Maryland Population Health Measurement Development
December 2016

Population Health Measures for Health Transformation

For the past year, under SIM, the State has been preparing for further alignment of its population health initiatives with the progression of the All Payer Model. The State believes it is vital to align all of its stakeholders in driving towards improvements in community and population health by both monitoring the health of its residents and then holding the health care delivery system increasingly accountable for indicators deemed appropriate. The process of developing a framework for population health in Maryland, through measure development in alignment with the All Payer Model Progression Plan is described forthwith.

The SIM Population Health Measures (i.e., "Measures") project focuses on a small set of measures that address broad indicators of health, which include chronic disease, risk factors associated with chronic illness, and hospital utilization. What is unique about the State's efforts to map out measures over the near, short, and long-term is that the measures are to be applied across entire population geographies or population sub-groups, instead of solely to a health care provider or health plan. The intention is to create accountability for an entire population's health and is intended to promote partnerships, prevention, and public health.

Project Purpose and Goals

It is within the context of the All Payer Model and broad health transformation that the State started this project. Maryland has been working with two broad goals:

1) Begin to identify and develop measures of population health that can be used to bring accountability to the health care delivery system that further the State's transition to long-term improved health outcomes, health equity, and community level health. The focus is to capture health at the population level. As such, the project aligns with the direction of health care transformation under SIM and the All Payer Model.

2) Update the State's current set of measures for population health to be more relevant and timely to the All Payer Model. This includes building on Maryland's State Health Improvement Process (SHIP).

Alignment with All Payer Model

The Population Health Measures project is fully aligned with the State's Progression Plan, including the All Payer Model, Maryland Comprehensive Primary Care Model, and Medicaid and Medicare Duals Care Delivery project. The Measures project is a key component of promoting incentives in a uniform way at both the state and federal level. Maryland seeks to enhance a system of health that is focused on reducing the burden of chronic illness, addressing health risk factors, non-medical determinants of health, and improving health equity. The Measures initiative has compiled metrics through an

accounting of recent literature, including the Institute of Medicine's report entitled *Vital Signs: Core Metrics for Health and Health Care Progress* which guides standardization for measuring and improving health.

The Measures project will directly integrate into the State's All Payer Model Amendment. Negotiated over calendar year 2016 and recently executed with CMMI to align hospital and non-hospital provider incentives to encourage care redesign, population health is also featured in the Amendment. Appendix 7 of the Amendment calls for the State to submit a Population Health Plan to CMS by June 30, 2017. The Population Health Plan will describe a transformation to value-based payments for selected population health measures. This Plan will include:

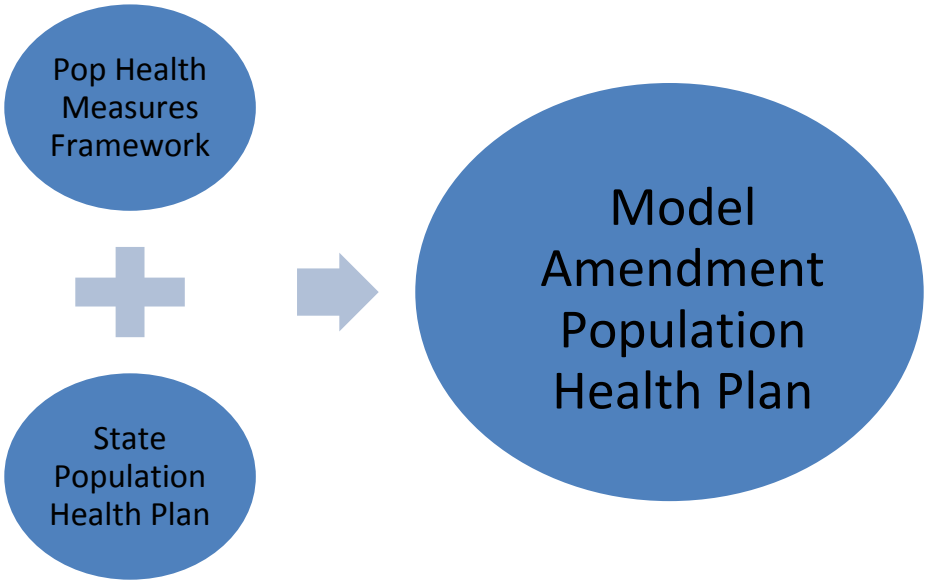
- Identifying measures that will be incorporated into the State's Appendix 7 measure reporting to CMS, as described in the All-Payer Model Agreement;
- Identifying at least three priority improvement measures for improving the State's population health;
- Proposing potential interventions to improve population health in these priority areas, including those that promote collaboration among State entities, public health agencies, and providers;
- Proposing outcomes-based measures that assess progress on population health improvement; and
- Describing pathways for transition to population-based, hospital payments.

The SIM Population Health Measures Project work will lay the foundation for the measures to be included in the All-Payer Amendment Population Health Plan. In the future, DHMH and HSCRC will work closely together to develop value-based payment methodologies to attach accountability to population health measures for Maryland hospitals. The population based payments are envisioned to be based on outcomes associated with the respective hospital's communities likely established by geographic attributions. This kind of transition will require hospitals to accelerate partnerships with community providers, community-based organizations, Local Health Departments (LHDs), consumers, social service organizations, and non-medical entities to improve the overall health of Maryland residents at the population level.

The State is concurrently working with CMS to develop a primary care model to improve population health. The proposal for the Maryland Comprehensive Primary Care Model will include care management infrastructure to aid practices in their transformation. The Care Transformation Organizations or CTOs will likely be similarly responsible for population health at a geographic level. Maryland will be designing the quality construct with CMS and its agency partners with the aim of ensuring alignment with the Amendment's Population Health Plan.

Moreover, the SIM State Population Health Plan: Planning for Population Health Improvement is establishing a framework for developing population health priorities and evidence-based interventions that will support the health care system in identifying sustainable investments for meeting these metrics. The findings from the State Population Health Improvement Plan will also be integrated into the Amendment Population Health Plan. The combination of these two population health activities into a future deliverable for CMS is illustrated in Figure 1. The initial timeline for the development of these activities under the Amendment Population Health Plan is laid out in Appendix 1.

Figure 1: SIM Population Health Activities to All Payer Model Population Health Plan



Stakeholder Engagement

Developing and refining measures is an intensive process. The State obtained input from internal and external stakeholders through the help of its contractor. With support of consultants from Johns Hopkins Center for Population Health Information Technology (CPHIT), DHMH, and its chief agency partners HSCRC and Medicaid as well as CRISP, served as the subject matter experts and guided the development of the Population Health Measures Framework. Additionally, CPHIT developed the list of proposed measures based on (1) current feasibility and accessibility of metrics in Maryland and (2) the measures reflection of population/community health.

Since the early stages of this project, our federal partners have been critical in guiding us through the process of measure identification. CMMI has given us valuable feedback on areas of focus as it relates to

our All-Payer Model work. Technical assistance leaders from the Centers for Disease Control and Prevention (CDC) have provided numerous consultations and outlets to other groups forming around the field of population health measurement.

In addition to the preliminary proposed measures, DHMH received expert guidance and consultation from numerous external stakeholders. The State sought comment and feedback from external field leaders in Maryland. These individuals shared on the ground feedback regarding how measure definitions can be improved, data sourcing recommendations, progression, etc. CPHIT assisted the State in developing the construct and measure recommendations in consultation with these listed partners:

- DHMH: Office of Population Health Improvement (OPHI), HSCRC, Medicaid
- CMMI and CDC
- Consultant – JHU-Center for Population Health IT (CPHIT)
- Consumer advocates
- Hospitals
- Payers
- Local Health Departments
- State Health Information Exchange (CRISP)
- ACOs
- Providers

DHMH OPHI presented to the following workgroups:

- HSCRC Performance Measurement Workgroup
- Local Health Officers
- CRISP Reporting and Analytics Subcommittee
- Duals Care Delivery Workgroup
- Maryland Hospital Association

Paramount to the Population Measurement Project's success is the inclusion of the aforementioned stakeholders. The State will require continued engagement with stakeholders in 2017 as it further refines measure development.

Maryland's Core Measures of Population Health

Population Health Measurement Framework

Guiding the health system's progress from an episodic, clinical system to a holistic system, will require a sophisticated and dynamic portrait of all the factors associated with health. This initial framework strives to reflect the diversity of the State and the goals of the All-Payer Model, by providing a balance

between broad population measures as well as narrower measures for vulnerable populations that require special attention.

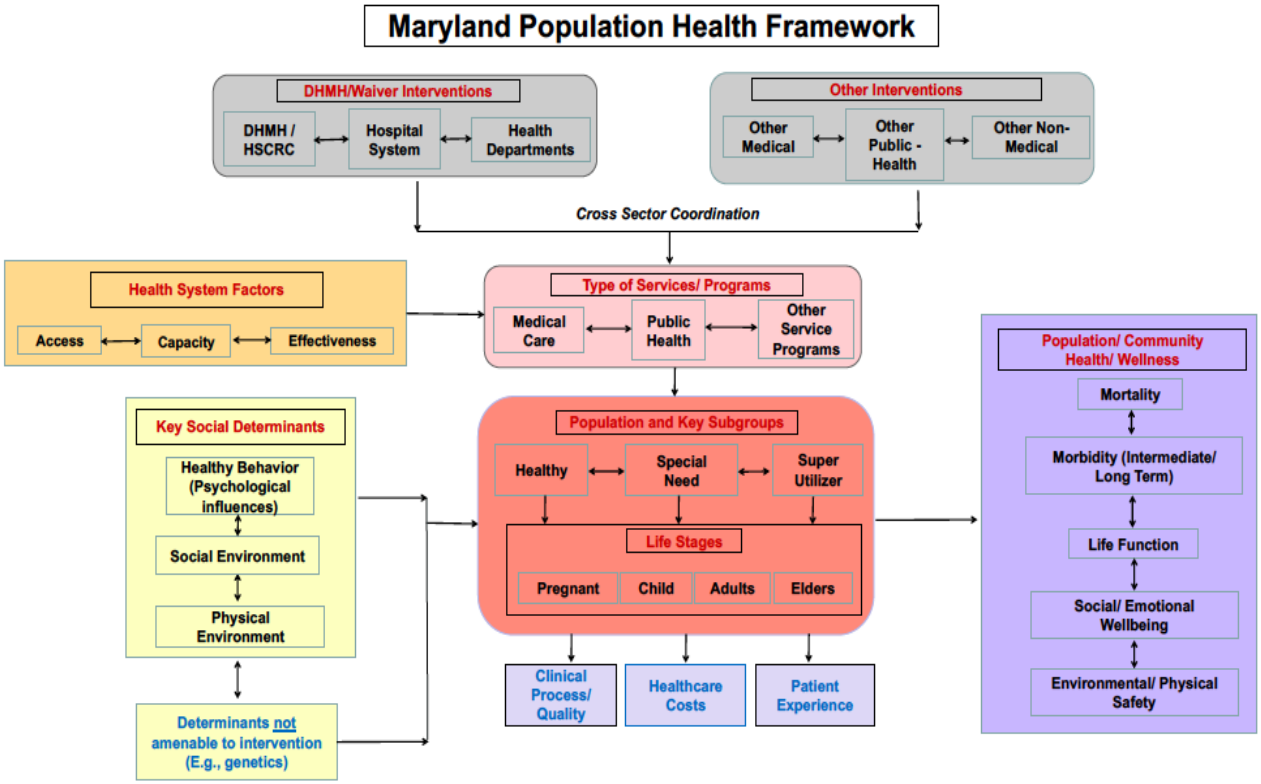
Early in the process, a population health framework was devised to guide thinking about measure diversity and inclusion. A framework for population health in Maryland was developed through a process utilizing peer-reviewed and expert-authored literature as well as scanned current population and public health measures in Maryland, other states, and local public health agencies. Maryland performed a semi-structured analysis to identify common themes using the following components:

- Identify existing population health frameworks and measures
- Extensive search of peer-reviewed and other expert-authored literature
    - Included an environmental scan of gray literature, those lacking formal peer review.
- Scan current population health and public health measures at
    - DHMH and similar state as well as local public health agencies
    - CMS
    - IOM
    - NQF (National Quality Forum)
    - IHI (Institute for Healthcare Improvement)
    - CDC
    - AHRQ (Agency for Healthcare Quality)
    - WHO (World Health Organization)

Parallel to considering existing measures, it was important to consider a framework of measures and data systems which looks to capture relevant community and population centric information to support and align with the success of both the All Payer Model as well as long-term health improvement. This included developing a comprehensive framework of population health measurement that builds on the current State Health Improvement Process (SHIP) framework, that is currently managed through the Office of Population Health Improvement.

The below proposed conceptual framework in Figure 2 consists of several domains and related subcategories. The framework is based on health system factors, determinants of health, population-based outcomes, and clinical outcomes. It is organized to track the process of health impacts, allowing for a balanced scorecard of measures to represent population and community wellness. The framework represents the continuum of life stages to recognize that health needs change across the life course. It also recognizes that clinical, non-clinical care, public health interventions, including infrastructure have effects on a variety of health outcome indicators. This conceptual framework serves as a foundation for identifying candidate measures for the Population Measures Project.

Figure 2: Maryland Population Health Framework



Develop Candidate Population Measures

Utilizing the Maryland Population Health Framework, population health specific metrics that can measure the key areas of health outlined in the conceptual framework were explored. The framework identifies the types of health measures needed while allowing for the specificity of target populations to be illustrated in the accompanying metrics that derive from the measure categories. Categories of these measures include:

- Healthy System Factors
  - Access
  - Capacity
  - Effectiveness
- Population /Community Health Wellness
  - Mortality
  - Morbidity
  - Life Function

    - Social/Emotional Well-being
    - Environmental/Physical Safety
- Key Social Determinants
    - Healthy Behaviors
    - Social Environment
    - Physical Environment

In developing criteria for the measures, already existing measures were prioritized while, at the same time, considering the context of driving towards population level measures that move away from a clinical-only sphere of influence. Additionally, for Maryland, the measures recommended are constructed with the specifications unique to the Maryland healthcare delivery system.

Given these considerations and measure categories, the types of measures proposed derived from the following buckets:

- Existing, validated measures (e.g., NQF, CMS) that until now have been used for a health plan/provider defined "denominator"
- Existing public health / community health measures used to date mainly for needs assessment at state or jurisdiction level
- Innovative measures (from IOM and others) addressing broader definitions of population health and newly expanded digital data sources

Given that measures look to drive towards population level measures, some unique features of the proposed measures include:

- Denominator/ "populations" defined more broadly: *Geographic or population-subgroup defined cohort without regard to provider or payer*

    The measures use a geographic denominator beyond what is standard in the measure definition. Instead of a standard payer or clinical group that is treated by a provider, the measure specifications developed under the project expand the denominator to bring a broader geographic group to represent an entire geography. Data capture and sourcing will be critical to capture such a denominator, but the reconfiguration of these measures is to better capture population and community wellness in Maryland by more fully measuring it.

- Makes use of expanded data sources: *Electronic health records and expanded social/geo data sources*

The Maryland project focused on using sources of data that are more timely than traditional data sources for population health. While in the short term, we may have to rely on survey data as we currently do, the intention is to move to more comprehensive data sources like electronic health records and local level data to determine population health. Long term, combining alternative data sources are key to measuring health.

- *Phased near-term/long-term deployment based on data system progression*

  The project ultimately proposes a process for phasing measures from process to outcome measures. This is in large part determined by the availability of data sources and the ability of the data infrastructure in the State to support this work.

- Moves beyond the "clinical/medical" model to address "social/environmental" factors known to have larger impact on health.

  The broader set of population measures laid out go beyond the traditional clinical measures. Maryland is focused on improving population health not just by improving clinical interventions, but by also addressing the risk factors and behaviors that drive outcomes. The State will begin to look at ways to capture and assess data through this work, and ultimately develop accountability and drive interventions.

Selection Criteria for Population Health Measures

The selection criteria for the population health measures were developed over several months. Maryland used six main criteria to select measures. These criteria guided selection in concert with the use of the Population Health Framework. The criteria are as follows:

1. Population/Community Focused: measures that are relevant to one or more of the three population level perspectives known as the three CDC Population Health "buckets" (Auerbach J. The 3 buckets of prevention. [1]

2. Importance/Applicability: measures that can be used as population based performance measures or clinical/public health intervention measures.

3. Balance: measures that focus on a balanced interplay between public health interventions and clinical care. A scorecard will support the current Maryland All-Payer Model in its current state and its future innovations (e.g., as described in the state innovation model grant). Additionally, the scorecard looks to acknowledge measures that are relevant to small areas within larger jurisdiction scope and a range of temporality (i.e., short term and longer term outcomes).

[1] *J Public Health Manag Pract*. 2016;22(3):215-218).

4. **Overall practicality / strategic value:** measurement areas not previously addressed by HSCRC/ DHMH or measures already identified, but where further work is needed. Additionally, measures that could be accomplished with limited resources (i.e., not a new major community survey) and fill a gap in the conceptual framework.

5. **Scientific Evidence / Measures Attributes -** peer reviewed evidence that are important for health and welfare of populations.

6. **Data Feasibility / digital infrastructure** – uses timely data from data sources available in Maryland including health information exchange (HIE), electronic health records, administrative data, and other geographic data.

Proposed Set of Community and Population Measures

Maryland began with a list of over 80 potential population health measures for consideration. The list of these measures is listed in Appendix 2. Using the criteria discussed above and the conceptual framework to guide efforts, the State whittled down the list to 15 measures of community and population health. The measures cover a broad set of populations and health outcomes. While some are existing measures in the current SHIP measurement framework, most are derived from other measure sets to represent a balanced scorecard of population health for the State. See Table 1 below.

Table 1: Mapping the Measures to the Population Health Framework

Overview of Population Health Measurements																	
Target Population	Life Courses	Health System Factors			Key Social Determinants			Outcomes									
								Population/ Community Health/ Wellness						Clinical Process/ Quality	Healthcare Cost	Patient Experience
		Access	Capacity	Effectiveness	Healthy Behavior	Social Environment	Physical Environment	Mortality	Morbidity		Life Function	Social/ Emotional Wellbeing	Environmental/ Physical Safety			
									Intermediate	Long Term						
Healthy	Across Target Populations & Life Courses	A1		A3	B1	B2	B3						C3			
	Pregnant															
	Child/ Adolescent															
	Adult															
	Elderly															
Special Needs	Across Target Populations & Life Courses		A2	A3 & A4				C1		C2						
	Pregnant															
	Child/ Adolescent															
	Adult															
	Elderly															
Super Utilizers	Across Target Populations & Life Courses															
	Pregnant															
	Child/ Adolescent															
	Adult															
	Elderly															

The numeric codes in parenthesis below reflect the domain within our previous developed population health framework where each measure can generally be categorized. The graphic that follows also summarizes the placement of the recommended list of measures within our framework overview of the domains.

Below is the list of fifteen proposed measures. The codes noted to the right reflect the measure's placement with the conceptual domain(s) based on the measurement framework we developed.

Code A: health system factors;
Code B: key social determinants;
Code C: population/ community health/ wellness.

