisons[5]
ACO, MCO, SPs	Medicaid claims/ encounters	All-cause ED visits	Contemporaneous PS balanced comparisons[5]
Outcomes for BH Populations			
ACO, MCO, CPs, SPs	Medicaid claims/ encounters	ED visits for adults with mental illness and/or substance addiction[3]	Contemporaneous PS balanced comparisons[5]
ACO, MCO, CPs, SPs	Medicaid claims/ encounters	Hospitalizations for adults with mental illness and/or substance addiction	Contemporaneous PS balanced comparisons[5]
BH CP, SPs	Medicaid claims/ encounters	All-cause readmissions among BH CP members[4]	Contemporaneous PS balanced comparisons[5]
Outcomes for LTSS Populations			
CPs, SPs	Medicaid claims/ encounters	Community tenure: BH and LTSS CP members[4]	Contemporaneous PS balanced comparisons[5]
LTSS CP, SPs	Medicaid claims/ encounters	All-cause readmissions among LTSS CP members[4]	Contemporaneous PS balanced comparisons[5]
Member Reported Health Outcomes			
ACO	Member survey	Overall rating of health	Contemporaneous PS balanced comparisons[5]
ACO	Member survey	Overall rating of mental/emotional health	Contemporaneous PS balanced comparisons[5]
LTSS, BH, CPs	Member survey	Functioning	Contemporaneous PS balanced comparisons[5]
Cost Outcomes			
ACO, CPs, MCO, SPs	Medicaid claims/ encounters	Total cost of care (all covered services)	Contemporaneous PS balanced comparisons[5]

Population(s)	Data Source(s)	Measure[1]	Analysis
ACO, MCO, CPs, SPs	Medicaid claims/encounters	Expenditures by service category (outpatient, inpatient, post-acute, lab, pharmacy, LTSS)	Contemporaneous PS balanced comparisons[5]

[1]Measure specifications included as Appendix B
[2]ACO Quality Monitoring Measures
[3]ACO Quality Performance Measures
[4]CP Quality Performance Measures
[5]Comparisons that occur during an overlapping period of time (e.g., the same Demonstration year) between a segment of the ACO/MCO population that is exposed to a specific program (e.g., Flexible Services) or organizational characteristic of interest (e.g., integrated care) and a similar group of ACO/MCO enrollees that are not exposed to that characteristic.

Analysis plan

We propose to evaluate the relationship between observed delivery system transformation and changes in performance using mixed methods. We will link data gathered under Domain 1 about high-level ACO organizational structures (e.g., provider reimbursement model), processes (e.g., PHM strategies) and implementation progress with ACO-level claims-based outcome and cost measures to compare outcomes between groups of members cared for by ACOs with divergent characteristics. Recognizing that there are only 17 ACOs, and further that certain typologies may be uncommon and there may be relatively few members enrolled in ACOs with a specific typology, we will perform power calculations prior to implementing each comparison and we will interpret underpowered analyses as exploratory. We will additionally use case studies of high and low performing ACO/CP partnerships to assess stakeholder views on if and how DSRIP funding and initiatives impacted care delivery and performance.

The timing of member exposure to Demonstration programs will be captured in an exposure attribution data infrastructure.[5] In addition to capturing the timing of enrollment with ACOs and CPs, the exposure attribution data infrastructure will track when members are exposed to specific ACO organizational characteristics (which may be dichotomous, categorical, or ordinal depending on the empirical structure of the data for a given characteristic), to the extent that such characteristics have been organized into typologies in Domain 1. Furthermore, we will capture important state and federal contextual effects to which members may be exposed differentially based upon time, geography, or other factors. If ACO/MCO enrollees are exposed differentially to important contextual factors, we will also conduct analyses to examine effect measure modification (e.g., was the effect of a Demonstration program different in a specific city than outside of the city because of health-related municipal policies that acted synergistically with the Demonstration) (VanderWeele, 2012).

To estimate the effects of specific exposures (e.g., integrated care, Flexible Services, state contextual factors) that are expected to contribute to the aggregate member and cost outcomes reported in Domains 3 and 4, we will perform a series of

[5] We will set up an analytic data set that classifies each day/month/quarter/year of the study period for each MassHealth member as either exposed or not exposed (or partially exposed, as appropriate, if data are categorical or ordinal with more than two levels) to each type of program (e.g., CPs, ACOs), organizational attribute (e.g., integrated care), and state context (e.g., county level public health initiative) that is of interest for the evaluation.

propensity score balanced comparisons separately for each exposure of interest within the ACO/MCO enrolled population over the course of the Demonstration period. For exposure-outcome relationships that were also evaluated cross-temporally, these analyses using a contemporaneous comparison group will shed light on the extent to which findings are robust to alternative analytic approaches. Contemporaneous comparisons will only be made in situations where based on actual DSRIP implementation, there is a valid comparison group for the exposed group of interest. For example, if implementation of the CP programs occurs in such a way that a similar group of CP eligible members are present in the ACO and MCO populations during the Demonstration, we will compare the CP enrollees to the CP eligible members who were not enrolled and had no history of enrollment. Within the propensity balanced cohorts, logistic, Poisson (or Poisson variants, as appropriate), and linear models will be used for analyses of dichotomous (yes/no), rate (e.g., hospitalizations per 100 person-years), and continuous (e.g., expenditures) outcome measures, respectively. If valid Demonstration period comparison groups are not available for key programs (e.g., Flexible Services) that also did not have valid pre-implementation comparisons groups (for evaluation in Domains 2-4), then we will perform within-member comparisons between the period before exposure and the period during exposure to the program (i.e., a pre-post analysis).

III. Demonstration Goal 3: Maintain near universal coverage

A. Introduction

Massachusetts leads the nation in health insurance coverage. Prior to, and following implementation of, the Affordable Care Act, Massachusetts incorporated several waves of state-level reform, facilitating near universal health insurance coverage in the state. Specifically, the Massachusetts uninsured rate is 3.7%, well below the national average of 8.8%.[6]

The current Demonstration invests in several programs to facilitate and sustain enrollment in insurance coverage. Some have been ongoing, such as: 1) expanded Medicaid eligibility; 2) streamlined redetermination procedures for select MassHealth members; 3) comprehensive enrollment materials and trainings to support consumer choice; 4) premium subsidies to low-income individuals to purchase commercial health insurance through the Health Connector; 5) premium assistance, coverage of out-of-pocket expenses and a coverage wrap for members with Employer Sponsored Insurance (ESI) through the Premium Assistance program; and 6) improved eligibility system and website/consumer functionality.

Other programs are new or newly funded by the Demonstration in the current Demonstration period, include: 1) Premium Assistance for the Student Health Insurance Program (SHIP); 2) Health Connector cost-sharing subsidies for members in ConnectorCare; and 3) the CommonHealth 65+ program.

SHIP Premium Assistance requires MassHealth students attending participating post-secondary schools in the state to enroll in school-sponsored insurance. The state provides premium and cost-sharing assistance, as well as benefit wrap-around coverage to ensure that the SHIP benefits are equivalent to MassHealth, including keeping out-of-pocket costs at the same level as if services were being received directly from MassHealth.

The ConnectorCare subsidies program provides premium assistance, cost-sharing, and gap coverage (until enrollment in ConnectorCare begins) to low-income adults. Prior to the current Demonstration approval, only premium assistance was federally matched. Following the current Demonstration approval, the cost-sharing subsidies and the gap coverage are now federally matched under this program.

Massachusetts residents age 65 and over are eligible to enroll in CommonHealth 65+, a program newly authorized for expenditure authority under the Demonstration. Individuals are eligible if they have disabilities and have paid employment for 40 hours or more per month.

The evaluation will describe trends in insurance coverage in Massachusetts during the Demonstration period and will compare trends in the state to those in comparison group

[6] CHIA 2017 Report: http://www.chiamass.gov/assets/docs/r/survey/mhis-2017/2017-MHIS-Report.pdf

states. In supporting analyses, membership in programs that support high rates of insurance will be tracked.

B. Goal 3: Maintain near universal coverage

Research Question*:* Has near-universal coverage in MA been maintained after implementation of Demonstration investments?

H1. Massachusetts will maintain near-universal coverage over the Demonstration period
H2. The percentage of MassHealth residents with a gap in coverage over 45 days will not increase over the study period (i.e. reduced churn)
H3. Massachusetts will maintain higher coverage, overall and among populations eligible for exchange subsidies, than states without premium and cost sharing subsidies.
H4. Enrollment in new and select ongoing programs funded with Demonstration investments supports near-universal coverage in Massachusetts, including:

- Health Connector premium subsidies
- Health Connector cost-sharing subsidies
- ESI Premium Assistance enrollment
- SHIP Premium Assistance enrollment
- CommonHealth 65+ enrollment

Study Design: The evaluation design will utilize a repeated cross-sectional approach to examine the trend in health insurance coverage prior to and after the current Demonstration period. We will compare the trend in coverage in Massachusetts to 23 states that are similar to Massachusetts but which do not offer premium and cost-sharing subsidies comparable to those offered by the Health Connector, overall and among populations eligible for exchange subsidies (< 300% FPL).

We will conduct secondary analyses tracking program enrollment in new Demonstration investment activities that support near-universal coverage, including SHIP Premium Assistance, CommonHealth 65+, and Connector Care cost-sharing subsidies. We also will track select ongoing Demonstration investment activities, including ESI Premium Assistance and Connector Care premium-sharing subsidies.

Finally, we will examine details of participation in new programs, describing length of enrollment and LTSS services used by CommonHealth 65+ participants. Without the CommonHealth 65+ authority, disabled seniors would potentially lose their MassHealth coverage for LTSS, which are not covered by Medicare or private health insurance.

Study Period: The evaluation period will begin 3 years prior to implementation of the current Demonstration period (CY 2015) and extend through the end of CY2022. We foresee that data through June 2020 will be included in the interim evaluation, and data through December 2022 will be included in the final report.

Data Sources:

1) *American Community Survey:* The American Community Survey (ACS) is an annual national survey conducted by the U.S. Census Bureau. The ACS collects

information about health insurance coverage nationwide and by state. Data are released annually. For 2016, the sample size in Massachusetts is approximately 46,000 housing units/group quarters per year, and the combined sample size in 23 states is approximately 1,133,000. Data will be available from three years prior to the current Demonstration period, 2015, through 2022. The Census Bureau disseminates files for public use. ACS is considered to be an appropriate data source comparing insurance coverage by state The ACS provides more robust state-level estimates than other national surveys (Current Population Survey, Behavioral Risk Factor Surveillance System) and less complicated questions than National Health Insurance Survey (Reschovsky, et al). For Massachusetts, estimates of insurance in MA has been demonstrated to be similar to Massachusetts-specific survey (Skopec, et al). Nevertheless, validity of the ACS in identifying health insurance coverage will be assessed by comparing estimates of MassHealth coverage in Massachusetts via ACS and MassHealth enrollment numbers. If there is a measurable discrepancy, we will describe and discuss the extent to which the estimates of overall insurance coverage in Massachusetts may be under- or overestimated by survey data.

2) *Program enrollment data:* We will use program reports and other summary data to track enrollment in MassHealth programs. We will obtain these data sets and operational statistics from MassHealth and the Health Connector. The data sets will include:

- *The Health Connector subsidy program data:* These data will come from summary reports from board meetings as well as summary reports of Qualified Health Plan coverage.
- *ESI Premium Assistance program data:* The program data will provide annual figures for the number of members enrolled in the program.
- *SHIP Premium Assistance program data:* These data will provide annual figures for the number of members enrolled in the program.
- *CommonHealth 65+ program data:* These data will provide annual figures for the number of members enrolled in the program.

3) *Medicaid administrative data:* MassHealth Medicaid Management Information Systems (MMIS) enrollment data will be used to evaluate study population enrollment.

Study Population: The study population to examine hypotheses H1 and H2 will consist of all MA residents. Annual estimates of the percentage insured will be obtained from approximately 46,000 annual MA respondents to the ACS. We will use data from two years prior to the current Demonstration period, CY2015, through the most recent available, CY2022. For supporting analyses tracking enrollment in specific programs, the study populations will consist of enrollees in SHIP Premium Assistance (approximately 30,000 enrollees annually), Premium Assistance for ESI (approximately 23,000 enrollees annually), CommonHealth 65+ (approximately 5,720 enrollees annually), and Health Connector premium subsidy and cost-sharing subsidy recipients (approximately 240,000 per year). For ongoing programs, we will track estimates from two years prior to the current Demonstration period, CY2015, through the most recently

available data, 2022. For new programs, we will track enrollment over the Demonstration period.

Comparison Group: The comparison group will consist of 23 states that are similar to Massachusetts in their Medicaid eligibility criteria, but who do not provide income-based subsidies in addition to federal subsidies. The 23 states are: AL, AZ, AR, CA, DE, IL, IN, IA, KY, MD, MI, MT, NV, NH, NJ, NM, ND, OH, OR, PA, RI, WA, WV. These states were chosen based on the following criteria:
1) Medicaid Eligibility criteria similar to Massachusetts (~138% FPL for childless adults);
2) states that do not provide income-based subsidies on top of federal subsidies; and
3) states that have not had changes to Medicaid eligibility in the past year. We recognize that there may be additional differences between Massachusetts and the comparison group states that may account for differences in health insurance coverage. We will control for additional socio-demographic variables in the analysis (see below). Details of the rationale for selecting these states are available in Appendix E.

Data from these states will be used to estimate what the insurance rate would have been for Massachusetts in the absence of Health Connector subsidies. Given the varied and multiple Medicaid programs that are implemented in other states, it is not feasible to identify comparison group states to isolate the effect of the other specific Massachusetts programs (Premium Assistance for ESI, SHIP Premium Assistance, CommonHealth 65+) by identifying states that are similar to the state in all aspects except for presence of these programs.

In addition to the 23 comparison group states described above, we will also compare health insurance coverage in Massachusetts to national estimates. This comparison will provide insight into the effects of any relevant federal policy changes on insurance rates in Massachusetts relative to the nation as a whole.

There will be no comparison group for the secondary analyses, that is, the analyses tracking enrollees in each of the Demonstration activities. These population-based measures will be tracked to provide supporting evidence for the continued high insurance coverage in the state. Given that each of these programs have been implemented state-wide, it will not be feasible to identify groups for whom the programs were not available to understand what would have happened to these populations in Massachusetts in the absence of Demonstration activities.

Measures: Measures will be identified in the ACS or program enrollment data, as appropriate. Each measure will be reported on an annual basis.

- Number and fraction of MA residents less than 65 years old that are uninsured, and number and fraction of residents of 23 comparison states less than 65 years old who are uninsured- ACS data
- Number of individuals who take up Qualified Health Plan coverage with assistance from the Massachusetts Health Connector subsidy program, Connector Care – Program enrollment data
- Number of individuals in the Premium Assistance for ESI program – Program enrollment data
- Number of individuals who access Health Safety Net – Program enrollment data

- Number of individuals who are enrolled in SHIP Premium Assistance annually
- Average length of enrollment in SHIP Premium Assistance – Program enrollment data
- Number of individuals who are enrolled in CommonHealth 65+ annually – Program enrollment data
- Length of enrollment, and LTSS received by CommonHealth 65+ enrollees – Program enrollment data

Data Analysis: We will present descriptive statistics of the percentage of MA residents uninsured during each calendar year. In each calendar year, we also will compare the percentage uninsured in MA to comparison group states and US overall and we will use generalized estimating equation models to estimate predicted probabilities of being uninsured in Massachusetts and the comparison states adjusting for relevant confounding variables (e.g., age, education, receipt of Supplemental Security Income (SSI). Analyses will be performed overall, by resident employment status (student, employed, other), and by income level.

This analysis is subject to limitations. Given the varied and multiple Medicaid programs that are implemented in other states, it is not feasible to identify comparison group states to isolate the effect of the other specific Massachusetts programs (Premium Assistance for ESI, SHIP Premium Assistance, CommonHealth 65+) by identifying states that are similar to the state in all aspects except for presence of these programs. Estimates of the percentage of members with health insurance coverage are obtained from survey data, which may underestimate the percentage with coverage (Skopec et al).

The percentage of MassHealth members with a 45 day or longer gap in coverage during a one-year period will be calculated quarterly. A time series approach will be used to evaluate the trends in the percentage with a gap, prior to and after the Demonstration period. Segmented regression analysis, using generalized estimating equations, will be used to evaluate trends prior to and after the start of the current Demonstration period.

Descriptive statistics will be presented to describe the number and percentage of MassHealth members enrolled in each program detailed above. Measures will be presented annually over the Demonstration period. For those programs which existed prior to the current Demonstration period, we will present data starting in 2015. While the data will be reported on an annual basis, some data sources contain monthly capture of various activities (e.g., the number of Demonstration eligible accessing premium assistance for ESI), while other data are only available on an annual basis. Data will be presented in tables and graphs in order to display trends over time for each population-level measure.

Evaluation questions, measures, data sources, and analytic approach are summarized in Table 8 (next page).

Table 8: Goal 3 | Maintain universal coverage

Evaluation Question	Evaluation Hypotheses	Measure [Reported for each Demonstration Year]	Recommended Data Source	Analytic Approach
Has near-universal coverage in MA been maintained after implementation of Demonstration?	MA residents will continue to have near universal health care coverage	Number (%) of MA residents with insurance	American Community Survey	Descriptive statistics (frequency and percentages); GEE models (adjusted predicted probabilities)
Has near-universal coverage in MA been maintained after implementation of Demonstration?	The percentage of MassHealth members with a 45-day gap in coverage during one year will not increase over the study (i.e. reducing churn)	Number (%) of MassHealth members with a gap in coverage 45 days or longer in one year	MassHealth claims/encounter data	Descriptive statistics (frequency and percentages); GEE models
Has near-universal coverage in MA been maintained after implementation of Demonstration?	MA will maintain higher coverage, overall and among populations eligible for exchange subsides, than states without premium and cost sharing subsidies	Number (%) of MA residents with insurance Number (%) of comparison state residents with health insurance Number (%) of US residents with health insurance	American Community Survey	Descriptive statistics (frequency and percentages); GEE models (adjusted predicted probabilities)
Has near-universal coverage in MA been maintained after implementation of Demonstration?	Enrollment in *new and select ongoing programs* funded with Demonstration investments supports near-universal coverage in Massachusetts	Number of individuals using cost sharing subsidies in MA	Health Connector subsidy program data	Descriptive statistics (frequencies)
Has near-universal coverage in MA been maintained after implementation of Demonstration?		Number of individuals enrolled in ESI Premium Assistance	ESI program data	Descriptive statistics (frequencies)
Has near-universal coverage in MA been maintained after implementation of Demonstration?		Number of individuals enrolled in SHIP Premium Assistance	SHIP program data	Descriptive statistics (frequencies)

Evaluation Question	Evaluation Hypotheses	Measure [Reported for each Demonstration Year]	Recommended Data Source	Analytic Approach
Has near-universal coverage in MA been maintained after implementation of Demonstration?		Number of individuals enrolled in CommonHealth 65+	CommonHealth 65+ program data	Descriptive statistics (frequencies)
How long do enrollees participate in SHIP Premium Assistance?	Enrollment in *new and select ongoing programs* funded with Demonstration investments supports near-universal coverage in Massachusetts	Average length of enrollment in SHIP Premium Assistance	SHIP program data, MMIS enrollment data	Descriptive statistics (mean (SD), median, range)
How long do enrollees participate in CommonHealth 65+?	Enrollment in *new and select ongoing programs* funded with Demonstration investments supports near-universal coverage in Massachusetts	Average length of enrollment in CommonHealth 65+	CommonHealth 65+ program data, MMIS enrollment data	Descriptive statistics (mean (SD), median, range)
What MassHealth-covered LTSS healthcare services do CommonHealth 65+ enrollees use?		LTSS received by CommonHealth 65+ members	CommonHealth 65+ program data, MMIS claims data	Descriptive statistics (mean (SD), median, range)

IV. Demonstration Goal 4: Sustainably support safety net providers to ensure continued access to care for Medicaid and low-income uninsured individuals

A. Introduction

The Safety Net Care Pool (SNCP) has been a Demonstration component since July 2005. Massachusetts uses SNCP authorities to provide financial support to the most critical MassHealth safety-net providers; to fund certain state health programs; to pay hospitals, community health centers (CHCs), and institutions for mental diseases (IMDs) for services provided to uninsured and low-income individuals; and to support delivery system transformation and infrastructure and capacity building for safety net providers. The total SNCP expenditure authority is over $1.8 billion in the first year of the current Demonstration period (representing a $0.6 billion increase compared to the prior year), and will then decrease over the course of the Demonstration period.

Changes to the SNCP have been implemented in the current Demonstration period. Compared to past Demonstration periods, a greater portion of the SNCP will be tied to incentive-based payments to promote delivery system transformation. The programs impacted by this shift include DSRIP, Public Hospital Transformation and Incentive Initiatives (PHTII), and Safety Net Provider Payments (SNPP).

DSRIP is described above in Section II. In Massachusetts, Cambridge Health Alliance (CHA) is the sole recipient of PHTII payments. CHA is Massachusetts' only non-state, non-federal public acute hospital, and is a key participant in delivery system transformation. Prior to the current Demonstration period, up to 30% of PHTII payments were tied to performance on quality improvement measures. In the new Demonstration period, an increasing portion of PHTII funding will be at-risk based on two activities: 1) Participation in an ACO model and demonstrated success on corresponding ACO performance measures (specifically the same performance goals established under DSRIP); 2) Continuation and strengthening of initiatives approved through PHTII in the prior Demonstration period, including, but not limited to, initiatives focused on behavioral health integration and demonstrated success on corresponding performance measures.

The Disproportionate Share Hospital-like (DSH-like) pool authorizes payments for uncompensated care provided to Medicaid and low-income uninsured individuals. Under the Demonstration, a new component of the DSH-like pool is SNPP, intended to provide ongoing financial support to the state's safety-net hospitals. These hospitals serve a disproportionately high number of Medicaid and uninsured patients, and have budget shortfalls related to providing large volumes of care that is uncompensated.

Under the SNPP program, Massachusetts may make payments to eligible hospitals, in recognition of safety net providers in Massachusetts that serve a large proportion of Medicaid and uninsured individuals and have a demonstrated need for support to address uncompensated care costs. These payments are intended to provide ongoing and necessary operational support. An increasing portion of these payments, from 5 percent in Year 1 to 20 percent in Year 5, will be at risk and hospitals will be required to meet the same performance goals established for DSRIP in order continue to receive these payments.

Though the total SNCP funding will reduce over time, efficiencies in care gained through ACO transformation coupled with improvements in performance measures resulting from increasing the portion of funding at risk is expected to promote sustainability of safety net providers. The current evaluation will examine the impact of changes to the SNCP on healthcare quality measures and uncompensated care costs at Safety Net Hospitals.

B. Goal 4: Sustainably support safety net providers to ensure continued access to care for Medicaid and low-income uninsured individuals

Research Question: What is the impact of safety-net funding investments on safety-net provider hospital quality performance and financial sustainability?

> **H1.** Increasing the portion of at-risk funding for safety-net hospitals under the PHTII and SNPP will be associated with improved care quality at these sites.
> **H2.** Despite a reduction in total supplemental payments provided through the Safety Net Care Pool over time, the amount of uncompensated care costs will not increase relative to trends prior to the current extension.

Study Design: To evaluate H1 for CHA, we will utilize a quasi-experimental interrupted time series approach to compare trends in hospital performance targets, measured three times per year, prior to and after the current Demonstration period. A smaller number of data points will be available for the other safety net hospitals and we will thus not have sufficient data to use a time series approach to evaluate H1 for these hospitals. We will therefore employ a difference-in-difference approach, using modeled estimates of quality measures in the post-demonstration period based on baseline measures (2015-2017), as described in *Section II, Subsection F, Subsection c,* to estimate what the quality measures would have been in the absence of the demonstration activities. As described below in the "Comparison Group" section, it is not feasible to identify a clear external comparison group, so we will use a time series approach for those analyses for which we have multiple data points per year and use difference in difference methodology as our comparison group.

To evaluate H2, we will conduct descriptive analyses to examine trends in uncompensated care costs before and after supplemental payments, prior to and during the current Demonstration period.

Study Period: To evaluate both hypotheses, the study period will begin in 2015 and continue through 2022. We foresee that data through June 2020 will be included in the interim evaluation, and data through December 2022 will be included in the final report.

Data Sources:

1) *PHTII Reports for Payment:* CHA provides tri-annual reports that hospitals under these programs will be required to submit, detailing key accomplishments in the reporting period towards the associated metrics, and outcome and improvement measures. Reports will be available from 2015 through 2022. Details of the measures reported in the PHTII that will be used in the analysis are provided in Appendix F.

2) *Uniform Medicaid & Uncompensated Care Cost & Charge Report (UCCR*): The Massachusetts Executive Office of Health and Human Services (EOHHS) Office of Medicaid requires hospitals to submit cost, charge and patient day data via the Uniform Medicaid and Uninsured Uncompensated Care Cost & Charge Report ("UCCR"). This data is used to ensure compliance with Uncompensated Care Cost Limit Protocol approved by the Centers for Medicare and Medicaid Services ("CMS") on December 11, 2013. In addition, EOHHS uses the data to calculate the preliminary payment amounts for certain supplemental payments. These reports contain cost data from Medicare cost reports, in addition to data provided by MassHealth, on supplemental payments to safety-net hospitals. The reports are generated annually and are available from 2015 through 2022. Details of the contents of the reports can be found at: http://www.mass.gov/eohhs/docs/masshealth/provlibrary/wcp-uccr-instructions-03-17.pdf

3) *Medicaid administrative data:* MassHealth MMIS enrollment, medical claims/ encounter files, and pharmacy claims files will be used to calculate quality measures for the 14 safety net hospitals.

Study Population: The study population for these analyses will be members served by CHA and the 14 safety-net hospitals eligible for Safety Net Provider Payments.

Comparison Group: Because PHTII payments will be distributed to CHA and SNPP payments will be distributed to other eligible safety-net hospitals in the state, a clear comparison group, that is, one that will estimate evaluation outcomes in the absence of the Demonstration activities, does not exist. Because PHTII quality metrics are available on a tri-annual basis, we will have enough data to adopt a time-series approach. The design is widely used and considered one of the strongest quasi-experimental designs for several reasons (Penfold, 2013; Shadish, 2001). First, the ITS design utilizes data from a larger number of time points than other quasi-experimental designs. Second, because ITS compares trends over time rather than data from single time points, the design also allows for evaluation of differential effects over various time frames, controls for confounding variables including seasonality, and controls for secular trends in the population. With this approach, estimates of what the evaluation measures would have been in the absence of the Demonstration can be estimated based on trends during the period prior to the Demonstration period.

Performance metrics for the 14 safety-net hospitals will be available on an annual basis, and we will therefore adopt a difference-in-difference approach, similar to the methodology used above in Goal 3, the comparison group will be estimated using baseline measures (2015 – 2017), adjusting for demographic and clinical characteristics of the patient population, to compare observed outcomes to estimated outcomes in the absence of current demonstration activities during each year of the study period.

Measures: Measures are defined as follows:

- ACO quality performance measures defined for DSRIP (CHA and other safety-net hospitals). See Appendix B. These measures include HEDIS-defined measures of access such as (HEDIS, 2018):

    - Initiation and Engagement of Alcohol and Other Drug Dependence Treatment (IET)
    - Prenatal and Postpartum Care (PPC)
    - Adults' Access to Preventive/ Ambulatory Health Services (AAP)
    - Children's and Adolescents' Access to Primary Care Practitioners (CAP)
    - Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics (APP)
- ACO participation and the measure slate outlined in the PHTII protocol, for ongoing initiatives related to behavioral health integration (CHA only) (See Appendix F for the Measure Slate for CHA)
- Uncompensated care costs prior to and after supplemental payments

Data Analysis:
For H1, an interrupted time series approach will be used to compare the change in trends in PHTII performance measures pre- and post-demonstration period. The hospital-level outcome measures will be obtained from the *PHTII Reports for Payment.* We will adjust the hospital level measures, if necessary, for potential changes in patient characteristics using a multi-stage approach. To do so, we will use MassHealth enrollment and claims/encounter data, to examine, with descriptive statistics, whether selected demographic and clinical characteristics of patients receiving care at CHA (as identified in the claims/encounter data) change over the course of the evaluation period. If we find this to be the case, we will evaluate, using multivariable statistical models, the association between patient characteristics and selected quality measures. If we find an association to exist, we will build a statistical model using data collected during 2015-2017 to describe the relationship, and use this model to estimate the projected quality measures in each evaluation year, 2018-2022, given observed changes in patient characteristics.

To evaluate changes in performance measures at the other 14 safety net hospitals, we will first use descriptive statistics to evaluate change in performance measures annually for each year of the Demonstration period. We will next utilize a difference-in-difference approach to compare changes in performance measures over the demonstration period to changes that would be expected in the absence of Demonstration activities. First, we will develop multivariable statistical models for estimating performance on a measure using member demographic and clinical characteristics during the 2015-2017 baseline period. The models developed using baseline data will then be used to predict expected outcomes in the absence of Demonstration activities during each year of the Demonstration, for members who receive care at the 14 safety net hospitals. For each Demonstration year we will compare the pre-Demonstration to post-Demonstration difference in the performance measure (observed) to the estimated pre-demonstration to post-demonstration estimated difference in the measure in the absence of demonstration activities (predicted). When higher values of a measure are desired (e.g., a higher proportion of the population screened), a ratio of observed to predicted greater than one will suggest quality improvement. When lower values of a measures are desired (e.g., readmission rates), a ratio of observed to predicted of less than one will suggest quality improvement.

To address H2, we will present, on an annual basis, uncompensated care and supplemental payments at safety-net hospitals, and uncompensated care costs before and after supplemental payments. Given the limited number of data points available, we will not be able to statistically test the hypothesis that uncompensated care costs do not increase over the evaluation period.

Hypotheses, evaluation questions, measures, data sources, and analytic approach are summarized in Table 9.

Table 9: Goal 4 | Sustainably support safety net providers to ensure continued access to care for Medicaid and low-income uninsured individuals

Evaluation Question	Evaluation Hypotheses	Measure [Reported for each Demonstration Year]	Recommended Data Source	Analytic Approach
What is the impact of safety net funding investments on safety-net provider hospital performance and financial sustainability?	Increasing the portion of funding for safety-net hospitals under the Public Health Transformation and Incentive Initiative (PHTII) and Disproportionate Share Hospital (DSH) pool will result in improved care quality at these sites.	CHA: DSRIP ACO performance measures	1) PHTII Reports for Payment 2) MMIS claims	Descriptive statistics; Interrupted time series
What is the impact of safety net funding investments on safety-net provider hospital performance and financial sustainability?	Increasing the portion of funding for safety-net hospitals under the Public Health Transformation and Incentive Initiative (PHTII) and Disproportionate Share Hospital (DSH) pool will result in improved care quality at these sites.	Safety Net Hospitals: DSRIP ACO performance measures	Safety Net Hospital reports	Descriptive statistics; difference in difference
What is the impact of safety net funding investments on safety-net provider hospital performance and financial sustainability?	Supplemental payments to hospitals funded through the DSH pool will help to reduce the total amount of uncompensated care so they can continue to serve Medicaid and uninsured residents	Uncompensated care costs pre- and post-supplemental payments	Massachusetts Uncompensated Care Cost reports.	Descriptive statistics (total, mean, median)

V. Demonstration Goal 5: Address the opioid addiction crisis by expanding access to a broad spectrum of recovery-oriented substance use disorder services

A. Introduction

Massachusetts has a long history of providing Medicaid SUD services within a managed care context, and has achieved some success in reducing hospital utilization and associated costs, without compromising quality of care (Callahan, 1995). State expansion of health insurance coverage in 2007 led to substantially higher numbers of high-risk substance abusers seeking treatment and enrolling in Medicaid (Zur J et al, 2007). More intensive opioid agonist therapy has recently been found to more effective in preventing relapse in Medicaid opioid users than behavioral therapy alone (Clark, 2015). This finding suggests that expanding long-term community-based rehabilitation approaches that include an oral agonist component could have a substantial impact on relapse and other outcomes. Other research has demonstrated that coaching can significantly reduce relapse rates in high-risk populations (LePage 2012).

The Demonstration makes changes to substance use disorder (SUD) services in order to improve state-wide capacity, divert SUD patients from inpatient and hospital settings to community-based environments, and respond to the opioid crisis. Prior to the Demonstration's extension, MassHealth covered outpatient counseling, medication assisted treatment, Inpatient Withdrawal Management (ASAM Level 4.0), short-term withdrawal management services (ASAM Level 3.7), and short-term residential services (ASAM Level 3.5) for members enrolled in fee for service. Managed Care Entities (MCEs) covered these services as well as Structured Outpatient Addiction Programs (ASAM Level 2.1). The Demonstration gives MassHealth expenditure authority for additional SUD services that previously were only provided by the Department of Public Health's Bureau of Substance Addiction Services (BSAS) at state cost, including transitional support services and residential rehabilitation services (ASAM Level 3.1) and recovery coaches. Furthermore, it expands SUD treatment in Massachusetts by adding Medicaid coverage for 24-hour community-based rehabilitation through high-intensity Residential Services (ASAM Level 3.3) and recovery support navigators.

Services at ASAM Level 3.1 have been covered as a wrap service for MassHealth members enrolled in managed care beginning November 2016. They will be phased into managed care beginning with the Behavioral Health Vendor on March 1, 2018 and the other Managed Care Entities on January 1, 2019. Expansion of ASAM Level 3.1 services will begin during calendar year 2018. All MassHealth members, except those in MassHealth Limited, are eligible for expanded substance use disorder services as part of the Demonstration (including members age 65+).

B. Goal 5: Address the opioid addiction crisis by expanding access to a broad spectrum of recovery-oriented substance use disorder services

Research Question: What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?

H1. The Demonstration will increase rates of identification, initiation, and engagement in treatment among individuals with SUD relative to trends prior to the current Demonstration period.
H2. The Demonstration will improve adherence to treatment among individuals with any SUD diagnosis (including, in particular, Opioid Use Disorder (OUD) diagnosis) relative to trends prior to the current Demonstration period.
H3. The Demonstration will reduce nonfatal overdoses and overdose deaths, particularly those due to opioids, relative to trends prior to the current Demonstration period.
H4. The Demonstration reduces utilization of emergency department and inpatient hospital settings and overall healthcare costs among individuals with any SUD-related diagnosis and with OUD diagnosis.
H5. The Demonstration will result in fewer readmissions to the same or higher level of care relative to trends prior to the current Demonstration period.
H6. The Demonstration will result in improved access to care for comorbid physical and mental health conditions among individuals with any SUD diagnosis, including OUD diagnoses, relative to trends prior to the current Demonstration period.
H7. The Return on Investment (ROI) will support continuation of SUD Demonstration activities

Study Design: We will employ a quasi-experimental interrupted time series (ITS) approach to compare trends in care quality measures, healthcare utilization, costs, and outcomes, pre- to post-implementation of expanded SUD services. We will also use a repeated cross-sectional design to compare trends in opioid overdoses and opioid deaths in MA to the rest of the nation.

Study Period: The evaluation period will begin three years prior to implementation of the current Demonstration period (CY 2015) and extend through the end of CY2022. We foresee that data through June 2020 will be included in the interim evaluation, and data through December 2022 will be included in the final report.

Data Sources:

1) *MassHealth administrative data*: The primary data source that will be used to address hypotheses is the MassHealth Medicaid Management Information Systems (MMIS) enrollment, medical claims /encounter files, and pharmacy claims files.

2) *Massachusetts death records:* To evaluate hypothesis H3 (the Demonstration will reduce overdose deaths), claims data will be linked to Massachusetts Death records, held by the Massachusetts Registry of Vital Records and Statistics.

3) *BSAS Program data*: If available, BSAS will provide member-level data regarding utilization of residential rehabilitation services and recovery coach services (i.e., services not covered by MassHealth in the pre-Demonstration period), to be used in conjunction with MassHealth claims/encounter data to address H2 (adherence to SUD treatment). (If this dataset is not available, services newly covered by MassHealth will be evaluated in the post-implementation period only).

4) *The Chapter 55 dataset*: To the extent possible, we will use the Chapter 55 dataset to evaluate hypothesis H3 (The Demonstration will reduce nonfatal overdoses). The Chapter 55 dataset, maintained by MDPH, is a linked dataset that was created by state statute to facilitate analysis of data to inform efforts to reduce opioid overdoses in the state. The dataset links individual-level data from a broad range of sources, including vital statistics, medical and pharmacy claims data, hospital discharge records, toxicology reports, ambulance transport records, DPH program enrollment, and BSAS service utilization. Non-fatal opioid overdoses are identified from a variety of sources, such as ambulance transport data, that are not available in MassHealth claims data. If the Chapter 55 data set is not available during the analysis period, information on non-fatal overdoses will be obtained from MMIS data using ICD /CPT codes to identify overdoses, with the limitation that claims data will underestimate the number of opioid overdoses.

5) *The CDC Wide-ranging Online Data for Epidemiologic Research (WONDER) database* is an internet-based publicly-available data system intended to further public health research and program evaluation. Information about overdoses is available in the mortality and multiple causes of death databases, which are populated using information from death certificates. Additionally, trends can be stratified at the state level, by year, and/or by a number of other demographic characteristics. For the Demonstration, we plan to use the WONDER database to compare trends in fatal overdoses in Massachusetts to the rest of the nation.

Study Population: The study population will consist of MassHealth members (excluding MassHealth Limited members) with SUD diagnoses, including alcohol or other drugs, but excluding tobacco. Members will be identified as having a SUD if they have an ICD-9/ICD-10 diagnosis on two or more medical claim/encounters, in any position, excluding lab services. Given that SUD is often underdiagnosed, sensitivity analyses will be performed identifying members with SUD using one or more ICD-9/10 code for SUD in any position, based on the codes referenced in Appendix A of the Draft SUD Section 1115 Demonstration Evaluation Design Technical Assistance document. Recent data suggests that approximately five percent of the MassHealth population (101,598 members) have a SUD diagnosis. For selected measures, the study population will be comprised of individuals with an OUD diagnosis (sample size approximately 6,500). The analysis will include for each individual with a SUD diagnosis or treatment claim, all claims from the first observed claim with an SUD diagnosis through eleven additional months after the last observed SUD claim, or the end of Medicaid enrollment, whichever comes first.

Comparison Group: Because expansion of services will be implemented statewide for all MassHealth members, a clear comparison group, that is, one that will estimate evaluation measures in the absence of the Demonstration activities, does not exist. Instead, we will use an ITS approach to compare trends in outcomes during the twelve calendar quarters prior to the intervention, to trends in outcomes observed during the implementation period. As described previously, the design is widely used and is considered one of the strongest quasi-experimental designs, and estimates of what the evaluation measures would have been in the absence of the Demonstration can be estimated based on trends during the period prior to the Demonstration period. We acknowledge limitations to this approach--specifically, that we will not be able to

adequately account for external factors at the local state, and national level. In order to partially address this concern, we will compare Massachusetts trends in the number of overdoses per resident to trends in the other 49 states. We will also attempt to identify a comparison group state that is similar to Massachusetts in baseline availability of substance use treatment facilities, but who do not expand treatment services over the Demonstration period, to compare outcomes (e.g., opioid overdoses and overdose deaths) to Massachusetts using a difference-in-differences approach. Potential states are New York and Oregon. We understand, however, that this exercise may not be feasible, given the ever-evolving initiatives to address the opioid crisis. These analyses will help our understanding of the effect of Massachusetts-specific initiatives over the Demonstration period in reducing overdoses. We discuss these limitations in more detail below.

Measures: Outcome measures will be identified in the MassHealth claims/encounter data along with death files and Chapter 55 data set, using ICD9/10, CPT, revenue, and NDC codes, as appropriate. Measures align with those listed in the November 2017 State Medicaid Director's letter SMD#17-003, and include:

- Number and percentage of the study population meeting National Quality Forum (NQF) quality measures related to initiation of treatment, pharmacotherapy use, and follow-up after ED discharge related to SUD
- Number and percentage of the population utilizing substance use disorder treatment
- Number and percentage of the population utilizing other services (e.g., emergency department, hospital inpatient, ambulatory, pharmacy)
- Fatal and non-fatal overdoses, overall and opioid specific
- Number of medication assisted treatment (MAT) providers/member with SUD, identified by DEA number in MassHealth administrative data and/or from list of qualified providers obtained from SAMHSA
- Total cost of care to MassHealth including costs of pharmacy, inpatient, outpatient, emergency, and residential care, and other healthcare costs. Cost measures are described below in more detail.

Total costs and total federal costs (Total Medicaid costs*federal medical assistance percentage [FMAP] for the state) will be reported. Total costs will be categorized by SUD cost drivers: SUD costs – costs with SUD diagnosis in primary position or relevant CPT code, and non-SUD costs - costs without an SUD diagnosis in the primary position. Total costs will also be categorized by type of care: ambulatory care, emergency department, pharmacy, inpatient, residential care, and long-term care costs. All cost data will be obtained from claims/encounter data.

Data Analysis: Member characteristics, including substance use diagnoses and other clinical and demographic characteristics during the three-year baseline period (CY 2015 – CY 2017) and during each of the evaluation years, CY2018 – CY2021, will be described. To evaluate H1- H6, we will calculate measures among members each quarter who have a SUD diagnosis from three years prior to the Demonstration, CY 2015, through CY2022.

Descriptive statistics for each quarter, including counts, percentages, means or medians, as appropriate, will be presented. A time-series approach will be used to

evaluate changes in evaluation measures over time. Segmented regression analysis, using generalized estimating equations, will be used to evaluate trends prior to, between each phase of implementation, and after implementation (including lag periods if warranted, to allow for the full effect of the implementation to occur). Analyses will be conducted with and without adjusting for differences in the risk profile of MassHealth members with SUD over time. Subgroup analyses will also be performed by geographic region and member risk profiles. Cost analyses are specified in more detail below. Where feasible, outcomes for established quality measures will be compared to national benchmarks (Appendix B).

For each month that an individual is enrolled in MassHealth, the analytic data file will obtain an observation with their Medicaid costs in that month, and demographic characteristics merged from the eligibility data. An indicator variable will be created to be used in all regression modeling analyses, equal to 1 for months on or after the start date of the demonstration and equal to 0 for the pre-demonstration period months.

From the individual month-level data, per member per month (PMPM) average costs will be calculated and presented in tabular format (see Appendix G). Means will also be plotted to show trends visually and to verify that month-to-month variation is within expectations, and does not indicate an underlying data error. Per member per quarter average costs will also be presented.

The interrupted time series analysis will be performed with generalized linear models. All costs will be evaluated on the log scale. The model will be specified as:

$$Costs = \beta 0 + \beta 1*TIME + \beta 2*POST + \beta 3*(TIME*POST) + Bi* CONTROLS + \varepsilon$$

Where: TIME is a count variable that starts with the first quarter pre-demonstration period data and ends with the last quarter of post-demonstration period data. POST is the indicator variable that equals 1 if the month occurred on or after demonstration start date. CONTROLS are covariates, such as age, gender, race, dual Medicare-Medicaid enrollment, and month.

The ITS model results will demonstrate the trends in PMPM costs in the treatment group. If the average marginal effect of the interaction term (β3*TIME*POST) is a positive dollar amount, then the costs in the post-demonstration period are statistically significantly higher than the costs in the pre-demonstration period, whereas if the interaction term is a negative dollar amount, then the costs in the post-demonstration period are statistically significantly lower than in the pre-demonstration period. ITS models without a comparison group cannot determine whether any observed changes are associated with the demonstration. Depending on the month-to month variability in costs, analyses may also be conducted with time as a calendar quarter.
Table shells for presenting results of the models are presented in Appendix G.

We recognize that our time series approach will not be able to adequately account for external factors, including exacerbations of the opioid epidemic, or multiple concurrent initiatives that will likely be conducted at the state, local, and national level during the Demonstration period to address the opioid crisis. In order to partially address this concern, we will compare Massachusetts trends in the number of overdoses per

resident to trends in the other 49 states. We will also attempt to identify a comparison group state that is similar to Massachusetts in baseline availability of substance use treatment facilities, but who do not expand treatment services over the demonstration period, to compare to opioid overdoses to Massachusetts. Potential states are New York and Oregon. We understand, however, that this exercise may not be feasible, given the ever-evolving initiatives to address the opioid crisis. These analyses will help our understanding of the effect of Massachusetts-specific initiatives over the Demonstration period in reducing overdoses. We discuss these limitations in more detail below.

We also recognize that not all of the measures listed in the letter to Medicaid Directors may be expected to be affected by Demonstration activities. For example, any changes to the measure, "Use of opioids at high dosage in persons without cancer" may likely be attributable to external factors such as change in dose limits implemented by MassHealth Pharmacy." As noted above, we will describe external policy initiatives or other activities occurring during the Demonstration period that may have an impact on evaluation measures.

We will calculate the ROI of SUD-treatment expansion over a five-year horizon from a MassHealth perspective. The goal is to isolate the ROI of SUD treatment expansion from other Demonstration activities (e.g., ACO implementation). In other words, we plan to compare program costs and healthcare costs of SUD members during the Demonstration period, that is, in a scenario in which both SUD treatment expansion and ACO implementation have occurred, to estimated healthcare costs of SUD members in a scenario in which there is no expansion of SUD treatment services but there are DSRIP funded initiatives (e.g., ACOs, CPs, Flexible Services) supporting delivery system transformation.

We will use the formula:

Where:

Net Healthcare cost savings will be calculated as the difference between

- Healthcare costs with SUD treatment expansion: Total cost of care to MassHealth, including costs of pharmacy, inpatient, outpatient, and residential care, and other healthcare costs over the five-year Demonstration period for members with SUD. Observed healthcare costs, measured from the claims and encounter data will be used.
- Healthcare costs without SUD treatment expansion: Estimated total cost of care to MassHealth for members with SUD in the absence of expansion of SUD treatment services, but assuming other Demonstration activities, e.g., ACO implementation have still occurred.

Because DSRIP-related delivery system transformation is occurring at the same time as expansion of SUD services, it is not straightforward to estimate costs in the absence of SUD treatment expansion activities but in the presence of ACO transformation. We will therefore examine various assumptions about the trajectory of member total healthcare costs in the absence of SUD treatment service expansion but in the presence of

delivery system transformation. In the base case, we will first calculate the percentage change in TCOC from baseline in each Demonstration year for members without SUD. We will then assume that members with SUD would have experienced a similar percentage change in total healthcare costs as members without SUD if they did not expand SUD treatment services. We will perform sensitivity analyses to evaluate alternative assumptions.

Program costs will be calculated as the sum of the costs to MassHealth of implementing expansion of recovery-oriented substance use disorder services, including costs to MassHealth of service provision and other administrative costs.

ROIs greater than 0 indicate a positive return on investment that is savings in healthcare costs greater than the program costs. ROIs of 0 indicate a cost-neutral program, that is, the healthcare savings were equal to the program costs. ROIs between 0 and < -1 indicate that healthcare savings did not fully offset program cost. ROIs of -1 indicates no healthcare cost savings, and ROIs less than -1 indicate the program increased healthcare costs.

Measures, data sources, and analytic approaches that will be used to address each evaluation hypothesis is presented in Table 10 (next page). Details on the specifications, numerator, and denominator for key measures are presented in Appendix B.

Table 10: Goal 5 | Address the opioid addiction crisis by expanding access to a broad spectrum of recovery-oriented substance use disorder services

Evaluation Question	Evaluation Hypotheses	Measure [Reported for each Demonstration quarter]	Recommended Data Source	Analytic Approach
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H1. The Demonstration increases rates of identification, initiation, and engagement in treatment among individuals with SUD.	NQF # 0004 Initiation and engagement of alcohol and other drug dependence treatment / members with SUD	MMIS claims/ encounter data	Descriptive statistics; Interrupted time series approach - segmented regression
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H2. The Demonstration improves adherence to treatment among individuals with any SUD diagnosis and with OUD diagnosis.	NQF 3175: Continuity of Pharmacotherapy for OUD / members receiving MAT	MMIS claims/ encounter data	Descriptive statistics; Interrupted time series approach - segmented regression
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H2. The Demonstration improves adherence to treatment among individuals with any SUD diagnosis and with OUD diagnosis	NQF #2605: Follow-Up after Discharge from the ED for Mental Health or Alcohol or Other Drug Use Dependence / members with SUD	MMIS claims/ encounter data	Descriptive statistics; Interrupted time series approach - segmented regression
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H2. The Demonstration improves adherence to treatment among individuals with any SUD diagnosis and with OUD diagnosis	Percentage of members with any SUD /OUD diagnosis who used the following per month: • Outpatient SUD services • Intensive outpatient services • Medication assisted treatment for SUD • Residential treatment, (ASAM Level 3.1), including average length of stay • ASAM level 3.3 • Clinical stabilization services (ASAM Level 3.5) • Acute Treatment Services (ASAM Level 3.7)	MMIS claims/ encounter data BSAS program data, if available	Descriptive statistics; Interrupted time series approach - segmented regression

Evaluation Question	Evaluation Hypotheses	Measure [Reported for each Demonstration quarter]	Recommended Data Source	Analytic Approach
		• Inpatient Withdrawal Management • Outpatient detox • Recovery Coach • Recovery Support Navigator		
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H3. The Demonstration reduces nonfatal overdoses and overdose deaths, particularly those due to opioids, relative to trends prior to the current Demonstration period.	NQF#2940: Use of opioids at high dosage in persons without cancer / MassHealth members	MMIS claims/ encounter data	Descriptive statistics; Interrupted time series approach - segmented regression
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H3. The Demonstration reduces nonfatal overdoses and overdose deaths, particularly those due to opioids, relative to trends prior to the current Demonstration period.	Non-fatal ODs, overall and opioid related / MassHealth members	MMIS claims/ encounter data; (Chapter 55 data)	Descriptive statistics; Interrupted time series approach - segmented regression
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H3. The Demonstration reduces nonfatal overdoses and overdose deaths, particularly those due to opioids, relative to trends prior to the current Demonstration period.	OD deaths, overall and opioid-related /MassHealth members	MMIS claims/ encounter data; MA death records	Descriptive statistics; Interrupted time series approach - segmented regression
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H4. The Demonstration reduces utilization of emergency department and inpatient hospital settings and overall healthcare costs among individuals with any SUD-related diagnosis and with OUD diagnosis.	Emergency department use /1,000 member months for members diagnosed with SUD/OUD	MMIS claims/ encounter data;	Descriptive statistics; Interrupted time series approach - segmented regression

Evaluation Question	Evaluation Hypotheses	Measure [Reported for each Demonstration quarter]	Recommended Data Source	Analytic Approach
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H4. The Demonstration reduces utilization of emergency department and inpatient hospital settings and overall healthcare costs among individuals with any SUD-related diagnosis and with OUD diagnosis.	Inpatient admissions /1,000 member months for members diagnosed with SUD/OUD	MMIS claims/ encounter data;	Descriptive statistics; Interrupted time series approach - segmented regression
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H4. The Demonstration reduces utilization of emergency department and inpatient hospital settings and overall healthcare costs among individuals with any SUD-related diagnosis and with OUD diagnosis.	Healthcare costs/member month, for members diagnosed with SUD/OUD overall and by component • Inpatient • ED • Ambulatory care • Pharmacy • Long-term care • SUD – other costs • Non-SUD costs	MMIS claims/ encounter data	Descriptive statistics; Interrupted time series approach - segmented regression
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H5. The Demonstration results in fewer readmissions to the same or higher level of care. The Demonstration results in fewer readmissions to the same or higher level of care.	30-day and 90-day readmission rates to same level of care or higher following admission to inpatient hospitalization or 24-hour diversionary services for any SUD diagnosis and OUD diagnosis / members with SUD admitted inpatient hospitalization or 24-hour diversionary services	MMIS claims/ encounter data	Descriptive statistics; Interrupted time series approach - segmented regression
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H6. The Demonstration results in improved access to care including for comorbid physical health conditions among individuals with any SUD diagnosis and with OUD diagnoses, relative to trends prior to the current Demonstration period.	MAT Prescribers / MH members diagnosed with SUD and / MH members diagnosed with OUD Healthcare Utilization • Outpatient SUD Professional visits / 1,000-member months • Inpatient admissions /1,000-member months • Ambulatory care visits/1,000-member months • Other utilization/1,000-member months	MMIS claims/ encounter/provide r data	Descriptive statistics; Interrupted time series approach - segmented regression

Evaluation Question	Evaluation Hypotheses	Measure [Reported for each Demonstration quarter]	Recommended Data Source	Analytic Approach
What is the impact of expanding MassHealth coverage to include residential services and recovery support services on care quality, costs and outcomes for members with substance use disorders (SUD)?	H7. The Return on Investment (ROI) will support continuation of SUD Demonstration activities	Program costs; healthcare costs	MMIS claims/ encounter data	Return on Investment

VI. Demonstration Goal 6: Continuing to provide coverage to former foster care youth who aged out of foster care under the responsibility of another state (and were enrolled in Medicaid in the state in which they lived at any time during the foster care period), as a means of increasing and strengthening overall coverage of former foster care youth and improving health outcomes for these youth

A. Introduction

In order to improve healthcare access to former foster care children under age 26 who "aged out" of the foster care system in other states, the Demonstration seeks to provide full Medicaid State Plan benefits to former foster care youth (regardless of income or assets) who are: (1) under age 26; (2) were in foster care under the responsibility of a state other than Massachusetts or a Tribe in such a state when they turned 18 or a higher age at which the state's or Tribe's foster care assistance ends; (3) were enrolled in Medicaid under that state's Medicaid state plan or 1115 Demonstration at any time during the foster care period; and (4) are currently living in Massachusetts.