The numbers present the subgroups of measures in each of the three main domains in the conceptual model. The initial six priority measures are bolded; the final four of outlined in blue shading detail in Table 2.

Additionally, in response to the Amendment's requirements for at least three priority measures, the State began working through a subset of focused measures. The State initially identified 6 measures to explore for feasibility of electronic medical record capture in the near to mid-term for population health accountability. Given the constraints of the SIM design period and data assessment rigor required, the initial set of 6 was further narrowed to 4 measures. These 4 measures represent what the State believes

are the broadest and most pressing areas of health outcomes that are directly related to the Progression Plan's focus on Medicare, dual eligibles, advanced primary care, and improvement on total cost of care and quality. The 4 measures selected are highlighted below in Table 2. For additional detail on the 6 priority measures including data sources, please see Appendix 3.

Table 2: Maryland Measures of Population Health including Priority Measures

1. Diabetes-related emergency department visits for community/population (A1/A2)
2. Asthma-related emergency department visits for community (A1/A2)
3. **Body Mass Index (BMI) screening and follow-up for community/ population (A3/ C2/PQ) (PQ= process quality)**
4. **Screening for high blood pressure and follow-up for community/population (A3/ /C2 /PQ)**
5. Food – nutrition; fruit and vegetable consumption for population (B1)
6. **Counseling on Physical Activity in the Population (B1)**
7. **Current adult smoking within population (B1)**
8. Median household income within population (B2)
9. Levels of housing affordability and availability (B2/B3)
10. Age-adjusted mortality rate from heart disease for population (C1)
11. Addiction-related emergency department visits (A1/C2)
12. **Falls; Fall-related injury rate (A4/B3/C1/C2/C3)**
13. Social connections and isolation (B2)
14. Functional Outcome Assessment (B1/C2)
15. **Self-Reported Health Status (C2)**

Measure Specifications

In the spirit of creating broad measures of population health, measure specifications were customized for each of the six priority measures to calculate for various population denominators. As mentioned above several of the selected measures are well-established measures for the healthcare system. They are well defined to evaluate the health of those already receiving healthcare services. This information was drawn mainly from existing quality metrics for population health; mainly developed for accountable providers such as accountable care organizations, health maintenance organizations, and patient-centered medical homes. Measures were then converted to cross-community measures in terms of denominator definitions and data linkage, for example, to address those in a specific geographic area. Additionally, the data sources required of these measures within a single organization will need to be expanded across interoperable data sources such as those maintained by CRISP or the HSCRC to be effectively retrievable and useable.

To expand the definition of the measures and to shift measures for evaluating the healthcare system to evaluating the health status of populations in different geographic areas, the project defined the denominator of the measures as those;

- Residing in a specific geographic area such as a jurisdiction or neighborhood;
- Cared for or treated by a specific provider/health plan (i.e., attribution would need be defined such as majority of care from a health system, enrolled with a primary care physician, insured by Medicaid) or,
- Member of a certain sub group (e.g., selected age, gender, race cohorts, socioeconomic group)

The detailed measurement specifications of the six priority measures is provided in Appendix 4. In Appendix 5, the State presents tables of measure descriptions for the remaining 9 measures of interest.

Data Infrastructure and Feasibility

The final work completed under the design component of the Population Health Measures project involved two efforts:

1. An assessment of the data sources and infrastructure to obtain these measures in a comprehensive system to measure population health.

2. A deployment plan or mapped progression of the proposed measures and how, ideally, they move from process to structure to outcome measures, based on the feasibility of capturing the data.

To design an actionable plan for measures to be used in the near and long-term, analysis of electronic measure extraction and the data infrastructure readiness must be performed. Given the consistent evolution of this work; design, discussion and stakeholder engagement will be ongoing to assess measure feasibility alongside ongoing health transformation in the State. This initial work sets the stage for establishing and testing measures of population health in Maryland at a broader level than previous.

The State worked to understand the current and future data environment for the proposed population health measures. This required two concurrent work streams:

Data Assessment

The project involved an EHR Data Assessment to identify the ability to capture the necessary data elements to accurately capture the proposed priority measure. Specifically, CRISP (state HIE) and CPHIT assessed the feasibility of current EHR type data being collected at an HIE level. This involved assessing feasibility of extracting priority measures from sample EHR data systems for near term deployment. The team reviewed C-CDA (Consolidated – Clinical Document Architecture) components (including upcoming releases) and determined what could be measured based on the standard content of that document; focusing on the reduced 4 priority measures (Body Mass Index (BMI), Smoking, Hypertension (HTN) and Falls). Working with CRISP, work included:

- C-CDA assessment

- Measure assessment by priority measures
- Assessment of available data under new CMS recommended Quality Reporting Document Architecture (QRDA) including Category 1 and 3 document reporting at the patient and population level

Findings from this assessment are provided in Appendix 6. Overall, it has been determined that parts of the measures can be accurately captured and calculated today, but additional work will need to be done in the upcoming months and years to be able to fully calculate the measures as proposed (outcome rather than process oriented measures).

Data Infrastructure plan

The initial data assessment shows data with various geographic denominators. The State would like to have various levels of geographic data, and therefore would require data that can be analyzed with more specific denominators. Currently, the smallest unit of analysis that can be aggregated for population level tracking and accountability is prioritized because of its ability to meet the goals of evaluating population health level data at a more granular, geographic level. (See Table 4 below.)

Table 4: Level of Geographic Detail by Data Source

The Expected level of Geographic Details By Type/Source of Data					
Data Type	Individual	Zip code /Track	County	State	National
Clinical	EHR				
Administrative	CRISP	HSCRC, MHCC/ Claims		Medicaid	
Survey		Census MDP	BRFSS	YRBSS BHA	YRBSS
Vital Records			Birth, Death, Mortality		

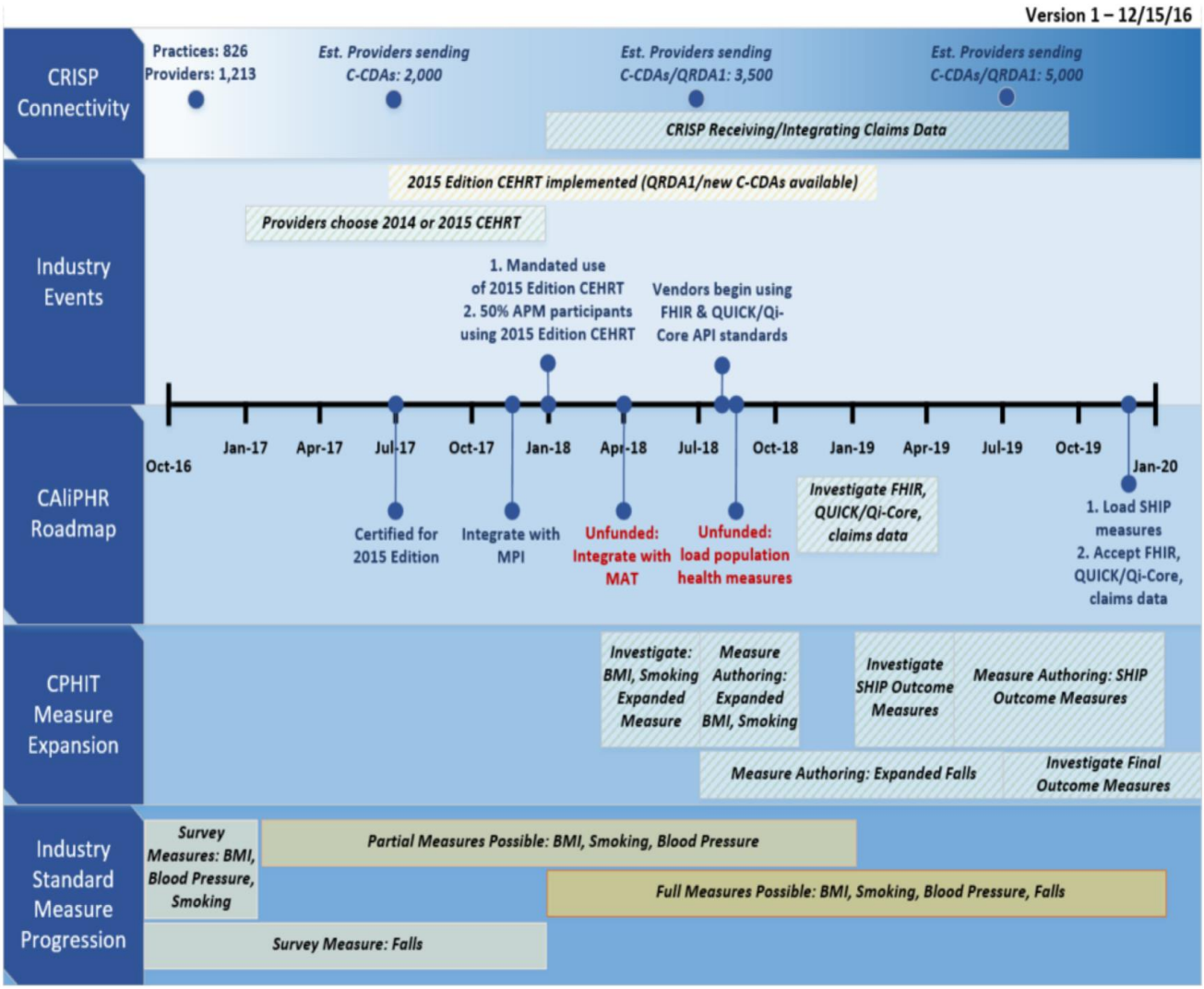
More detailed analysis of the data environment in Maryland and recommendations to improve data collection are available in the Appendices. Appendices include:

- Assessment of Data Sources

- Development of the recommendations and DHMH mandates to address data collection and reporting by providers, meeting CCDA and QRDA standards

The timeline for continuing data assessment in Maryland and subsequently deployment measures is summarized in the Figure 3 below. This is a preliminary estimate of how fast measures could be rolled out given the current data infrastructure as it relates to electronic measurement, electronic health record connectivity to CRISP, and policy and operational changes taking place at the state and federal levels. Maryland will be meeting with stakeholders in additional planning meetings for the foreseeable future to plan out how to appropriately deploy and progress measurement to meet its population health needs.

Figure 3: Summary Timeline of Population Health Measures Deployment Plan and Data Assessment



Data Infrastructure and Measure Deployment Plan

The Data Infrastructure and Measure Deployment Plans work together. This component of the project begins to develop a strategic approach for incorporating EHR and other future data into a data infrastructure that leverages CRISP. As the data sources become clearer, each data source will be accompanied by a map outlining a reasonable transition of the measures provided by that data source. The State is proposing plans for measures to evolve from process to structure to outcome measures as data and information becomes more available (deployment plans). The State developed a Measure Deployment Progression Plan for the 4 Priority Population Health Measures. This Plan detailed the transition from process to structure to outcome measures for capturing and measuring population health. The four metrics are:

- Body Mass Index (BMI)
- Hypertension (HTN)
- Smoking
- Falls

For example, in Figure 4 below there is a sketch of a measure progression plan for hypertension. The near-term measure would manifest in an expected 6 months to two years and the mid/long-term measure would look to see results in 3 to 5 years. The Deployment Plan includes time frame dimensions, possible next stage metrics and new data sources. The detailed information on the Deployment Plan is provided in Appendix 8.

The deployment plan is organized by listing the four proposed measures and connecting them to the available SHIP measures. The SHIP measures are considered the ultimate measures to address the health of the population in Maryland. While they are considered as the areas of importance in population health for Maryland policy makers, they need target revision. In addition, SHIP measures are based on survey data. The Deployment Plan is developed to show how the 4 proposed measures can change based on the availability of data that moves away from survey data to more granular, individual data at a geographic level. This shift in data can then address the ultimate goal defined by the SHIP measures, or the long-term population health outcome, in an individual level manner and measure. The way that measures change over time is by changing their data sources from survey based data to possibly available billing data sources and individual level data through available EHR. In other words, naming SHIP measures as the long-term measures does not look to move to survey based measures in long term rather looks to utilize the SHIP measures as the areas of improvement to focus on, and proposes individual level measures to evaluate and look at over time to achieve the long-term goal of the SHIP measures.

Example of Measure Deployment

Hypertension (HTN) is one of the proposed priority measures. Collecting HTN is from data on high blood pressure screening, and data on recommended follow-up plans to help detect those adults with high

blood pressure and manage them in an outpatient setting. It addresses the long-term SHIP measure of decreasing “emergency department visit rate due to hypertension”.

To achieve this long-term goal DHMH would be required to collect data on screening of blood pressure (BP). Namely DHMH would look to collect the percentage of patients aged 18 years and older seen during the reporting period who were screened for high blood pressure and who have a recommended follow-up plan documented based on the current blood pressure reading. The recommended measure addresses CMS measure # 22v5 (see Figure 4).

CMS specified reporting occurs via the health care system. For this project the definition is expanded to claims-based (i.e., billing) population health data sources and those non-traditional locations with potential access to EHRs and other data sources. Some examples are LHD clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. The definition is also expanded to include blood pressure reporting for people in a specific catchment area. Depending on the availability of the data, a phased-approach in reporting this measure may be necessary. Some data such as those population health measures collected through mobile vans and health fairs might not be readily available at the onset.

Short term (current): The recommended measure addresses two process measures and an outcome measure. Visits for BP screening and follow up visits function as the process measures and age adjusted BP operates as the outcome measure. Currently state-submitted information of person-level utilization of services can be collected through CMS Medicaid Analytic eXtract (MAX). This provides claims data on screening for BP and follow up visits. Person-level data files are available for all states and DC starting in 1999, only selected states are available prior to 1999. It is unclear at what geographic level data may be available - at the patient or provider level. Many ambulatory, inpatient and emergency department EHRs collect BP scores during an encounter on an individual level. Having patients' addresses and their zip code from EHRs provides the potential for geo-coding the BP data and generating a report at the zip code level.

Currently, most electronic health record systems connected to CRISP in Maryland (hospital and non-hospital), are Meaningful Use compliant, and as such do correctly record vitals (including blood pressure) for most visits (>75%). However, CRISP currently receives this data specific to calculating the blood pressure measure on only about 25% of patients. This substantial drop is a result of the vitals section not being always required in the C-CDA documents commonly sent to CRISP. Therefore, the BP information is available to calculate the first part of the measure, the percentage of patients with a reported BP score but not necessarily the second part of the measure, both the follow-up visit and the age adjusted BP. The current documents sent to CRISP rarely send any exclusion information, intervention information, or procedure orders. For example, this information might include exercise or diet counseling or a nutrition referral. The information on interventions and plans is necessary to

calculate aspects of the numerator criteria for the second part of the measure; a follow-up plan for those with BP outside of normal parameters.

Near term (6 months to 2 years): In the next 6 months to 2 years CRISP expects to report BP scores for the Maryland population who have sought care at a facility which participates in CRISP. This is due to the newer requirement for clinical systems, which allow a user to export a document specifically built to export and share data for certain clinical quality measures, a QRDA. The system would be able to generate and send QRDA Category 1 and 3 documents.

Source systems are only required to generate and send the document if they are certified to do so. Because BP is very common, CRISP expects most organizations to have the capability to generate the data for BP measures, including both the denominator and numerator information.

Mid to Long Term (3 to 5 years): CRISP continues to grow in multiple measure areas such as in population served by CRISP in organizations served by CRISP and thus an increase in provider participation, in quality of data gathered, and in data formats (e.g. QRDA) containing additional data. This makes it possible to address the long-term goals defined by SHIP measures for BP screening, BP follow up, and BP control in adults and children populations.

Longer Term (5 to 10 years): In the longer term (> 5 years) BP reported data from EHRs would help DHMH to establish a hypertension surveillance system with continuous BP reporting through EHRs. EHRs would be used to calculate hypertension rates in specific catchment areas and changes in its pattern over the time. This evolution requires the collection of data from those non-traditional locations with potential access to EHRs and other data sources such as LHD clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.

Figure 4: Sketch of a Possible Measurement Deployment Plan (Hypertension as an Example):

High Blood Pressure

<table>
<tr><th colspan="7">Measurement Deployment Plan; High Blood Pressure</th></tr>
<tr><td rowspan="4">Triple Aim</td><td>Milestones</td><td colspan="3">Process and Output Measures</td><td colspan="2">Outcomes Measures</td><td>Impact</td></tr>
<tr><td rowspan="2">Time Frame</td><td rowspan="2">Short Term (Current)</td><td colspan="3">Near Term (6 months to 2 years)</td><td colspan="2">Mid to Long Term (3 to 5 years)</td><td rowspan="2">Longer Term (5 to 10 years)</td></tr>
<tr><td rowspan="2">SHIP Categories</td><td rowspan="3">SHIP Measures</td></tr>
<tr><td>Geographic Level</td><td>State</td><td colspan="2">Individual</td><td></td></tr>
<tr><td>Data Sources</td><td>Medicaid</td><td>EHR</td><td>CRISP</td><td></td><td></td></tr>
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Cost of Care		Reduce total cost of care; Hospital and ER utilization as proxy for total cost of care using metric developed/endorsed by NQF. Several of current HSCRC mandated measures address this.					
Population Health	Screening for high blood pressure and follow-up for community/population (CMS#22v5)	Claims data on screening for HTN and f/u visit	Screening for High Blood Pressure and Follow up for a community/population (with specific BP)	The BP measure is available with data found in the C-CDA. There is partial coverage for data needed within the numerator criteria to calculate f/u visits.	Quality Preventive Care	Emergency department visit rate due to hypertension	Hypertension surveillance in a specific catchment area with application of BP measurements through EHR

Patient Experience of Care		HSCRC and CMS Measures on Patient Experience					

Future Recommendations and Next Steps

The Population Health Measures project aligns with the State's Progression Plan and its component models to drive population health. As Maryland has outlined in the Plan, the State is laser focused on improving population health. Strategies include address upstream influences on health status, including personal health behaviors, behavioral health issues and environmental factors particularly for vulnerable populations. To drive interventions that address population health strategies, Maryland seeks to foster accountability for population health in an incremental approach that makes the best use of measures in a thoughtful and appropriate manner.

The Measures project supports this overarching aim by directly integrating into the State's All Payer Model Amendment which calls for a Population Health Plan. The Population Health Plan will describe a transformation to value-based payments for selected population health measures.

Below is a year by year review of potential measure progression based on anticipated data infrastructure developments. Additional recommendations for data infrastructure can be found in Appendix 9.

Measurement Progression Strategy by Calendar Year

The following outlines a strategy for the progression from the existing population health measures available today to the more mature and robust population health outcome measures of the future. An incremental approach to this process allows DHMH to extract useful population health data from day one, but also ensures progress towards the overall goal of conducting more comprehensive and outcome based measurement. This strategy is impacted by market/industry factors, data availability, funding, and measure authoring cycles. Thus, the timelines and milestones identified below are subject to change.

Appendix 9 summarizes the Recommendations to Improve Data Collection that will concurrently need to be taken on to ensure that measurement progression can be achieved.

A summary timeline of Measurement progression and data infrastructure is proposed below. This timeline will guide discussions in 2017 on developing the data infrastructure, measure deployment, and additional stakeholder input.

Near-Term (6 Months to 2 years)

2017 Calendar Year

- Presently, through use of the CQM Aligned Population Health Reporting Tool (CRISP CAliPHR tool), CRISP partially calculates the industry standard BMI, High Blood Pressure, and Smoking Status measures. The measures can only partially be calculated due to limitations of the C-CDA described above.

- In the summer of 2017, CRISP anticipates that EHR vendors will begin rolling out a 2015 Edition ONC Certified technology. These upgraded EHRs will be capable of exporting QRDA Category 1 files, which are necessary to calculate the full industry standard measures.
    - CRISP will pilot QRDA Category 1 data feeds with a practice to assess the quality of data, and its ability to meet the needs of the priority population health measures.

2018 Calendar Year

- By January 2018, all providers participating in the EHR Incentive Program or the Quality Payment Program will be required to have adopted 2015 Edition Certification. As CRISP begins establishing QRDA Category 1 connections, the full industry standard BMI, High Blood Pressure, Smoking Status, and Falls measures will be deployed with CAliPHR.
- In the spring of 2018, CRISP will investigate whether expanded BMI and Smoking measures exist to cover the age ranges excluded from industry standard measures. If measures do not exist, CRISP will need to create a measure authoring strategy to author the measures.
    - In the summer of 2018, CRISP will begin the process of authoring the expanded BMI, Smoking, and Falls measures.
    - The Falls expanded measure requires clinical expertise to make the necessary changes, so the process will likely take longer.
- In the winter of 2018, CRISP will begin working with CMS, ONC, and NCQA to determine if draft outcome measures exist for the four population health measurement areas.
    - If no draft measures exist, DHMH should facilitate a measure authoring strategy and process, which includes the convening of clinical experts and measure authors.

Mid-Term (3 to 5 years)

2019 Calendar Year

The industry standard measures will remain in production for population health surveillance.

By January 2019, CRISP will deploy the expanded BMI and Smoking measures (that cover the age ranges not covered by the industry specific measures) to all CRISP/CAliPHR participants.

- The expanded Falls measure will be deployed in the summer/fall timeframe of 2019.
- In the spring/summer timeframe, DHMH will facilitate the measure authoring process as laid out in the strategy previously created.

    - Clinicians and measure authors will be retained to author a draft version of the SHIP process/outcome measures.

- In the summer of 2019, DHMH will facilitate a measure authoring strategy and process to author Final Population Health outcome measures.
- In the winter of 2019, DHMH will facilitate the measure authoring process for the Final Population Health outcome measures.
    - Clinicians and measure authors will be retained to author draft version of the Final Population Health Outcome measures.
- By December of 2019, CRISP will begin piloting the draft SHIP process/outcome measure with select practices and analyze the results.

2020 through 2023

- CRISP will deploy final versions of the SHIP process/outcome measures for all CRISP/CAliPHR participants.
    - The industry standard measures and expanded measures will remain in production.
- CRISP will deploy the Final Population Health Outcome measures to production
    - The industry standard, expanded, and SHIP process/outcome measures will remain in production.

Long-Term (5+ years)

2024 through 2029

- CRISP will work with DHMH to ensure that all deployed population health measures meet the program requirements.
- CRISP will periodically assess whether new measures exist within the market, or new data sources/types exist to further supplement population health measurement.

Appendices

Appendix 1 – Model Amendment - Population Health Plan, Timeline

Due Date	Description
June 30, 2017	State submits a Population Health Plan to CMS.
August 31, 2017	CMS target date to send comments on the submitted Population Health Plan to the State (requested within 60 calendar days of receiving the State's Population Health Plan). State works with CMS to incorporate CMS comments in the Population Health Plan.
January 1, 2018	State submits to CMS the Value Based Payment Plan ("VBP Plan").
July 1, 2018	State begins tracking proposed value-based program measures for each hospital.
March 31, 2019	Based on the State's testing, the State submits any modifications to the VBP Plan to CMS for review and comment.
May 31, 2019	CMS target date to send comments on the submitted VBP Plan to the State (requested within 60 calendar days of receiving the State's VBP Plan). State works with CMS to incorporate CMS comments and modifications in the VBP Plan.
July 1, 2019	State incorporates the VBP Plan Measures into its payment methodologies.

Appendix 2 - Candidate Measures*

A) Health System Factors

- Health insurance status(C)
- Primary care access(C)
- Access to needed services(C)
- Condition specific hospital admissions(C)
- Heart Failure Admission Rate(C,A)
- Annual well being check-up(C)
- Use of imaging for low back pain(C,A,1)
- Preventable hospitalizations(C,A,1)
- Appropriate treatment of children with upper respiratory infection(C,A,1)
- Appropriate testing for children with pharyngitis(C,A,1)
- Asthma Assessment(C,A,1)
- Addictive substances assessment and counseling(C,A)
- Tobacco use assessment and cessation intervention(C,A,1)
- Weight assessment and physical activity counseling for children and adolescents(C,A,1)
- Preventive Care and Screening and Counseling such as unhealthy alcohol use(C,A)
- BMI Screening and Follow-Up(C,A,1)
- Influenza Immunization(C,A,1)
- Pneumococcal vaccination for patients 65 years and older(C,A,1)
- Breast cancer screening(C,A,1)
- Colorectal cancer screening(C,A,1)
- Immunizations(C)
- Maternity care(C)
- Children with Inconsistent Health Insurance Coverage in the Past 12 Months(C,A)
- Children Who Had Problems Obtaining Referrals When Needed(C,A)
- Newborn and child development assessment(C)
- Childhood immunization(C,A,1)
- Risky Behavior Assessment or Counseling by Age 13 Years(C,A)
- Developmental screening using a parent completed screening tool(C,A)
- 6+ well child visits(, 0-15 months(C,A,1)
- Adult Major Depressive Disorder: Suicide Risk Assessment(C,A)
- Colorectal Cancer Screening(C,A)

B) Key Social Determinants

- Substance abuse(C)
- Safer sexual activity(C)
- Healthy food options(C)
- Neighborhood walkability(C)
- Affordable housing(C)
- Air quality(C)
- Community safety(C)
- Youth using any kind of tobacco product(C, ,1)
- Adults who smoke(C, ,1)

C) Population/ Community Health/ Wellness Outcomes

- Homicide rate(C)
- Suicide rate(C)
- Age-adjusted mortality rates from heart disease and cancer(C)
- Drug-induced death rate(C)
- Fall-related death rate(C, ,1)
- Alcohol-impaired driving fatalities(C)
- Injuries(C)
- Accidents(C)
- Chlamydia infection rate(C)
- Reduced new HIV infections(C, ,1)
- Life expectancy(C, ,1)
- Increased physical activity(C)
- Disparities-sensitive measures such as education (e.g., graduation rate)(C), poverty level(C), domestic violence(C)
- Pedestrian injury rate on public roads(C)
- Salmonella infections transmitted through food(C)
- Unhealthy air days(C)
- Infant mortality(C)
- Sudden unexpected infant deaths(C)
- Low birth weight rate(C,A)
- Preterm birth (C)
- Rate of children with healthy weight or obese (C)
- Rate of obese children(C, ,1)
- Rate of children with recommended vaccination(C, ,1)
- Children who live in communities perceived as safe(C,A)
- Child maltreatment rate(C)
- Students entering kindergarten ready to learn(C)
- High school graduation rate(C)
- Teen birth rate(C)
- Children who are exposed to secondhand smoke inside home(C,A)

D) Clinical Process/ Quality

- ED visits (due to asthma, diabetes, hypertension, mental health, addictions, dental care) (C, ,1)
- ED visits for uninsured(C)
- Hospitalization for dementia(C)
- Persons with usual primary care provider(C)
- Access to dental care(C)
- Hospitalization related to Alzheimer's disease(C)
- Composite measure of preventable hospitalization(C, ,1)
- Coronary artery disease composite: ACE inhibitor or ARB therapy – Diabetes or LVSD(C,A,1)
- Coronary artery disease: oral antiplatelet therapy prescribed for patients with CAD(C,A,1)

- Coronary artery disease composite: lipid control(C,A,1)
- Coronary artery disease: Beta-Blocker therapy for LVSD(C,A,1)
- Heart failure: Beta-Blocker therapy for LVSD(C,A,1)
- Ischemic vascular disease: use of Aspirin or another antithrombotic(C,A,1)
- Ischemic vascular disease: complete lipid panel and LDL control(C,A,1)
- Diabetes; eye, foot exam, blood pressure management, LDL management, HbA1c Control(C,A,1)
- Hypertension: controlling high blood pressure(C,A,1)
- Use of appropriate medications for people with asthma(C,A,1)
- Antidepressant medication management(C,A,1)
- Screening for clinical depression and follow-up plan(C,A,1)
- Initiation and engagement of alcohol and other drug dependence treatment(C,A,1)
- Use of appropriate medications for people with asthma(C,A,1)
- Follow-up care for children prescribed ADHD meds(C,A,1)
- Unable to afford to see a doctor(C)
- Care in the 1st trimester(C)
- Children receiving dental care(C)
- Adolescent wellness checkup(C)
- Early prenatal care(C)
- Lead screening and levels(C)
- Rate of adults with healthy weight or obese(C, 1)
- Rate of physically active adults(C)

** Letters and numbers in parenthesis present data sources, levels of evidence, and time frame.*

Data Source Key: E - Electronic Health Record and admin data; C-Health Claims/administrative data from Health Systems, Medicare, other payers, HSCRC, CRISP; PH-public health/vital records; HR-human resource/non medical data from pop; S-Survey of patients/consumers.

Levels of Evidence Key: based on NQF measures as gold standard or level A, other measures are graded from A to D; B-AHRQ Prevention Quality Indicators (PQIs)

Time Frame for Measure Development: 1. Near Term (2014-2018) 2. Middle Term (2016-2018) 3. Long Term (2019-2024).

References

1. DHMH health services cost review commission (HSCRC); population health measures. . 2014.

2. HSCRC performance measure workgroup; measuring population health http://Www.hscrc.state.md.us/documents/commission-meeting/2014/07-09/post/2c-perf-msrmnt-strategy-population-based-patient-centered-report-final-2014-7-2.pdf. . 2014.

3. Maryland all payer hospital system modernization; performance measure workgroup. . June 2015.

4. Maryland state health improvement process. http://Dhmh.maryland.gov/ship/SitePages/home.aspx. . 2015.

5. MD HSCRC waiver proposed data sources. . 2014.

6. Maryland's state health innovation plan. . 2014.

7. Maryland behavioral risk factor surveillance system (BRFSS); modules asked in Maryland during 1995-2015. http://Www.marylandbrfss.org/pdf/BRFSSWebModulesAvail.pdf. 2015.

Appendix 3 – Focused Priority Set of Measures – 4 Top Priority Measures in Green

Measure #	Domain	Title	Target Population	Possible Sources of Data
3	System Effectiveness/ Process Quality/ Morbidity	BMI Screening/ Follow-up	Adult (& Children)	EHR & Claims
4	System Effectiveness/ Process Quality/ Morbidity	Hypertension Screening & Follow-up	Adult	EHR & Claims
6	Healthy Behavior/ Determinant	Physical Activity	Adult (& Children)	EHR or BRFSS / Survey-Pt. Portal
7	Healthy Behavior/ Determinant	Smoking	Adult	EHR or BRFSS / Survey /Patient Portal
12	Morbidity/Mortality Physical Environment/ Safety	Falls related acute utilization	Adult / Elders	HSCRC/ Claims/ EHR Vital records (optional)
15	Morbidity	Self-Reported Health Status - Fair or Poor	Adult	BRFSS /Survey or EHR / Patient portal

Appendix 4 – Measurement specification for six priority measures

Following provides detailed measurement specifications of the six priority measures. It is the intention that each of the following measures can be calculated for various population denominators consisting of all in-scope persons. Several of the selected measures are well-established measures for the healthcare system. They are well defined to evaluate the health of those already receiving healthcare services. To expand the definition of the measures and to convert them from measures defined for evaluation of healthcare system to evaluation of the health status of populations in different geographic areas we define the denominator of the measures as those;

1) Residing in a specific geographic area such as a county or neighborhood;
2) Cared for or treated by a specific provider/health plan (attribution would need be defined such as majority of care from a health system, enrolled with a primary care physician, insured by Medicaid);
3) Who are a member of a certain sub group (e.g., selected age, gender, race cohorts, socioeconomic group).

For six priority measures we offer detailed specification information. This information was drawn mainly from existing quality metrics for population health mainly developed for accountable providers such as accountable care organizations, health maintenance organizations, and patient-centered medical homes. Then measures were converted to cross-community measures in terms of denominator definitions and data linkage; for example, to address those in a specific geographic area. Also, as noted, data assessment section addresses the issue of how the data sources required of these metrics within a single organization will need to be expanded across interoperable data sources such as those maintained by CRISP or the HSCRC.

Measure # 3: Body Mass Index (BMI) Screening and Follow-up

Measure Title	**Body Mass Index (BMI) Screening and Follow-up**
Description	Percentage of patients with a calculated BMI in the past six months or during the current visit documented in the medical record AND if the most recent BMI is outside of normal parameters, a follow-up plan is documented The definition includes 3 measures; 1.Outcome measure: age adjusted BMI 2.Process measure: visit for screening of BMI 3.Process measure: follow up visit The definition includes capturing BMI through non-traditional locations with potential access to EHRs and other data sources such as local health

	department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. It also includes BMI report for patients in a specific catchment area.
Measure Purpose	Recent literature indicates nearly 50 percent of primary care physician visits did not include a record of the height and weight data necessary to calculate BMI. For clinically obese patients (BMI = 30), 70 percent did not receive a diagnosis of obesity and 63 percent did not receive counseling from their physician. Lack of provider documentation of obesity is linked to the absence of counseling patients about weight loss and the health risks of obesity. Ma, et al (2009) performed a retrospective, cross-sectional analysis of ambulatory visits in the National Ambulatory Medical Care Survey from 2005 and 2006. The study findings on obesity and office-based quality of care concluded the evidence is compelling that obesity is underappreciated in office-based physician practices across the United States. Many opportunities are missed for obesity screening and diagnosis, as well as for the prevention and treatment of obesity. Ranhoff, et al., (2005) identified using a BMI< 23, resulted in a positive screen for malnutrition (sensitivity 0.86, specificity 0.71), giving 0.75 correctly classified subjects, thus leading to the recommendation that a score of BMI< 23 should be followed by MNASF when the aim is to identify poor nutritional status in elderly.
NQF Number	0421
Measure Steward	Centers for Medicare and Medicaid Services (CMS). The measure is included in Maryland SHIP measures.
Link to measure citation	https://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=71112 https://www.cms.gov/regulations-and-guidance/legislation/ehrincentiveprograms/downloads/2014_cqm_adultrecommend_coresettable.pdf
Measure type	Health System Factors; Effectiveness (Risk Factor Prevention/Screening)
Performance and Achievement Type	Merit-Based Incentive Payment System; quality measure and clinical practice improvement
DHMH-specific modifications to Measure Steward's specification	NQF measure is for those 18 years and older. We expanded the measure to include those younger than 18.

	CMS specified the reporting through health care system. We expanded the definition to claims-based population health data sources and those non-traditional locations with potential access to EHRs and other data sources. Some examples are local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. We also expanded the definition to include BMI reporting for people in a specific catchment area. Depending on the availability of the data we might need to have a phased-approach in reporting this measure. Some data such as those population health measures through mobile vans and health fairs might not be readily available.
Denominator Description	1. All patients seen during the 12-month reporting period with one or more denominator CPT or HCPCS encounter codes reported on the Medicare Part B Claims submission for the encounter along with one of the 6 numerator HCPCS clinical quality codes. 2. All participants at a local health department clinic, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs 3. All residents of a specific catchment area
Denominator Inclusions	The Total Denominator Population (TDP) is defined with the following criteria: 1) patient´s age at the time of the encounter 2) encounter date within the 12-month reporting period 3) denominator CPT or HCPCS encounter codes AND 4) provider reported HCPCS numerator clinical quality code described below (G8420, G8417, G8418, G8422, G8421 & G8419). TOTAL DENOMINATOR POPULATION Number of persons (population) AND Patient encounters during the 12-month reporting period with the following CPT or HCPCS encounter codes: 90801, 90802, 90804,

	90805, 90806, 90807, 90808, 90809, 97001, 97003, 97802, 97803, 98960, 99201, 99202, 99203, 99204, 99205, 99212, 99213, 99214, 99215, D7140, D7210, G0101, G0108, G0270, G0271, G0402, G0438, G0439 AND Patient encounters with the following HCPCS numerator clinical quality codes: G8420, G8417, G8418, G8422, G8421 & G8419 HCPCS NUMERATOR CLINICAL QUALITY CODES (6) PERFORMANCE PASS CLINICAL QUALITY CODES (3) BMI Calculated as Normal, No Follow-Up Plan Required G8420: Calculated BMI within normal parameters and documented BMI Calculated Above Upper Normal Parameters, Follow-Up Documented G8417: Calculated BMI above the upper parameter and a follow-up plan was documented in the medical record BMI Calculated Below Lower Normal Parameters, Follow-Up Documented G8418: Calculated BMI below the lower parameter and a follow-up plan was documented in the medical record
Denominator Exclusions	A patient is identified as a Denominator Exclusions (B) and excluded from the Total Denominator Population (TDP) in the Performance Denominator (PD) calculation if one or more of the following reason (s) exist: there is documentation in the medical record that the patient is over or under weight and is being managed by another provider, if the patient has a terminal illness-life expectancy is 6 months or less, if the patient is pregnant, if the patient refuses BMI measurement, if there is any other reason documented in the medical record by the provider explaining why BMI measurement was not appropriate, and patient is in an urgent or emergent medical situation where time is of the essence and to delay treatment would jeopardize the patient's health status.
Numerator Description	Patients with BMI calculated within the past six months or during the current visit and a follow-up plan documented if the BMI is outside of parameters

	Normal Parameters: Age 65 years and older: BMI > = to 23 and <30 Age 18 – 64 years: BMI > = to 18.5 and <25 Age < 18 years: BMI interpreted relative to other children of the same sex and age using CDC growth charts (http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html)
Numerator Inclusions	For the purposes of calculating performance, the Numerator (A) is defined by providers reporting the clinical quality action was performed. For this measure, performing the clinical quality action is numerator HCPCS G8420, G8417 & G8418. All discussed coding detail is listed in denominator Inclusion. The reporting might also occur in those non-traditional locations with potential access to EHRs such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.
Numerator Exclusions	Details are listed in Denominator Exclusions
Care Setting	1. Inpatient 2. Outpatient: emergency room, long term care facilities, skilled nurse facility 3. Non-traditional locations: local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs 4. Population-based measure
Potential Data Source for Md.	Refer to section on data sources for details on available and future data sources.
Measurement Period	This measure is to be reported a minimum of once per reporting period for patients seen during the reporting period. There is no diagnosis associated with this measure. This measure may be reported by eligible professionals who perform the quality actions described in the measure based on the services provided and the measure-specific denominator coding. BMI measured and documented in the medical record may be reported if done in the provider's office/facility or if BMI calculation within the past six months is documented in outside medical records obtained by the provider. The documentation of a follow up plan should be based on the most recent calculated BMI.
Selected References	Ma, J., Xiao, L., & Stafford, R.S. (2009). Adult Obesity and Office-Based of Care in the United States. Obesity, 17(5): 1077-1085.