As per CMS request, Massachusetts is shifting authority from the State Plan to the 1115 Demonstration to continue existing coverage of certain former foster care youth. MassHealth is proactively working to maintain healthcare coverage and improve health outcomes within this population. The Demonstration offers continued access to ensure that former foster care youth will be enrolled and have access to health services. The Demonstration also encourages positive health outcomes in this population.

B. Goal 6: Continuing to provide coverage to former foster care youth who aged out of foster care under the responsibility of another state (and were enrolled in Medicaid in the state in which they lived at any time during the foster care period), as a means of increasing and strengthening overall coverage of former foster care youth and improving health outcomes for these youth.

Research Questions:

1. Does the Demonstration provide continuous health insurance coverage for former foster care individuals meeting specified eligibility criteria?
   H1. Eligible former foster care individuals will be continuously enrolled for 12 months

2. How did former foster care individuals utilize health services?
   H2. Former foster care individuals will access health services at rates comparable to other Medicaid members with similar characteristics

3. How do health outcomes for former foster care individuals compare to similar Medicaid members?
   H3. Former foster care individuals will have positive health outcomes as defined by NQF measures, comparable to other Medicaid members with similar characteristics

Study Design: The evaluation design will utilize a post-only assessment to track enrollment, healthcare utilization, and outcomes in the study population on an annual basis. Findings will be benchmarked relative to MassHealth members with similar demographic and clinical characteristics.

Study Period: The timeframe for the post-only period will begin when the Demonstration begins, July 1, 2018 and continue through December 2022. We foresee that data through June 2020 will be included in the interim evaluation, and data through December 2022 will be included in the final report.

Data Source:
MassHealth administrative data: The primary data source is the MassHealth MMIS enrollment, medical claims/encounter files, and pharmacy claims files.

Program Enrollment data: MassHealth ID numbers of former foster care youth covered by Medicaid will be received annually from MassHealth, for linking with administrative data.

Study Population: The study population will be former youth who were in foster care out-of-state who enroll in MassHealth from 2018 - 2022. We estimate the sample size will be approximately 75 members per year.

Comparison Group: A clear comparison group, that is, one that will estimate evaluation outcomes in the study population in the absence of the Demonstration activities, does not exist for these analyses. Moreover, given the small anticipated sample size, we will not have adequate power to perform statistical analyses comparing members of the study population to a comparison group (See Appendix H). Nevertheless, we will identify a 1:1 group of Medicaid members matched on age, gender, clinical comorbidity, to benchmark the outcome measures to other Medicaid members with similar clinical and demographic characteristics. Baseline data prior to the intervention will not be available, as some of this population received insurance coverage from another source prior to the current Demonstration period in MA.

Measures: Measures will be identified from claims/encounter data, and measured annually:

- Number and percentage of the study population who were continuously enrolled in MassHealth for one year
- Number and percentage of the study population who had an ambulatory care visit
- Number and percentage of the study population who had an emergency department visit
- Number and percentage of the study population who had an inpatient visit
- Number and percentage of the study population who had a behavioral health encounter
- Number and percentage of the study population with an annual preventive visit

Given the small sample size, we anticipate having a very small number of members who take persistent medications, have asthma, are women, or were hospitalized. We are therefore unable to assess the following outcome measures:

- Total number of members on persistent medications with annual monitoring/Total number of members on persistent medications
- Total number of members with a cervical cancer screening/Total number of members eligible for cervical cancer screening.
- Number and percentage of the study population with appropriate follow-up care for hospitalizations (physical and/or mental illness)

Data Analysis: We will use descriptive statistics for the analysis, specifying and presenting all measures on an annual basis. For all evaluation questions, we will employ descriptive statistics, including frequency and percentages for dichotomous outcomes, and means/standard deviations and medians/ranges for continuous measures during each year of the Demonstration. Trends in measures over evaluation period will be presented in graphic format We will not have statistical power to statistically compare evaluation measures for former foster care to other MassHealth members with similar demographic and clinical characteristics. Nevertheless, we will benchmark to MassHealth members with similar clinical and demographic characteristics. Analyses are also subject to limitations of using administrative data, as described on pg.6.

Measures, data sources, and analytic approaches that will be used to address each evaluation hypothesis is presented in Table 11 (next page).

Table 11: Goal 6 | Former Foster Care Youth Coverage

Evaluation Question	Evaluation Hypotheses	Measure [Reported for each Demonstration Year]	Recommended Data Source	Analytic Approach
Does the Demonstration provide continuous health insurance coverage?	Members will be continuously enrolled for 12 months	Number of members continuously enrolled/ Total number of enrollees	MMIS claims/ encounter enrollment data	Descriptive statistics (frequency and percentages)
How did members utilize health services?	Members will access health services	Number of members who had an ambulatory care visit/Total number of members	MMIS claims/ encounter data	Descriptive statistics (and percentages)
How did members utilize health services?	Members will access health services	Number of members who had an emergency department visit/Total number of members	MMIS claims/ encounter data	Descriptive statistics (frequencies and percentages)
How did members utilize health services?	Members will access health services	Number of members who had an inpatient visit/ Total number of members	MMIS claims/ encounter data	Descriptive statistics (frequencies and percentages)
How did members utilize health services?	Members will access health services	Number of members who had a behavioral health encounter/Total number of members	MMIS claims/ encounter data	Descriptive statistics (frequencies and percentages)
What do health outcomes look like for members?	Members will have positive health outcomes [as defined by NQF measures]	Total number of beneficiaries with an annual preventive visit/Total number of beneficiaries	MMIS claims/ encounter data	Descriptive statistics (frequency and percentage)

VII. Demonstration Goal 7: Ensure the long-term financial sustainability of the MassHealth program through refinement of provisional eligibility and authorization for Student Health Insurance Program (SHIP) Premium Assistance

A. Introduction

Massachusetts is one of few states to offer provisional enrollment in Medicaid. Prior to the current Demonstration period, Massachusetts offered provisional eligibility for all MassHealth applicants, even if individuals' eligibility factors could not be readily verified with federal and state data. Applicants were given a 90-day window during which they would receive complete benefits associated with their category of eligibility. Verification of the eligibility factors – excluding disability, immigration, and citizenship – needed to be ascertained within the 90-day period or else the individual would either be dis-enrolled from MassHealth or, as applicable, enrolled in a different aid category.

With this update to the Demonstration, MassHealth hopes to reduce the number of individuals receiving provisional eligibility who are ultimately not eligible for MassHealth while still protecting the most vulnerable populations. Massachusetts will be removing provisional eligibility for all adults over 21 years of age with unverified income, except for the following:

- Pregnant women with attested income at/below 200% of the Federal Poverty Level (FPL)
- Adults 21 through 64 years of age who are HIV-positive and have attested income at/below 200% FPL
- Individuals with breast and cervical cancer who are under 65 and have attested income at/below 250% FPL

SHIP Premium Assistance requires MassHealth students attending participating post-secondary schools in the state to enroll in school-sponsored insurance. The state provides premium and cost-sharing assistance, as well as benefit wrap-around coverage to ensure that the SHIP benefits are equivalent to MassHealth, including keeping out-of-pocket costs at the same level as if services were being received directly from MassHealth.

The evaluation will examine MassHealth enrollment and cost implications of changes to provisional eligibility rules and the authorization of SHIP Premium Assistance. To evaluate the changes to provisional eligibility, we will examine the extent to which this narrowing of eligibility for provisional eligibility affected provisional enrollment and MassHealth expenditures for individuals ultimately deemed ineligible for coverage. To evaluate SHIP Premium Assistance, we will estimate the cost savings and describe member experiences associated with the program

B. Goal 7: Ensure the long-term financial sustainability of the MassHealth program through refinement of provisional eligibility and authorization of SHIP Premium Assistance.

Research Question: What is the effect of the Demonstration's refinement of provisional eligibility?

- **H1.** The Demonstration's refinement of provisional eligibility will decrease the number of individuals who were deemed provisionally eligible for MassHealth based on self-attestation of eligibility factors, but were not ultimately able to verify MassHealth eligibility relative to trends before the effective date of the current Demonstration extension period.
- **H2.** The Demonstration's refinement of provisional eligibility will decrease costs to MassHealth by reducing MassHealth expenditures for individuals who are deemed provisionally eligible for MassHealth during the provisional eligibility period but cannot confirm their MassHealth eligibility within 90-days, relative to trends before the effective date of the current Demonstration extension period.

Research Question: What is the effect of the Demonstration's authorization of SHIP Premium Assistance on MassHealth expenditures?

- **H3.** The SHIP Premium Assistance program will result in cost savings to MassHealth
- **H4:** The SHIP Premium Assistance Program will result in a similar or better member experience compared with the period prior to enrollment

Study Design: To evaluate H1 and H2, we will utilize an interrupted time-series approach. To address hypothesis H1, we will use this approach to compare the trends in the number and percentage of individuals during each calendar quarter who receive provisional eligibility, but are later disenrolled due to not confirming their eligibility pre- and post- the current Demonstration period. To address hypothesis H2, we will compare the trends in health care costs incurred by members with provisional insurance who are later disenrolled due to not confirming their eligibility, pre- and post- the current Demonstration period. To evaluate H3 we will conduct a cost savings analysis. To evaluate H4, we will compare member experiences in the SHIP PA program to their experience prior to enrollment.

Study Period: The evaluation period will begin three years prior to implementation of the current Demonstration period CY 2015, and extend through the end of CY2022. We foresee that data through June 2019 will be included in the interim evaluation, and data through December 2022 will be included in the final report.

Data Sources:

1) *Health Insurance Exchange /Integrated Eligibility System (HIX/IES):* The HIX/IES data set contains Medicaid ID, demographic information, date of enrollment/renewal, whether the individual lost coverage after 90-days, and reason for loss of coverage. Data from HIX/IES will be used to identify individuals with provisional eligibility who lost eligibility after 90-days.

2) MassHealth administrative data: MassHealth MMIS enrollment, medical claims/ encounter files, and pharmacy claims files will be used to evaluate MassHealth enrollment and healthcare costs in the study populations.

3) Capitation rates: Capitation rates, by risk corridor and age group categories, which will be obtained from MassHealth

4) Member experience survey: Data about member experiences with the SHIP PA program will be collected from college students enrolled in the program.

Study Population: To evaluate H1 and H2, the study population will be comprised of MassHealth members who have provisional eligibility. The annual sample size will be approximately 135,000 per year.

To evaluate H3, the study population will be comprised of MassHealth members enrolled in SHIP Premium Assistance. The annual enrollment is approximately 30,000 members.

Comparison Group: Because the Demonstration affects MassHealth members statewide, a clear comparison group to evaluate H1 and H2, that is, one that estimates what would have occurred in the absence of the Demonstration, does not exist. Instead, we will use an interrupted time-series approach to compare trends in measures during the twelve calendar quarters prior to the intervention to trends in outcomes observed during the implementation period. With this approach, estimates of what the evaluation outcome measures would have been in the absence of the Demonstration can be estimated based on trends during the period prior to the pre-Demonstration period. To evaluate H3, we will calculate cost to MassHealth of SHIP Premium Assistance enrollees had they not participated in the program based on what MassHealth would have paid in capitated per member per month payments. To evaluate H4, we will collect member experience before and during enrollment in the SHIP PA program to enable pre-post comparisons where applicable.

Measures: To evaluate Hypothesis H1, the outcome measure will be the number and percentage of individuals who received provisional eligibility, and the number and percentage who received provisional eligibility and who later were deemed ineligible and disenrolled as identified in HIX-IES data.

To evaluate Hypothesis H2, the outcome measure will be the total MassHealth expenditures during the provisional eligibility period, as identified in MMIS claims/encounter period, for individuals who received provisional eligibility and who later were deemed not eligible.

To evaluate H4, measures considered may include the members' perceptions of their access to care prior to and after enrollment into the SHIP PA program, the members' learned independence in coordination of benefits and services, and members'

preparedness for a post-graduation transition to either MassHealth or coverage in a commercial network.

Data Analysis: Demographic characteristics of individuals receiving provisional eligibility during the three-year baseline period (CY 2015 – CY 2017) and during each evaluation year (CY2018 – CY2022) will be described. To evaluate H1, we will calculate, during each calendar quarter, the percentage with provisional eligibility and the percentage with provisional eligibility that lose eligibility after 90-days. An interrupted time-series approach will be used to evaluate changes in evaluation measures over time. Segmented regression analysis, using generalized estimating equations, will be used to evaluate trends in measures prior to and after the changes to provisional eligibility. To evaluate H2, we will calculate total MassHealth expenditures during the provisional eligibility period during each calendar quarter among those who are given provisional eligibility but are not able to verify eligibility, prior to, and after the provisional eligibility period.

We acknowledge the limitations of a time-series approach. Specifically, we will be unable to account for external factors that may affect results. In reporting our results, we will describe concurrent external events that may be affecting our results. Data are also subject to limitations of administrative data, as discussed on pg. 6.

We will calculate the annual cost savings of SHIP Premium Assistance over a five-year horizon from a MassHealth perspective.

We will use the formula below to determine cost savings:

Where:

MassHealth healthcare costs without SHIP: Total costs to MassHealth will be estimated as the sum of the capitated per member per month payments that would have been paid for SHIP Premium Assistance enrollees had they been directly covered by MassHealth and enrolled in managed care. Capitated payments will reflect the enrollee's rating category and the duration of time enrolled in SHIP Premium Assistance. Various assumptions will be assessed in sensitivity analyses.

MassHealth costs with SHIP: Cost to MassHealth for premiums, cost sharing and benefit wrap coverage for SHIP Premium Assistance members. Actual observed healthcare costs will be used.

For H4 of the SHIP PA program evaluation, we will describe member experience prior to entry and during enrollment in the SHIP PA program. We will then examine differences in member experiences between the pre-enrollment and the enrollment period. We will survey students new to the SHIP Premium Assistance program and those with longer durations in the program, which will allow us to examine heterogeneity in member

experiences by length of time in the program. We will monitor response rates, assess the potential for bias from nonresponses, and check for measurement error (e.g., due to mode of administration, interviewer, inappropriate responses).

Evaluation questions, hypotheses, measures, data sources, and analytic approach that will be used to for address each evaluation hypothesis are presented in Table 12.

Table 12: Goal 7 | Ensure the long-term financial sustainability of the MassHealth program through refinement of provisional eligibility and authorization for SHIP Premium Assistance

Evaluation Question	Evaluation Hypotheses	Measure [Reported for each Demonstration Year]	Recommended Data Source	Analytic Approach
What is the impact of the Demonstration's refinement of provisional eligibility?	The Demonstration's refinement of provisional eligibility will reduce the number of provisionally eligible individuals who are ultimately not able to verify eligibility for MassHealth.	Number and percentage of provisionally-enrolled individuals	HIX/IES data	Descriptive statistics, interrupted time series
What is the impact of the Demonstration's refinement of provisional eligibility?	The Demonstration's refinement of provisional eligibility will reduce the number of provisionally eligible individuals who are ultimately not able to verify eligibility for MassHealth.	Number and percentage of provisionally-enrolled individuals later disenrolled	HIX/IES data	Descriptive statistics, interrupted time series
What is the impact of the Demonstration's refinement of provisional eligibility?	The Demonstration's refinement of provisional eligibility will decrease healthcare costs by reducing MassHealth Expenditures costs incurred for individuals who were deemed provisionally eligible for MassHealth during the provisional eligibility period but were not able to confirm their eligibility within 90 days, relative to trends before the effective date of the current Demonstration extension period.	Total healthcare costs among those provisionally enrolled who were not able to confirm their eligibility within 90 days relative to trends before the effective date of the current Demonstration extension period. Only those provisional members who did not regain their aid category within 90 days of disenrollment will be included in the analysis	HIX/IES, MMIS data	Descriptive statistics; interrupted time series approach
What is the effect of the Demonstration's authorization of SHIP Premium Assistance on MassHealth expenditures?	The SHIP Premium Assistance program will result in cost savings to MassHealth.	Healthcare costs that would have been paid by MassHealth for SHIP Premium Assistance members if they were directly covered by MassHealth and enrolled in managed care.	MMIS claims data	Cost savings

Evaluation Question	Evaluation Hypotheses	Measure [Reported for each Demonstration Year]	Recommended Data Source	Analytic Approach
What is the effect of the Demonstration's authorization of SHIP Premium Assistance on MassHealth expenditures?	The SHIP Premium Assistance program will result in cost savings to MassHealth.	SHIP Premium Assistance program costs	MMIS claims data	Cost savings
What is the effect of the Demonstration's authorization of SHIP Premium Assistance on MassHealth expenditures?	The SHIP Premium Assistance Program will result in a similar or better member experience compared with the period prior to enrollment.	Measures could include member's experience with perceived network access, actual care (personal doctor, specialist, and health plan), learned independence in coordination of benefits and services, transition to coverage post-graduation	MMIS Claims Data, SHIP Program Data, Member Experience Survey Data	Descriptive statistics, pre-post comparison

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IX. Appendices

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Appendix A1: Participating ACOs

Contractor	Model	ACO Partner	Service Area
Boston Medical Center Health Plan, Inc.	Accountable Care Partnership Plan	Boston Accountable Care Organization	Attleboro, Boston, Brockton, Fall River, Falmouth, Greenfield, Holyoke, Lynn, Malden, New Bedford, Northampton, Plymouth, Quincy, Revere, Somerville, Springfield, Taunton, Waltham, Wareham, Westfield, Woburn
Boston Medical Center Health Plan, Inc.	Accountable Care Partnership Plan	Mercy Health Accountable Care Organization	Holyoke, Northampton, Springfield, Westfield
Boston Medical Center Health Plan, Inc.	Accountable Care Partnership Plan	Signature Healthcare Corporation	Brockton, Plymouth, Quincy, Taunton
Boston Medical Center Health Plan, Inc.	Accountable Care Partnership Plan	Southcoast Health Network	Attleboro, Fall River, Falmouth, New Bedford, Plymouth, Wareham, Taunton
Fallon Community Health Plan, Inc.	Accountable Care Partnership Plan	Health Collaborative of the Berkshires	Adams, Pittsfield
Fallon Community Health Plan, Inc.	Accountable Care Partnership Plan	Reliant Medical Group	Framingham, Gardner-Fitchburg, Southbridge, Worcester
Fallon Community Health Plan, Inc.	Accountable Care Partnership Plan	Wellforce	Attleboro, Barnstable, Beverly, Boston, Brockton, Falmouth, Framingham, Haverhill, Lawrence, Lowell, Lynn, Malden, Orleans, Plymouth, Quincy, Revere, Salem, Somerville, Waltham, Wareham, Woburn
Health New England, Inc.	Accountable Care Partnership Plan	Baystate Health Care Alliance	Holyoke, Northampton, Springfield, Westfield
Neighborhood Health Plan, Inc.	Accountable Care Partnership Plan	Merrimack Valley ACO	Lawrence, Lowell, Haverhill
Tufts Health Public Plans, Inc.	Accountable Care Partnership Plan	Atrius Health	Attleboro, Beverly, Boston, Brockton, Falmouth, Framingham, Gardner-Fitchburg, Lawrence, Lowell, Lynn, Malden, Plymouth, Quincy, Revere, Salem, Somerville, Waltham, Wareham, Woburn

Contractor	Model	ACO Partner	Service Area
Tufts Health Public Plans, Inc.	Accountable Care Partnership Plan	Beth Israel Deaconess Care Organization	Attleboro, Barnstable, Beverly, Boston, Brockton, Falmouth, Framingham, Haverhill, Lowell, Lynn, Malden, Orleans, Plymouth, Quincy, Revere, Salem, Somerville, Waltham, Wareham, Woburn
Tufts Health Public Plans, Inc.	Accountable Care Partnership Plan	Cambridge Health Alliance	Boston, Lynn, Malden, Revere, Somerville, Waltham, Woburn
Tufts Health Public Plans, Inc.	Accountable Care Partnership Plan	Boston Children's ACO	Attleboro, Barnstable, Beverly, Boston, Brockton, Fall River, Falmouth, Framingham, Haverhill, Holyoke, Lawrence, Lowell, Lynn, Malden, New Bedford, Northampton, Orleans, Plymouth, Quincy, Revere, Salem, Somerville, Southbridge, Springfield, Taunton, Waltham, Wareham, Westfield, Woburn, Worcester
Community Care Cooperative, Inc.	Primary Care ACO	Not applicable	Not applicable
Partners HealthCare Accountable Care Organization, LLC	Primary Care ACO	Not applicable	Not applicable
Steward Medicaid Care Network, Inc.	Primary Care ACO	Not applicable	Not applicable
Lahey Clinical Performance Network, LLC	MCO-Administered ACO	Not applicable	Not applicable

Appendix A2: Participating BH CPs

Bidder	Consortium Entities	Affiliated Partners *(Partnership Name, if applicable)*	Region: Service Area
South Shore Mental Health Center, Inc.	Not applicable	• Spectrum Health Systems, Inc.	**Greater Boston:** Quincy
Boston Health Care for the Homeless Program, Inc.	Not applicable	• Bay Cove Human Services, Inc. • Boston Public Health Commission • Boston Rescue Mission, Inc. • Casa Esperanza, Inc. • Pine Street Inn, Inc. • St. Francis House • Victory Programs, Inc. • Vietnam Veterans Workshop, Inc.	**Greater Boston:** Boston Primary
Community Counseling of Bristol County, Inc.	Not applicable	Not applicable	**Southern:** Attleboro, Brockton, Taunton
Southeast Community Partnership, LLC	• South Shore Mental Health Center, Inc. • Gosnold, Inc.	• FCP, Inc. dba Family Continuity	**Southern:** Attleboro, Barnstable, Brockton, Fall River, Falmouth, Nantucket, New Bedford, Oak Bluffs, Orleans, Plymouth, Taunton, Wareham
Stanley Street Treatment and Resources, Inc.	Not applicable	• Greater New Bedford Community Health Center, Inc. • HealthFirst Family Care Center, Inc. • Fellowship Health Resources, Inc.	**Southern:** Attleboro, Barnstable, Fall River, Falmouth, New Bedford, Oak Bluffs, Orleans, Taunton, Wareham
Northeast Behavioral Health Corporation, dba Lahey Behavioral Health Services	Not applicable	N/A	**Northern:** Beverly, Gloucester, Haverhill, Lawrence, Lowell, Lynn, Malden, Salem, Woburn
Lowell Community Health Center, Inc.	Not applicable	• Lowell House, Inc.	**Northern:** Lowell

Bidder	Consortium Entities	Affiliated Partners *(Partnership Name, if applicable)*	Region: Service Area
The Bridge of Central Massachusetts, Inc.	Not applicable	*Central Community Health Partnership/BH* • Alternatives Unlimited, Inc. • LUK, Inc. • Venture Community Services • Adcare	**Central:** Athol, Framingham Gardner-Fitchburg, Southbridge, Worcester
Community Healthlink, Inc.	Not applicable	Not applicable	**Central:** Gardner-Fitchburg, Worcester
Behavioral Health Network, Inc.	Not applicable	Not applicable	**Western:** Holyoke, Springfield, Westfield
The Brien Center for Mental Health and Substance Abuse Services, Inc.	Not applicable	Not applicable	**Western:** Adams, Pittsfield
Innovative Care Partners, LLC	• Center for Human Development, Inc. (CHD) • Gandara Mental Health Center, Inc. • ServiceNet, Inc.	Not applicable	**Western:** Adams, Greenfield, Holyoke, Northampton, Pittsfield, Springfield, Westfield
High Point Treatment Center, Inc.	Not applicable	• Brockton Area Multi Services, Inc. (BAMSI) • Bay State Community Services, Inc. • Child & Family Services, Inc. • Duffy Health Center • Steppingstone, Inc.	**Greater Boston:** Quincy **Southern:** Attleboro, Barnstable, Brockton, Fall River, Falmouth, New Bedford, Orleans, Plymouth, Taunton, Wareham