	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2715846/ Waring, M.E., Roberts, M.B., Parker, D.R., & Eaton, C.B. (2009). Documentation and Management of Overweight and Obesity in Primary Care. The Journal of the American Board of Family Medicine, 22 (5): 544-552. http://www.jabfm.org/content/22/5/544.full.pdf+html Ranhoff, A.H., Gjoen, A.U., Mowe, M. (2005). Screening for Malnutrition in Elderly Acute Medical Patients: The Usefulness of MNA-SF. The Journal of Nutrition, Health & Aging. 9(4): 221-225. https://www.researchgate.net/publication/7762747_Screening_for_malnutrition_in_elderly_acute_medical_patients_The_usefulness_of_MNA-SF http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html
Future Measures to Consider	Application of BMI measurement through EHR for surveillance of obesity trends in a specific catchment area.

Measure # 4: Screening for High Blood Pressure and Follow-up for Community/Population

Measure Title	**Screening for High Blood Pressure and Follow-up for Community/Population**
Description	Percentage of patients aged 18 years and older seen during the reporting period who were screened for high blood pressure AND a recommended follow-up plan is documented based on the current blood pressure reading as indicated. The definition includes 3 measures; 1.Outcome measure: age adjusted HTN 2.Process measure: visit for screening of HTN 3.Process measure: follow up visit The definition includes capturing blood pressure through those non-traditional locations with potential access to EHRs and other data sources such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. It also includes blood pressure report for patients in a specific catchment area.

Measure Purpose	Hypertension, or high blood pressure, is one of the most common diseases in the world. The Centers for Disease Control and Prevention (CDC) report that approximately 70 million Americans have hypertension, roughly 1 in every 3 adults aged 18 years or older. The prevalence of hypertension increases with age, from 7% in the 18 to 39-year age group to 67% in those over 60. Hypertension is the most important modifiable risk factor for coronary heart disease (the leading cause of death in the US), stroke (the third leading cause of death), congestive heart failure, and end-stage renal disease. The CDC reports that unmanaged hypertension results in nearly 1000 deaths every day. In 2012, 55% of all Medicare Fee-For Service beneficiaries had a diagnosis of hypertension. There are disparities associated with claims related to hypertension. African American beneficiaries had the highest rate of hypertension among all racial and ethnic groups at 63%.
NQF Number	None; CMS measure ID: CMS22v5
Measure Steward	Centers for Medicare and Medicaid Services (CMS). The measure is not included in Maryland SHIP measures and HSCRC Potential Population Health Measure
Link to measure citation	https://ecqi.healthit.gov/ep/ecqms-2017-performance-period/preventive-care-and-screening-screening-high-blood-pressure-and
Measure type	Health System Factors; Effectiveness (Risk Factor Prevention/Screening)
Performance and Achievement Type	Merit-Based Incentive Payment System; quality measure and clinical practice improvement
DHMH-specific modifications to Measure Steward's specification	CMS specified the reporting through health care system. We expanded the definition to those non-traditional potential data sources including EHRs, local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. We also expanded the definition to include blood pressure reporting for people in a specific catchment area.
Denominator Description	1. All patients aged 18 years and older before the start of the measurement period with at least one eligible encounter during the measurement period

	2. All participants at a local health department clinic, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs 3. All residents of a specific catchment area
Denominator Inclusions	Patients are age18 years or older at the beginning of the measurement period who have a valid blood pressure recorded at a visit to a practitioner's office or other non-emergency outpatient facilities. The reporting might also occur in non-traditional locations with potential access to blood pressure information including EHR's at outpatient clinics, health fairs, mobile vans, community health clinics, school based health centers, and community outreach programs.
Denominator Exclusions	Patient has an active diagnosis of hypertension; patients with a Medicare claim indicating a history of hypertension prior to the first day of the measurement period or patient is under medical management for hypertension. Documentation of medical management should be indicated in the medical records during reporting time. Patient refuses to participate (either blood pressure measurement or follow-up). Patient is in an urgent or emergent medical situation where time is of the essence and to delay treatment would jeopardize the patient's health status. This may include but is not limited to severely elevated blood pressure when immediate medical treatment is indicated.
Numerator Description	Patients who were screened for high blood pressure AND have a recommended follow-up plan documented, as indicated if the blood pressure is pre-hypertensive or hypertensive.
Numerator Inclusions	Both the systolic and diastolic blood pressure measurements are required for inclusion. If there are multiple blood pressures on the same date of service, use the most recent as the representative blood pressure. Eligible professionals who report the measure must perform the blood pressure screening at the time of a qualifying visit by an eligible professional and may not obtain measurements from external sources. The reporting might also occur in non-traditional locations with potential access to relevant information such as blood pressure calculations. The intent of this measure is to screen patients for high blood pressure

	and provide recommended follow-up as indicated. The documented follow-up plan must be related to the current BP reading as indicated, example: Patient referred to primary care provider for BP management. Value set Anti-Hypertensive Pharmacologic Therapy (2.16.840.1.113883.3.600.1476): Added 3 RXNORM codes (1665057, 1719286, 1719290) and deleted 18 RXNORM codes. Value set BP Screening Encounter Codes (2.16.840.1.113883.3.600.1920): Deleted 11 CPT codes (97532, 99218, 99219, 99220, 99224, 99225, 99226, 99234, 99235, 99236, 99340). Value set Follow-up within one year (2.16.840.1.113883.3.600.1474): Deleted 1 SNOMEDCT code (61342007).
Numerator Exclusions	Details are listed in Denominator Exclusions
Care Setting	1. Inpatient 2. Outpatient: emergency room, long term care facilities, skilled nurse facility 3. Non-traditional locations: local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs 4. Population-based measure
Potential Data Source in Md.	Electronic Clinical Data: Electronic Health Record (EHR) eCQM Electronic Specifications; Group Practice Reporting Option (GPRO) Web Interface EHRs are available in 100% of hospitals and about 85% of physician offices. Other sources, such as mobile vans, health fairs, and community outreach programs may have information relevant to this measure, but this will require further data assessments. A review of this information is available in a separate document.
Measurement Period	This measure is to be reported a minimum of once per reporting period for patients seen during the reporting period. This measure may be reported by eligible professionals who perform the quality actions described in the measure based on the services provided and the measure-specific denominator coding. Blood pressure measured and documented in the medical record may be reported if done in the provider's office/facility or if a current blood pressure is documented in outside medical records obtained by the provider. The documentation of a follow up plan should be based on the most recent reported blood

	pressure.
Selected References	Centers for Disease Control and Prevention. Hypertension Among Adults in the United States: National Health and Nutrition Examination Survey, 2011-2012. http://www.cdc.gov/nchs/data/databriefs/db133.pdf Centers for Medicare & Medicaid Services. Chronic Conditions. http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and- Reports/Chronic-Conditions/index.html
Future Measures to Consider	Application of blood pressure measurement through EHR for surveillance of hypertension trends in a specific catchment area. Evaluating the change in blood pressure screening and follow up of particular cohorts.

Measure # 6: Counseling on Physical Activity in the Population

Measure Title	**Counseling on Physical activity in the Population**
Description	Discussing Physical Activity: Percentage of patients who reported discussing their level of exercise or physical activity with a doctor or other health provider in the last 12 months Advising Physical Activity: Percentage of patients who reported receiving advice to start, increase, or maintain their level of exercise or physical activity from a doctor or other health provider in the last 12 months The definition includes discussing and advising on physical activity through non-traditional data sources including EHRs and other data available at local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. It also includes reporting the measure for patients in a specific catchment area.
Measure Purpose	Physical activity is important to prevent heart disease and stroke, two of the important causes of death in United States. In order to improve overall cardiovascular health, The American Heart Association suggests at least 150 minutes per week of moderate exercise or 75 minutes per week of vigorous exercise. Chronic conditions related to physical inactivity are major contributors to

	health care costs in the United States. Most older adults suffer from at least one chronic condition for which there is a clinical guideline recommending physicians to counsel patients to exercise. Five of the major chronic conditions account for 32.7 percent of U.S. health care expenditures ($1.9 trillion overall in 2004).
NQF Number	NQF 0029
Measure Steward	Centers for Medicare and Medicaid Services (CMS). The measure is included in Maryland SHIP measures.
Link to measure citation	https://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=71111
Measure type	Key Social Determinants; Healthy Behavior
Performance and Achievement Type	Merit-Based Incentive Payment System; quality measure and clinical practice improvement
DHMH-specific modifications to Measure Steward's specification	NQF measure is specific for adults of 65 years and older. We expanded the measure to all age groups. CMS specified the reporting through health care system. We expanded the definition to those non-traditional locations with potential access to new data sources such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. We also expanded the definition to include measure reporting for people in a specific catchment area.
Denominator Description	The populations considered as the denominator would be from one of the following groups; 1. All patients seen during the 12-month reporting period; Discussing physical activity: The number of patients who responded "yes" or "no" to the question "In the past 12 months, did you talk with a doctor or other health provider about your level of exercise or physical activity? For example, a doctor or other health provider may ask if you exercise regularly or take part in physical exercise." (The Medicare Health Outcomes Survey)

	Advising Physical activity: The number of patients who responded “yes” or “no” to the question, “In the past 12 months, did a doctor or other health provider advise you to start, increase or maintain your level of exercise or physical activity? For example, in order to improve your health, your doctor or other health provider may advise you to start taking the stairs, increase walking from 10 to 20 minutes every day or to maintain your current exercise program.” (The Medicare Health Outcomes Survey) 2. All participants at a local health department clinic, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs 3. All residents of a specific catchment area
Denominator Inclusions	Patients who reported having had a visit to a health care provider in the past 12 months. All patients reported having a visit at non-traditional locations All residents of a specific catchment area would be included for rates related to that area.
Denominator Exclusions	N/A
Numerator Description	1. All participants completed the Medicare Health Outcomes Survey, a patient self-reported survey measure with two rates: Discussing physical activity: The number of patients in the denominator who responded “yes” to the question, “In the past 12 months, did you talk with a doctor or other health provider about your level of exercise or physical activity? For example, a doctor or other health provider may ask if you exercise regularly or take part in physical exercise.” Advising physical activity: The number of patients in the denominator who responded “yes” to the question, “In the past 12 months, did a doctor or other health provider advise you to start, increase or maintain your level of exercise or physical

	activity? For example, in order to improve your health, your doctor or other health provider may advise you to start taking the stairs, increase walking from 10 to 20 minutes every day or to maintain your current exercise program." 2. All participants with information about discussing and advising the physical activity in their health record at a local health department clinic, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs 3. All residents of a specific catchment area with information about discussing and advising the physical activity in their health record
Numerator Inclusions	This measure is collected through the Medicare Health Outcomes Survey - a national survey of Medicare Advantage Organization members. The survey is collected through mail with a telephone follow up. The two rate for this measure are collected through the following questions. Discussing physical activity: Response of "yes" to Q46 in the Medicare Health Outcomes Survey (HOS): "In the past 12 months, did you talk with a doctor or other health provider about your level of exercise or physical activity? For example, a doctor or other health provider may ask if you exercise regularly or take part in physical exercise." Advising physical activity: Response of "yes" to Q47 in the Medicare Health Outcomes Survey (HOS): "In the past 12 months, did a doctor or other health provider advise you to start, increase or maintain your level of exercise or physical activity? For example, in order to improve your health, your doctor or other health provider may advise you to start taking the stairs, increase walking from 10 to 20 minutes every day or to maintain your current exercise program."
Numerator Exclusions	N/A
Care Setting	1. Inpatient 2. Outpatient: emergency room, long term care facilities, skilled nurse facility 3. Non-traditional locations with potential access to EHRs: local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community

	outreach programs 4. Population-based measure
Potential Data Source in Md.	Refer to section on data sources for details on available and future data sources.
Measurement Period	This measure is to be reported a minimum of once per reporting period for patients seen during the reporting period. There is no diagnosis associated with this measure. This measure may be reported by eligible professionals who perform the quality actions described in the measure based on the services provided and the measure-specific denominator coding. The measure might also be reported by those non-traditional locations with potential access to EHRs such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.
Selected References	http://dhmh.maryland.gov/ship/Pages/home.aspx Berra K, Rippe J, Manson JE.(2015). Making Physical Activity Counseling a Priority in Clinical Practice. The Time for Action is Now. JAMA. 314:314(24):2617-2618. Liu CK & Fielding RA. (2011). Exercise as an Intervention for Frailty. Clinics in Geriatric Medicine; 27(1):101-10. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3005303/ Motl RW & McAuley E. (2010). Physical Activity, Disability, and Quality of Life in Older Adults. Physical Medicine and Rehabilitation Clinics of North America; 21(2):299-308. US Bureau of the Census. (2009). Age and Sex. In: 2005-2009 American Community Survey. https://www.census.gov/programs-surveys/acs/data.html Chen YM. (2010). Perceived Barriers to Physical Activity Among Older Adults Residing in Long-Term Care Institutions. Journal of Clinical Nursing; 19(3-4):432-9. http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2702.2009.02990.x/epdf Agency for Healthcare Research and Quality. (2006). The High Concentration of U.S. Health Care Expenditures. Available at: http://www.ahrq.gov/research/ria19/expendria.pdf.

	Agency for Healthcare Research and Quality. (2002) Physical Activity and Older Americans: Benefits and Strategies. Available at: http://www.ahrq.gov/ppip/activity.htm. Angevaren M, Aufdemkampe G, Verhaar HJ, et al. (2008). Physical Activity and Enhanced Fitness to Improve Cognitive Function in Older People Without Known Cognitive Impairment. Cochrane Database Syst Rev. 16(2):CD005381. http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD005381.pub3/full King AC, Castaneda CA, Sceppa MC, et al. (2007). Physical Activity and Public Health in Older Adults. Recommendation from the American College of Sports Medicine and the American Heart Association. Circulation. 116:1094-1105
Future Measures to Consider	Physical activity surveillance in a specific catchment area using EHR data Evaluating the available physical activity space in different neighborhoods. Evaluating environment safety in different neighborhoods.

Measure # 7: Smoking Status within Population

Measure Title	**Smoking Status within Population**
Description	Smoking/Tobacco Use Cessation and Medical Assistance Including; a. Advising Smokers and Tobacco Users to Quit, b. Discussing Smoking and Tobacco Use Cessation Medications, c. Discussing Smoking and Tobacco Cessation Strategies The percentage of patients who were current smokers or tobacco users, who were seen by a practitioner (physicians and other primary care providers) during the measurement year and who received advice to quit smoking or tobacco user whose practitioner recommended or discussed smoking or tobacco use cessation medication, methods or strategies. The definition includes capturing the measurement specified above

	through non-traditional data sources. It also includes reporting the measurement for those in a specific catchment area.
Measure Purpose	Cigarette smoking is the cause of almost 6,800 Maryland deaths each year and 150,000 people suffer from diseases/cancers caused by cigarette smoking. Preventing youth from using tobacco products is critical to improving the health of Marylanders. Smoking is highly addictive behavior and can lead to costly illnesses and death to users and those exposed to secondhand smoke. The analysis of National Ambulatory Medical Care Survey (NAMCS) data between 2001 to 2004 showed that only about 20% of smokers received physician counseling to quit during an office visit. Meta-analysis and systematic reviews of clinical trials revealed that combination of behavioral counseling and pharmacotherapy is found to be the best results for smoking cessation.
NQF Number	NQF 0027 and 0028
Measure Steward	Centers for Medicare and Medicaid Services (CMS). HSCRC selected it as "Hospital Related Population Health Measure". The measure is included in Maryland SHIP measures.
Link to measure citation	https://www.cms.gov/regulations-and-guidance/legislation/ehrincentiveprograms/downloads/2014_cqm_adultrecommend_coresettable.pdf
Measure type	Key Social Determinants; Healthy Behavior
Performance and Achievement Type	Merit-Based Incentive Payment System; quality measure and clinical practice improvement
DHMH-specific modifications to Measure Steward's specification	NQF measure is defined for patients 18 years of age and older. We expanded the measure to all age groups. NQF specified the reporting through health care system. We expanded the definition to use non-traditional data sources such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. We also expanded the definition to include measurement reporting for people in a specific catchment area.

Denominator Description	1. The number of patients who were seen by a practitioner during the measurement year 2. All participants at a local health department clinic, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs 3. All residents of a specific catchment area
Denominator Inclusions	For those patients in items 1 and 2 of denominator description we include all those with documentation of being a tobacco user in active problems or social History: former smoker, smoker with current status unknown, current some day smoker, current every day smoker, “Tobacco Use” OR patient has had an outpatient encounter <= 2 years before or simultaneously to measurement end date with CPT code: 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99217, 99218, 99219, 99220, 99241, 99242, 99243, 99244, 99245, 99341, 99342, 99343, 99344, 99345, 99347-99350, 99384, 99385, 99386, 99387, 99394, 99395, 99396, 99397, 99401, 99402, 99403, 99404, 99411, 99412, 99420, 99429, 99455, 99456 For those residents of a specific catchment area all registered residents will be included.
Denominator Exclusions	NA
Numerator Description	Patient has been a tobacco user for <=1 year before or simultaneously to measurement period with one of the following documented; Patient has one of the inclusion instructions documented for tobacco use cessation counseling" <=1 year before or simultaneously to measurement period OR Patient has “Communication to patient: tobacco use cessation counseling” documented <=1 year before or simultaneously to measurement end date The reporting might also occur in those non-traditional locations such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.

Numerator Inclusions	Patient Instructions: Smoking and tobacco-use cessation counseling visit; intermediate, 3-10min (CPT: 99406) Patient Instructions: Smoking and tobacco-use cessation counseling visit; >10min (CPT: 99407) Patient Instruction: Communication to patient: tobacco use cessation counseling SNOMED: 171055003, 225323000, 225324006, 315232003, 384742004, 395700008
Numerator Exclusions	N/A
Care Setting	1. Inpatient 2. Outpatient: emergency room, long term care facilities, skilled nurse facility 3. Non-traditional locations: local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs 4. Population-based measure; including those in a specific catchment area
Potential Data Source in Md	Refer to section on data sources for details on available and future data sources.
Measurement Period	This measure is to be reported a minimum of once per reporting period for patients seen during the reporting period. There is no diagnosis associated with this measure. This measure may be reported by eligible professionals who perform the quality actions described in the measure based on the services provided and the measure-specific denominator coding. The measure might also be reported by those non-traditional locations such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.
References	http://dhmh.maryland.gov/ship/Pages/home.aspx Suls JM, Luger TM, Curry SJ, Mermelstein RJ, Sporer AK, An LC. (2012). Efficacy of smoking-cessation interventions for young adults: a meta-analysis. Am J Prev Med. Jun;42(6):655-62. Stead LF, Koilpillai P, Lancaster T. (2015). Additional behavioural support as an adjunct to pharmacotherapy for smoking cessation. Cochrane Database Syst Rev. http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD009670.pub3/full

	West R, Raw M, McNeill A, Stead L, Aveyard P, Bitton J, Stapleton J, McRobbie H, Pokhrel S, Lester-George A, Borland R. (2015). Health-care interventions to promote and assist tobacco cessation: a review of efficacy, effectiveness and affordability for use in national guideline development. Addiction. Sep;110(9):1388-403. Ferketich AK, Khan Y, Wewers ME. (2006). Are physicians asking about tobacco use and assisting with cessation? Results from the 2001-2004 national ambulatory medical care survey (NAMCS). Prev Med. 2006;43(6):472. Thorndike AN, Regan S, Rigotti NA. (2007). The treatment of smoking by US physicians during ambulatory visits: 1994-2003. Am J Public Health. 97(10):1878.
Future Measures to Consider	Application of smoking status measurement through EHR for surveillance of smoking trends in a specific catchment area. Evaluating the change in smoking status of particular cohorts.

Measure # 12: Falls-Related Injury Rate

Measure Title	**Falls-Related Injury Rate**
Description	1. Number of falls regardless of type of fall that ended in a hospitalization/emergency department visit in patients of age 65 and older by different payers OR 2. Percentage of patients of age 65 and older with unintended and undetermined falls in a specific catchment area The definition includes those dual eligible; Medicare/ Medicaid eligible. For dual eligible the number includes those of older than 65 years. The definition includes capturing falls through non-traditional locations such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.
Measure Purpose	Each year, 2.5 million older people are treated in emergency departments for

	fall injuries. The Centers for Disease Control and Prevention (CDC) asserts that based on inflation adjustments for a 2006 study, direct fall-related medical costs for people ages sixty-five and older in the United States were about $35 billion in 2013. Injury death rates from falls nearly doubled between 2000 and 2013, from 29 to 56 per 100,000 populations. The increasing death rate combined with a growing older adult population means the direct medical costs of falls in the United States are projected to increase from about $35 billion in 2012 to over $100 billion in 2030.
NQF Number	NA
Measure Steward	Centers for Disease Control and Prevention (CDC). The measure is not included in Maryland SHIP measures.
Link to measure citation	http://www.cdc.gov/steadi/
Measure type	Population/ Community Health and Wellness Outcomes; Morbidity
Performance and Achievement Type	Merit-Based Incentive Payment System; Meaningful use of certified EHR technology
DHMH-specific modifications to Measure Steward's specification	HSCRC has introduced falls-related death rate as one of the potential hospital measures. We expanded the measure and included any type of injury. The reporting is not limited to the health care system. It includes those non-traditional locations with potential access to EHRs and other data types such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. We also expanded the definition to include reporting for patients in a specific catchment area.
Denominator Description	1. All patients of age 65 and older, continuously enrolled for at least 6 months in a Medicare preferred/Medicare Advantage program or dual eligible (Medicare/ Medicaid enrollees) OR 2. All participants at a local health department clinic, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs

	3. All residents of a specific catchment area 4. For dual eligible the number includes those of younger than 65 years.
Denominator Inclusions	Patients are age 65 years or older at the beginning of the measurement period. The falls diagnosis during a visit to the practitioner's office or other non-emergency outpatient facility. The reporting might also occur in non-traditional locations such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.
Denominator Exclusions	Patient refuses to participate in falls assessment or there is no diagnosis code of falls in their record.
Numerator Description	All patients of age 65 and older with a diagnosis of falls using ICD-9 codes, continuously enrolled for at least 6 months in a Medicare preferred/Medicare Advantage program or dual eligible (Medicare/ Medicaid enrollees). The reporting might also occur in non-traditional locations with potential access to EHRs such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. All patients of age 65 and older with a diagnosis of falls using ICD-9 codes living in the catchment area of interest.
Numerator Inclusions	The following are ICD-9 codes for falls related incidents; E8800, E8801, E8809, E8810, E8811, E882, E8830, E8831, E8832, E8839, E8840, E8841, E8842, E8843, E8844, E8845, E8846, E8849, E885, E8850, E8851, E8852, E8853, E8854, E8859, E8860, E8869, E888 , E8880, E8881, E8888, E8889, E9570, E9571, E9572, E9579, E9681, E9870, E9871, E9872, E9879
Numerator Exclusions	Details are listed in Denominator Exclusion
Care Setting	1. Inpatient 2. Outpatient: emergency room, long term care facilities, skilled nurse facility 3. Non-traditional locations with potential access to EHRs: local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community

	outreach programs 4. Population-based measure
Potential Data Source in Md	Refer to section on data sources for details on available and future data sources.
Measurement Period	This measure is to be reported a minimum of once per reporting period for patients seen during the reporting period. This measure may be reported by eligible professionals who perform the quality actions described in the measure based on the services provided and the measure-specific denominator coding. The reporting might also occur in non-traditional locations such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.
References	Stevens JA, Corso PS, Finkelstein EA, Miller TR. The costs of fatal and non-fatal falls among older adults. Inj Prev. 2006;12(5):290–5. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2563445/ Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web–based Injury Statistics Query and Reporting System (WISQARS). http://www.cdc.gov/injury/wisqars/ Houry D. Florence C. Baldwin G. Stevens J. , & McClure R . (2016). The CDC injury center's response to the growing public health problem of falls among older adults. American Journal of Lifestyle Medicine, 10, 74–77. http://ajl.sagepub.com/content/10/1/74.abstract?ijkey=6e88f9d1833a4a91f40355d09c34ec47390cb233&keytype2=tf_ipsecsha
Future Measures to Consider	Assessing the frequency of an individual falling such as repeat falls within a timeframe. Assessing factors playing role in falls such as sidewalks or no access to walker, housing adjustment, access to durable medical equipment and insurance coverage for those services.

Measure # 15: Self-Reported Health Status

Measure Title	**Self-Reported Health Status**

Description	Percentage of adults aged 18 years and older seen during the reporting period who were screened for self-reported health status and reported fair or poor health The definition includes capturing health status through those non-traditional locations such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. It also includes health status report for patients in a specific catchment area.
Measure Purpose	Self-reported current health status is a good predictor of future disability, hospitalization and mortality. Healthy People 2020 uses both self-reported health and physically and mentally unhealthy days to measure general health status. General health status is one of four indicators that Healthy People 2020 labels as Foundation Health Measures. Self-reported health status and other quality of life measures have been shown to have good construct validity, acceptable correlation with related measures, and good respondent acceptability ratings.
NQF Number	NA
Measure Steward	Centers for Disease Control and Prevention (CDC), as a part of Behavioral Risk Factors Surveillance System. The measure is not included in Maryland SHIP measures.
Link to measure citation	http://www.healthindicators.gov/Indicators/Fair-or-poor-health-adults-percent_5/Profile
Measure type	Population/ Community Health and Wellness Outcomes; Morbidity
Performance and Achievement Type	Merit-Based Incentive Payment System; resource use and meaningful use of certified EHR technology
DHMH-specific modifications to Measure Steward's specification	CDC specified the reporting through health care system. We expanded the definition to those non-traditional locations such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. We also expanded the definition to include health status reporting for patients in a specific catchment area.
Denominator Description	1. All respondents age 18 years and older seen during the 12-month reporting period with valid response for self-reported health

	status question 2. All participants at a local health department clinic, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs 3. All residents of a specific catchment area
Denominator Inclusions	Data available on county level and five age groups (18-44, 45-54, 55-64, 65-74, 75+) In 2011, the BRFSS began collecting data via cell phone. This makes data collected from 2011 forward incomparable to data collected prior to 2011. We include BRFSS after the change in collecting data was applied, and the baselines would be 2011 BRFSS data.
Denominator Exclusions	NA
Numerator Description	All respondents age 18 years and older seen during the 12-month reporting period with self-reported fair or poor health status. The reporting might also occur in non-traditional locations such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. All respondents age 18 years and older with self-reported fair or poor health status living in the catchment area of interest.
Numerator Inclusions	Details are listed in Denominator Exclusions
Numerator Exclusions	Estimates based on fewer than 50 cases or with a confidence interval half-width of 10% or more ((upper CI-lower CI/100) >10) are considered unreliable and are not displayed.
Care Setting	1. Inpatient 2. Outpatient: emergency room, long term care facilities, skilled nurse facility 3. Non-traditional locations with potential access to EHRs: local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs 4. Population-based measure
Potential Data Source in Md	Refer to section on data sources for details on available and future data sources.

Measurement Period	This measure is to be reported a minimum of once per reporting period for participants included during the reporting period. There is no diagnosis associated with this measure. This measure may be reported by eligible professionals who perform the quality actions described in the measure based on the services provided and the measure-specific denominator coding. The reporting might also occur in non-traditional locations such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.
Selected References	http://www.doh.wa.gov/portals/1/documents/5500/ghs-srhs2012.pdf About Healthy People Foundation Health Measures page. HealthyPeople.gov Web site. http://www.healthypeople.gov/2020/about/tracking.aspx. Jamoom EW, Horner-Johnson W, Suzuki R, Andresen EM, Campbell VA, RRTC Expert Panel on Health Status Measurement. (2008). Age at disability onset and self-reported health status. BMC Public Health. 8:1-7. Measuring Healthy Days. Atlanta, GA: Centers for Disease Control and Prevention; 2000:8-9,12,15-18. https://www.cdc.gov/hrqol/pdfs/mhd.pdf
Future Measures to Consider	Application of self-reported measurement through EHR for surveillance on a population level.

Appendix 5 – Measure Summary for Nine Lower Priority Recommended Measures

In this section, we present tables of brief descriptor and overview for the nine measures not described in detail in previous section.

Measure # 1: Diabetes-Related Emergency Department Visits for community/population

Measure Title	Diabetes-Related Emergency Department Visits for community/population
Description	The emergency department visit rate due to diabetes (per 100,000 population) The measurement includes those emergency department visits that resulted in admission. It includes emergency department visits after adjustment for different ethnicity and gender.
Measure Purpose	Diabetes can lead to blindness, heart and blood vessel disease, stroke, kidney failure, amputations, nerve damage, pregnancy complications and birth defects. Emergency department visits for diabetes-related complications may signify that the disease is uncontrolled. In 2010, about 12.1 million diabetes-related ED visits for adults were reported across U.S. ED visits were defined as having a diabetes diagnosis documented in the patient's discharge record. This number translates to about 9.4% of all ED visits for adults or about 515 visits per 10,000 U.S. population. 57.9% of these visits were ED treatment and release while 42.1% resulted in a hospitalization at the same facility. In comparison, for those with and without diabetes only 15.3% of all adult ED visits resulted in a hospitalization. In Maryland, there were 10,620 emergency department visits for primary diagnosis of diabetes in 2010.
NQF Number	NA
Measure Steward	The measure is included in Maryland SHIP measures.
Link to measure citation	http://dhmh.maryland.gov/ship/Pages/home.aspx
Measure type	Health System Factors; Access to Care
DHMH-specific modifications to Measure Steward's specification	None
Denominator Description	Number of persons (population) in the community of interest
Denominator Inclusions	Data available on county level, by year, and race; Non-Hispanic Asians, non-

	Hispanic blacks, Hispanics, non-Hispanic whites
Denominator Exclusions	NA
Numerator Description	Number of emergency department visits for which the primary diagnosis was coded as 250.xx
Numerator Inclusions	Data available on county level, by year, and race; Non-Hispanic Asians, non-Hispanic blacks, Hispanics, non-Hispanic whites. The methodology used to identify race in the HSCRC data files changed in 2013. Therefore, data reports in 2013 and beyond may not be comparable to data reports released in earlier years.
Numerator Exclusions	Rates not reported where the number of ED visits was less than 20.
Potential Data Source in Md.	Refer to section on data sources for details on available and future data sources.
References	http://dhmh.maryland.gov/ship/Pages/home.aspx Washington RE, Andrews RM, Mutter R. (2013). Emergency Department Visits for Adults with Diabetes, 2010. https://www.hcup-us.ahrq.gov/reports/statbriefs/sb167.jsp

Measure # 2: Asthma-Related Emergency Department Visits for Community

Measure Title	**Asthma-Related Emergency Department Visits for Community**
Description	The rate of emergency department visits due to asthma per 10,000 population
Measure Purpose	Asthma is a chronic health condition which causes very serious breathing problems. When properly controlled through close outpatient medical supervision, individuals and families can manage their asthma without costly emergency intervention. The asthma-related emergency department visit is an indicator of poor control and management of this disease across patient population. In 2011, there were 1.8 million emergency department visits with asthma as the primary diagnosis across the U.S., the number of hospital outpatient department visits with

	asthma as the primary diagnosis was 1.3 million in 2010. In Maryland only, there are nearly 50,000 emergency department visit related to asthma each year.
NQF Number	NA
Measure Steward	The measure is included in Maryland SHIP measures.
Link to measure citation	http://dhmh.maryland.gov/ship/Pages/home.aspx
Measure type	Health System Factors; Access to Care
DHMH-specific modifications to Measure Steward's specification	None
Denominator Description	Number of persons (population) in the community of interest
Denominator Inclusions	Data available on county level, by year, and race; Non-Hispanic Asians, non-Hispanic blacks, Hispanics, non-Hispanic whites. These data are age-adjusted to 2000 U.S. standard population.
Denominator Exclusions	NA
Numerator Description	Number of emergency department visits for which the primary diagnosis was coded as 493.xx
Numerator Inclusions	Data available on county level, by year, and race; Non-Hispanic Asians, non-Hispanic blacks, Hispanics, non-Hispanic whites. The methodology used to identify race in the HSCRC data files changed in 2013. Therefore, data reports in 2013 and beyond may not be comparable to data reports released in earlier years.
Numerator Exclusions	Rates not reported where the number of ED visits was less than 20.
Potential Data Source in Md.	Refer to section on data sources for details on available and future data sources.
eferences	http://dhmh.maryland.gov/ship/Pages/home.aspx http://www.cdc.gov/asthma/most_recent_data.htm

Measure # 5: Food – Nutrition; Fruit and Vegetable Consumption for Population

Measure Title	Food – Nutrition; Fruit and Vegetable Consumption for Population
Description	Percentage of adults aged 18 years and older in a specific catchment area who report consuming fruits and vegetables five or more times per day
Measure Purpose	Eating more fruits and vegetables adds nutrients to diets, reduces the risk for heart disease, stroke, and some cancers, and helps manage body weight when consumed in place of more energy-dense foods. During 2007–2010, half of the total U.S. population consumed <1 cup of fruit and <1.5 cups of vegetables daily; 76% did not meet fruit intake recommendations, and 87% did not meet vegetable intake recommendations. Although national estimates indicate low fruit and vegetable consumption, substantial variation by states has been observed.
NQF Number	NA
Measure Steward	Centers for Medicare and Medicaid Services (CMS). The measure is not included in Maryland SHIP measures.
Link to measure citation	http://nccd.cdc.gov/BRFSSPrevalence/rdPage.aspx?rdReport=DPH_BRFSS.ExploreByTopic&islClass=CLASS06&islTopic=Topic25&islYear=2014&go=GO
Measure type	Key Social Determinants; Healthy Behavior
DHMH-specific modifications to Measure Steward's specification	Expanding the measure to a specific catchment area rather than the state level data
Denominator Description	Adults aged 18 years and older in a specific catchment area
Denominator Inclusions	Data available on state level, by two sex, six age groups (18-24, 25-34, 35-44, 45-54, 55-64, + 65), race (white/ non-Hispanic, Black/ non-Hispanic, Hispanic, Other/ non-Hispanic, Multiracial/ non-Hispanic), education (Less than H.S., H.S. or G.E.D, some post H.S., collage graduate), household income (less than $15,000, $15,000-24,999, $25,000-34,999, $35,000-49,999, $50,000)
Denominator Exclusions	NA
Numerator Description	Adults aged 18 years and older who have consumed fruits and vegetables five or more times per day in a specific catchment area
Numerator Inclusions	Data available on state level, by two sex, six age groups (18-24, 25-34, 35-44, 45-54, 55-64, + 65), race (white/ non-Hispanic, Black/ non-Hispanic, Hispanic, Other/ non-Hispanic, Multiracial/ non-Hispanic), education (Less than H.S., H.S.

	or G.E.D, some post H.S., collage graduate), household income (less than $15,000, $15,000-24,999, $25,000-34,999, $35,000-49,999, $50,000)
Numerator Exclusions	NA
Potential Data Source in Md.	Refer to section on data sources for details on available and future data sources.
References	http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6426a1.htm

Measure # 8: Median Household Income within Population

Measure Title	**Median Household Income within Population**
Description	The household income at the 50th percentile per 100,000 population in a catchment area of interest
Measure Purpose	Income allows families and individuals to purchase health insurance and medical care, but also provides options for healthy lifestyle choices. Poor families and individuals are most likely to live in unsafe homes and neighborhoods, often with limited access to healthy foods, employment options, and quality schools. While the starkest difference in health is between those with the highest and lowest incomes, this relationship persists throughout all income brackets. Adults in the highest income brackets are healthier than those in the middle class and will live, on average, more than six years longer than those with the lowest incomes.
NQF Number	NA
Measure Steward	Institute of Medicine Recommendation. The measure is not included in Maryland SHIP measures.
Link to measure citation	http://www.nationalacademies.org/hmd/reports/2014/capturing-social-and-behavioral-domains-in-electronic-health-records-phase-1.aspx
Measure type	Key Social Determinants; Social Environment
DHMH-specific modifications to Measure Steward's specification	None
Denominator Description	Number of persons (population) in a specific catchment area
Denominator Inclusions	Data available on county level, by year, age 15-24, 25-34, 35-44, 45-54, 55-64, +

	65) and race; Asians, Blacks, Hispanics (any race), non-Hispanic whites, type of house hold, nativity of household, region in the country, residence.
Denominator Exclusions	NA
Numerator Description	The household income in a specific catchment area
Numerator Inclusions	Data available on county level, by year, age 15-24, 25-34, 35-44, 45-54, 55-64, + 65) and race; Asians, Blacks, Hispanics (any race), non-Hispanic whites, type of house hold, nativity of household, region in the country, residence
Numerator Exclusions	NA
Potential Data Source in Md.	Refer to section on data sources for details on available and future data sources.
References	http://www.countyhealthrankings.org/our-approach/health-factors/income Braveman P, Egerter S, Barclay C. Income, wealth and health. Princeton: Robert Wood Johnson Foundation (RWJF); 2011. Exploring the Social Determinants of Health Issue Brief No. 4.