Bidder	Consortium Entities	Affiliated Partners *(Partnership Name, if applicable)*	Region: Service Area
Eliot Community Human Services, Inc.	Not applicable	Not applicable	**Greater Boston:** Revere, Somerville **Northern:** Beverly, Gloucester, Lowell, Lynn, Malden, Salem, Woburn **Central:** Framingham, Waltham
Riverside Community Care, Inc.	Not applicable	• Brookline Community Mental Health Center, Inc. • The Dimock Center, Inc. • The Edinburg Center, Inc. • Lynn Community Health Center, Inc. • North Suffolk Mental Health Association, Inc. • Upham's Corner Health Center	**Greater Boston:** Boston Primary, Revere, Somerville, Quincy **Northern:** Lowell, Lynn, Malden, Woburn **Central:** Framingham, Southbridge, Waltham
Eastern Massachusetts Community Partners, LLC	• Vinfen Corporation • Bay Cove Human Services, Inc. • Bridgewell, Inc.	Not applicable	**Greater Boston:** Boston Primary, Revere, Somerville, Quincy **Northern:** Haverhill, Lawrence, Lowell, Lynn, Malden, Salem **Southern:** Attleboro, Barnstable, Brockton, Fall River, Falmouth, New Bedford, Orleans, Plymouth, Taunton, Wareham

Bidder	Consortium Entities	Affiliated Partners *(Partnership Name, if applicable)*	Region: Service Area
Clinical Support Options, Inc.	Not applicable	Not applicable	**Central:** Athol **Western:** Adams, Greenfield, Northampton, Pittsfield
Behavioral Health Partners of Metrowest, LLC	• Advocates, Inc. • South Middlesex Opportunity Council • Spectrum Health Systems, Inc. • Wayside Youth and Family Support	• Family Continuity (FCP), Inc.	**Northern:** Beverly, Gloucester, Haverhill, Lawrence, Lowell, Lynn, Malden, Salem, Woburn **Central:** Athol, Framingham, Gardner-Fitchburg, Southbridge, Waltham, Worcester

Appendix A3: Participating LTSS CPs

Bidder	Consortium Entities	Affiliated Partners *(Partnership Name, if applicable)*	Region: Service Area
Boston Medical Center	Not applicable	*Boston Allied Partners* • Boston Senior Home Care, Inc. • Central Boston Elder Services • Southwest Boston Senior Services d/b/a Ethos	**Greater Boston:** Boston-Primary
LTSS Care Partners	• Vinfen • Bay Cove Human Services • Justice Resource Institute • Boston Center for Independent Living • Mystic Valley Elder Services • Somerville Cambridge Elder Services • Boston Senior Home Care, Inc.	Not applicable	**Greater Boston:** Boston-Primary, Revere, Somerville, Quincy **Northern:** Malden **Southern:** Brockton
Alternatives Unlimited	Not applicable	*Central Community Health Partnership* • The Bridge of Central Massachusetts, Inc. • LUK, Inc. • Venture Community Services, Inc.	**Central:** Athol, Framingham, Gardner-Fitchburg, Southbridge, Worcester
Elder Services of Merrimack Valley	Not applicable	*Merrimack Valley Community Partnership* • Northeast Independent Living Program	**Northern:** Haverhill, Lawrence, Lowell
Family Service Association	Not applicable	Not applicable	**Southern:** Attleboro, Barnstable, Brockton, Fall River, Falmouth, Nantucket, New Bedford, Oaks Bluff, Orleans, Plymouth, Taunton, Wareham

Bidder	Consortium Entities	Affiliated Partners *(Partnership Name, if applicable)*	Region: Service Area
Innovative Care Partners	• Center for Human Development • Gandara Mental Health Center, Inc. • Service Net, Inc.	Not applicable	**Western:** Adams, Greenfield, Holyoke, Northampton, Pittsfield, Springfield, Westfield
Greater Lynn Senior Services	Not applicable	*North Region LTSS Partnership* • Bridgewell • Northeast Arc	**Northern:** Beverly, Gloucester, Haverhill, Lawrence, Lowell, Lynn, Malden, Salem, Woburn
Seven Hills Family Services, Inc.	Not applicable	*Massachusetts Care Coordination Network* • Advocates, Inc. • Boston Center for Independent Living, Inc. • HMEA • BayPath Elder Services, Inc. • BAMSI	**Northern:** Beverly, Gloucester, Haverhill, Lawrence, Lowell, Lynn, Malden, Salem, Woburn **Southern:** Attleboro, Barnstable, Brockton, Fall River, Falmouth, Nantucket, New Bedford, Oaks Bluff, Orleans, Plymouth, Taunton, Wareham **Central:** Athol, Framingham, Gardner-Fitchburg, Southbridge, Waltham, Worcester
WestMass Elder Care	Not applicable	*Care Alliance of Western Massachusetts* • Greater Springfield Senior Services, Inc. • Highland Valley Elder Services, Inc. • LifePath, Inc. • Elder Services of Berkshire County, Inc. • Stavros Center for Independent Living, • Adlib, Inc. • Behavioral Health Network, Inc.	**Central:** Athol **Western:** Adams, Greenfield, Holyoke, Northampton, Pittsfield, Springfield, Westfield

Appendix A4. Participating CSAs

Bidder
Children's Services of Roxbury
Wayside Youth and Family Support Network
Child & Family Services, Inc.
Eliot Community Human Services, Inc.
The Home for Little Wanderers
Youth Opportunities Upheld, Inc. (YOU, Inc.)
Behavioral Health Network, Inc.
Family Service Association of Greater Fall River
Brockton Area Multi-Services, Inc.
Community Counseling of Bristol County, Inc.
Community Healthlink, Inc.
North Suffolk Mental Health Association, Inc.
Bay State Community Services
Riverside Community Care, Inc.
Gandara Mental Health Center, Inc.
Justice Resource Institute
Lahey Health Behavioral Services
Clinical and Support Options, Inc.
The Brien Center

Appendix A5: BH and LTSS CP Identification Algorithms

BH CP Identification Algorithm

Individuals identified for BH CP Supports using the analytics claims-based identification process include members enrolled in managed care with a relevant diagnosis AND some relevant utilization/co-morbidities in the last 15 months. To be part of the target population, members must meet the criteria for at least one of the following three groups. Members receiving care management supports from other EOHHS programs were excluded from the BH CP program. Members in the Department of Mental Health Adult Community Clinical Supports were identified for the BH CP Program unless otherwise directed by the Department of Mental Health, regardless of managed care enrollment.

	Members must have a diagnosis from the below list…	...AND meet at least one of the following...	...AND meet at least one of the following
Highest need BH diagnosis (Group 1)	• Schizophrenia • Bipolar disorder • Personality/ other mood disorders • Psychosis • Trauma • Attempted suicide or self-injury • Homicidal ideation	N/A	• IP visits (3+) • ED visits (5+) • Select medical comorbidities (3+) • High LTSS utilization • Current DMH enrollment
High need BH diagnosis (Group 2)	• Major depression • Other depression • Adjustment reaction • Anxiety • Psychosomatic disorders • Conduct disorder • PTSD	• BH-related IP visits (1+) • ESP interactions (2+) • ED visits (5+)	• IP visits (3+) • ED visits (5+) • Select medical comorbidities (3+) • High LTSS utilization • Current DMH enrollment
SUD diagnosis (Group 3)	• Any SUD diagnosis excluding caffeine and nicotine	• IP visit with a primary SUD diagnosis (2+) • ESP interaction (2+) • Detoxification (2+) • Methadone treatment (1+)	

LTSS CP Identification Algorithm

Individuals identified for LTSS CP Supports using the analytics claims-based identification process include individuals with >$300 in expenditures on LTSS State Plan service over 3 consecutive months, over a 12-month look-back period. Members receiving care management supports from other EOHHS programs were excluded from the LTSS CP program.

LTSS State Plan services include:

Extended Care Facility	Orthotics
Hospice	Chronic inpatient & outpatient hospitals
Therapists	PCA services
Nursing Facility	Home Health
Speech and Hearing Center	Independent Nurse
Rehabilitation Center	Adult Foster Care/Group Adult Foster Care
Early Intervention	Adult Day Health
Targeted Case Management	Day Habilitation
Durable Medical Equipment	Independent living (also PCA services)
Oxygen & Respiratory Therapy Equipment	Nursing Services
Prosthetics	

Exclusions from Identification Algorithm: Certain MassHealth members were excluded from the LTSS CP identification algorithm based on the reception of certain services or enrollment in certain programs. However, these members may be referred into the CP Program on an individual basis.

LTSS CP Identification Algorithm Exclusions:
- Adult Supports Waiver
- Home Care Program – Basic, Non-Waiver
- Home Care Basic – Waiver (Frail Elder Waiver)
- Choices (Frail Elder Waiver)
- Community Living Waiver
- Traumatic Brain Injury Waiver
- Intensive Supports Waiver
- Acquired Brain Injury Non-Residential Waiver
- Autism Waiver
- Money Follows the Person Residential Waiver
- Money Follows the Person Community Living Waiver
- Acquired Brain Injury Residential Habilitation Waiver
- Community Case Management
- Non-waiver 24/7 Residential Supports (Shared Living and Group Home)

Appendix B:
1115 Demonstration Evaluation
Specifications of Quantitative Measures Derived from Existing Data Sources

Overview

The table below lists process and outcome measures derived from existing data sources to be used in the quantitative evaluation of Demonstration Goals 1-2 (DSRIP) and Goals 3-7. These measures were selected to capture the Demonstration's effects on healthcare access, program enrollment, care processes, needs identification, integration, healthcare utilization, member outcomes, and healthcare costs.

Measure Selection

Accountability measures comprising the Massachusetts Medicaid ACO measure slate and the 2 CP measure slates were selected by MassHealth after iterative feedback from stakeholders in Massachusetts and from CMS. Measures that were not selected by MassHealth for accountability purposes but that were deemed important for monitoring will also be studied. Additional measures were selected based on NQF endorsement and from established measure stewards to study Demonstration effects on processes and outcomes across other important conceptual areas, particularly those included in the DSRIP Implementation Logic Model. Standard epidemiologic measures (e.g., rates, proportions) will also be calculated to track changes in utilization and costs over the study period. Similar to other state evaluations, measure selection accounts for outcomes specific to Massachusetts' 1115 Demonstration.

The table below is organized into two main sections: Goals 1 and 2 (DSRIP) and Goals 3-7. Similar to other states, the measures selected here includes the steward, NQF measure number (if applicable), NQF endorsement, and national benchmarks from CMS, NCQA, and ARHQ, if available. Measures operationalized by MassHealth and UMMS do not have national benchmarks.

Note: Some measure specifications are still under review between the State and CMS, to be finalized at a later date.

Goals 1 and 2 (DSRIP) are organized by evaluation domain:

- Domain 1: State, organizational, and provider-level actions promoting delivery system transformation
- Domain 2: Changes in care processes
- Domain 3: Changes in member outcomes
- Domain 4: Changes in healthcare cost trends
- Domain 5: Sustainability of innovative delivery system changes, including ACOs, CPs, and Flex Services
- Domain 6: Effects of specific DSRIP investments and actions

Goals 3 to 7 are organized by goal:

- Goal 3: Maintaining near-universal coverage
- Goal 4: Sustainably support safety net providers to ensure continued access to care for Medicaid and low-income uninsured individuals

- Goal 5: Address the opioid addiction crisis by expanding access to a broad spectrum of recovery-oriented substance use disorder services.
- Goal 6: Continuing to provide coverage to former foster care youth who aged out of foster care under the responsibility of another state (and were enrolled in Medicaid at any time in the state in which they lived), as a means of increasing and strengthening overall coverage of former foster care youth and improving health outcomes for these youth.
- Goal 7: Ensure the long-term financial sustainability of the MassHealth program through refinement of provisional eligibility and authorization for SHIP Premium Assistance

Measure Stewards

Measure stewards are recognized as expert organizations involved in developing measure definitions. The stewards used in this evaluation include:

- National Council for Quality Assurance (NCQA) – a national nonprofit organization that monitors healthcare quality and accredits health plans. The Healthcare Effectiveness Data and Information Set (HEDIS) developed and maintained by NCQA is a tool used by the majority of American health plans to measure performance on various aspects of healthcare and services provided
- Agency for Healthcare Research and Quality (AHRQ) – a federal agency that strives to improve the quality and safety of American healthcare systems
- Choosing Wisely – A national initiative that works with patients and clinicians to avoid wasteful and/or unnecessary healthcare services
- MassHealth – the program that administers Medicaid and the Children's Health Insurance Program in Massachusetts

Measure Data

Measures include national or state benchmarks where available. CMS benchmarks are presented here at the 50th and 90th percentile. The other benchmarks appear as rates (ARHQ measures), or percentiles. Most measures will be calculated from the following data sources:

- Massachusetts Medicaid administrative data: This member-level database is comprised of eligibility, enrollment, and billing records for healthcare services for the MassHealth member population.
- Health Insurance Exchange/Integrated Eligibility Information System (HIS/IES) data: The HIX/IES data set contains Medicaid ID, demographic information, date of enrollment/renewal, whether the individual lost coverage or had their aid category changed after 90-days, and reason for loss of coverage.
- Extracts from MassHealth's analytics vendor: MassHealth has contracted with an outside vendor to develop datasets, conduct analyses, and produce reports to support monitoring and accountability measurement. These extracts will include information on hybrid quality measures that require clinical information and claims/encounter data.
- Chapter 55 opioid overdose data: a linked dataset that was created by a MA statute to facilitate analysis of data to inform efforts to reduce opioid overdoses in the state. The dataset links individual-level data from a broad range of sources,

including vital statistics, medical and pharmacy claims data, hospital discharge records, toxicology reports, ambulance transport records, DPH program enrollment, and BSAS service utilization.

A few measures to be used in the evaluation of Goals 3-7 utilize data from other sources such as the Massachusetts Uncompensated Care Cost reports, Safety Net Hospital reports, and program data from MassHealth.

Appendix B:
Specifications of Quantitative Measures Derived from Existing Data Sources

DSRIP Evaluation Measures	
Domain 2 Measures	
Measure: Oral Health Evaluation *Steward: American Dental Association on behalf of the Dental Quality Alliance (#2517)* **MassHealth ACO quality measure* *NQF Endorsed: Yes*	
Description	Percentage of enrolled children under age 21 years who received a comprehensive or periodic oral evaluation within the reporting year.
Numerator	Unduplicated number of enrolled children under age 21 years who received a comprehensive or periodic oral evaluation as a dental service
Denominator	Unduplicated number of enrolled children under age 21 years
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Developmental Screening in the First 3 Years of Life *Steward: National Committee for Quality Assurance (#1448)* **MassHealth ACO monitoring measure* *NQF Endorsed: No; Recommended for use in the Child Core Set for Medicaid*	
Description	The percentage of children ages one, two, and three years who had a developmental screening performed 3 Rates – Rate 1: Developmental Screening by Child's First Birthday Rate 2: Developmental Screening by Child's Second Birthday Rate 3: Developmental Screening by Child's Third Birthday
Numerator	Children who had documentation of a developmental screening (screening for risk of developmental, behavioral, and social delays) using a standardized tool by their first, second, and third birthdays
Denominator	Children with a visit who turned one, two, and three years of age
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Adolescent Wellcare *Steward: National Committee for Quality Assurance* **MassHealth ACO monitoring measure* *NQF Endorsed: No; Recommended for use in the Child Core Set for Medicaid*	
Description	Percentage of adolescents ages 12 to 21 who had at least one comprehensive well-care visit with a primary care practitioner (PCP) or an obstetric/gynecologic (OB/GYN) practitioner during the measurement year
Numerator	At least one comprehensive well-care visit with a PCP or an OB/GYN practitioner during the measurement year. The practitioner does not have to be the practitioner assigned to the adolescent
Denominator	The eligible population
Data Sources	Medicaid claims/encounters data
National Benchmark	2016 Medicaid HMO = 50.6% Source: https://www.ncqa.org/hedis/measures/child-and-adolescent-well-care-visits/
Measure: Lead Screening *Steward: National Committee for Quality Assurance* **MassHealth ACO monitoring measure* *NQF Endorsed: No; Recommended for use by NCQA*	
Description	Among children who turn two (2) years of age as of December 31st of the measurement year, the percentage with at least one lead venous or capillary blood test on or before the child's second (2nd) birthday.
Numerator	Children should have at least one (1) lead venous or capillary blood test on or before their second (2nd) birthday
Denominator	Children who turn two (2) years of age as of December 31st of the measurement year

Data Sources	Medicaid claims/encounters
National Benchmark	2016 Medicaid HMO = 67.6% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/lead-screening
Measure: BH CP Engagement in 90 Days *Steward: MassHealth* **MassHealth ACO and CP quality measure* *NQF Endorsed: No*	
Description	Percentage of enrollees 18 to 64 years of age who engaged with a BH Community Partner and received a completed treatment plan within 3 months (92 days) of Community Partner assignment
Numerator	ACO attributed members 18 to 64 years of age, who were assigned to a BH CP on or between October 3rd of the year prior to the measurement year and October 2nd of the measurement year, and who had documentation of engagement within 90 days of assignment
Denominator	ACO attributed members 18 to 64 years of age who were assigned to a BH CP on or between October 3rd of the year prior to the measurement year and October 2nd of the measurement year
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Initiation and Engagement of Alcohol, Opioid, or Other Drug Abuse or Dependence Treatment *Steward: National Committee for Quality Assurance (#0004)* **MassHealth ACO quality measure* *NQF Endorsed: Yes*	
Description	The percentage of adolescent and adult patients with a new episode of alcohol or other drug (AOD) dependence who received the following: -Initiation of AOD Treatment. The percentage of patients who initiate treatment through an inpatient AOD admission, outpatient visit, intensive outpatient encounter or partial hospitalization within 14 days of diagnosis -Engagement of AOD Treatment: The percentage of patients who initiated treatment and who had two or more additional services with a diagnosis of AOD within 30 days of the initiation visit
Numerator	Initiation of AOD Dependence Treatment: Initiation of AOD treatment through an inpatient admission, outpatient visit, intensive outpatient encounter or partial hospitalization within 14 days of the index episode start date. --- Engagement of AOD Treatment: Initiation of AOD treatment and two or more inpatient admissions, outpatient visits, intensive outpatient encounters or partial hospitalizations with any AOD diagnosis within 30 days after the date of the Initiation encounter (inclusive)
Denominator	Patients age 13 years of age and older who were diagnosed with a new episode of alcohol or other drug dependence (AOD) during the first 10 and ½ months of the measurement year (e.g., January 1-November 15)
Data Sources	Medicaid claims/encounters data, analytics vendor extract
National Benchmark	Initiation: 2016 Medicaid HMO = 40.8% Engagement: 2016 Medicaid HMO = 12.5% http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/alcohol-treatment
Measure: LTSS CP Engagement in 90 Days *Steward: MassHealth* **MassHealth ACO and CP quality measure* *NQF Endorsed: No*	

Description	Percentage of enrollees 3 to 64 years of age who engaged with a LTSS Community Partner and received a completed care plan within 3 months (92 days) of Community Partner assignment
Numerator	ACO attributed members 3 to 64 years of age, who were assigned to a LTSS CP on or between October 3rd of the year prior to the measurement year and October 2nd of the measurement year, and who had documentation of engagement within 90 calendar days of assignment
Denominator	ACO attributed members 3 to 64 years of age who were assigned to a LTSS CP on or between October 3rd of the year prior to the measurement year and October 2nd of the measurement year
Data Sources	Medicaid claims/encounters, analytics vendor extract
National Benchmark	None
Measure: Health related social needs screening *Steward: MassHealth* **MassHealth ACO quality measure* *NQF Endorsed: No*	
Description	Percentage of members 0 to 64 years of age who were screened for health-related social needs in the measurement year
Numerator	Members 0 to 64 years of age who were screened for health-related social needs in the measurement year
Denominator	Members 0 to 64 years of age
Data Sources	Medicaid claims/encounters data, analytics vendor extract
National Benchmark	None
Measure: Asthma Medication Ratio *Steward: National Committee for Quality Assurance* **MassHealth ACO quality measure (#1800)* *NQF Endorsed: Yes*	
Description	The percentage of patients 5–64 years of age who were identified as having persistent asthma and had a ratio of controller medications to total asthma medications of 0.50 or greater during the measurement year
Numerator	The number of patients who have a ratio of controller medications to total asthma medications of 0.50 or greater during the measurement year
Denominator	All patients 5–64 years of age as of December 31 of the measurement year who have persistent asthma by meeting at least one of the following criteria during both the measurement year and the year prior to the measurement year: • At least one emergency department visit with asthma as the principal diagnosis • At least one acute inpatient encounter with asthma as the principal diagnosis • At least four outpatient visits or observation visits on different dates of service, with any diagnosis of asthma AND at least two asthma medication dispensing events. Visit type need not be the same for the four visits. • At least four asthma medication dispensing events for any controller medication or reliever medication
Data Sources	Medicaid claims/encounters
National Benchmark	2016 Medicaid HMO = 61.1% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/asthma
Measure: Gap in HIV Medical Visits *Steward: Health Research and Services Administration (#2080)* *NQF Endorsed: Yes*	
Description	Percentage of patients, regardless of age, with a diagnosis of HIV who did not have a medical visit in the last 6 months of the measurement year A medical visit is any visit in an outpatient/ambulatory care setting with a nurse practitioner, physician, and/or a physician assistant who provides comprehensive HIV care.

Numerator	Number of patients in the denominator who did not have a medical visit in the last 6 months of the measurement year (Measurement year is a consecutive 12-month period of time).
Denominator	Number of patients, regardless of age, with a diagnosis of HIV who had at least one medical visit in the first 6 months of the measurement year. (The measurement year can be any consecutive 12-month period.)
Data Sources	Medicaid claims/encounters
National Benchmark	None
Measure: Continuity of care for children with complex medical conditions (Continuity of Primary Care for Children with Medical Complexity) *Steward: Seattle Children's (#3153)* *NQF Endorsed: Yes*	
Description	This measure assesses the percentage of children with medical complexity age 1 to 17 years old who have a Bice-Boxerman continuity of care index of >=0.5 in the primary care setting over a 12-month period.
Numerator	Number of eligible children (1) who have a Bice-Boxerman COC index >=0.50 in the primary care setting during the measurement year. 1. Eligible children are defined as children who are continuously enrolled for 12 months with no more than a 30-day gap in enrollment. Children with a gap greater than 30 days are excluded because of the potential for them to be enrolled in a different health plan at that time. In such cases, the child's administrative data for the health plan being measured would be incomplete and thus might not reflect the health plan's true performance on the measure. The timeframe of 30 days as the length of the gap was chosen to be consistent with the month-to-month eligibility assessments used by many Medicaid health plans.
Denominator	Children with medical complexity (1) who are 1-17 years old (2) and who have had >= 4 primary care visits (3) during the measurement year. 1. Children with medical complexity are defined as children who are classified by the Pediatric Medical Complexity algorithm, Version 2 (PMCA-V2) as having no chronic illness or non-complex chronic illness. 2. Children must be >=1 year and <=17 years of age on the last day of the measurement year. 3. Research has shown that stability of the COC index increases as the number of visits increases (i.e. less subject to significant change as a result of minor variations in care dispersion).
Data Sources	Medicaid claims/encounters
National Benchmark	None
Measure: Antidepressant medication management *Steward: National Committee on Quality Assurance (#0105)* *NQF Endorsed: Yes*	
Description	The percentage of patients 18 years of age and older with a diagnosis of major depression and were treated with antidepressant medication, and who remained on an antidepressant medication treatment. Two rates are reported. a) Effective Acute Phase Treatment. The percentage of patients who remained on an antidepressant medication for at least 84 days (12 weeks). b) Effective Continuation Phase Treatment. The percentage of patients who remained on an antidepressant medication for at least 180 days (6 months).
Numerator	Adults 18 years of age and older who were treated with antidepressant medication, had a diagnosis of major depression, and who remained on an antidepressant medication treatment
Denominator	Patients 18 years of age and older with a diagnosis of major depression and were newly treated with antidepressant medication

Data Sources	Medicaid claims/encounters data
National Benchmark	Acute Phase Treatment: 2016 Medicaid HMO = 53.1% Continuation Phase Treatment: 2016 Medicaid HMO = 38%
Measure: Adult access to preventive/ambulatory health services *Steward: National Committee on Quality Assurance* *NQF Endorsed:*	
Description	This measure is used to assess the percentage of members 20 years and older who had an ambulatory or preventive care visit. Medicaid members who had an ambulatory or preventive care visit during the measurement year
Numerator	One or more ambulatory or preventive care visits during the measurement year
Denominator	Members age 20 years and older as of December 31 of the measurement year
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Annual primary care visit *Steward: MassHealth* **MassHealth CP quality measure* *NQF Endorsed: No*	
Description	Percentage of enrollees 18 to 64 years of age who had an annual primary care visit in the measurement year
Numerator	Number of enrollees who had at least one primary care visit during the measurement year
Denominator	Eligible population
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Immunizations for Adolescents *Steward: National Committee on Quality Assurance (#1407)* **MassHealth ACO quality measure* *NQF Endorsed: Yes*	
Description	The percentage of adolescents 13 years of age who had the recommended immunizations (meningococcal vaccine and one tetanus, diphtheria toxoids and acellular pertussis vaccine (Tdap) or one tetanus, diphtheria toxoids vaccine (Td)) by their 13th birthday
Numerator	Adolescents 13 years of age who had one dose of meningococcal vaccine and one tetanus, diphtheria toxoids and acellular pertussis vaccine (Tdap) or one tetanus, diphtheria toxoids vaccine (Td) by their 13th birthday
Denominator	Adolescents who turn 13 years of age during the measurement year
Data Sources	Medicaid claims/encounters, analytics vendor extract
National Benchmark	2016 Medicaid HMO = 75.1% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/immunizations-for-adolescents
Measure: Timeliness of Prenatal Care *Steward: National Committee on Quality Assurance (#1517)* **MassHealth ACO quality measure* *NQF Endorsed: No; Recommended as part of the Child Core Set for Medicaid*	
Description	The percentage of deliveries of live births between November 6 of the year prior to the measurement year and November 5 of the measurement year. For these women, the measure assesses the following facets of prenatal and postpartum care: Rate 1: Timeliness of Prenatal Care. The percentage of deliveries that received a prenatal care visit as a member of the organization in the first trimester or within 42 days of enrollment in the organization. Rate 2: Postpartum Care. The percentage of deliveries that had a postpartum visit on or between 21 and 56 days after delivery.
Numerator	1. Deliveries with a prenatal care visit as a member of the organization in the first trimester or within 42 days of enrollment in the organization. 2. Deliveries that had a postpartum visit on or between 21 and 56 days after delivery.

Denominator	Deliveries of live births between November 6 of the year prior to the measurement year and November 5 of the measurement year
Data Sources	Medicaid claims/encounters, analytics vendor extract
National Benchmark	2016 Medicaid HMO = 81.7% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/perinatal-care
Measure: Primary care provider visit (children) *Steward: National Committee on Quality Assurance* *NQF Endorsed: No; Recommended as part of the Child Core Set for Medicaid*	
Description	Percentage of children and adolescents ages 12 months to age 19 who had a visit with a primary care practitioner (PCP). Four separate percentages are reported: - Children ages 12 to 24 months and 25 months to age 6 who had a visit with a PCP during the measurement year - Children ages 7 to 11 and adolescents ages 12 to 19 who had a visit with a PCP during the measurement year or the year prior to the measurement year
Numerator	For ages 12 to 24 months, ages 25 months to age 6: One or more visits with a PCP (Ambulatory Visits Value Set) during the measurement year. For ages 7 to 11, ages 12 to 19: One or more visits with a PCP (Ambulatory Visits Value Set) during the measurement year or the year prior to the measurement year. Count all children/adolescents who had an ambulatory or preventive care visit to any PCP.
Denominator	The eligible population
Data Sources	Medicaid claims/encounters data
National Benchmark	2015 Medicaid HMO = 90.2% Source: https://www.ncqa.org/Portals/0/PublicComment/HEDIS-Ad-Hoc/5.%20Child%20and%20Adolescent%20Access.pdf?ver=2017-07-13-092457-440
Measure: ED Boarding of Members with BH Conditions *Steward:* None *NQF Endorsed: No*	
Description	The rate of ED visits resulting in boarding among members with BH conditions
Numerator	The number of ED visits for members with a BH condition with an arrival date and discharge date separated by one or more days (a minimum duration in the ED of 24 hours).
Denominator	The person-time contributed by members of the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Multiple Antipsychotic Use In Children *Steward: National Committee on Quality Assurance* **MassHealth ACO monitoring measure* *NQF Endorsed: No; Recommended as part of the Child Core Set for Medicaid*	
Description	Percentage of children and adolescents ages 1 to 17 who were treated with antipsychotic medications and who were on two or more concurrent antipsychotic medications for at least 90 consecutive days during the measurement year
Numerator	Beneficiaries on two or more concurrent antipsychotic medications for at least 90 consecutive days during the measurement year
Denominator	The eligible population
Data Sources	Medicaid claims/encounters data
National Benchmark	2016 Medicaid HMO = 2.4% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/use-of-multiple-concurrent-antipsychotics-in-children-and-adolescents

Measure: Follow-up care for children prescribed ADHD medication (Initiation and Maintenance Phase) *Steward: National Committee on Quality Assurance (#0108)* **MassHealth ACO quality measure (initiation phase)* *NQF Endorsed: Yes*	
Description	Percentage of children newly prescribed attention-deficit/hyperactivity disorder (ADHD) medication who had at least three follow-up care visits within a 10-month period, one of which was within 30 days of when the first ADHD medication was dispensed. Two rates are reported. Initiation Phase: Percentage of children ages 6 to 12 as of the Index Prescription Start Date (IPSD) with an ambulatory prescription dispensed for ADHD medication, who had one follow-up visit with practitioner with prescribing authority during the 30-day Initiation Phase. Maintenance Phase: Percentage of children who remained on ADHD medication for at least 210 days and who, in addition to the visit in the Initiation Phase, had at least two additional follow-up visits with a practitioner within 270 days (9 months) after the Initiation Phase ended.
Numerator	Initiation Phase: Patients who had at least one face-to-face visit with a practitioner with prescribing authority within 30 days after the IPSD. Maintenance Phase: Patients who had at least one face-to-face visit with a practitioner with prescribing authority during the Initiation Phase, and at least two follow-up visits during the Continuation and Maintenance Phase. One of the two visits during the Continuation and Maintenance Phase may be a telephone visit with a practitioner.
Denominator	Initiation Phase: Children 6-12 years of age who were dispensed an ADHD medication during the Intake Period and who had a visit during the measurement period. Maintenance Phase: Children 6-12 years of age who were dispensed an ADHD medication during the Intake Period and who remained on the medication for at least 210 days out of the 300 days following the IPSD, and who had a visit during the measurement period.
Data Sources	Medicaid claims/encounters data
National Benchmark	Initiation: 2016 Medicaid HMO = 44.5% Maintenance: 2016 Medicaid HMO = 54.5% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/adhd
Measure: Metabolic Monitoring for Children and Adolescents on Antipsychotics *Steward: National Committee on Quality Assurance (#2800)* **MassHealth ACO quality measure* *NQF Endorsed: Yes*	
Description	The percentage of children and adolescents 1–17 years of age who had two or more antipsychotic prescriptions and had metabolic testing.
Numerator	Children and adolescents who received glucose and cholesterol tests during the measurement year.
Denominator	Children and adolescents who had ongoing use of antipsychotic medication (at least two prescriptions).
Data Sources	Medicaid claims/encounters data
National Benchmark	2016 Medicaid HMO = 33.3% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/metabolic-monitoring-for-children-and-adolescents-on-antipsychotics
Measure: Annual treatment plan completion (BH CP) *Steward: MassHealth* **MassHealth CP quality measure* *NQF Endorsed: No*	
Description	Percentage of BH CP enrollees 18 to 64 years of age who received a completed a treatment plan within the measurement year
Numerator	Enrollees 18 to 64 years of age who completed a treatment plan

Denominator	Enrollees 18 to 64 years of age
Data Sources	Medicaid claims/encounters, analytics vendor extract
National Benchmark	None
Measure: Annual care plan completion (LTSS CP) *Steward: MassHealth* **MassHealth CP quality measure* *NQF Endorsed: No*	
Description	Percentage of LTSS CP enrollees 3 to 64 years of age who received a completed a care plan within the measurement year
Numerator	Enrollees 3 to 64 years of age who completed a care plan
Denominator	Enrollees 3 to 64 years of age
Data Sources	Medicaid claims/encounters, analytics vendor extract
National Benchmark	None
Measure: Flexible services utilization *Steward: MassHealth* **MassHealth ACO monitoring measure* *NQF Endorsed: No*	
Description	The rate of flexible service utilization
Numerator	The number of members that received at least one Flexible Service during the measurement period
Denominator	The person-time contributed by members in the population during the measurement period
Data Sources	Medicaid claims/encounters
National Benchmark	None
Measure: Diabetes Screening for People With Schizophrenia or Bipolar Disorder Who Are Using Antipsychotic Medications (SSD) *Steward: National Committee on Quality Assurance (#1932)* **MassHealth ACO quality measure* *NQF Endorsed: Yes*	
Description	The percentage of patients 18 – 64 years of age with schizophrenia or bipolar disorder, who were dispensed an antipsychotic medication and had a diabetes screening test during the measurement year.
Numerator	Among patients 18-64 years old with schizophrenia or bipolar disorder, those who were dispensed an antipsychotic medication and had a diabetes screening testing during the measurement year.
Denominator	Patients ages 18 to 64 years of age as of the end of the measurement year (e.g., December 31) with a schizophrenia or bipolar disorder diagnosis and who were prescribed an antipsychotic medication
Data Sources	Medicaid claims/encounters data
National Benchmark	2016 Medicaid HMO = 80.7% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/schizophrenia
Measure: Cholesterol testing for members using antipsychotics *Steward: National Committee on Quality Assurance* *NQF Endorsed: No*	
Description	Percentage of members age 18 to 64 with a filled prescription for second generation antipsychotic medication in the prior year who had at least one LDL-C screening performed within 180 days of last prescription fill
Numerator	Among the patients 18 to 64 years old who were dispensed a second generation antipsychotic medication in the prior year who had at least one LDL-C screening performed within 180 days of last prescription fill

Denominator	Patients ages 18 to 64 with a filled prescription for second generation antipsychotic medication in the prior year
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Physician visit within 30 days of hospital discharge *Steward: MassHealth* *NQF Endorsed: No*	
Description	Percentage of hospitalizations for enrollees 18 to 64 years of age where the member received follow-up within 30 days of hospital discharge
Numerator	Enrollees 18 to 64 years of age who had a follow-up visit within 30 days of hospital discharge
Denominator	Enrollees 18 to 64 years of age who were hospitalized
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Follow-up with CP after any hospitalization within 3 days *Steward: MassHealth* **MassHealth CP quality measure* *NQF Endorsed: No*	
Description	Percentage of acute or post-acute stays for enrollees 18 to 64 years of age where the member received follow-up from the CP within 3 business days of discharge
Numerator	Enrollees 18 to 64 years of age who received follow-up care from the CP within 3 business days of discharge
Denominator	Enrollees 18 to 64 years of age who were hospitalized in the measurement year
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Follow-up with BH CP or provider after ED visit *Steward: MassHealth* **MassHealth CP quality measure* *NQF Endorsed: No*	
Description	Percentage of ED visits for enrollees 18 to 64 years of age where the member received follow-up within 7 days of ED discharge
Numerator	Enrollees 18 to 64 years of age who received follow-up care from a BH CP or provider after an ED visit
Denominator	Enrollees 18 to 64 years of age who had an ED visit in the measurement year
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Follow-up after emergency department for mental illness (7 days) *Steward: MassHealth* **MassHealth ACO quality measure* *NQF Endorsed: No*	
Description	The percentage of ED visits for members 6 to 64 years of age with a principal diagnosis of mental illness, who had a follow-up visit for mental illness within 7 days of the ED visit.
Numerator	ACO attributed members 6 to 64 years of age as of the date of the ED visit who received follow-up within 7 days after discharge.
Denominator	ACO attributed members 6 to 64 years of age as of the date of the ED visit
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Follow-up after hospitalization for mental illness (7 days) *Steward: MassHealth* **ACO and CP Performance Measure* *NQF Endorsed: No*	
Description	The percentage of discharges for members 6 to 64 years of age who were hospitalized for treatment of selected mental illness diagnoses and who received a follow-up visit with a mental health practitioner within 7 days of discharge

Numerator	ACO attributed members 6 to 64 years of age as of the date of discharge who had a follow-up visit with a mental health practitioner within 7 days after discharge
Denominator	ACO attributed members 6 to 64 years of age as of the date of discharge
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Imaging for low back pain *Steward: National Committee on Quality Assurance (#0312)* *NQF Endorsed: No; Recommended for use in the CMS Medicare Shared Savings Program*	
Description	Percentage of patients at least 18 years of age with a diagnosis of back pain for whom the physician ordered imaging studies during the six weeks after pain onset, in the absence of "red flags" (overuse measure, lower performance is better).
Numerator	The number of patients with an order for or report on an imaging study during the six weeks after pain onset.
Denominator	Patients at least 18 years of age with back pain lasting six weeks or less.
Data Sources	Medicaid claims/encounters data
National Benchmark	2016 Medicaid HMO = 70.5% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/low-back-pain
Measure: Pre-operative chest radiography *Steward: Choosing Wisely* *NQF Endorsed: No; Recommended for use in the Child Core Set for Medicaid*	
Description	Percentage of patients receiving a chest x-ray within 30 days prior to low or intermediate risk non-cardiothoracic surgery
Numerator	The number of patients who receive a chest x-ray within 30 days prior to low/intermediate risk non-cardiothoracic surgery
Denominator	Patients at least 18 years of age who undergo low to intermediate risk non-cardiothoracic surgery
Data Sources	Medicaid claims/encounters
National Benchmark	None
Measure: Head imaging for syncope *Steward: Choosing Wisely* *NQF Endorsed: No; Recommended by the AAFP*	
Description	Percentage of patients receiving a CT or MRI of the head or brain following a syncope event
Numerator	The number of patients who receive a CT or MRI of the head or brain following a syncope event
Denominator	Patients at least 18 years of age who have a syncope event
Data Sources	Medicaid claims/encounters
National Benchmark	None
Measure: Abdomen CT combined studies *Steward: Centers for Medicare and Medicaid Services* *NQF Endorsed: No; Recommended by CMS*	
Description	This measure calculates the percentage of abdomen and abdominopelvic computed tomography (CT) studies that are performed without and with contrast, out of all abdomen and abdominopelvic CT studies performed (those without contrast, those with contrast, and those with both) at each facility.
Numerator	Of studies identified in the denominator, number of abdomen and abdominopelvic studies with and without contrast (combined studies)
Denominator	The number of abdomen and abdominopelvic studies performed with contrast, without contrast, or both without and with contrast.
Data Sources	Medicaid claims/encounters
National Benchmark	None
Measure: CT/MRI for headache *Steward: National Committee on Quality Assurance* *NQF Endorsed: No*	

Description	Percentage of patients who receive a CT or MRI of the head or brain after having a headache or migraine
Numerator	The number of patients who receive a CT or MRI of the head or brain after having a headache or migraine
Denominator	Patients 18 to 64 who have a diagnosis of headache
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Avoidance of Antibiotic Treatment in Adults With Acute Bronchitis *Steward: National Committee on Quality Assurance (#0058)* *NQF Endorsed: Yes*	
Description	The percentage of adults 18–64 years of age with a diagnosis of acute bronchitis who were not dispensed an antibiotic prescription.
Numerator	Patients who were dispensed antibiotic medication on or three days after the index episode start date (a higher rate is better). The measure is reported as an inverted rate (i.e. 1- numerator/denominator) to reflect the number of people that were not dispensed an antibiotic.
Denominator	All patients 18 years of age as of January 1 of the year prior to the measurement year to 64 years as of December 31 of the measurement year with an outpatient or ED visit with any diagnosis of acute bronchitis during the Intake Period (January 1–December 24 of the measurement year)
Data Sources	Medicaid claims/encounters data
National Benchmark	2016 Medicaid HMO = 30.4% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/acute-bronchitis
Measure: CT without ultrasound for childhood appendicitis *Steward: Choosing Wisely* *NQF Endorsed: No*	
Description	Percentage of children age 1-18 with a diagnosis of appendicitis who had a CT scan, but not an ultrasound, within 30 days prior to the diagnosis
Numerator	The number of children age 1-18 with a diagnosis of appendicitis who had a CT scan without ultrasound within 30 days prior to diagnosis
Denominator	All patients 1-18 with a diagnosis of appendicitis
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Strep test with antibiotic dispensing for childhood pharyngitis *Steward: National Committee on Quality Assurance (#0002)* *NQF Endorsed: No*	
Description	The percentage of children 2–18 years of age who were diagnosed with pharyngitis, dispensed an antibiotic and received a group A streptococcus (strep) test for the episode. A higher rate represents better performance (i.e., appropriate testing).
Numerator	A group A streptococcus test (Group A Strep Tests Value Set) in the seven-day period from three days prior to the Index Episode Start Date (IESD) through three days after the IESD.
Denominator	Children age 2 years as of July 1 of the year prior to the measurement year to 18 years as of June 30 of measurement year who had an outpatient or ED visit with only a diagnosis of pharyngitis and were dispensed an antibiotic for the episode of care during the 6 months prior to through the 6 months after the beginning of the measurement year.
Data Sources	Medicaid claims/encounters data
National Benchmark	2016 Medicaid HMO = 66.5% Source: http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality/2017-table-of-contents/pharyngitis
Domain 3 Measures	
Measure: All cause inpatient admissions *Steward: MassHealth* **MassHealth ACO monitoring measure*	

NQF Endorsed: No	
Description	Rate of all-cause acute hospital admissions (or observation stays)
Numerator	The number of acute inpatient admissions from any cause
Denominator	The person-time contributed by members in the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Unplanned hospital readmissions within 30 days (overall) *Steward: National Committee on Quality Assurance (#1768)* **MassHealth ACO quality measure* *NQF Endorsed: Yes*	
Description	For beneficiaries ages 18 to 64, the number of acute inpatient stays during the measurement year that were followed by an unplanned acute readmission for any diagnosis within 30 days and the predicted probability of an acute readmission. Data are reported in the following categories: • Count of Index Hospital Stays (IHS) (denominator) • Count of 30-Day Readmissions (numerator) • Expected Readmissions Rate
Numerator	All acute inpatient discharges on or between January 1 and December 1 of the measurement year
Denominator	The eligible population
Data Sources	Medicaid claims/encounters data
National Benchmark	Medicare Shared Savings Program 2018-19 Benchmark 50th Percentile: 14.91 Medicare Shared Savings Program 2018-19 Benchmark 90th Percentile: 14.27
Measure: All cause ED Visits **MassHealth ACO monitoring measure* *NQF Endorsed: No*	
Description	Rate of all cause ED visits for enrollees 3 to 64 years of age
Numerator	All ED visits by enrollees 3 to 64 years of age on or between January 1 and December 1 of the measurement year
Denominator	Enrollees 3 to 64 years of age
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Primary Care Sensitive ED Visits *NQF Endorsed: No*	
Description	Rate of primary care sensitive ED visits for enrollees 3 to 64 years of age
Numerator	All primary care sensitive ED visits by enrollees 3 to 64 years of age on or between January 1 and December 1 of the measurement year
Denominator	Person-time contributed by enrollees 3 to 64 years of age
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Acute unplanned admissions adult diabetes (Diabetes Short-Term Complications Admission Rate) *Steward: Agency for Healthcare Research and Quality (#0272)* **MassHealth ACO quality measure* *NQF Endorsed: Yes*	
Description	Rate of acute unplanned hospital admissions (or observation stays) for members with diabetes
Numerator	The outcome measure is the observed number of acute unplanned hospital admissions (or observation stays) per 1,000-member months at risk for admissions
Denominator	The expected number of admissions (or observation stays) for members with diabetes when adjusting for the ACO case mix
Data Sources	Medicaid claims/encounters data
National Benchmark	2013 National Overall Population: 68.94 admissions / 100,000 admissions Source: https://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/V60-ICD09/Version_60_Benchmark_Tables_PQI.pdf
Measure: Acute unplanned admissions adult (chronic ACSCs)	

NQF Endorsed: No	
Description	Rate of admissions for members with chronic ACSCs
Numerator	The number of acute unplanned hospital admissions for adults with chronic ACSCs (or observation stays)
Denominator	The person-time contributed by members in the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Acute unplanned admissions adult (acute ACSCs) *NQF Endorsed: No*	
Description	Rate of admissions for members with acute ACSCs
Numerator	The outcome measure is the observed number of acute unplanned hospital admissions for adults with acute ACSCs (or observation stays) per 1,000-member months at risk for admissions
Denominator	The expected number of admissions (or observation stays) for members 18 to 65 years of age when adjusting for the ACO case mix
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: NICU Hospitalizations *Steward: MassHealth* **MassHealth ACO monitoring measure* *NQF Endorsed: No*	
Description	Rate of NICU hospitalizations per 1,000 live births
Numerator	The outcome measure is the observed number of NICU hospitalizations per 1,000-member months at risk
Denominator	The expected rate of NICU hospitalizations for members when adjusting for case mix
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Pediatric asthma admissions *Steward: Agency for Healthcare Research and Quality* **MassHealth ACO monitoring measure* *NQF Endorsed: No*	
Description	Admissions with a principal diagnosis of asthma per 100,000 population, ages 2 through 17 years. Excludes cases with a diagnosis code for cystic fibrosis and anomalies of the respiratory system, obstetric admissions, and transfers from other institutions.
Numerator	Discharges, for patients ages 2 through 17 years, with a principal ICD-9-CM diagnosis code for asthma.
Denominator	Population ages 2 through 17 years in metropolitan area (1) or county. Discharges in the numerator are assigned to the denominator based on the metropolitan area or county of the patient residence, not the metropolitan area or county of the hospital where the discharge occurred.
Data Sources	Medicaid claims/encounters data
National Benchmark	National Population 2014 = 41.13 admissions / 100,000 admissions Source: https://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/V60-ICD09/Version_60_Benchmark_Tables_PQI.pdf
Measure: Pediatric readmissions *Steward: MassHealth* **MassHealth ACO monitoring measure* *NQF Endorsed: No*	
Description	Rate of pediatric readmissions (or observation stays) for members under age 18
Numerator	The outcome measure is the observed number of pediatric readmissions for members under 18 per 1,000-member months at risk for admissions
Denominator	The expected rate of readmissions for members under 18 years of age when adjusting for case mix
Data Sources	Medicaid claims/encounters data

National Benchmark	None
Measure: Pediatric ED Visits (all-cause) *NQF Endorsed: No*	
Description	Rate of all-cause pediatric ED visits for members under age 18
Numerator	The observed number of all cause pediatric ED visits for members under 18
Denominator	The person-time contributed by members in the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Pediatric hospitalizations (all-cause) *NQF Endorsed: No*	
Description	Rate of all-cause hospital admissions (and observation stays) for members under age 18
Numerator	The observed number of all cause pediatric hospitalizations for members under 18
Denominator	The person-time contributed by members in the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: ED Visits for Adults with SMI, Addiction, or Co-occurring Conditions *Steward: MassHealth* **MassHealth ACO quality measure* *NQF Endorsed: No*	
Description	Rate of ED visits for members 18 to 64 years of age identified with a diagnosis of serious mental illness and/or substance addiction
Numerator	The expected number of admissions (or observation stays) for members with mental illness and/or SUD and/or co-occurring conditions when adjusting for the ACO case mix
Denominator	The expected number of admissions (or observation stays) for members with mental illness and/or SUD and/or co-occurring conditions when adjusting for the ACO case mix
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Hospital admissions for adults with mental illness and/or substance addiction *NQF Endorsed: No*	
Description	Rate of acute hospital admissions (or observation stays) for members 18 to 64 years of age identified with a diagnosis of serious mental illness and/or substance addiction
Numerator	The number of hospital admissions for adults with SMI and/or SUD
Denominator	The person-time contributed by members in the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: All cause readmissions among BH CP members *Steward: MassHealth* **MassHealth CP monitoring measure* *NQF Endorsed: No*	
Description	The rate of acute unplanned hospital readmissions within 30 days of discharge for BH CP enrollees 18 to 64 years of age
Numerator	The outcome measure is the observed number of all-cause readmissions among BH CP members per 1,000-member months at risk for admissions
Denominator	The expected number of readmissions among BH CP members when adjusting for the ACO case mix
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Community tenure: BH and LTSS CP members *Steward: MassHealth* **MassHealth CP monitoring measure* *NQF Endorsed: No*	