Measure # 9: Level of Housing Affordability and Availability

Measure Title	**Level of Housing Affordability and Availability**
Description	The percentage of housing units sold that are affordable on the median teacher's salary in a specific catchment area
Measure Purpose	Affordable housing can improve health by providing greater stability and reducing stress. Having affordable housing can allow family resources to be used for other needs like healthy food and healthcare. Studies show that stable housing is strongly associated with improved mental health outcomes and a reduction in the number of days hospitalized among formerly homeless adults. In 2012, among low-income households with more than half income spent on housing costs, and severely housing cost burdened, expenditure on food and health care was less compared to similar households who spent 30% or less of their income on housing. These differences in health care and nutrition

	spending were particularly large in rural areas.
NQF Number	NA
Measure Steward	The measure is included in Maryland SHIP measures.
Link to measure citation	http://dhmh.maryland.gov/ship/Pages/home.aspx
Measure type	Key Social Determinants; Physical Environment
DHMH-specific modifications to Measure Steward's specification	None
Denominator Description	Number of housing units sold in a specific catchment area
Denominator Inclusions	Data available on county level and by year
Denominator Exclusions	NA
Numerator Description	Number of housing units sold that are affordable on the median teacher's salary in a specific catchment area
Numerator Inclusions	Data available on county level and by year
Numerator Exclusions	NA
Potential Data Source in Md,	Refer to section on data sources for details on available and future data sources.
References	http://dhmh.maryland.gov/ship/Pages/home.aspx Kyle T, Dunn JR. (2008). Effects of Housing Circumstances on Health, Quality of Life and Health Care Use for People with Severe Mental Illness: A Review." Health and Social Care in the Community 16 (1):1–15 Alexander B, Apgar W, Baker K, Baldwin P. (2014). The State of the Nation's Housing. Boston, MA: Joint Center for Housing Studies of Harvard University.

Measure # 10: Age-Adjusted Mortality Rate from Heart Disease for Population

Measure Title	**Age-adjusted Mortality Rate from Heart Disease for Population**
Description	The mortality rate from heart disease in a specific catchment area adjusted for

	age distribution of the area
Measure Purpose	Heart disease is the leading cause of death in Maryland accounting for 25% of all deaths. In 2009, over 11,000 people died of heart disease in Maryland. Although death rates attributable to cardiovascular disease (CVD) declined by 31% from 2000 to 2010, CVD still accounts for 1 in 3 deaths in Americans.
NQF Number	NA; several measures for inpatient mortality rate related to heart disease
Measure Steward	The measure is included in Maryland SHIP measures and Vital Statistics Administration Measure
Link to measure citation	http://dhmh.maryland.gov/ship/Pages/home.aspx
Measure type	Population/ Community Health and Wellness Outcomes; Mortality
DHMH-specific modifications to Measure Steward's specification	None
Denominator Description	Number of persons (population) in a specific catchment area
Denominator Inclusions	Data available on county level, by year, and race; Hispanic, non-Hispanic Asian/ pacific islander, non-Hispanic black. African American, non-Hispanic white. Race and Hispanic origin are reported separately. Data for persons of Hispanic origin are included in the data for each race group. Hispanic rates include all deaths to persons of Hispanic origin of any race. For multi-year calculation: Average number of deaths divided by the total population of middle year (per 100,000). Data are age-adjusted to 2000 U.S. standard population.
Denominator Exclusions	NA
Numerator Description	Number of deaths with an ICD-10 code of I00-I09,I11,I13,I20-I51
Numerator Inclusions	Data available on county level, by year, and race; Hispanic, non-Hispanic Asian/ pacific islander, non-Hispanic black. African American, non-Hispanic white. Race and Hispanic origin are reported separately. Data for persons of Hispanic origin are included in the data for each race group. Hispanic rates include all deaths to persons of Hispanic origin of any race. For multi-year calculation: Average number of deaths divided by the total population of middle year (per 100,000). Data are age-adjusted to 2000 U.S. standard population.

Numerator Exclusions	Rates not reported if number of deaths was less than 20.
Potential Data Source in Md.	Refer to section on data sources for details on available and future data sources.
References	HHS Secretary Sebelius Statement on National High Blood Pressure Education Month. U.S. Department of Health & Human Services (HHS) 2012. http://www.hhs.gov/news/press/2012pres/05/20120502a.html.

Measure # 11: Addiction-Related Emergency Department visits

Measure Title	**Addiction-Related Emergency Department Visits**
Description	The rate of emergency department visits related to substance abuse disorders (per 100,000 population) in a catchment area
Measure Purpose	Substance abuse problems can place a heavy burden on the healthcare system, particularly when persons in crisis utilize emergency departments instead of other sources of care when available. In Maryland, there were 66,383 emergency department visits for substance related disorders in 2010. Diagnoses include alcohol-related disorders and drug related disorders.
NQF Number	NA
Measure Steward	The measure is included in Maryland SHIP measures.
Link to measure citation	http://dhmh.maryland.gov/ship/Pages/home.aspx
Measure type	Health System Factors; Access to Care
DHMH-specific modifications to Measure Steward's specification	None
Denominator Description	Number of persons (population) in a specific catchment area
Denominator Inclusions	Data available on county level, by year, and race; Hispanic, non-Hispanic Asian/ pacific islander, non-Hispanic black. African American, non-Hispanic white. The methodology used to identify race in the HSCRC data files changed in 2013. Therefore, data reports in 2013 and beyond may not be comparable to data reports released in earlier years.

	Data are age-adjusted to 2000 U.S. standard population.
Denominator Exclusions	NA
Numerator Description	Number of emergency department visits for which any diagnosis code was substance-related disorders by the Agency for Healthcare Research and Quality (AHRQ), 2007 HCUP Fact Book No. 10. AHRQ Publication No. 07-0008. These diagnoses included alcohol-related disorders and drug related disorders.
Numerator Inclusions	Data available on county level, by year, and race; Hispanic, non-Hispanic Asian/ pacific islander, non-Hispanic black. African American, non-Hispanic white. The methodology used to identify race in the HSCRC data files changed in 2013. Therefore, data reports in 2013 and beyond may not be comparable to data reports released in earlier years. Data are age-adjusted to 2000 U.S. standard population.
Numerator Exclusions	Rates not reported where the number of ED visits was less than 20.
Potential Data Source in Md	Refer to section on data sources for details on available and future data sources.
References	http://dhmh.maryland.gov/ship/Pages/home.aspx

Measure # 13: Social Connections and Isolation

Measure Title	**Social Connections and Isolation**
Description	The rate of people age 3 to 85 years old with self-reported perceptions of social support, companionship, social distress, and positive social development in a specific catchment area.

Measure Purpose	The social integration is defined as the degree to which a person has social ties or relationships with other individuals, groups, or organizations and is based on perceived social support, companionship, social distress, and positive social development. The impacts of social relationships on health rival or exceed those of major biomedical factors (e.g., high blood pressure, cholesterol, and blood sugar) and behavioral factors (e.g., smoking, diet, obesity, physical activity, and alcohol consumption). Since the late 1970s, social isolation and low levels of social integration have been shown to predict all-cause mortality and disease-specific indicators of morbidity, functioning, disability, and mortality, netting a wide range of biomedical and psychosocial confounders.
NQF Number	NA
Measure Steward	Institute of Medicine Recommendation. The measure is not included in Maryland SHIP measures.
Link to measure citation	http://www.nihtoolbox.org/HowDoI/TechnicalManual/Technical%20Manual%20sections/Toolbox%20Friendship%20Survey%20Technical%20Manual.pdf
Measure type	Key Social Determinants; Social Environment
DHMH-specific modifications to Measure Steward's specification	No specific measure is recommended by IOM. The measure is developed based on the definition of social support by NIH toolbox.
Denominator Description	Number of persons (population) in a specific catchment area
Denominator Inclusions	Data available on individuals from ages 3-85 since 2012
Denominator Exclusions	NA
Numerator Description	Number of people with self-reported perceptions of social support, companionship, social distress, and positive social development based on standard NIH toolbox for the assessment of neurological and behavioral function
Numerator Inclusions	Data available on individuals from ages 3-85 since 2012
Numerator Exclusions	NA

Potential Data Source in Md	Refer to section on data sources for details on available and future data sources.
References	http://www.nationalacademies.org/hmd/reports/2014/capturing-social-and-behavioral-domains-in-electronic-health-records-phase-1.aspx

Measure # 14: Functional Outcome Assessment

Measure Title	**Functional Outcome Assessment**
Description	Percentage of visits for patients aged 18 years and older with documentation of a current functional outcome assessment using a standardized functional outcome assessment tool on the date of the encounter AND documentation of a care plan based on identified functional outcome deficiencies on the date of the identified deficiencies
Measure Purpose	Standardized outcome assessments, questionnaires or tools are a vital part of evidence-based practice. Despite the recognition of the importance of outcomes assessments, questionnaires and tools, recent evidence suggests their use in clinical practice is limited. Selecting the most appropriate outcomes assessment, questionnaire or tool enhances clinical practice by (1) identifying and quantifying body function and structure limitations; (2) formulating the evaluation, diagnosis, and prognosis; (3) informing the plan of care; and (4) helping to evaluate the success of physical therapy interventions.
NQF Number	2624
Measure Steward	Centers for Medicare and Medicaid Services. The measure is not included in Maryland SHIP measures.
Link to measure citation	http://www.qualityforum.org/QPS/2624
Measure type	Population/ Community Health and Wellness Outcomes; Clinical Process/ Quality
DHMH-specific modifications to Measure Steward's specification	None
Denominator Description	All visits for patients aged 18 years and older

Denominator Inclusions	Check denominator description
Denominator Exclusions	A patient is not eligible if one or more of the following reasons(s) is documented: patient refuses to participate, patient unable to complete questionnaire, and patient is in an urgent or emergent medical situation where time is of the essence and to delay treatment would jeopardize the patient's health status
Numerator Description	Patients with a documented current functional outcome assessment using a standardized tool AND a documented care plan based on the identified functional outcome deficiencies.
Numerator Inclusions	Check numerator description
Numerator Exclusions	Check denominator exclusions
Potential Data Source in Md	Refer to section on data sources for details on available and future data sources.
References	Potter K, Fulk GD, Salem Y, Sullivan J. Outcome measures in neurological physical therapy practice: part I. Making sound decisions. J Neurol Phys Ther. 2011 Jun;35(2):57-64.

Appendix 6 – E.H.R. Data Assessment

CRISP Assessment of E.H.R Data for Four Priority Measures							
Measure Title	**QDM Data Types Needed**	**Data Available in C-CDA**	**DHMH-Specific Modifications Notes**	**Numerator Analysis**	**Denominator Analysis**	**Exclusion or Exception Analysis**	**General Notes**
Preventive Care and Screening: BMI Screening and Follow-Up Plan	Diagnosis, Active	Yes	DHMH expanded the age range of the Denominator/IPP to include those under 18 years of age. The modifications have little impact on analysis.	Partial, some medication orders not in data set; depends on sending system. Follow up interventions usually not in data currently.	Possible	Exclusions - Partial	The first half of this measure is possible with data found in a C-CDA. However, we have not seen intervention and procedure orders within a C-CDA, which is necessary to calculate aspects of the numerator criteria.
	Encounter, Performed	Likely				Exceptions - N/A	
	Intervention, Order	No					

Medication, Order	More Analysis Needed
Physical Exam, Performed	Yes
Procedure, Order	No

	Attribute: Reason	Yes					
Preventive Care and Screening: Screening for High Blood Pressure and Follow-Up Documented	Diagnosis, Active	Yes	Modifications have no impact on analysis.	Partial, not ideal.	Possible	Exclusions - Possible	The first half of this measure is possible with data found in the C-CDA. There is partial coverage for data needed within the numerator criteria. Information for the denominator exception is not found in the C-CDA.
	Diagnostic Study, Order	No				Exceptions - Not Possible	
	Diagnostic Study, Order not done	No					

	Encounter, Performed	Likely					
	Intervention, Order	No					
	Intervention, Order not done	No					
	Laboratory Test, Order	Possible					

	Laboratory Test, Order not done	No					
	Medication, Order	More Analysis Needed					
	Medication, Order not done	No					

	Physical Exam, Performed	Yes					
	Physical Exam, Performed not done	No					
	Attribute: Reason	Yes					
Preventative	Encounter,	Likely	DHMH expanded the age range of	Partial/Possible;e-	Possible	Exclusion -	There is a possibility that

Care and Screening: Tobacco Use: Screening and Cessation Intervention	Performed		the Denominator/IPP to include those under 18 years of age. The modifications have little impact on analysis.	medication orders not in data set; depends on sending system.		N/A	most data elements needed to calculate the numerator and denominator will be found in a C-CDA. Data for the denominator exception will not be found in the C-CDA.
	Intervention, Performed	Likely				Exception - Not Possible	
	Medication, Active	Yes					
	Medication, Order	More Analysis Needed					
	Patient Characteristic: Tobacco Non-User	Yes					

	Patient Characteristic: Tobacco User	Yes						
	Risk Category Assessment	Possible						
	Risk Category Assessment not done	No						

Falls: Screening for Future Fall Risk	Encounter, Performed	Likely	DHMH expanded the numerator to include any type of injury, but this isn't specifically specified in the numerator inclusions. Secondly, unclear how to define a "specific catchment area" - this data may or may not be in the C-CDA/demographics.	Possible	Possible	Exclusion - N/A	There is a possibility that most data elements needed to calculate the numerator and denominator will be found in a C-CDA. Data for the denominator exception will not be found in the C-CDA.
	Risk Category Assessment	Possible				Exception - Not Possible	
	Risk Category Assessment not done	No					

Appendix 7 – Assessment of Data Sources

There are a number of data sources available in Maryland that can be used to construct our proposed measures. For each major potential data source, the matrix that follows outlines key characteristics, challenges and opportunities and potential applicability to one or more of the 15 potential population based measures we propose. This document outlines some of these data sources and gives a preliminary description of how the data can be used, who owns it, and what variables would be used for each measure. Other data sources that may be available and useful for the 15 measures are listed at the end of this section. The main focus of this assessment is on data sources that are feasible to use now or in the near future for the proposed 15 population health measures.

Summary of Data Sources That Contribute to Each Recommended Population Health Measure

Measure by number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
EHR	x	x	x	x	x	x	x	x		x	x	x	x	x	x
HSCRC	x	x	x			x	x			x	x	x			
MHCC	x	x	x			x	x			x	x	x			
CRISP	x	x				x					x	x			
Vital Records										x					
BRFSS			x		x	x	x					x	x		x
Census					x			x	x				x		x
MDP								X	X						
BHA					X								X	X	X
YRBSS					X	X									
Medicaid; CMS	X	X		X		X				X	X	X			
Others:															
Mobile Health Vans			x	x			x								x
School health clinics			x	x	x	x							x	x	x
Community health fairs			x	x	x	x			x				x	x	x

Community/outreach			x	x	x	x	x	x	x			x	x	x	x
Medicare Health Outcomes Survey						x									

The following table summarizes when data sources are available for the 15 proposed measures. Actual availability may depend on data variables requested for the measure and is subject to verification in future measure development.

Data Source Availability

Currently available	**Near term availability (6 months-2 years)**	**Future availability (3-5 years)**
HSCRC BRFSS YRBSS MDP Medicaid Census Vital Records BHA	EHR CRISP MHCC	Mobile Health Vans Community programs School Health Clinics Community health fairs Social services

The following tables provide detailed information on selected data sources;

1) Electronic Health Records

Data Governance	Multiple vendors sell EHR's to hospitals, clinics, and health systems. The largest are Cerner and EPIC (needs citation). Data is typically "governed" by the clinical provider and access to data needs to be requested to the health system. As of Mar 2015, all of Maryland hospitals and approximately 85% of office-based physicians use EHRs. Virtually all of the EHRs are capable of sharing "CCD" format summaries and most follow ONC standards; however, they are not interoperable from vendor to vendor or outside of the major health systems (UMMS, JHHS, MedStar).
Data Type	Format: Structured and unstructured Context: Primarily clinical variables as well as patient portal information

	Pre-calculated Measures: may include eCQMs and other quality measures reported in EHR's
Variables	Variable types may vary based on EHR type Clinical: diagnosis, procedures, labs (ordered, performed, results), medication (ordered), vitals (including BMI and BP), history (social, surgical, medical). Demographic: age, sex, marital status and others Social: smoking status, alcohol consumption, and others All major providers also have a comprehensive "web portal" that allows the consumer patient to interact with the EHR. Most providers also use this to collect "patient reported" data (such as functional status and satisfaction and history) information directly from the patients.
Population/ Geo	Denominator of the population who is seeking care at the health systems, clinics, hospitals Patient addresses allow for small area rates, but may not necessarily be shared pending legal/ privacy issues
Primary Use	EHR data is typically used for direct patient care. EHR potentially provides for the ability to share information between providers to enhance patient care
Challenges with the data	● Interoperability: One EHR implementation at one site is not necessarily compatible to other EHR's at other sites. This can make data cleaning and collecting challenging especially on a community level. ● Data Quality: o Pulling vital signs, lab results, or other raw data is not necessarily clean or inputted in a standard way. o Not all elements are collected across all EHR's regardless of vendor or clinic site. o Patient reported information completeness and reliability requires further assessment.
Feasibility	Using EHR data could be feasible now or in the near future if asking for data that is collected with both high interoperability and data quality specs. Further assessment on each EHR vendor will be needed to understand how often data is collected and filled. Diagnosis, orders, and medications are not always

	updated or current. Patients may have active diagnoses that are actually inactive. Information on medical and social history are collected in a variety of forms (structured tables or free text notes)
Proposed Population Health Measures	• 1. Diabetes-related emergency department visits • 2. Asthma-related emergency department visits • 3. Body Mass index screening and follow up (with specific BMI level) • 4. Screening for High Blood Pressure and Follow up for a community/population (with specific BP) • 5. Food and nutrition (web portal or social history) • 6. Counseling on physical activity in elders • 7. Smoking/Tobacco Use Cessation and Medical Assistance • 8. Median household income • 10. Age-adjusted mortality rate from heart disease • 11. Addiction-related emergency department visits • 12. Falls • 13. Social connection (web portal or social history) • 14. Functional Outcome Assessment (web portal or social history) • 15. Self-reported health status (web portal or history)

2) Health Services Cost Review Commission (HSCRC) Case Mix Data

Data Governance	Health Services Cost Review Commission - HSCRC (State of Maryland)
Data Type	Format: Structured Context: Administrative / Billing information
Variables	The Inpatient dataset contains discharge medical record abstract including all diagnoses and billable services provided for each admission. The Outpatient data contains medical abstract and billing data on all outpatient surgeries, clinic visits and referred outpatient ancillary utilization occurred in a hospital setting
Population/ Geo	All hospitals in the state of Maryland submit data on a quarterly basis. Information is transmitted to CRISP on a monthly basis for master patient indexing and data linkage completion. Data are available at the full zip code level
Primary Use	To support reimbursements for hospital systems in Maryland
Challenges	• Data Timeliness/Latency: Data confirmation has a lag of a few months (hospitals report every quarter) and is generally not available for quality measurement meanwhile.