Description	The rate of eligible days CP enrollees 18 to 64 years of age resided in their home or in a community setting without utilizing acute or post-acute inpatient services
Numerator	The number of days CP enrollees 18-64 years of age resided in their home or in a community setting without utilizing acute or post-acute inpatient services
Denominator	The person-time contributed by members in the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: All cause readmissions among LTSS CP members *Steward: MassHealth* **MassHealth CP monitoring measure* *NQF Endorsed: No*	
Description	The rate of acute unplanned hospital readmissions within 30 days of discharge for LTSS CP enrollees 18 to 64 years of age
Numerator	The outcome measure is the observed number of all-cause readmissions among BH CP members per 1,000-member months at risk for admissions
Denominator	The expected number of readmissions among BH CP members when adjusting for the ACO case mix
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Long-term nursing home admissions *NQF Endorsed: No*	
Description	The rate of long-term (>100 days) nursing home admissions
Numerator	The number of long-term nursing home admissions for MassHealth members 18-64 years of age
Denominator	The person-time contributed by members in the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Domain 4 Measures	
Measure: Total cost of care (All covered services) *NQF Endorsed: No*	
Description	Costs of all MassHealth covered services
Numerator	Costs of all MassHealth covered services (excludes cosmetic surgery, treatment for infertility, experimental treatment, personal comfort items, non-covered laboratory services, other services specified as not covered by MassHealth)
Denominator	The person-time contributed by members in the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Total cost of care (services included in cap/benchmark) *NQF Endorsed: No*	
Description	Costs for services included in the capitated rate or total cost of care benchmark (See ACO model appendices)
Numerator	Costs for services included in the capitated rate or total cost of care benchmark
Denominator	The person-time contributed by members in the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Measure: Expenditures by service category *NQF Endorsed: No*	
Description	Costs for specific categories and sub-categories of services including inpatient (e.g., non-maternity physical health, maternity, behavioral health), ED visits, outpatient non-BH ((lab and radiology, non-BH outpatient hospital), outpatient BH (e.g., Emergency Services Program, diversionary services), professional services, pharmacy, home health, durable medical equipment, emergency transportation, long-term care, other

	medical services, and services excluded from the TCOC (e.g., applied behavioral analysis, Children's Behavioral Health Initiative, long term services and supports).
Numerator	Costs for specific categories and sub-categories of services (calculated separately for each category of service)
Denominator	The person-time contributed by members in the population of interest during the measurement period
Data Sources	Medicaid claims/encounters data
National Benchmark	None
Goals 3-7 Evaluation Measures	
Goal 3 Measures	
Measure: Uninsured MA Residents *NQF Endorsed: No*	
Description	Number and fraction of uninsured MA residents less than 65 years of age that are uninsured
Numerator	Number of uninsured MA residents less than 65 years of age
Denominator	Total number of MA residents less than 65 years of age
Data Sources	American Community Survey
National Benchmark	None
Measure: Uninsured Residents of 23 Comparison States (See Appendix E) *NQF Endorsed: No*	
Description	Number and fraction of uninsured residents from 23 comparison group states less than 65 years of age
Numerator	Number of uninsured residents from the 23 states less than 65 years of age
Denominator	Total number of residents from the 23 states less than 65 years of age
Data Sources	American Community Survey
National Benchmark	None
Measure: Number of individuals using cost sharing subsidies in MA *NQF Endorsed: No*	
Description	Number of individuals who take up Qualified Health Plan coverage with assistance from the MA Health Connector subsidy program
Numerator	Number of individuals who take up Qualified Health Plan coverage with assistance from the MA Health Connector subsidy program
Denominator	N/A
Data Sources	Health Connector subsidy program data
National Benchmark	None
Measure: Number of individuals enrolled in ESI Premium Assistance *NQF Endorsed: No*	
Description	Number of MassHealth members enrolled in ESI Premium Assistance
Numerator	Number of MassHealth members enrolled in ESI Premium Assistance
Denominator	N/A
Data Sources	ESI program data
National Benchmark	None
Measure: Number of MassHealth members with a gap in coverage 45 days or longer in one year *NQF Endorsed: No*	
Description	Number (%) of MassHealth members with a gap in coverage 45 days or longer in one year
Numerator	Number (%) of MassHealth members with a gap in coverage 45 days or longer in one year
Denominator	Total number of MassHealth members
Data Sources	MMIS enrollment data
National Benchmark	None
Measure: Number of individuals enrolled in SHIP Premium Assistance	

NQF Endorsed: No	
Description	Number of MassHealth members enrolled in SHIP Premium Assistance
Numerator	Number of MassHealth members enrolled in SHIP Premium Assistance
Denominator	N/A
Data Sources	SHIP Premium Assistance program data
National Benchmark	None
Measure: Number of individuals enrolled in CommonHealth 65+ *NQF Endorsed: No*	
Description	Number of MassHealth members enrolled in CommonHealth 65+
Numerator	Number of MassHealth members enrolled in CommonHealth 65+
Denominator	N/A
Data Sources	CommonHealth 65+ program data
National Benchmark	None
Measure: Length of enrollment in SHIP *NQF Endorsed: No*	
Description	**Average length of enrollment for MassHealth members in SHIP Premium Assistance**
Numerator	**Total months that members were enrolled in SHIP Premium Assistance**
Denominator	**N/A**
Data Sources	**SHIP Premium Assistance program data, MMIS enrollment data**
National Benchmark	None
Measure: Number (and type) of LTSS services utilized by CommonHealth 65+ enrollees *NQF Endorsed: No*	
Description	Total number of LTSS services utilized by CommonHealth 65+ enrollees, overall and by type
Numerator	Total number of LTSS services utilized by CommonHealth 65+ enrollees, overall and by type
Denominator	N/A
Data Sources	CommonHealth 65+ program data, MMIS claims data
National Benchmark	None
Measure: Length of enrollment in CommonHealth 65+ *NQF Endorsed: No*	
Description	Average length of enrollment of MassHealth members 65 and older in CommonHealth 65+
Numerator	Total months that members were enrolled in CommonHealth 65+
Denominator	N/A
Data Sources	CommonHealth 65+ program data, MMIS enrollment data
National Benchmark	None
Goal 4 Measures	
Measure: DSRIP ACO Performance Measures (Cambridge Health Alliance) *NQF Endorsed: No*	
Description	Measures related to the behavioral health integration at CHA. For specifications, see the section of Appendix B for Goals 1 and 2 (DSRIP) above.
Data Sources	PHTII reports for payment, MMIS claims
National Benchmark	None
Measure: DSRIP ACO Performance Measures (Safety Net Hospitals) *Steward: MassHealth* *NQF Endorsed: See specific measures*	
For specifications, see the section of Appendix B for Goals 1 and 2 (DSRIP) above.	
Measure: Uncompensated care costs pre-supplemental payments *Steward: Centers for Medicaid and Medicare Services* *NQF Endorsed: No*	

Description	Total cost of uncompensated care for pre- supplemental payments to safety net hospitals
Numerator	Total cost of uncompensated care for pre-supplemental payments to safety net hospitals
Denominator	N/A
Data Sources	Massachusetts Uncompensated Care Cost reports
National Benchmark	None
Measure: Uncompensated care costs post- supplemental payments *Steward: Centers for Medicaid and Medicare Services* *NQF Endorsed: No*	
Description	Total cost of uncompensated care costs for post- supplemental payments to safety net hospitals
Numerator	Total cost of uncompensated care costs for post- supplemental payments to safety net hospitals
Denominator	N/A
Data Sources	Massachusetts Uncompensated Care Cost reports
National Benchmark	None
Goal 5 Measures	
Measure: Initiation and engagement of alcohol and other drug dependence treatment *Steward: National Committee for Quality Assurance (#0004)* *NQF Endorsed: Yes*	
Description	The percentage of adolescent and adult patients with a new episode of alcohol or other drug (AOD) dependence who received the following. - Initiation of AOD Treatment: The percentage of patients who initiate treatment through an inpatient AOD admission, outpatient visit, intensive outpatient encounter or partial hospitalization within 14 days of the diagnosis. - Engagement of AOD Treatment: The percentage of patients who initiated treatment and who had two or more additional services with a diagnosis of AOD within 30 days of the initiation visit.
Numerator	-Initiation of AOD Dependence Treatment: Initiation of AOD treatment through an inpatient admission, outpatient visit, intensive outpatient encounter or partial hospitalization within 14 days of the index episode start date. -Engagement of AOD Treatment: Initiation of AOD treatment and two or more inpatient admissions, outpatient visits, intensive outpatient encounters or partial hospitalizations with any AOD diagnosis within 30 days after the date of the Initiation encounter (inclusive).
Denominator	Patients age 13 years of age and older who were diagnosed with a new episode of alcohol or other drug dependency (AOD) during the first 10 and ½ months of the measurement year (e.g., January 1-November 15).
Data Sources	MMIS claims/encounter data
National Benchmark	Initiation: 2016 Medicaid HMO = 40.8% Engagement: 2016 Medicaid HMO = 12.5%
Measure: Continuity of Pharmacotherapy for OUD *Steward: University of Southern California (#3175)* *NQF Endorsed: Yes*	
Description	Percentage of adults 18-64 years of age with pharmacotherapy for opioid use disorder (OUD) who have at least 180 days of continuous treatment

Numerator	Individuals in the denominator who have at least 180 days of continuous pharmacotherapy with a medication prescribed for OUD without a gap of more than seven days
Denominator	Individuals 18-64 years of age who had a diagnosis of OUD and at least one claim for an OUD medication
Data Sources	MMIS claims/encounter data
National Benchmark	
Measure: Follow-Up after Discharge from the ED for Mental Health or Alcohol or Other Drug Use Dependence *Steward: National Committee for Quality Assurance (#* *NQF Endorsed:*	
Description	The percentage of discharges for patients 18 years of age and older who had a visit to the emergency department with a primary diagnosis of mental health or alcohol or other drug dependence during the measurement year AND who had a follow-up visit with any provider with a corresponding primary diagnosis of mental health or alcohol or other drug dependence within 7- and 30-days of discharge. Four rates are reported: 1) The percentage of emergency department visits for mental health for which the patient received follow-up within 7 days of discharge. 2) The percentage of emergency department visits for mental health for which the patient received follow-up within 30 days of discharge. 3) The percentage of emergency department visits for alcohol or other drug dependence for which the patient received follow-up within 7 days of discharge. 4) The percentage of emergency department visits for alcohol or other drug dependence for which the patient received follow-up within 30 days of discharge.
Numerator	The numerator for each denominator population consists of two rates: Mental Health: Rate 1: An outpatient visit, intensive outpatient encounter or partial hospitalization with any provider with a primary diagnosis of mental health within 7 days after emergency department discharge Rate 2: An outpatient visit, intensive outpatient encounter or partial hospitalization with any provider with a primary diagnosis of mental health within 30 days after emergency department discharge Alcohol or Other Drug Dependence: Rate 1: An outpatient visit, intensive outpatient encounter or partial hospitalization with any provider with a primary diagnosis of alcohol or other drug dependence within 7 days after emergency department discharge Rate 2: An outpatient visit, intensive outpatient encounter or partial hospitalization with any provider with a primary diagnosis of alcohol or other drug dependence within 30 days after emergency department discharge
Denominator	Patients who were treated and discharged from an emergency department with a primary diagnosis of mental health or alcohol or other drug dependence on or between January 1 and December 1 of the measurement year
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Outpatient SUD services usage per month *NQF Endorsed: No*	

Description	Percentage of members with any SUD /OUD diagnosis who used the following per month: • Outpatient SUD services • Intensive outpatient services • Medication assisted treatment for SUD • Residential treatment, (ASAM Level 3.1), including average length of stay • ASAM level 3.3 • Clinical stabilization services (ASAM Level 3.5) • Acute Treatment Services (ASAM Level 3.7) • Inpatient Withdrawal Management • Outpatient detox • Recovery Coach • Recovery Support Navigator
Numerator	Total number of members with any SUD/OUD diagnosis who used any of the listed services per month
Denominator	Total number of members with SUD/OUD diagnosis
Data Sources	MMIS claims/encounter data, BSAS program data (if available)
National Benchmark	None
Measure: Use of Opioids at High Dosage in Persons Without Cancer *Steward: Pharmacy Quality Alliance (#2940)* *NQF Endorsed: Yes*	
Description	The proportion (XX out of 1,000) of individuals without cancer receiving prescriptions for opioids with a daily dosage greater than 120mg morphine equivalent dose (MED) for 90 consecutive days or longer, AND who received opioid prescriptions from four (4) or more prescribers AND four (4) or more pharmacies.
Numerator	Any member in the denominator with opioid prescription claims where the MED is greater than 120mg for 90 consecutive days or longer* AND who received opioid prescriptions from 4 or more prescribers AND 4 or more pharmacies.
Denominator	Any member with two or more prescription claims for opioids filled on at least two separate days, for which the sum of the days' supply is greater than or equal to 15.
Data Sources	MMIS claims/encounter data
National Benchmark	
Measure: Nonfatal overdoses, overall and opioid-related *NQF Endorsed: No*	
Description	Percentage of members who had a non-fatal overdose
Numerator	Total number of all cause and opioid-related nonfatal overdoses in MassHealth members
Denominator	Total number of MassHealth members
Data Sources	MMIS claims/encounter data, Ch. 55 Public Health Dataset
National Benchmark	None
Measure: Overdose deaths, overall and opioid-related *NQF Endorsed: No*	
Description	Percentage of members who had a fatal overdose
Numerator	Total number of all cause and opioid-related fatal overdoses in MassHealth members
Denominator	Total number of MassHealth members
Data Sources	MMIS claims/encounter data, MA death records
National Benchmark	None
Measure: ED use for any SUD-related diagnosis and OUD diagnosis *NQF Endorsed: No*	
Description	ED visits for SUD-related diagnoses and for OUD/1,000 member months for SUD-related and OUD diagnoses
Numerator	Total number of ED visits for SUD-related and OUD diagnoses
Denominator	1,000-member months among members with SUD/OUD diagnosis
Data Sources	MMIS claims/encounter data

National Benchmark	None
Measure: Inpatient admissions for any SUD-related diagnosis and OUD diagnosis *NQF Endorsed: No*	
Description	Inpatient admissions for SUD and OUD / 1,000-member months for SUD-related and OUD diagnoses
Numerator	Total number of inpatient admissions for SUD-related and OUD diagnoses
Denominator	1,000-member months among members with SUD/OUD diagnosis
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Healthcare costs, overall *NQF Endorsed: No*	
Description	Total cost of healthcare among individuals with any SUD-related diagnosis and OUD diagnosis
Numerator	Total cost of individuals with any SUD-related diagnosis and OUD diagnosis
Denominator	N/A
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Healthcare costs, inpatient *NQF Endorsed: No*	
Description	Total cost of inpatient hospitalization healthcare among individuals with any SUD-related diagnosis and OUD diagnosis
Numerator	Total cost of individuals with any SUD-related diagnosis and OUD diagnosis with inpatient healthcare costs
Denominator	N/A
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Healthcare costs, ED *NQF Endorsed: No*	
Description	Total cost of ED utilization among individuals with any SUD/OUD diagnosis
Numerator	Total cost of individuals with any SUD-related diagnosis and OUD diagnosis who utilize the ED
Denominator	N/A
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Healthcare costs, ambulatory care *NQF Endorsed: No*	
Description	Total cost of ambulatory care among individuals with any SUD/OUD diagnosis
Numerator	Total cost of individuals with any SUD-related diagnosis and OUD diagnosis with ambulatory healthcare costs
Denominator	N/A
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Healthcare costs, pharmacy *NQF Endorsed: No*	
Description	Total pharmacy costs among individuals with any SUD/-related diagnosis and OUD diagnosis
Numerator	Total cost of individuals with any SUD-related diagnosis and OUD diagnosis with pharmacy costs
Denominator	Total healthcare costs
Data Sources	MMIS claims/encounter data

National Benchmark	None
Measure: 30-day readmission rates to the same level of care or higher following hospitalization for any SUD and OUD diagnosis *NQF Endorsed: No*	
Description	Percentage of members with any SUD or OUD diagnosis that are readmitted to the same or higher level of care within 30 days
Numerator	Members with any SUD or OUD diagnosis that are readmitted to the same or higher level of care within 30 days
Denominator	Total number of MassHealth members with SUD/OUD diagnosis
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: 90-day readmission rates to the same level of care or higher following hospitalization for any SUD and OUD diagnosis *NQF Endorsed: No*	
Description	Percentage of members with any SUD or OUD diagnosis that are readmitted to the same or higher level of care within 90 days
Numerator	Members with any SUD or OUD diagnosis that are readmitted to the same or higher level of care within 90 days
Denominator	Total number of MassHealth members with SUD/OUD diagnosis who were admitted to inpatient hospitalization or 24-hour diversionary services for any SUD diagnosis and OUD diagnosis
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Healthcare utilization *NQF Endorsed: No*	
Description	Healthcare service utilization among members with SUD diagnosis
Numerator	Total number of members with SUD and OUD diagnoses who used healthcare services used among members with SUD and OUD diagnoses: • Outpatient SUD Professional visits • Inpatient visits • Ambulatory care visits • Other
Denominator	1,000 member months among members with SUD/OUD diagnosis
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: MAT Prescribers *NQF Endorsed: No*	
Description	Total number of providers who prescribe MAT
Numerator	Providers who prescribe MAT
Denominator	N/A
Data Sources	MMIS claims/encounter data
National Benchmark	None
Goal 6 Measures	
Measure: Continuous enrollment in Medicaid *NQF Endorsed: No; See Appendix H*	
Description	Percentage of former foster care youth continuously enrolled for 12 months in Medicaid
Numerator	Number of members identified as former foster care youth who are continuously enrolled
Denominator	Total number of members who were former foster care youth
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Ambulatory care visits *NQF Endorsed: No; See Appendix H*	

Description	Percentage of former foster care youth who have an ambulatory care visit
Numerator	Number of members identified as former foster care youth who had an ambulatory care visit
Denominator	Total number of members who were former foster care youth
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: ED visits *NQF Endorsed: No; See Appendix H*	
Description	Percentage of former foster care youth who have an ED visit
Numerator	Number of members identified as former foster care youth who had an ED visit
Denominator	Total number of members who were former foster care youth
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Inpatient visits *NQF Endorsed: No; See Appendix H*	
Description	Percentage of former foster care youth who have an inpatient visit
Numerator	Number of members identified as former foster care youth who had an inpatient visit
Denominator	Total number of members who were former foster care youth
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Behavioral health encounters *NQF Endorsed: No; See Appendix H*	
Description	Percentage of former foster care youth who have a behavioral health encounter
Numerator	Number of members identified as former foster care youth who had a behavioral health encounter
Denominator	Total number of members who were former foster care youth
Data Sources	MMIS claims/encounter data
National Benchmark	None
Measure: Annual Preventive care visit *NQF Endorsed: No; See Appendix H*	
Description	Percentage of former foster care youth who have an annual preventive care visit
Numerator	Number of members identified as former foster care youth who had an annual preventive care visit
Denominator	Total number of members who were former foster care youth
Data Sources	MMIS claims/encounter data
National Benchmark	None
Goal 7 Measures	
Measure: Number of MassHealth members who are provisionally enrolled *NQF Endorsed: No*	
Description	Total number of members who are provisionally enrolled in MassHealth
Numerator	Total number of members who are provisionally enrolled in MassHealth
Denominator	N/A
Data Sources	HIS/IES data
National Benchmark	None
Measure: Provisionally-enrolled individuals later disenrolled *NQF Endorsed: No*	
Description	Percentage of provisionally-enrolled individuals who later disenrolled from Medicaid
Numerator	Total number of provisionally-enrolled individuals who later disenrolled from Medicaid
Denominator	Total number of provisionally-enrolled individuals
Data Sources	HIS/IES data
National Benchmark	None

Measure: Healthcare costs among those provisionally-enrolled and later disenrolled *NQF Endorsed: No*	
Description	Total healthcare costs among those provisionally enrolled who were disenrolled due to absence of required confirmation.
Numerator	Total healthcare costs among those members provisionally enrolled who were disenrolled due to absence of required confirmation
Denominator	N/A
Data Sources	MMIS Claims data
National Benchmark	None
Measure: Healthcare costs paid by MassHealth for SHIP enrollees *NQF Endorsed: No*	
Description	Total healthcare costs among SHIP Premium Assistance enrollees
Numerator	Total healthcare costs among SHIP Premium Assistance enrollees
Denominator	N/A
Data Sources	SHIP Premium Assistance program data, MMIS claims data
National Benchmark	None
Measure: SHIP program costs *NQF Endorsed: No*	
Description	Total costs of SHIP Premium Assistance
Numerator	Total costs of SHIP Premium Assistance
Denominator	N/A
Data Sources	SHIP Premium Assistance program data
National Benchmark	None

Appendix C:
Independent Evaluator Qualifications, Faculty Leads, and Scientific Advisory Council (SAC)

MassHealth has selected the University of Massachusetts Medical School (UMMS) to be the Independent Evaluator for the 1115 Demonstration, including the DSRIP Program.

UMMS was founded in 1962 to provide affordable medical education for state residents and increase the number of primary care physicians in underserved areas. Today, it is an academic health sciences center of 6,180 employees with a reputation as a world-class research institution and a leader in primary care education. The Medical School attracts more than $289 million annually in research funding, placing it among the top 50 medical schools in the nation.

Faculty members and staff participating in the Demonstration Evaluation have been drawn from the Departments of Quantitative Health Sciences (QHS), Family Medicine and Community Health (FMCH), the Center for Health Policy and Research (CHPR) and the Center for Health Law and Economics (CHLE).

Formed in 2009, the QHS Department is located on the Medical School campus and is comprised of quantitative health scientists. Arlene Ash, PhD., leads the QHS Division of Biostatistics and Health Services Research, and will serve as the faculty lead for quantitative components of the Demonstration evaluation. QHS also houses the Quantitative Methods Core (QMC) which provides biostatistical, epidemiological, and other methodological consultation and technical support for research across the campus. Dr. Eric Mick, PhD is the Assistant Director of the QMC and will lead the statistical team for the Demonstration evaluation.

CHPR and CHLE are components of Commonwealth Medicine, the public-sector consulting arm of UMMS founded in 2000. CHPR faculty and staff have deep experience in the evaluation of Medicaid programs and routinely partner with health and human services agencies, nonprofits, and other organizations to evaluate program outcomes and support evidence-based policy making. Dr. Jay Himmelstein, CHPR's founding director and Chief Health Policy Strategist, will serve as the UMMS executive sponsor and faculty lead for the overall evaluation. CHLE specializes in public and private sector coverage options, delivery systems, financing, and legislative reform. Rachel Gershon, JD, MPH, a Senior Associate at CHLE, will serve as Senior Policy advisor to the evaluation.

The Draft Evaluation Design has been informed by review and feedback from the 1115 Demonstration Scientific Advisory Committee (SAC), a group comprised of nationally recognized experts in Medicaid program evaluation and health services research, convened to assure scientific rigor and feasibility of the evaluation design. It is anticipated that SAC members will be involved on an ongoing basis to help address evaluation implementation challenges as needed and review evaluation deliverables as appropriate.

1. Faculty Leadership

Jay Himmelstein, MD, MPH
Professor of Quantitative Health Sciences and Family Medicine and Community Health
1115 Demonstration Principal Investigator and UMMS Executive Sponsor

Dr. Jay Himmelstein will serve as Principal Investigator and UMMS Executive Sponsor for the 1115 Demonstration Evaluation. In this role, he will lead the interdisciplinary team of faculty members and staff conducting the Section 1115 MA Demonstration evaluation activities, providing strategic direction, and serving as the executive liaison with MassHealth and CMS. Dr. Himmelstein will be responsible for overseeing the efforts of the qualitative and quantitative teams and will provide final sign off on evaluation deliverables including the interim and final reports.

Dr. Himmelstein is a Professor of Family Medicine and Community Health and Quantitative Health Sciences and Chief Health Policy Strategist for CHPR. His professional career in research, policy development, and service is dedicated to improving health care and health outcomes for those served by the public sector. He has placed special emphasis on Medicaid programs and health services for people with disabilities, and is a nationally recognized physician, educator, and researcher. Dr. Himmelstein was the founding Director of the UMMS Center for Health Policy Research and led the Center from 1997-2007 in producing over 100 evaluation and research reports related to the Massachusetts Medicaid program. He has authored over 100 peer-reviewed articles, chapters, and technical reports and has served on national review committees for the National Academy of Science and several editorial review boards.

Arlene Ash, PhD
Professor and Division Chief, Biostatistics and Health Services Research,
Department of Quantitative Health Sciences
Co-Principal Investigator and Lead Quantitative Researcher

Dr. Arlene Ash will serve as Co-Principal Investigator and Lead Quantitative Researcher, directing quantitative analyses for the Demonstration and overseeing the quantitative team. She will participate in designing of analytic methods for the evaluation's process and outcome measures and will oversee the statistical team and all its outputs. Dr. Ash will also be a member of the evaluation leadership team and will participate in weekly leadership meetings.

Dr. Ash is Professor and Division Chief for Biostatistics and Health Services Research in QHS at UMMS, and an internationally recognized methods expert in health services research. She pioneered tools for using administrative data to monitor and manage health care delivery systems, including those now used by the Medicare program. Dr. Ash was one of six appointees to the COPSS-CMS white paper project: "Statistical Issues in Assessing Hospital Performance." Her UMMS team has helped MassHealth incorporate social determinants of health into Medicaid/CHIP global payments.

Deborah Gurewich, PhD
Assistant Professor, Department of Family Medicine and Community Health
Investigator, Center for Healthcare Organization and Implementation Research, Department of Veterans Affairs
Co-Principal Investigator and Lead Qualitative Researcher

Dr. Deborah Gurewich will serve as Co-Principal Investigator and Lead Qualitative Researcher, overseeing all qualitative aspects of the evaluation, including design and piloting of interview instruments, surveys, and mixed-methods approaches. Additionally, Dr. Gurewich will oversee the training of qualitative field staff and contribute to all evaluation deliverables to MassHealth and CMS. Dr. Gurewich will be a member of the leadership team and participate in weekly leadership meetings and coordinating meetings with MassHealth as appropriate.

Trained as a health services researcher, Dr. Deborah Gurewich specializes in research on organizational behavior, especially in safety net health care delivery settings. This work has concentrated in primary care settings, but has also included hospitals, home health agencies, and behavioral health care providers. Areas of focus for Dr. Gurewich include primary care, care integration, and program implementation. Methodologically, Dr. Gurewich's research has used a combination of qualitative and quantitative techniques, including case studies and survey methodologies. She has extensive experience using comparative case studies and in the design and management of multi-site data collection efforts.

Karen Clements, MPH, ScD
Assistant Professor, Biostatistics and Health Services Research,
Department of Quantitative Health Sciences
Co-Principal Investigator and Lead Researcher for Demonstration Goals 3-7

Dr. Karen Clements will serve as Co-Principal Investigator and will be the lead researcher for goals 3-7, overseeing analyses addressing return on investment and cost effectiveness of the Demonstration across all seven goals. She will work on the quantitative aspects of the evaluation, including study design of goals 3-7 and contribute to all deliverables for MassHealth and CMS. Dr. Clements will also be a member of the leadership team and attend weekly leadership meetings. Dr. Clements will receive analytical and technical support for goals 3-7 from Dr. Arlene Ash, Dr. Matthew Alcusky, Dr. Eric Mick, and the core evaluation team.

Dr. Clements is a trained epidemiologist with 15 years of experience in health services and health economics and outcomes research. She has expertise in design and analysis of studies that utilize secondary data sources, including administrative databases and health survey data, and experience designing decision analytic models for economic evaluations. Dr. Clements has led or participated in dissemination efforts for her studies, including co-authoring over 30 peer-reviewed manuscripts and authoring numerous technical reports, data briefs, posters, and oral presentations. She has extensive project management experience gained through leading projects with multi-disciplinary research teams, as well as experience in program evaluation using large linked administrative databases.

Matthew Alcusky, PharmD, MS
Assistant Professor, Department of Quantitative Health Sciences
Co- Principal Investigator

Dr. Matthew Alcusky will serve as Co-Principal Investigator and is responsible for integrating and supporting evaluation efforts across all demonstration goals. He will oversee the core research team, consisting of evaluation support staff and function as the day-to-day scientific liaison with MassHealth and CMS as needed. Dr. Alcusky will also be a member of the leadership team and participate in leadership and coordinating meetings with MassHealth.

Dr. Alcusky is a pharmaco-epidemiologist and health services researcher focused on generating evidence from quantitative data sources to inform clinical practice and guide health policy. Recently, his research has included the study of prescribing patterns, comparative safety and effectiveness, and medication related healthcare utilization, often in vulnerable segments of the Medicaid and Medicare populations. Dr. Alcusky has previously studied the relationship between hospital cost and quality in the Medicare program, the relationship between post-acute site of care and health outcomes and is currently evaluating the longitudinal effects of a large regional medical home initiative.

Eric Mick, ScD
Associate Professor of Epidemiology, Department of Quantitative Health Sciences,
Assistant Director of Quantitative Methods Core,
Co-Investigator, Senior Statistician

Dr. Eric Mick will serve as Co-Investigator and Senior Statistician. As Assistant Director of the Quantitative Measurement Core for the Department of Quantitative Health Sciences and for this project, Dr. Mick will be responsible for supervising study biostatisticians and for developing, managing, and analyzing the administrative data that will be used to track implementation efforts and outcomes. Dr. Mick will be responsible for translating the research design into clearly documented working code. He will be a member of the overall evaluation leadership team, participating in leadership meetings and coordinating meetings with MassHealth, as appropriate.

Dr. Mick was trained as a psychiatric and genetic epidemiologist and his methodological areas of interest are epidemiology (descriptive and clinical), analysis of “big-data” (genomic research and administrative databases), and multivariate methods for longitudinal data. His current focus is on informing health care delivery reform through risk adjustment modeling of total cost of care and measures of quality.

2. Consulting Subject Matter Experts

Glenn Pransky, MD, M.Occ.H
Associate Professor, Quantitative Health Sciences and Family Medicine and Community Health

Chair of the Scientific Advisory Committee (SAC) and Scientific Advisor

Dr. Glenn Pransky will serve as Chair of the Scientific Advisory Committee and will advise Dr. Himmelstein and the faculty leads on evaluation design and implementation. He will be responsible for reviewing evaluation designs and deliverables for completeness and scientific rigor.

Dr. Pransky's research focuses on disability prevention strategies, enhancing recovery in musculoskeletal disorders, health care effectiveness, work disability in older workers, and methods to achieve safe and sustained return to work. Research methods include health data and claims analysis, qualitative and quantitative observational studies, geospatial and multilevel analyses, and intervention studies. Dr. Pransky has co-authored over 130 articles in the scientific literature on various topics and was the cofounder of the ICOH Scientific Section on Work Disability Prevention Research.

Rachel Gershon, JD, MPH
Senior Associate, Center for Health Law and Economics
Senior Policy Advisor

Rachel Gershon will serve as a Senior Policy Advisor to faculty leads and evaluation staff across all goals, assuring that the evaluation team is correctly interpreting Medicaid guidelines and details of all policy initiatives. She will participate in coordination meetings with MassHealth and external stakeholders and serve as a reviewer of all evaluation deliverables.

Rachel performs legal and policy analysis regarding Medicaid, health reform, and social services. Specific areas of her work include health care affordability, Accountable Care Organizations, long-term supports and services, housing supports, language access, and consumer protections. Rachel also brings experience advising and representing individuals who receive public benefits, including Medicaid, Medicare, prescription assistance, Supplemental Security Income (SSI) and Social Security.

Robin Clark, PhD
Professor, Departments of Family Medicine and Community Health and Quantitative Health Sciences
Co-Investigator

Dr. Clark will serve as Co-Investigator and provide methodological and subject matter expertise for goal 5. He will be available for consultation during the design and analysis of this component of the evaluation.

Dr. Clark's current work focuses on implementation of treatment for individuals with addiction in real world settings and the impact of Medicaid policies on the accessibility, effectiveness and cost of treatment for opioid addiction. Dr. Clark is also studying policies and practices that support individuals with persistently high health care costs and multiple chronic conditions.

Dr. Clark is a Professor in the Departments of Family Medicine and Community Health and Quantitative Health Sciences. He specializes in the economic evaluation of health care policies and interventions, with a special focus on substance abuse, mental health and primary care. His work has been funded by the National Institute on Drug Abuse, the National Institute of Mental Health, the Robert Wood Johnson Foundation, the Blue Cross and Blue Shield Foundation of Massachusetts and by health and human services agencies in several states.

Alexis Henry, ScD

Dr. Henry will provide consultation and subject matter expertise related to community-based behavioral health services, particularly services for DMH clients (e.g. ACCS model). In addition, she will offer consultation on approaches to conducting qualitative interviews with consumers and other stakeholders.

Dr. Henry is Associate Professor in the Department of Psychiatry and oversees CHPR's research and evaluation activities. Her work focuses on the impact of health and social policies and programs on the well-being of transition-age and working-age people with disabilities, particularly those served by public programs. Over the past decade, she has worked closely with the MA DMH and with community-based provider organizations to evaluate the effectiveness of services for DMH clients. In collaboration with MassHealth, Dr. Henry has led studies examining the perceptions and experiences of members enrolled in One Care, the state's integrated care demonstration for working-age dual-eligible beneficiaries (Medicare and Medicaid), using focus groups, surveys and other methods. Her work has been funded by the Social Security Administration, the Centers for Medicare and Medicaid Services, the Substance Abuse and Mental Health Service Administration, the MA Department of Public Health and others.

3. 1115 Demonstration Evaluation Scientific Advisory Committee (SAC)

The MA 1115 Demonstration Scientific Advisory Committee (SAC) has reviewed and provided feedback on the evaluation methods and approaches in this Draft Demonstration Evaluation Design Document. Members were selected based on their areas of health services research expertise and methodological experience in evaluating the impact of policy changes on health care systems and populations of interest. The SAC has reviewed the proposed evaluation methods and data sources to assure that the proposed approaches in the EDD are feasible and meet prevailing standards of scientific and academic rigor.

The SAC will be consulted over the life of this evaluation as scientific advisors and will be asked to review CMS deliverables. The SAC will be available as needed to consult with Demonstration faculty to address potential obstacles to the evaluation and provide guidance relating to specific analyses, interpretation of findings, and may collaborate on reports in the scientific literature.

Dr. Glenn Pransky will serve as Chair of the Scientific Advisory Committee and will be responsible for communicating and incorporating SAC guidance into the evaluation design and implementation.

SAC Members:

John Ayanian, MD, MPP
Director, Institute for Health Policy and Innovation, University of Michigan

Dr. Ayanian's area of expertise for this evaluation includes him serving as director of the 1115 Demonstration evaluation of Medicaid expansion for the state of Michigan, including its effects on access, utilization, and health outcomes for Medicaid enrollees. Additional areas of expertise include health care disparities, quality of care, and risk adjustment in CMS payment systems.

Dr. Ayanian is the inaugural director of the Institute for Healthcare Policy and Innovation (IHPI), one of the world's largest groups of healthcare and health policy researchers, involving more than 450 experts from across the University of Michigan and partner organizations. Dr. Ayanian also serves as the Alice Hamilton Professor of Medicine in the University of Michigan Medical School, Professor of Health Management and Policy in the School of Public Health, and Professor of Public Policy in the Gerald R. Ford School of Public Policy. At the University of Michigan, Dr. Ayanian leads an institute with multiple projects using large-scale health care data resources to assess the impact of policy, payment, and practice changes on patients' health.

Randall P. Ellis, PhD
Professor, Dept. of Economics, Boston University

Dr. Ellis's area of expertise relevant to this evaluation includes research on risk adjustment in public insurance programs, provider payment incentives, reimbursement models, and treatment costs and impacts for substance abuse disorders in disadvantaged populations

Dr. Ellis is a professor in the Department of Economics at Boston University, where he has been on the faculty since 1981. He earned his Ph.D. in economics from MIT after attending Yale University and the London School of Economics and Political Science. For 35 years, his research has focused on health economics, spanning both US and international economics topics. He is a past president of the American Society of Health Economists. Dr. Ellis has been the principal or co-investigator on numerous research projects that developed Diagnostic Cost Group (DCG) and Hierarchical Condition Category (HCC) models, with funding from CMS and others. CMS now uses HCC models for risk adjust payments to Medicare Advantage health plans, Part D plans and the Health Insurance Exchanges. His risk adjustment research received the Academy Health 2008 Health Services Research Impact Award.

John McConnell, MA, MS, PhD
Director, Center for Health Systems Effectiveness, Oregon Health Sciences Center

Dr. McConnell has several areas of expertise relevant to this evaluation. He is the principal investigator for the Oregon 1115 Demonstration evaluation team. His health economics research has addressed total costs of care (in context of provider accountability), displaced costs estimates, and Medicaid quality of care. He has studied the impact of CCO (ACO-type) implementation on coordination, access, quality, outcomes, costs, avoidable care (linked database evaluation) and behavioral and physical healthcare integration in Medicaid populations. Dr. McConnell also has conducted research on costs and outcomes in alternate substance abuse care pathways, and developing comparison populations for waiver evaluation, including interstate data. A focus of his current work is understanding the effectiveness of reform of the Medicaid payment and delivery system, with Oregon serving as a leading example.

Dr. McConnell is a health economist and Director of the Center for Health Systems Effectiveness at OHSU. His research has also addressed emergency and trauma care, organizational management, behavioral health, and state health policy.

Deborah Peikes, MPA, PhD
Senior Fellow, Mathematica Policy Research

Dr. Peikes's areas of expertise relevant to this evaluation include the impact of alternative primary care models on health outcomes, and qualitative studies of health care systems. Her expertise includes program evaluation, evaluation of patient-centered medical homes, primary care effectiveness and integration of care for persons with multiple comorbidities.

Dr. Peikes is a leader in research on how to improve the delivery of primary care through the patient-centered medical home and related models of care, value-based purchasing, care coordination and disease management for people with chronic illnesses, and the health, employment, and social integration of beneficiaries with severe disabilities. Dr. Peikes currently leads a large-scale, mixed-methods evaluation of the Comprehensive Primary Care Plus, a multi-payer initiative to improve care delivery in thousands of primary care practices, for CMS. She also led the evaluation of the Comprehensive Primary Care initiative, an earlier intervention to transform primary care delivery and payment.

Rebecca Wells, PhD
Professor, Management, Policy and Community Health, University of Texas School of Public Health

Dr. Wells's experience relevant to this evaluation includes being the principal investigator for the Texas 1115 Demonstration and DSRIP evaluation. Her expertise and research focus has included program and infrastructure change, implementation and performance measures for DSRIP funded initiatives, behavioral health and substance abuse disorder program effectiveness, as well as evaluating the impacts of community support services programs.

Dr. Wells served on the University of Texas Health Policy and Management faculty full time for seven years. Since then, she has continued to collaborate with both University of Texas and University of North Carolina faculty on projects related to medical homes, case management, and behavioral health care. Dr. Wells currently serves on the UNC-based Workforce Development Center led by Dorothy Cilenti, examining how community collaboration affects factors contributing to diabetes, and is evaluating an innovative case management program for clients of a new sobering center model. She recently led the evaluation of Texas's $11 billion Medicaid 1115(a) waiver value-based payment program.

Appendix D:
1115 Demonstration Evaluation
Summary Table of DSRIP Domains, Research Questions, and Hypotheses

Domain 1: State, organizational, and provider-level actions promoting delivery system transformation	
Research Questions	**Hypotheses**
RQ1: To what extent did the state take actions to support delivery system transformation?	**H1.1.** DSRIP ACO and CP funding will support delivery system transformation **H1.2.** Statewide investment (SWI) initiatives aimed at increasing the supply, preparedness, and retention of the community-based workforce (SWI 1 through 4) will support delivery system transformation **H1.3** SWI initiatives aimed at providing technical assistance to ACOs and CPs, supporting provider preparedness to enter alternative payment models, reducing emergency department boarding, and improving access for people with disabilities and for whom English is not a primary language (SWI 5 through 8) will support delivery system transformations
RQ2: To what extent did ACOs take organizational-level actions to transform care delivery under an accountable and integrated care model?	**H2.1.** ACOs will vary with respect to governance structure (e.g., lead provider, role of provider and patients), service scope, and local conditions (e.g., experience participating in payment reforms, local context/market served) **H2.2.** ACOs will engage providers (primary care and specialty) in delivery system change through financial (e.g., shared savings) and non-financial levers (e.g., data reports) **H.2.3.** ACOs will implement Health Information Technology (HIT)/Health Information Exchange (HIE) infrastructure to support population health management (e.g., reporting, data analytics) and data exchange within and outside the ACO **H2.4** ACOs will implement non-CP-related population health management activities including risk stratification, needs screenings and assessments, and programs to address identified needs **H2.5** ACOs will implement structures and processes to coordinate care across the care continuum **H2.6** ACOs will implement processes to identify and address health-related social needs (HRSN), including management of Flexible Services **H2.7** ACOs will implement strategies to reduce the total cost of care (e.g., utilization management, referral management, administrative cost reduction), excluding the population health management/care programs mentioned above **H2.8.** Accountable Care Partnership Plans (Model A) will transition more of the care management responsibilities to their ACO partners over the course of the demonstration **H2.9** ACOs will establish processes to facilitate member engagement **H2.10** ACOs will monitor quality performance and establish mechanisms to support quality improvement efforts
RQ3: How and to what extent did CPs target resources and take actions to operate under an accountable and integrated care model?	**H3.1:** CPs will engage constituent entities in delivery system change **H3.2:** CPs will recruit, train and/or retrain staff by leveraging SWIs and other supports **H3.3:** CPs will develop HIT/HIE infrastructure and interoperability to support care coordination (e.g. reporting, data analytics) and data exchange (e.g., internally with ACOs & MCOs, and externally with BH, LTSS, specialty providers, and social service entities) **H3.4:** CPs will develop systems to coordinate services across the care continuum that complement services provided by other state agencies (e.g., DMH)

RQ4: How and to what extent did ACOs, MCOS, and CPs align resources and take common actions to operate under an accountable and integrated care model?	**H4.1:** ACOs, MCOs, & CPs establish structures and processes to promote improved administrative coordination between organizations (e.g. enrollee assignment, engagement and outreach) **H4.2:** ACOs, MCOs, & CPs establish structures and processes to promote improved clinical integration across their organizations (e.g. flow of patient and patient information across settings, integrated care plans) **H4.3:** ACOs, MCOs, & CPs establish structures and processes for joint management of performance, quality, and conflict resolution
Domain 2: Changes in care processes	
Research Question	**Hypotheses**
RQ5: To what extent did the identification of member needs including physical, BH, LTSS, and social needs improve?	**H5.1:** The identification of individual members' unmet needs (including health-related social needs, BH, and LTSS needs) will improve
RQ6: To what extent did access to physical care, BH care, and LTSS improve?	**H6.1:** Access to physical care services will improve or remain consistent for members **H6.2:** Access to BH services for will improve or remain consistent for members **H6.3:** Access to LTSS will improve or remain consistent for members
RQ7: To what extent did engagement with physical care, BH care, and LTSS improve?	**H7.1:** Engagement with physical care services will improve or remain consistent for members **H7.2:** Engagement with BH services will improve or remain consistent for members **H7.3:** Engagement with LTSS will improve or remain consistent for members
RQ8: To what extent did care processes improve for physical, BH, and LTSS?	**H8.1:** Physical health care processes (e.g., wellness & prevention, chronic disease management) will improve for members **H8.2:** BH care processes will improve for members **H8.3:** LTSS processes will improve for members **H8.4:** The management of health-related social needs will improve through use of Flexible Services and/or other social service interventions for members **H8.5:** Provider staff will report an improved experience delivering healthcare services to members
RQ9: To what extent did integration between physical health, behavioral, and long-term services increase?	**H9.1:** Integration across the care continuum (e.g., physical health, BH, LTSS, acute care, social services) will increase **H9.2:** Provider staff will report increased care integration (within and between ACOs and CPs)
RQ10: How did the volume and mix of services change during the course of the Demonstration?	**H10.1:** The volume and mix of services utilized will shift, when clinically appropriate, in the direction of lower cost sites and types of care **H10.2:** The utilization of low value care will decrease
DOMAIN 3: Changes in member outcomes	
Research Question	**Hypotheses**
RQ11: To what extent did member outcomes improve?	**H11.1:** Inpatient and emergency department utilization rates will decrease overall **H11.2:** Inpatient and emergency department utilization rates will decrease for adults and children with specific conditions including ambulatory care sensitive conditions

	H11.3: Inpatient and emergency department utilization rates will decrease among adults with mental illness, substance addiction, co-occurring conditions, or LTSS needs **H11.4:** Community tenure will increase **H11.5:** Members will report improved ratings of health
RQ12: To what extent did member experience improve during the Demonstration?	**H12.1:** Members will report improved overall ratings of their healthcare provider
DOMAIN 4: Changes in healthcare cost trends	
Research Question	**Hypotheses**
RQ13: To what extent were Medicaid total cost of care trends moderated for the for the ACO population?	**H13.1:** The rate of increase in the total cost of care for the ACO population will decrease
DOMAIN 5: Sustainability of innovative delivery system changes, including ACOs, Community Partners and Flexible Services	
Research Question	**Hypotheses**
RQ14: To what extent will innovative delivery system changes including ACOs, CPs, and Flexible Services will be sustainable without DSRIP funding?	**H14.1:** ACOs will develop strategies to continue to operate under an accountable and integrated care model after the Demonstration ends **H14.2:** CPs will develop strategies to continue to operate under an accountable and integrated care model after the Demonstration ends **H14.3:** ACOs will pursue strategies to continue to provide Flexible Services to members after the Demonstration ends' **H14.4** The costs and effects of the ACO program will warrant continued investment **H14.5** The costs and effects of the CP program will warrant continued investment **H14.6** The costs and effects of the FS program will warrant continued investment
RQ15: To what extent did alternative and value-based payments constitute an increasingly larger proportion of the payments to organizations and providers managing the care of MassHealth members?	**H15.1:** The number of members cared for in ACOs will increase **H15.2:** ACOs and MCOs will engage in value-based payment arrangements with specialist providers **H15.3:** ACOs and MCOs will engage in alternative payment models and value-based payment arrangements with hospitals **H15.4** The number of primary care practices participating in ACOs will increase
DOMAIN 6: Effects of Specific DSRIP Investments and Actions	
Research Question	**Hypotheses**
RQ16: To what extent can observed changes in care processes, outcomes, and costs be attributed to DSRIP?	**H16.1:** Improvements in care processes will be associated with key DSRIP inputs and outputs **H16.2:** Improvements in member outcomes will be associated with key DSRIP inputs and outputs **H16.3:** Moderated total cost of care trends will be associated with key DSRIP inputs and outputs **H16.4:** The State and local context will modify the relationship between DSRIP outputs and ACO quality and cost performance

Appendix E:

1115 Demonstration and Evaluation
Selection of Comparison States for Goal 3

To determine a comparison group for the evaluation of Massachusetts' subsidies, we first identified states with similar Medicaid eligibility criteria (around 138% FPL for adults):[7]

Alabama
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
Illinois
Indiana
Iowa
Louisiana
Kentucky
Maryland
Michigan
Minnesota
Montana
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Dakota
Ohio
Oregon
Pennsylvania
Rhode Island
Vermont
Washington
West Virginia

Of these 29 states, we excluded three states that provided subsidies for lower income members on top of federal subsidies: [8]

Minnesota
New York
Vermont

We also excluded states that had had changes to Medicaid eligibility criteria in the past year (2017): [9]

Colorado
Connecticut
Louisiana

Following these exclusions, we were left with 23 states to use as a collective comparison group: Alabama, Arizona, Arkansas, California, Delaware, Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Montana, Nevada, New Hampshire, New Jersey, New Mexico, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, Washington, and West Virginia.

[7] Kaiser Family Foundation - https://www.kff.org/health-reform/state-indicator/medicaid-income-eligibility-limits-for-adults-as-a-percent-of-the-federal-poverty-level/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Parents%20(in%20a%20family%20of%20three)%22,%22sort%22:%22desc%22%7D

[8] Potential Consequences of Proposal to Further Reduce Eligibility for HUSKY Insured Parents (April 2016)

[9] https://www.kff.org/medicaid/state-indicator/states-reporting-at-least-one-eligibility-expansion-or-restriction/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Eligibility%20Standard%20Expansions%22,%22sort%22:%22desc%22%7D

Appendix F:
1115 Demonstration and Evaluation – Cambridge Health Alliance Measure Slate for Goal 4

				Reporting DY21/SFY 2018						
	Measure	Source	Geography	Cambridge	Somerville	Everett	Malden	Revere	Statewide	Reported
1	Overall age-adjusted rate per 100,000 for premature death (below age 75)	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	194	292	419	284	341	275	Yes
	Age-adjusted rate per 100,000 for premature death (below age 75), for **White, Non-Hispanic**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	175	309	482	336	390	282	Yes
	Age-adjusted rate per 100,000 for premature death (below age 75), for **Black, Non-Hispanic**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	261	311	264	201	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	313	Yes
	Age-adjusted rate per 100,000 for premature death (below age 75), for **Hispanic**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	246	156	136	112	282	227	Yes
	Age-adjusted rate per 100,000 for premature death (below age 75), for **Asian/Pacific Islander, non-Hispanic**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	149	166	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	151	244	121	Yes
	Age-adjusted rate per 100,000 for premature death (below age 75), for **American-Indian, Non-Hispanic**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	0	0	0	0	0	245	Yes
2	Overall age-adjusted rate per 100,000 for hospital discharges for primary care manageable conditions: asthma	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	774	798	1,021	826	929	920	Yes
	Age-specific rate per 100,000 for hospital discharges for primary care manageable conditions: asthma - **Under-15**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	465	385	536	440	632	450	Yes
	Age-specific rate per 100,000 for hospital discharges for primary care manageable conditions: asthma - **15-29 years old**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	176	213	711	447	633	607	Yes
	Age-specific rate per 100,000 for hospital discharges for primary care manageable conditions: asthma - **30-44 years**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	530	494	836	718	669	859	Yes
	Age-specific rate per 100,000 for hospital discharges for primary care manageable conditions: asthma - **45+ years**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	1,397	1,497	1,548	1,305	1,436	1,394	Yes
	Age-adjusted rate per 100,000 for hospital discharges for primary care manageable conditions: asthma - **White, Non-Hispanic**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	655	700	1,031	908	874	803	Yes

				Reporting DY21/SFY 2018						
	Measure	Source	Geography	Cambridge	Somerville	Everett	Malden	Revere	Statewide	Reported
	Age-adjusted rate per 100,000 for hospital discharges for primary care manageable conditions: asthma - **Black, Non-Hispanic**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	1,126	1,450	1,031	1,019	1,394	1,556	Yes
	Age-adjusted rate per 100,000 for hospital discharges for primary care manageable conditions: asthma - **Hispanic**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	1,351	902	909	677	628	1,661	Yes
	Age-adjusted rate per 100,000 for hospital discharges for primary care manageable conditions: asthma - **Asian/Pacific Islander, non-Hispanic**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	219	282	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	489	530	327	Yes
	Age-adjusted rate per 100,000 for hospital discharges for primary care manageable conditions: asthma - **American Indian, Non-Hispanic**	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	0	0	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	580	Yes
3	Age-adjusted rate* per 100,000 for suicide mortality	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	7	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	8	9	Yes
4	Age-adjusted rate* per 100,000 for Hepatitis C incidence	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	70	61	161	131	171	129	Yes
5	Percentage of children fully immunized at kindergarten entry	Immunization Program, MA Department of Public Health and Department of Elementary and Secondary	Cambridge, Somerville, Everett, Malden, Statewide	98.8%	97.7%	92.8%	97.0%	Data not available at school level	94.1%	Yes
6	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **high school surveys (Lifetime Heroin Use)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	0.6%	0.1%	0.0%	1.0%	Data not available at school level	1.7%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **high school surveys (Lifetime Opioid Use without Rx)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	N/A Question not asked	N/A Question not asked	N/A Question not asked	3.9%	Data not available at school level	N/A (See Note)	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **high school surveys (Current Tobacco Use)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	6%	5%	2.0%	2.0%	Data not available at school level	8%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **high school surveys (Current Marijuana Use)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	26%	16%	13%	10%	Data not available at school level	25%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **high school surveys (Current Alcohol Use)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	32%	19%	17%	15%	Data not available at school level	34%	Yes