	• Data Scope/Denominator:
	  o Billing data only gives us a certain amount of information about the patient or population, Lab results, medication information, and other clinical information is not captured in billing data.
	  o Data is limited to what HSCRC requires hospitals to report
	  o Does not include physician services provided by health system unless categorized as an outpatient data or emergency room visit

Feasibility	HSCRC is a feasible and accessible source of data for a number of proposed population measures. There is a clear process to request the data. HSCRC should be consulted on some of the measures if we want hospitals to submit new information or variables for the measures.
Proposed Population Health Measures	• 1. Diabetes-related emergency department visits • 2. Asthma-related emergency department visits • 3. Body Mass index screening and follow up • 6. Counseling on physical activity in elders • 7. Smoking/Tobacco Use Cessation and Medical Assistance • 10. Age-adjusted mortality rate from heart disease • 11. Addiction-related emergency department visits • 12. Falls

3) Maryland Health Care Commission: All Payer Claims Data Base (MHCC)

Data Governance	Maryland Health Care Commission - MHCC (State of Maryland)
Data Type	Format: Structured Context: Insurance claims data
Variables	The MHCC's All Payer claims database has enrollment, provider, and claims information for those with private insurance.
Population/Geo	Mainly covers Maryland residents enrolled in private insurance but also includes limited coverage of Medicare/Medicaid enrollees Zip code information is available pending legal/privacy issues

Primary Use	MHCC supports estimates of cost and utilization, policy analysis, and evaluation of demonstration programs. It can also be used as a decision support tool for state partners, HSCRC, and Maryland insurance administration
Challenges	• Data Scope/Denominator: Limited to a select population in Maryland with private insurance • Data Timeliness/Latency: Not real-time and only available for 2010-2014 data • Data Access: There are limits to what we can use the data for and all uses need to be approved by the commission and/or IRB approved • Data Interoperability: Data will be difficult to link to other databases unless connected with the CRISP master patient ID. The data at MHCC does not have this ID, but would need to send basic demographic information to connect to the unique ID.
Feasibility	The MHCC is a suitable database for cost and utilization research. Data can be used to compare providers, and insurance types. However, MHCC is not a satisfactory data source for current or prospective analysis. Geo-focused analysis will be difficult as the smallest geographic level is zip-code level.
Proposed Population Health Measures	• 1. Diabetes-related emergency department visits • 2. Asthma-related emergency department visits • 3. Body Mass index screening and follow up • 6. Counseling on physical activity in elders • 7. Smoking/Tobacco Use Cessation and Medical Assistance • 10. Age-adjusted mortality rate from heart disease • 11. Addiction-related emergency department visits • 12. Falls

4) Chesapeake Regional Information System for our Patients (CRISP)

Data Governance	CRISP receives clinical feeds from providers and adds a master patient ID internally. CRISP ID is "protected and managed" by CRISP; however, the health data is owned by the data provider (e.g., hospitals, HSCRC) The use of HSCRC vs. CRISP data would need to be explored further as the overlap between the HSCRC and the ADT (admission discharge transfer) CRISP file is considerable. CRISP also has other less complete databases that over time will become more complete

	In this table we explore data that is available at CRISP that is not the HSCRC data.
Data Type	Format: Mainly structured (e.g., HL7) but also unstructured (e.g., reports, CCD free text fields) Context: Clinical data
Variables	CRISP receives admission, discharge, and transfer (ADT) notifications from all hospitals within the state of Maryland. A few hospitals also send additional data in the CCD format. HSCRC sends the case-mix data to CRISP, which is then tagged and linked via the master patient ID. Pharmacy/medication data: medication fill history is available through the query portal. This information is provided by RxHub and Superscripts pharmacy network. Data is geo-coded and can be shared at a specific geographic level. CRISP continues to work with other organization to receive new data including emergency services.
Population/ Geo	All Maryland population who have sought care at one of the Maryland acute care hospitals at least once since 2012. Other data and participants have been included at various times including ambulatory clinics and PDMP. Patient address level is available pending legal/privacy issues. CRISP Geo-codes the addresses and may be able to share at a census block or track level pending on further review.
Primary Use	Provides encounter notification to providers about their patients in the form of HL7 ADT Messages. Providers can also access the query portal and search the prescription drug monitoring program (PDMP).
Challenges	● Data Types: Limited data is currently collected at CRISP ● Governance: There are strict rules and regulations of what the data can be used for ● Data Scope: Not all elements are collected for the proposed population health measures

Feasibility	CRISP and their master patient index would be a fitting approach to link different data sources together to make the measures more feasible. The data itself does not belong to CRISP so special request to use the data is needed. CRISP is working on internal policies and procedures to facilitate data access for research purposes.
Proposed Population Health Measures	● 1. Diabetes-related emergency department visits ● 2. Asthma-related emergency department visits ● 6. Counseling on physical activity in elders ● 7. Smoking/Tobacco Use Cessation and Medical Assistance ● 11. Addiction-related emergency department visits ● 12. Falls Possibly (dependent on new data CRISP may start collecting) ● 3. BMI Screening ● 4. Screening for high blood pressure ● 7. Smoking/tobacco cessation

5) Vital Records

Data Governance	Vital Statistics Administration at DHMH
Data Type	Format: Structured vital information Context: Social and administration data
Variables	Birth, Death, population estimates, infant mortality, live birth data, and others
Population/Geo	State of Maryland - DHMH Data is mainly at the state and county level. Smaller geo level availability and access is unclear.
Primary Use	
Challenges	● Data Quality: Data is not detailed and has limited information, we can receive counts and basic demographics. Details available varies by variable ● Data Timeliness/Latency: Data is released yearly and delayed. Currently there are preliminary reports for 2014 available as the latest data, but more recent data may be available to state workers
Feasibility	This data is already accessible to DHMH and can be used for certain measures. The data is known to be accurate, reliable, and collected in a structured format. The data has been utilized before and DHMH is familiar with the data so using

	variables for new measures will not be difficult.
Proposed Population Health Measures	• 10. Age-adjusted mortality rate from heart diseases

6) Behavioral Risk Factor Surveillance System

Data Governance	CDC collects and shares with DHMH
Data Type	Format: Structured Context: Social and some clinical (self-reported) data This is a telephone survey that collects health-related behaviors, chronic conditions, and preventive services. BRFSS is collected in all 50 states, with certain additions that are often state specific. Maryland's BRFSS includes the following modules http://www.marylandbrfss.org/pdf/BRFSSWebModulesAvail.pdf
Variables	Link to the 2015 BRFSS script: http://www.marylandbrfss.org/pdf/MD_BRFSS_Questionnaire_2015.pdf Questions ask about health status, quality of life, access to care, hypertension, cholesterol awareness, chronic health, demographic information and use of tobacco and smoking, access to fruits and vegetables, exercise, seatbelt use, and immunization information.
Population/Geo	BRFSS is based on a representative sample for the state of Maryland. In 2014, 12,369 people were interviewed. Geographic information is available at state and county level.
Primary Use	Collected to help characterize health behaviors, prevalence factors, and target groups with increased needs
Challenges	• Data Scope/Denominator: The data is only collected in a small sample size of the population and may not be completely representative. • Data Quality: Self-reported information is not as reliable as clinical data or administrative claims data. • Data Interoperability: Information is in a structured format, but not linkable to patient specific information

Feasibility	Already collected at DHMH so access is feasible, but the data is not very detailed on an individual level or linkable. The data is limited and may not have the exact information needed for measures. Answers may be used as proxies to variables specified for each measure.
Proposed Population Health Measures	● 3. Body Mass index screening (self-reported weight and height) ● 5. Food and nutrition (self-reported nutrition information) ● 6. Counseling on physical activity in elders ● 7. Smoking/Tobacco Use Cessation and Medical Assistance ● 8. Median household income ● 12. Falls ● 13. Social connection ● 15. Self-reported health status

7) Census Records

Data Governance	US Census Bureau and other State Government agencies
Data Type	Format: Structured Context: Survey information from Census and the American Community Survey
Variables	Information on social, economic, housing information and demographic information as well as general health status is collected.
Population/ Geo	Full census is collected every 10 years (last one being in 2010). The American Community Survey collects data from a sample population of about 3 million people (1% of the population) and is available at the census block level or higher.
Primary Use	Primarily used to understand the population trends and make estimates. Census data can be used for resource planning and intervention planning if linked to other information.
Challenges	● Data Scope/Denominator: The ACS is just a sample and not necessarily representative to specific geographic locations ● Data Interoperability: Not linkable at an individual level
Feasibility	Pulling data from the Census or ACS is a simple process.
Proposed Population Health Measures	● 5. Food and nutrition ● 8. Median household income ● 9. Levels of housing affordability and availability ● 13. Social connection ● 15. Self-reported health status

8) Maryland Department of Planning (MDP)

Data Governance	State of Maryland: Maryland State Data center http://planning.maryland.gov/msdc/
Data Type	Format: Structured/geographic Context: survey information from the Census
Variables	Information from the Census Bureau is linked here. Zip code maps, population and median household income estimates are available, as well as other census analysis specific to the state of Maryland.
Population/ Geo	State level information can also be explored at a zip code and county level.
Primary Use	Primarily used to understand the population trends and make estimates. Data is analyzed by the state to analyze social, economic, and other characteristic trends and provide projections for population, housing, employment, and labor needs.
Challenges	● Data is primarily census information. It is unclear if there is unique data not found in other data sources. ● Data is aggregated and in forms of reports and analysis.
Feasibility	It is unclear if raw data is available through the data center or if data requests should be done through the ACS and census bureau
Proposed Population Health Measures	● 8. Median household income ● 9. Levels of housing affordability and availability

9) Behavioral Health Administration: Specifically, the Beacon Health Options

Data Governance	State of Maryland: Department of Mental Health and Hygiene; Behavioral Health Administration http://maryland.beaconhealthoptions.com/index.html
Data Type	Format: semi-structured Context: Survey information for children and adults
Variables	The BHA and Beacon Health Option links to the Outcomes Measurement System (OMS) Datasmart. Questionnaires asking children and adults about their living

	situation, functional status, psychiatric symptoms, involvement with the legal system, general health, employment, etc. Variables are all self-reported. Other data on services available and accessed by Maryland residents may be available but it is unclear based on our initial exploration. Information around mental and behavioral health is often considered highly sensitive and may not be available for secondary use.
Population/ Geo	State of Maryland, It is unclear how data is collected and aggregated or what geographic level data is available in. According to the 2014 report 2,982 adults were contacted and 1010 completed the telephone interview. 2316 caregivers and 870 completed the interview for the child health outcomes.
Primary Use	Beacon Health Options and BHA are partnering to improve and advance health services for mental and behavioral health.
Challenges	● It is unclear how the data is stored and made available (if at all). ● Available data elements may be minimal. Access to OMS may be available, but the sample size is small and not generalizable.
Feasibility	Unclear, further exploration is required.
Proposed Population Health Measures	Depending on actual data available for measurement, the potential measures could benefit from this data are: ● 5. Food and nutrition ● 13. Social connection ● 14. Functional Outcome Assessment ● 15. Self-reported health status

10) Youth Risk Behavior Surveillance System (YRBSS)

Data Governance	National: Center for Disease Control and Prevention http://www.cdc.gov/healthyyouth/data/yrbs/index.htm State: Maryland Department of Health and Mental Hygiene http://phpa.dhmh.maryland.gov/ccdpc/Reports/Pages/yrbs2013.aspx

Data Type	Format: National data: structured State: Structured Context: National: Survey/questionnaire format State: same as national
Variables	The national YRBSS asks questions about risk behavior that may cause injury, alcohol use, tobacco use, other drug use, physical activity, dietary behaviors, and sexual behaviors. In 2013, the state of Maryland also asked questions about bullying and harassment, suicide thoughts, overweight and obesity, sexual violence, sexual identify and protective factors. Also in 2013, the YRBS was combined with the Maryland Youth Tobacco Survey.
Population/ Geo	Data is available at a national and most state level. Smaller geographic areas are limited. Data is not available by zip code, census tract or school. Data is only available about county based large urban school districts found on the participation history list (http://www.cdc.gov/healthyyouth/data/yrbs/participation.htm#tabs-807570-3) and county or state level identifiers are not available in the national data set because the data is not representative of each region or state.
Primary Use	The YRBSS was designed to understand prevalence of adolescent health behaviors and compare behaviors over time and across subpopulations, whether they are geographic (state) or age, gender, etc.
Challenges	• National data is not representative to the entire nation. Questionnaire is primarily used in urban settings. • National data has no geographic identifiers making linkage or comparison to other data sets difficult.
Feasibility	Maryland specific YRBS is representative of Maryland youth based on a total of over 53,000 students across all public high schools in the state. Collected in a structured and known manner access and analysis will not be complicated.
Proposed Population Health Measures	Only good for measures dealing with adolescent health. • 5. Food and nutrition • 6. Counseling on physical activity in elders

11) Medicaid: CMS

Data Governance	Centers for Medicare & Medicaid Services
Data Type	Format: structured, Context: eligibility and claims files Medicaid Statistical Information System (MSIS), Medicaid Analytic eXtract (MAX), CMS-64 reports
Variables	State submitted information on patient characteristics, utilization, and payment information can be found in the MSIS. Person-level data on eligibility, utilization, and payments can be collected in MAX. and the CMS reports detail information about financial budget and grants system.
Population/ Geo	Person-level data files are available for all states and DC starting in 1999, only select states are available prior to 1999. It is unclear at what geographic level data may be available by at the patient or provider level.
Primary Use	Understand population's utilization of health services and payments to help with reimbursement models. Secondary use for research is common.
Challenges	● Data is limited. Claims data only shows a part of the picture of a person's health and other data sets may be more informative for measurements. ● Data is delayed. Claims data is not submitted to CMS in a real-time fashion.
Feasibility	There is a structured process to request and receive CMS data. Data is typically clean and gives a clear picture based on what is known in the database. We will know what is done with a patient, but will not know if other diagnosis, procedures, etc. occur that are not collected in claims information.
Proposed Population Health Measures	● 1. Diabetes-related emergency department visits ● 2. Asthma-related emergency department visits ● 4. Screening for High Blood Pressure and Follow up for a community/population ● 7. Smoking/Tobacco Use Cessation and Medical Assistance ● 10. Age-adjusted mortality rate from heart disease ● 11. Addiction-related emergency department visits ● 12. Falls

As mentioned, there are a number of other data sources that can be explored in the future that may provide information for the proposed population health measures. Future work and assessment is needed as measure specifications are developed to determine the best source of data for each measure. A list of these potential additional data sources follows:

- Mobile Health Vans (i.e. Mobile-Med; Wellness on Wheels Mobile Health Clinic; etc.)
- Community organization/outreach programs (i.e. B'FRIEND initiative; Healthcare for the Homeless; Meals on Wheels; etc.)
- School health clinics
- Community Health Fairs
- Medicare Health Outcomes Survey
- Voter registration
- Geographic specific information:
    - Property tax
    - Alcohol outlet density
    - Commutes/transportation
- Dental care

Some data sources assessed and/or utilized for SHIP and other measures do not provide information relevant to our 15 population health measures, but may be informative for other measures in the future:

- The Maryland Department of Education (MSDE) currently collects demographic information about schools that are aggregated and available at the state, county or individual school level. Data is collected on: attendance, absentee, and dropout rates, test scores, teacher/staffing information, and student receiving special services such as title 1, special ed., etc. The data is broken down between elementary, middle, and high school. This information may be informative on some level and the special services could be proxy for family income level, but the same information can be found in other data sources.

- State Highway Association has some data that is publically available about road conditions, consumer thoughts on road conditions, plowing, and safety, toll road use, and highway mileage etc. There is very little information available online that would be useful for our proposed measures.

Appendix 8 – Measurement Deployment Plan

The current document provides detailed deployment plan and data assessment for four selected measures over time while it assesses the current and future available data and the geographic level on which each measure would be assessed. It also provides specific recommendations to improve data collection for selected measures over time. In addition, it describes the current status of EHR data collected by the HIE (CRISP) in Maryland for each selected measure and provides recommendations for near, mid, and long term to increase the coverage of the reported data across the state of Maryland. Each section includes a table as the overview of deployment plan for the selected measure followed by detailed description of the plan over time. At the end, we provide measurement progression strategy by calendar year and recommendations and proposed strategies to improve data collection. The assessment for EHR data is provided in the last table.

The deployment plan is developed with listing the four proposed measures and connecting them to the available SHIP measures. The SHIP measures are considered as the ultimate measures to address the health of the population in Maryland. While they are considered as the areas of importance in population health for Maryland policy makers, they are in need of updating and revision since most of SHIP measures point out long term goals and are based on survey data. The deployment plan is developed by showing that for each of the proposed measures they could change with the available data and move from survey and billing data to more individual data on a more granular geographic level and they could address the ultimate goal defined by the SHIP measures in an individual level manner. The way that measures could change over time is by changing their data sources from survey based data to possibly available billing data sources and individual level data through available EHR. In other words, naming SHIP measures as the long-term measures does not mean to move to survey based measures in long term. The SHIP measures are treated as the areas of improvement to focus on and proposed measures are defined to change over time in order to achieve the long-term goal of the SHIP measures.

Body Mass Index

<table>
<tr><th colspan="9">Measurement Deployment Plan; Body Mass Index</th></tr>
<tr><td rowspan="4">Triple Aims</td><td>Milestones</td><td colspan="3">Process and Output Measures</td><td colspan="2">Outcomes Measures</td><td>Impact</td></tr>
<tr><td rowspan="2">Time Frame</td><td rowspan="2">Short Term (Current)</td><td colspan="2">Near Term (6 months to 2 years)</td><td colspan="2">Mid to Long Term (3 to 5 years)</td><td rowspan="2">Longer Term (5 to 10 years)</td></tr>
<tr><td colspan="2"></td><td rowspan="3">SHIP Categories</td><td rowspan="3">SHIP Measures</td></tr>
<tr><td>Geographic Level</td><td>County</td><td colspan="2">Individual</td><td></td></tr>
<tr><td>Data Sources</td><td>BRFSS</td><td>E.H.R</td><td>CRISP</td><td></td></tr>
<tr><td>Cost of Care</td><td></td><td colspan="7">Reduce total cost of care; Hospital and ER utilization as proxy for total cost of care using metric developed/endorsed by NQF. Several of current HSCRC mandated measures address this</td></tr>
<tr><td>Population Health</td><td>Body Mass Index (BMI) screening and follow-up for community/ population (NQF#0421 and CMS#69)</td><td>BMI score based on self-reported weight and height of a representative sample (12,369 people) for the state of Maryland</td><td>BMI score based on measured height and weight</td><td>BMI screening is possible with data found in a C-CDA. However, intervention and procedure orders</td><td>Healthy Living</td><td>Adults who are a healthy weight</td><td rowspan="2">Obesity surveillance in a specific catchment area using E.H.R data</td></tr>
<tr><td></td><td>Children and adolescents who are obese</td></tr>
</table>

				within a C-CDA are not available, which is necessary to calculate f/u visits.			
Patient Experience of Care		HSCRC and CMS Measures on Patient Experience					

Body Mass Index

Body Mass Index (BMI) is one of the proposed priority measures. Collecting BMI data helps to detect the number of adults, adolescences, and children with healthy weight and those whom are overweight or obese. It addresses the long-term SHIP measures of detecting “Adults who are a healthy weight” and “Children and adolescents who are obese”.

To achieve these long-term goals DHMH has defined a two-component measure on BMI screening and follow-up. DHMH looks to collect data on screening of BMI, namely the percentage of patients with a calculated BMI in the current visit documentation or in the past six months AND, if the most recent BMI is outside of normal parameters, that a follow-up plan is documented. The recommended measure addresses NQF measure # 0421 and CMS measure # 69.