				Reporting DY21/SFY 2018						
	Measure	Source	Geography	Cambridge	Somerville	Everett	Malden	Revere	Statewide	Reported
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **high school surveys (Depressive Symptoms in Prior Year)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	25%	31%	31%	25%	Data not available at school level	27%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **high school surveys (Lifetime Sexual Intercourse)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	33%	33%	33%	24%	Data not available at school level	36%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **high school surveys (Current Sexual Intercourse)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	N/A Question not asked	N/A Question not asked	N/A Question not asked	17%	Data not available at school level	28%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **high school surveys (Condom Use at Last Intercourse)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	64%	60%	65%	70%	Data not available at school level	63%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **middle school surveys (Lifetime Heroin Use)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	0.6%	0.0%	0.0%	0.9%	Data not available at school level	N/A Question not asked	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **middle school surveys (Lifetime Opioid Use without Rx)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	N/A Question not asked	N/A Question not asked	N/A Question not asked	3.8%	Data not available at school level	N/A Question not asked	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **middle school surveys (Current Tobacco Use)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	0.7%	1.0%	2.0%	1.0%	Data not available at school level	1.4%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **middle school surveys (Current Marijuana Use)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	2.0%	2.0%	2.0%	3.0%	Data not available at school level	2.4%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **middle school surveys (Current Alcohol Use)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	4.0%	3.0%	5%	5%	Data not available at school level	4.4%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **middle school surveys (Depressive Symptoms in Prior Year)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	21%	N/A Question not asked	31%	22%	Data not available at school level	18%	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **middle school surveys (Lifetime Sexual Intercourse)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	3.0%	4.0%	7%	6%	Data not available at school level	N/A Question not asked	Yes
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **middle school surveys (Current Sexual Intercourse)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	N/A Question not asked	N/A Question not asked	N/A Question not asked	4.0%	Data not available at school level	N/A Question not asked	Yes

				Reporting DY21/SFY 2018						
	Measure	Source	Geography	Cambridge	Somerville	Everett	Malden	Revere	Statewide	Reported
	Percent of adolescents reporting specific risk behaviors (as available), from the Youth Risk Behavior Survey (YRBS)- **middle school surveys (Condom Use at Last Intercourse)**	Youth Risk Behavior Survey (YRBS) (Bi-Annual)	Cambridge, Somerville, Everett, Malden, (as available by community) Statewide	N/A Question not asked	N/A Question not asked	69%	61%	Data not available at school level	N/A Question not asked	Yes
7	Age-adjusted rate per 100,000 for Opioid poisoning mortality	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	9	14	48	23	32	16	Yes
8	Ranking top cause of 1) hospitalizations, by city: Age-adjusted rate* per 100,000 for hospitalizations (by individual cause)	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	Endocrine: Diabetes Mellitus Related, Rate: 1,573	Endocrine: Diabetes Mellitus Related, Rate: 2,129	Endocrine: Diabetes Mellitus Related, Rate: 2,649	Endocrine: Diabetes Mellitus Related, Rate: 2,158	Endocrine: Diabetes Mellitus Related, Rate: 2,246	Mental Disorders: All (Related), Rate: 4,087	Yes
	Ranking top cause of 2) Emergency Department visits, by city: Age-adjusted rate* per 100,000 for Emergency Department visits (by individual cause).	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	Mental Disorders: All, Rate: 2,950	Musculoskeletal Diseases: All, Rate: 3,101	Musculoskeletal Diseases: All, Rate: 4,872	Musculoskeletal Diseases: All, Rate: 3,590	Musculoskeletal Diseases: All, Rate: 3,798	Musculoskeletal Diseases: All, Rate: 2,844	Yes
9	Age-specific rate* per 100,000 for 1) Emergency Department -visits related to falls among those age 65 years and over, by city.	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	3,765	5,140	3,767	4,250	3,817	4,348	Yes
	Age-specific rate* per 100,000 for 2) mortality related to falls among those age 65 years and over, by city.	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	87	105	86	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	52	Yes
10	Age-adjusted rate* per 100,000 for Emergency Department visits related to alcohol or substance use.	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	1,956	1,543	1,586	1,332	1,245	987	Yes
11	Age-adjusted rate* per 100,000 for Emergency Department visits related to Opioid poisoning.	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	172	164	484	470	495	323	Yes
12	Age-adjusted rate* per 100,000 for hospitalizations related to Hypertension.	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	3,404	4,328	5,220	4,332	4,646	4,107	Yes
13	Age-adjusted rate* per 100,000 for 1) hospitalizations related to Renal Failure or Renal Disorder.	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	1,390	1,789	2,083	1,737	1,936	1,592	Yes
	Age-adjusted rate* per 100,000 for 2) Emergency Department visits related to Renal Failure or Renal Disorder.	MA Department of Public Health (Annual)	Cambridge, Somerville, Everett, Malden, Revere, Statewide	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	N/A Rates based on 1 to 4 deaths are not reported (DPH Guidelines)	12	Yes

*Age-adjusted and age-specific rates are expressed per 100,000 persons.

^ Measures are reported using the most recent available data from public sources.

Appendix G:
1115 Demonstration Evaluation
Description of SUD Related Costs for Goal 5

	Type of cost	Pre-Demonstration		Post-Demonstration	
		Month 1	Month 2	Month 1	Month 2
Treatment group costs					
Total costs	• Total costs • Total federal costs				
SUD cost drivers	• SUD-other • Non-SUD				
Type or source of care cost drivers	• Outpatient costs – non ED • Outpatient costs – ED • Inpatient costs • Pharmacy costs • Long-term care costs				

Adjusted cost outcomes: ITS results (present marginal effects and standard errors)

	Total costs	Total federal costs	SUD-other	Non-SUD	Outpatient non-ED	Outpatient ED	Inpatient	Pharmacy	Long- term care
Demonstration period									
Time (continuous)									
Demonstration period * time (continuous)									
Covariates									
Constant									

Appendix H:
1115 Demonstration and Evaluation
CMS Former Foster Care Evaluation Design[10]

Comparison groups for the Former Foster Care Evaluation Design propose conducting chi squared testing to determine the impact of the demonstration on the target population. Based on a sample size calculation for chi squared tests, with standard assumptions for power and expected differences between target population and the comparison group, the number of individuals in the target population whom the state would need to have data on is 40.

1. Certain metrics proposed for the evaluation design would not be captured on the entire enrolled population because not all beneficiaries will use the services represented by the proposed metrics (e.g., length of time to follow-up after hospitalization, number of beneficiaries on appropriate medication management for asthma, and number of beneficiaries on persistent medication with annual monitoring).

2. Therefore, we looked at the prevalence of hospitalizations, asthma and utilization of persistent medication to help determine how large of a sample size we will need to expect to have at least 40 enrollees who could be tracked by each metric. Where possible, we looked for the most recent prevalence rates from scientific sources within the Medicaid population. If such data could not be easily obtained, we looked for data on the overall American population.

a. **Rate of Hospitalization:** per the Agency for Health Care Research and Quality (AHRQ), in 2012, approximately 21% of the Medicaid population was hospitalized in 2012. We would need at least 200 enrollees to have at least 40 of those receive a hospitalization at the expected rate of 21%.

b. **Rate of Asthma:** per the Centers for Disease Control (CDC), in 2014, approximately 10.5% of the population below 100% of the FPL had asthma. We would need 400 enrollees to have at least 40 of those be expected to have asthma.

c. **Rate of Individuals who utilize persistent medications:** per the National Quality Forum (NQF), in 2006, approximately 29% of the American population is on 5 or more medications. We would need 145 enrollees to expect to have at least 40 on medication which would be monitored via this metric.

3. Therefore, setting the criteria for potential enrollees to be **at least 500** will help ensure that an adequate number of individuals actually enroll, and that they acquire services which would fall into the proposed metrics.

4. Because Massachusetts is expecting to enroll 70 individuals, Massachusetts will not be able to meet the criteria for having at least 500 potential enrollees. Therefore, Massachusetts has modified the evaluation design to remove the comparison group. The state will still capture all proposed metrics on the target population.

[10]From CMS: https://www.medicaid.gov/federal-policy-guidance/downloads/cib112116.pdf

Appendix I:
1115 Demonstration Evaluation
Acronyms and Definitions

Acronym	Definition
ACO	Accountable Care Organizations
ACS	American Community Survey
AHRQ	Agency for Healthcare Research and Quality
AMA	American Medical Association
APCD	All Payer Claims Database
ASAM	American Society of Addiction Medicine
BH	Behavioral Health
BSAS	Bureau of Substance Abuse Services
CDC	Centers for Disease Control and Prevention
CFIR	Consolidated Framework for Implementation Research
CHA	Cambridge Health Alliance
CHC	Community Health Center
CHPR	Center for Health Policy Research
CMS	Centers for Medicare and Medicaid Services
CP	Community Partner
CPT	Current Procedural Terminology
CSA	Community Service Agency
CY	Calendar Year
DMH	Department of Mental Health
DPH	Department of Public Health
DSH	Disproportionate Share Hospital
DSRIP	Delivery System Reform Incentive Payment
DUA	Data Use Agreement
DY	Demonstration Year
ED	Emergency Department
EDD	Evaluation Design Document
EOHHS	Executive Office of Health and Human Services
ESI	Employer Sponsored Insurance
FMCH	Family Medicine and Community Health
FPL	Federal Poverty Level
FY	Fiscal Year
HIT	Health Information Technology
HIE	Health Information Exchange
HIX-IES	Health Insurance Exchange/Integrated Eligibility System
HRSA	Health Resources and Services Administration
HRSN	Health Related Social Needs
IA	Independent Assessor
ICER	Incremental Cost Effectiveness Ratio
IE	Independent Evaluator
ICD	International Classification of Diseases
ISA	Interdepartmental Services Agreement
ITS	Interrupted Time Series
LTSS	Long Term Support Services

Acronym	Definition
MA	Massachusetts
MCO	Managed Care Organization
MC	Managed Care Eligible
MDS	Minimum Data Sets
MMIS	MassHealth Medicaid Management Information
MRI	Magnetic Resonance Imaging
NASCO	National Survey of Accountable Care Organizations
NCQA	National Committee on Quality Assurance
NQF	National Quality Forum
OD	Overdose
OUD	Opioid Use Disorder
PCC	Primary Care Clinician
PCP	Primary Care Provider
PCPI	Physician Consortium for Performance Improvement
PHM	Population Health Measure
PHTII	Public Hospital Transformation and Incentive Initiative
PMPM	Per Member Per Month
PMPY	Per Member Per Year
QHS	Quantitative Health Sciences
ROI	Return on Investment
RQ	Research Question
SAC	Scientific Advisory Committee
SHIP	Student Health Insurance Program
SMI	Serious Mental Illness
SNF	Skilled Nursing Facility
SNCP	Safety Net Care Pool
SNPP	Safety Net Provider Payments
STC	Standard Terms and Conditions
SUD	Substance Use Disorders
SWI	Statewide Investments
TA	Technical Assistance
TCOC	Total Cost of Care
UCC	Uncompensated Care Cost
UCCR	Uncompensated Care Cost & Charge Report
UMMS	University of Massachusetts Medical School

Evaluation of the MassHealth 1115 Demonstration Extension
Budget Narrative: July 1, 2018 through June 30, 2024

MassHealth has selected the University of Massachusetts Medical School (UMMS) to be the Independent Evaluator for the overall 1115 Demonstration and DSRIP Program. The University of Massachusetts Medical School (UMMS) is requesting $5,939,321 including $1,049,395 in funding for Year 1 (FY '19) to conduct the evaluation for the overall 1115 Demonstration and DSRIP Program. This narrative describes anticipated costs for the full six years of the project, from July 2018 to June 2024 (See Table 1 for a breakdown of costs for each project year).

It is anticipated that approximately 15% of the total evaluation budget will be spent on survey and measure development, 30% on qualitative data collection, cleaning, and coding, 20% on quantitative data collection, cleaning and coding, and 35% on analyses and reports generation.

Faculty members and staff participating in the Demonstration Evaluation have been drawn from the Departments of Quantitative Health Sciences (QHS), Family Medicine and Community Health (FMCH), the Center for Health Policy and Research (CHPR) and the Center for Health Law and Economics (CHLE).

PROJECT PERSONNEL

Investigators

Jay Himmelstein, MD, MPH (FTE 25% in Years 1-2; 20% in Years 3-5; 15% in Year 6)
1115 Demonstration Principal Investigator and Executive Sponsor

Dr. Jay Himmelstein will serve as Principal Investigator and UMMS Executive Sponsor for the 1115 Demonstration Evaluation. In this role, he will lead the interdisciplinary team of faculty members and staff conducting the Section 1115 MA Demonstration evaluation activities, providing strategic direction, and serving as the executive liaison with MassHealth and CMS. Dr. Himmelstein will be responsible for directing the efforts of the qualitative and quantitative teams across all seven Demonstration goals and will provide final sign off on evaluation deliverables including the interim and final reports.

Arlene Ash, PhD (FTE 20% in Years 1-4; 15% in Years 5-6)
Co-Principal Investigator and Lead Quantitative Researcher

Dr. Arlene Ash will serve as Co-Principal Investigator and Lead Quantitative Researcher, directing quantitative analyses for the Demonstration and overseeing the quantitative team. She will participate in designing analytic methods for the evaluation's process and outcome measures and will oversee the statistical team and all its outputs. Dr. Ash will also be a member of the overall evaluation leadership team and participate in leadership meetings and coordinating meetings with MassHealth, as appropriate.

Deborah Gurewich, PhD (FTE 25% in Year 1; 20% in Years 2-5; 15% in Year 6)
Co-Principal Investigator and Lead Qualitative Researcher (Sub-contract)

Dr. Deborah Gurewich will serve as Co-Principal Investigator and Lead Qualitative Researcher, overseeing all qualitative aspects of the evaluation, including design and piloting of interview instruments, surveys, and mixed-methods approaches. Additionally, Dr. Gurewich will oversee the training of qualitative field staff and contribute to all evaluation deliverables to MassHealth

and CMS. Dr. Gurewich will be a member of the overall evaluation leadership team and participate in leadership meetings and coordinating meetings with MassHealth, as appropriate.

Karen Clements, MPH, ScD (FTE 45% in Years 1-5; 35% in Year 6)
Co-Principal Investigator

Dr. Karen Clements will serve as Co-Principal Investigator and will be the lead investigator for goals 3-7, overseeing analyses addressing return on investment and cost effectiveness of the Demonstration across all seven goals. She will work on the quantitative aspects of the evaluation, including study design of goals 3-7, and contribute to all deliverables for MassHealth and CMS. Dr. Clements will also be a member of the overall evaluation leadership team and participate in leadership meetings and coordinating meetings with MassHealth as appropriate. Dr. Clements will receive analytical and technical support for goals 3-7 from Dr. Arlene Ash, Dr. Matthew Alcusky, Dr. Eric Mick, and the core evaluation team.

Matthew Alcusky, PharmD, MS (FTE 50% in Years 1-5; 45% in Year 6)
Co-Principal Investigator

Dr. Matthew Alcusky will serve as Co-Principal Investigator and is responsible for integrating and supporting evaluation efforts across all demonstration goals. He will oversee the core research team, consisting of evaluation support staff, and function as the day-to-day scientific liaison with MassHealth and CMS as needed. Dr. Alcusky will also be a member of the overall evaluation leadership team and participate in leadership meetings and coordinating meetings with MassHealth, as appropriate.

Eric Mick, ScD (FTE 21.5% in Year 1; 20% in Years 2-3; 15% in Years 4-6)
Co-Investigator, Senior Statistician

Dr. Eric Mick will serve as Co-Investigator and Senior Statistician. As Assistant Director of the Quantitative Measurement Core for the Department of Quantitative Health Sciences and for this project, Dr. Mick will be responsible for supervising study biostatisticians and for developing, managing, and analyzing the administrative data that will be used to track implementation efforts and outcomes. Dr. Mick will be responsible for translating the research design into clearly documented working code. He will be a member of the overall evaluation leadership team, participating in leadership meetings and coordinating meetings with MassHealth, as appropriate.

TBH (FTE 40% in Years 1-5; 25% in Year 6)
Phuong Huang, Ph.D., Qualitative Researcher, Co-Investigator

Dr. Huong, a qualitative researcher with extensive extensive experience in methods and oversignt of implementing qualitative studies will be responsible for training and directly overseeing the qualitative field staff and implementing the evaluation design as approved by CMS across all qualitative elements.

Consulting Subject Matter Experts

Glenn Pransky, MD, M.Occ.H (FTE 10% in Year 1; 5% in Years 2-6)

Dr. Glenn Pransky will serve as Scientific Advisor and Chair of the Scientific Advisory Committee (SAC) and will advise Dr. Himmelstein and the faculty leads on evaluation design and implementation. He will be responsible for reviewing evaluation designs and deliverables for completeness and scientific rigor. Dr. Pransky will also be a member of the evaluation leadership team and a reviewer of all project deliverables.

Rachel Gershon, JD, MPH (FTE 5% in Years 1-6)

Rachel Gershon will serve as Senior Policy Advisor to faculty leads and evaluation staff across all goals, assuring that the evaluation team is correctly interpreting Medicaid guidelines and details of all policy initiatives. She will participate in coordination meetings with MassHealth and external stakeholders and serve as a reviewer for evaluation designs and deliverables. Rachel will also be available to participate in leadership meetings as needed.

Robin Clark, PhD (FTE 5% in Years 1-6)

Dr. Clark will provide methodological and subject matter expertise for goal 5. He will be available for consultation during the design and analysis of this component of the evaluation.

Alexis Henry, ScD (FTE 9% in Year 1; 5% in Years 2-4)

Dr. Henry will provide consultation and subject matter expertise related to community-based behavioral health services, particularly services for DMH clients (e.g. ACCS model). In addition, she will offer consultation on approaches to conducting qualitative interviews with consumers and other stakeholders.

Sarah Goff, MD, M.P.H. (FTE 10% in Year 1; 5% in Years 2-5)
Co-Investigator (Sub-Contract)

Dr. Goff will participate on the qualitative research team lead by Dr. Gurewich, will lead the development of the interview guides during year 1, and participate in the pilot testing of the interview guides and training of the interview staff. She will also act as a subject matter expert supporting the team on evaluation of pediatric sub-populations.

Project Staff

TBN, MPH (FTE 46% in Year 1; 50% in Years 2-5; 30% Year 6)
Project Manager

The Project Manager will support the Principal Investigator and the other investigators in all aspects of this project. She will be responsible for development and coordination of the project management plan and assisting with both quantitative and qualitative data collection efforts. Her project responsibilities will include participation in qualitative data collection, coordinating staff efforts for quantitative data development, monitoring progress of all aspects of the project, and project reporting. She will also develop and submit the IRB application for this project. She will be a participant on both the core and leadership teams and attend weekly meetings.

Aparna Ghosh Kachoria, MPH (FTE 55% in Years 1-5; 40% in Year 6)
Project Analyst-Field Interviewer

Aparna Kachoria will support investigators in the development of interview instruments and related evaluation tools. Additionally, Aparna will assist with coordination of the SAC and provide support to the Project Director. She is responsible for attending all research meetings and supporting the evaluation team. She will be a participant on both the core and leadership teams and attend weekly meetings. Working as a Field Interviewer, Aparna will be part of the Qualitative Analysis Team conducting interviews with MA state, ACO, and CP representatives. Additionally, she will be responsible for maintaining all interview data (interview notes and audio recordings). In this capacity she will work under the supervision of the Qualitative Researchers throughout the life of the study.

Quantitative Analysis Team (FTE 120% in Years 1-5; 80% in Year 6)

The Quantitative Analysis Team will include biostatisticians who will provide development support for statistical programming necessary for data management, processing, and statistical analysis of large claims-based datasets. Programming will also include programming for tables and figures for presentations, publications, reports. The biostatisticians will serve as primary liaison for primary data sources, translating them into useable statistical analysis datasets.

Qualitative Analysis Team (FTE 105% in Year 1; 155% in Year 2; 150% in Year 3; 100% in Years 4; 44% in Years 5 and 40% in Year 6)

The Qualitative Analysis Team will be responsible for collecting and analyzing all qualitative data available over the course of the project. The team will be trained to conduct key interviews with MA state, ACO and CP representatives, and consumers. This team will work under the supervision of the Qualitative Researchers throughout the life of the study. Responsibilities also include maintaining all interview data, including interview notes and audio recordings and for coordinating with a professional transcriptionist once the interviews are complete for transcription.

Administrative Support Team (FTE 40% in Years 1-4; 27% in Year 5; 13% in Year 6)

The Administrative Support Team will provide financial, contracting and other administrative duties as needed for this project.

TOTAL SALARY COSTS, YEARS 1-6: **$3,321,496**

Fringe Benefits

Costs for fringe benefits for benefitted personnel are calculated at the established UMMS institutional rate of 32%.

TOTAL FRINGE COSTS, YEARS 1-6: **$1,039,919**

TOTAL UMMS PERSONNEL COST (salary and fringe): $4,361,415

NON-PERSONNEL COSTS

Travel

Local and National Travel

Local travel for the 1115 Evaluation Demonstration will include costs for team members to travel to project locations throughout the Commonwealth for data collection purposes. Additionally, there will be periodic progress meetings in Boston (Mass Health Central Office). Expected costs include mileage (reimbursed currently at $0.545 /mile) parking and tolls. Mileage and tolls costs are calculated from UMMS campus location to each site destination and MassHealth in Boston.

TOTAL COST OF TRAVEL: **$20,255**

Supplies/Licenses/Administrative Expenses

Routine office supplies to support this project include office supplies as well as software licenses, and audio recording equipment and supplies.

TOTAL COST OF SUPPLIES: **$22,079**

Sub-Contracts

Boston University, Deborah Gurewich, PhD $252,096
Co-Principal Investigator and Lead Qualitative Researcher

Dr. Deborah Gurewich will serve as Co-Principal Investigator and Lead Qualitative Researcher, overseeing all qualitative aspects of the evaluation, including design and piloting of interview instruments, surveys, and mixed-methods approaches. Additionally, Dr. Gurewich will oversee the training of qualitative field staff and contribute to all evaluation deliverables to MassHealth and CMS. Dr. Gurewich will be a member of the leadership team and participate in weekly leadership meetings and coordinating meetings with MassHealth as appropriate.

UMass Amherst, Sarah Goff, MD, PhD $58,938

Dr. Goff will participate on the qualitative research team lead by Dr. Gurewich, will lead the development of the the interview guides during year 1, participate in the pilot testing of the interview guides and training of the interview staff. She will also act as a subject matter expert supporting the evaluation of pediatric sub-populations.

UMMS's Office for Survey Research (OSR) $130,402

The Office for Survey Research staff includes senior survey researchers, project managers and data analysts. OSR will work closely with the qualitative team and IA to develop the provider survey, advising on survey question design, and will be responsible for fielding the provider survey in Wave 1 and Wave 2. OSR will work with the qualitative team to identify and finalize the samples for both Wave 1 and Wave 2, field the survey in each wave, construct the survey data sets, conduct the analyses of data from each wave and will conduct analyses of the combined Wave 1 and Wave 2 survey data.

Scientific Advisory Committee (SAC) $50,000

The SAC will be consulted over the life of this evaluation as scientific advisors and will be asked to review CMS deliverables. The SAC will be available as needed to consult with Demonstration faculty to address potential obstacles to the evaluation and provide guidance relating to specific analyses, interpretation of findings, and may collaborate on reports in the scientific literature.

TOTAL COSTS OF ALL SUB-CONTRACTS: **$426,035**

Other Non-personnel Cost

Transcription $39,680

We will subcontract with a professional transcription service. Transcription services will be used to transcribe qualitative interviews conducted for the study. One interview will equal approximately 5 hours of transcription time. The current rate for transcription services is $32.00/ hour.

Participant Stipends $3,000

We are requesting $3,000 for participant stipends. This will allow us to provide $50 stipends for participating to each of 60 MassHealth members who is interviewed about their experiences.

Occupancy/Space $84,816

Current occupancy/space costs at the UMMS Shrewsbury MA campus (333 South Street) are calculated at $4,000 per FTE. Occupancy costs are charged for the Team members whose primary location is in Shrewsbury. Occupancy costs are treated as a direct cost in projects with an indirect rate of 18.25%. Occupancy costs are consistently charged as direct costs to Interdepartmental Service Agreements with MA state agencies.

TOTAL OTHER NON-PERSONNEL COST: **$127,496**

TOTAL NON-PERSONNEL COSTS: $661,267

TOTAL DIRECT COSTS: $5,022,682

Total Indirect Costs

We will apply UMMS' current approved indirect rate of 18.25%.

TOTAL INDIRECT COST: $916,639

TOTAL PROJECT COSTS, YEAR 1-6: $5,939,321

Evaluation of the MassHealth 1115 Demonstration Extension
Budget Narrative: July 1, 2018 through June 30, 2024

Table 1. Breakdown of Costs by Project Years

	Year 1 FY19	Year 2 FY20	Year 3 FY21	Year 4 FY22	Year 5 FY23	Year 6 FY24	Total
Personnel Staff Costs							
Salary	585,991	619,915	607,905	571,503	515,928	420,254	3,321,496
Fringe	187,517	186,991	182,951	182,881	165,097	134,481	1,039,919
Total Personnel	773,509	806,906	790,856	754,383	681,025	554,735	4,361,415
Non-Personnel							
Travel	5,400	3,000	4,461	2,752	2,350	2,292	20,255
Supplies	6,573	2,665	3,200	2,700	4,741	2,200	22,079
Sub-Contracts							
Office of Survey Research	5,000	65,402		60,000			130,402
Boston Medical Center	45,800	41,816	42,652	43,505	44,375	33,947	252,096
UMass Amherst	19,000	9,690	9,884	10,081	10,283		58,938
Scientific Advisory Committee	10,000	10,000	10,000	10,000	10,000		50,000
Other Non-Personnel							
Transcription, stipends, occupancy	22,156	27,920	22,900	32,760	12,840	8,920	127,496
Total Non-Personnel	113,929	160,493	93,097	161,799	84,590	47,359	661,267
Total Direct Cost	887,438	967,399	883,954	916,182	765,615	602,094	5,022,682
Total Indirect Cost	161,957	176,550	161,322	167,203	139,725	109,882	916,639
TOTAL PROJECT COSTS	1,049,395	1,143,949	1,045,275	1,083,385	905,339	711,976	5,939,321