The NQF measure is defined for those 18 years and older. DHMH expanded the measure to include those younger than 18. CMS reporting is specified through health care system. Acquiring this measure can be achieved by establishing a measure authoring process, which includes convening the necessary experts to author and deploy a revised, cloned BMI measure which assesses those patients who are 17 years old and younger. The combination of this additional measure with the existing BMI measure will allow DHMH to assess BMI scores across all patient age groups. It is not recommended to change the nationally recognized standard measure, because changing it would prohibit the comparison of measure results across incentive, value-based payment programs, and population health initiatives. Rather, the DHMH proposed measure expands the definition to claims-based population health data sources and those non-traditional locations with potential access to EHRs and other data sources. Some examples of these data sources are local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. The definition further expands to include BMI reporting for people in a specific catchment area. Depending on the availability of the data a phased-approach in reporting this measure may be necessary. Some data such as those population health measures through mobile vans and health fairs might not be readily available currently.

Short term (current): The recommended measure addresses two process measures: (1) visits for BMI screening and follow up visit (possible in the short term), and (2) an outcome measure of age adjusted BMI (possible in the long term). Currently self-reported BMI is collected through BRFSS survey on a county level. The estimate of BMI is based on a survey of 12369 Maryland residents. Many ambulatory, inpatient and emergency department EHRs also collect BMI scores by calculating it from the height and weight data captured during an encounter. This clinical data is collected on an individual level in association with patients' address and their zip code, creating potential for geo-coding the BMI data at a zip code level.

Currently, manysystems in Maryland are meaningful use compliant and are correctly recording vitals (including height, weight, and BMI) for most visits (>75%). CRISP currently receives this data on ~25% of patients. This gap in what can be collected and what is actually being transmitted is a result of the vitals section not being always captured in the C-CDA documents (C-CDA; Consolidated Clinical Document Architecture serves as the base standard for building electronic clinical documents) that are commonly

sent to CRISP. The current BMI measure (CMS Measure ID: CMS69v4, NQF Number: 0421) defines the denominator to be all patients with an encounter (with some reasonable exclusions, such as pregnant patients). The denominator is measurable in most C-CDA's and CRISP data today. Most C-CDA's also include the height and weight vital information, allowing for the part of the numerator to be calculated. However, the expanded numerator requires that a follow up plan is document when a BMI is outside of normal parameters. Most organizations currently do not send the follow up plan information in the C-CDAs. This limits the measure from being correctly calculated in full. Therefore, this measure will need to be staggered into two components: 1) screening only (possible with a C-CDA), and then 2) screening with follow-up (captured in a QRDA Category 1 file). The current documents sent to CRISP rarely send any exclusion, intervention information, or procedure orders (for example, this might include exercise or diet counseling, a nutrition referral, or an exercise referral). The information on interventions and plans is necessary to calculate aspects of the numerator criteria for the second part of the measure, namely a follow-up plan for those with BMI outside of normal parameters. The follow-up intervention details are currently captured in an EHR, but rarely sent to CRISP in a C-CDA document. This is seen in ambulatory and inpatient facility data.

Near term (6 months to 2 years): In the next 6 months to 2 years CRISP expects to receive BMI scores for the Maryland population who have sought care at a facility which shares data with CRISP. This is due to the newer requirement for clinical systems, which allow a user to export a document specifically built to export and share data for electronic clinical quality measures (eCQMs). The system would be able to generate and send Quality Reporting Document Architecture (QRDA) Category 1 and 3 documents. QRDA is a standard document format for the exchange of eCQM data. QRDA Category I Requirements include reporting requirements and information on succession management, value sets, and time zones. QRDA Category III Submission Rules includes guidelines for submissions under the Comprehensive Primary Care (CPC) initiative, the EHR Incentive Program (Meaningful Use), and the Physician Quality Reporting System (PQRS) Program.

EHRs and source systems are only required to generate and send the QRDA Category 1 if they are certified to do so. Because BMI is very common measurement, CRISP expects most organizations to have the capability to generate the data necessary for BMI measurement including both the denominator and numerator information. This includes the capturing of vitals, along with whether the provider has ordered counseling or prescription medications for the patient.

Mid to Long Term (3 to 5 years): CRISP continues to grow in multiple areas such as in population served, provider participation, in quality of data gathered, and in data formats (e.g. QRDA) containing additional data. This makes it possible to address the long-term goals defined by SHIP measures for BMI screening, follow up, and control in adults and children populations.

Longer Term (5 to 10 years): In the longer term (> 5 years) BMI reported data from EHRs would help DHMH to establish an obesity surveillance system with continuous BMI reporting through EHRs to

calculate obesity rates in specific catchment areas and changes in its pattern over the time. The growth of data collected through CRISP from EHRs, by way of QRDA, fast healthcare interoperability resources (FHIR), and potentially others will augment the existing BMI data. Growth into self-reported data will also be important, whether this is via CRISP or otherwise. Additional collection of data from those non-traditional locations with potential access to EHRs and other data sources such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.

High Blood Pressure

Measurement Deployment Plan; High Blood Pressure							
	Milestones	**Process and Output Measures**			**Outcomes Measures**		**Impact**
	Time Frame	**Short Term (Current)**	**Near Term (6 months to 2 years)**		**Mid to Long Term (3 to 5 years)**		**Longer Term (5 to 10 years)**
Triple Aims	**Geographic Level**	**State**	**Individual**		**SHIP Categories**	**SHIP Measures**	
	Data Sources	Medicaid	E.H.R	CRISP			
Cost of Care		Reduce total cost of care; Hospital and ER utilization as proxy for total cost of care using metric developed/endorsed by NQF. Several of current HSCRC mandated measures address this					
Population Health	Screening for high blood pressure and follow-up for community/population (CMS#22v5)	Claims data on screening for HTN and f/u visit	Screening for High Blood Pressure and Follow up for a community/population (with specific BP)	The BP measure is available with data found in the C-CDA. There is	Quality Preventive Care	Emergency department visit rate due to hypertension	Hypertension surveillance in a specific catchment area with application of BP measurements through

				partial coverage for data needed within the numerator criteria to calculate f/u visits.			E.H.R
Patient Experience of Care		HSCRC and CMS Measures on Patient Experience					

High Blood Pressure

High blood pressure (BP) is one of the proposed priority measures. Collecting the BP score, data on screening for high blood pressure, and on the recommended follow-up plan helps to detect those adults with high blood pressure and manage them in an outpatient setting. The measure additionallyaddresses the long-term SHIP measure of decreasing "Emergency department visit rate due to hypertension".

To achieve this long-term goal, DHMH is required to collect data on the screening of BP, namely the percentage of patients aged 18 years and older seen during the reporting period who are screened for high blood pressure AND have a recommended follow-up plan documented based on the current blood pressure reading. The recommended measure addresses CMS measure # 22v5.

CMS reporting is specified through health care system. DHMH looks to expand the definition to claims-based population health data sources and those non-traditional locations with potential access to EHRs and other data sources. Some examples of these types of data sources are local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. The expanded definition of the measure looks to include blood pressure reporting for people in a specific catchment area. Depending on the availability of the data, a phased-approach in reporting may need to be used for this measure. Some data such as those population health measures collected through mobile vans and health fairs might not be readily available in the near term.

Short term (current): The recommended measure addresses two process measures; (1) visits for BP screening and follow up visits and (2) an outcome measure, age adjusted BP. Currently state-submitted information of person-level data on utilization of services can be collected through CMS Medicaid Analytic eXtract (MAX). This data source provides claims data on screening for BP and follow up visits. Person-level data files are available for all states and DC starting in 1999, however only selected states are available prior to 1999. It is unclear at what geographic level data may be available at the patient or provider level. Many ambulatory, inpatient and emergency department EHRs also collect BP scores during an encounter. This clinical data is collected at an individual level. Having patients' address and their zip code from her, similarly to BMI, presents the opportunity for the data to be geo-coded on a zip code level.

Currently, many systems connected to CRISP in Maryland are meaningful use compliant and record vitals (including blood pressure) for most visits (>75%), however currently CRISP receives ~25% of patient data. This gap is a result of the vitals section, where BP is recorded, not always being required in the C-CDA documents that are sent to CRISP. The BP information is available to calculate the first part of the measure, the percentage of patients with a reported BP score. However, since the current documents sent to CRISP rarely send any exclusion,intervention information, or procedure orders (for example, exercise or diet counselling or a nutrition referral) which is necessary to calculate aspects of the numerator criteria for the second part of the measure, a follow-up plan for those with BP outside of normal parameters, it can be difficult with currently available data to calculate the measure.

Near term (6 months to 2 years): In the next 6 months to 2 years CRISP expects to report BP scores for the Maryland population who have sought care at a facility that participates in CRISP. This is due to newer requirement for clinical systems which allow a user to export a document that is specifically built in order to be exported and have the data shared for certain clinical quality measures. This system would be able to generate and send QRDA Category 1 and 3 documents.

Source systems, like this, are only required to generate and send the document if they are certified to do so. Because BP is very common CRISP expects most organizations to have the capability to generate the data for BP measures, including both the denominator and numerator information.

Mid to Long Term (3 to 5 years): CRISP continues to grow in multiple areas such as in population served, provider participation, in quality of data gathered, and in data formats (e.g. QRDA) containing additional data. This makes it possible to address the long-term goals defined by SHIP measures for BP screening, follow up, and control in adults and children populations.

Longer Term (5 to 10 years): In a longer term (> 5 years) BP reported data from EHRs will help DHMH to establish a hypertension surveillance system with continuous BP reporting through EHRs. It will allow for calculation of hypertension rates in specific catchment areas and changes in its pattern over the time. This will incorporate and require that data be collected from those non-traditional locations with potential access to EHRs and other data sources such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.

Smoking Status within Population

Measurement Deployment Plan; Smoking Status									
Triple Aims	**Milestones**	**Process & Output Measures**					**Outcomes Measures**		**Impact**
	Time Frame	**Short Term (Current)**		**Near Term (6 months to 2 years)**			**Mid-Long Term (3 to 5 years)**		**Longer Term (5 to 10 years)**
	Geographic Level	**County**	**State**	**Individual**		**Zip code/ Track**	**SHIP Categories**	**SHIP Measures**	
	Data Sources	BRFSS	Medicaid	E.H.R	CRISP	MHCC			
Cost of Care		Reduce total cost of care; Hospital and ER utilization as proxy for total cost of care using metric developed/endorsed by NQF. Several of current HSCRC mandated measures address this							
Population Health	Current adult smoking within population	Based on the BRFSS questionnaire asking current smoking habits among adults of a representative sample (12,369	Claims data on smoking medical assistance	Individual data on smoking/tobacco use cessation, and medical assistance	Most data elements needed to calculate smoking cessation will be	Claims data on smoking medical assistance	Healthy Living	Adults who currently smoke	Application of smoking status measurement through E.H.R for surveillance of smoking trends in a specific

		people) for the state of Maryland			found in a C-CDA.				catchment area
Patient Experience of Care		HSCRC and CMS Measures on Patient Experience							

Smoking Status within Population

Smoking status within population is one of the proposed priority measures. Collecting data on smoking/tobacco use cessation and medical assistance helps to detect the number of current smokers or tobacco users, who were seen by a practitioner (physicians and other primary care providers). It addresses the SHIP measure of decreasing number of "Adults who currently smoke".

To achieve this long-term goals data will need to be collected on the number of patients who are current smokers or tobacco users, those patients who are seen by a practitioner (physicians and other primary care providers) during the measurement year and who receive advice to quit smoking or those patients who are tobacco users whose practitioner recommended or discussed smoking or tobacco use cessation medication, methods or strategies. The recommended measure addresses NQF measures # 0027 and 0028. The measure is selected by CMS and HSCRC selected it as "Hospital Related Population Health Measure".

The NQF measure is defined for patients 18 years of age and older. We expanded the measure to all age groups. NQF reporting is specified through the health care system. This can be achieved by establishing a measure authoring process, which includes convening the necessary experts to author and deploy a revised, cloned Smoking Status measure which assesses those patients who are 17 years old and younger. The combination of this additional measure with the existing measure will allow DHMH to assess smoking status across all patient age groups. It is recommended that the nationally recognized standard measure be maintained and not adapted to meet the needs of DHMH because adapting the measure would not allow for the comparison of the measure results across incentive, value-based payment programs, and population health initiatives. Rather, the expanded measure would be added to the nationally recognized measure. The definition of the measure for DHMH is expanded to use claims-based population health data sources and those non-traditional locations with potential access to EHRs and other data sources. Some examples of these data sources are local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. The definition is further expanded to include reporting for people in a specific catchment area. Depending on the availability of the data a phased-approach in reporting this measure may be necessary. Some data such as those population health measures acquired through mobile vans and health fairs might not be readily available currently.

Short term (current): The recommended measure addresses process measures of smoking cessation and medical assistance. The SHIP outcome of decreasing currently smokers would be achieved in a long term. Currently BRFSS questionnaire collects data on current smoking habits among 12369 Maryland residents. In addition, state-submitted information of person-level data on utilization of services can be

collected through CMS Medicaid Analytic eXtract (MAX). This provides claims data on smoking medical assistance. Person-level data files are available for all states and DC starting in 1999, however only selected states are available prior to 1999. It is unclear at what geographic level data may be available at the patient or provider level. Many ambulatory, inpatient and emergency department EHRs also collect smoking history and medical assistance. This clinical data is collected within the HER on an individual level where patients' address and their zip code may allow for geo-coding smoking data at a zip code level.

Currently, most systems that are connected to CRISP in Maryland are meaningful use compliant and as such do correctly record current smoking status for most ambulatory visits (>75%). Capture rates are often lower for inpatient and ED encounters. CRISP receives this data on >20% of patients. This substantial drop is a result of the observations section not being always required in the C-CDA documents commonly sent to CRISP. The smoking information is available to calculate the current smokers or tobacco users, who are seen by a practitioner and who receive advice to quit smoking. The information on a tobacco user whose practitioner recommended or discussed smoking or tobacco use cessation medication, methods or strategies are also available based on C-CDA documents that CRISP receives. Currently, only some of the information to counsel or improve patients smoking status is received via most C-CDAs, although this has steadily been improving as software vendors more accurate adopt health information exchange (HIE) and eCQM technologies.

Near term (6 months to 2 years): In the next 6 months to 2 years CRISP expects to report smoking screening and cessation intervention for the Maryland population who have sought care at a facility which participates in CRISP. This is due to the newer requirement for clinical systems, which allow a user to export a document specifically built to export and share data for certain clinical quality measures. The system would be able to generate and send QRDA Category 1 and 3 documents. Source systems are only required to generate and send the document if they are certified to do so. Because smoking information is very common, CRISP expects most organizations to have the capability to generate the data for smoking status, including information on screening and cessation intervention.

In the next 6 months to 2 years the MHCC's all payer claims database could be used to measure tobacco cessation and medical assistance. MHCC provides enrollment, provider, and claims information for those with private insurance in Maryland. It also provides limited coverage of Medicare/Medicaid enrollees. Data could be available on a zip code level pending legal/privacy issues, but it would only include data starting in 2010.

Mid to Long Term (3 to 5 years): CRISP continues to grow in multiple areas such as in population served, provider participation, in quality of data gathered, and in data formats (e.g. QRDA) containing additional data. This makes it possible to address the long-term goals defined by SHIP measures for smoking.

Longer Term (5 to 10 years): In a longer term (> 5 years) smoking reported data from EHRs would help DHMH to establish a smoking surveillance system with continuous report on smoking, cessation and medical assistance through EHR to calculate smoking rates in specific catchment areas and changes in its pattern as well as support provided over the time. This requires the collection of data from those non-traditional locations with potential access to EHRs and other data sources such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.

Falls-Related Injury Rate

Measurement Deployment Plan; Falls Related Injuries										
Triple Aims	Milestones	Process & Output Measures						Outcomes Measures		Impact
	Time Frame	Short Term (current)			Near Term (6 months to 2 years)			Mid-Long Term (3 to 5 years)		Longer Term (5 to 10 years)
	Geographic Level	Zip code/ Track	County	State	Individual		Zip code/ Track	SHIP Categories	SHIP Measures	
	Data Sources	HSCRC	BRFSS	Medicaid	E.H.R	CRISP	MHCC			
Cost of Care		Reduce total cost of care; Hospital and ER utilization as proxy for total cost of care using metric developed/endorsed by NQF. Several of current HSCRC mandated measures address this.								
Population Health	Falls; Fall-related injury rate	Number of falls resulted in an ED visit or hospitalization in a zip code including physician services categorized as an	Hx of falls; a representative sample (12,369 people) for the state of Maryland	Claims data on falls related ED visit and hospitalization	Individual data on falls related visit in ED or inpatient	Data on falls related visit in ED or inpatient	Claims data on ED visit and hospitalization	Healthy Communities	Fall-related death rate	Falls surveillance including repeated falls among individuals in a specific catchment

		outpatient data or emergency room visit								area using E.H.R data
Patient Experience of Care		HSCRC and CMS Measures on Patient Experience								

Falls-Related Injury Rate

The falls-related injury rate is one of the proposed priority measures for the dual eligible population. Collecting data on falls-related injury helps to addresses the SHIP measure of decreasing number of "falls-related death rate".

To achieve this long-term goal DHMH is required to collect data on the number of falls regardless of type of fall that ended in a hospitalization or emergency department visit in patients of age 65 and older by different payers OR percentage of patients of age 65 and older with unintended and undetermined falls in a specific catchment area. To institute these recommended changes to the measure, a measure authoring process will need to be established, which includes the convening of the necessary experts to author and deploy the revised measure. The definition includes those dual eligible; Medicare/ Medicaid eligible. Fthe dual eligible the number includes those of older than 65 years. The definition also includes capturing falls through non-traditional locations such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.

The measure is recommended by CDC. HSCRC has introduced falls-related death rate as one of the potential hospital measures. The measure here is expanded toinclude any type of injury that ended in a hospitalization or emergency department visit. The reporting is not limited to the health care system but includes non-traditional locations with potential access to EHRs and other data types such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs. The definition is further expanded to include reporting for patients in a specific catchment area. Depending on the availability of the data a phased-approach in reporting for this measure may be needed. Some data such as those population health measures through mobile vans and health fairs might not be readily available currently.

Short term (current): The recommended measure addresses the process measure of falls related injury. Interventions to decrease the injury rate would help to achieve the SHIP outcome of decreasing falls-related death rate in a long term. Currently the BRFSS questionnaire collects data on history of falls among 12369 Maryland residents. The HSCRC database also provides administrative and billing information. The Inpatient dataset contains discharge medical record abstract including all diagnoses and billable services provided for each admission. The Outpatient data contains medical abstract and billing data on all outpatient surgeries, clinic visits and referred outpatient ancillary utilization occurred in a hospital setting. This dataset could provide the number of falls resulted in an ED visit or hospitalization in a zip code including physician services categorized as an outpatient data or emergency room visit

In addition, state-submitted information of person-level data on utilization of services can be collected through CMS Medicaid Analytic eXtract (MAX). This provides claims data on falls related ED visit and hospitalization. Person-level data files are available for all states and DC starting in 1999, however only selected states are available prior to 1999. It is unclear at what geographic level data may be available at the patient or provider level. Many ambulatory, inpatient and emergency department EHRs are also

collecting falls related ED visit and hospitalization. This clinical data is collected on an individual level with patients' address and their zip codes from EHRs allowing for geo-coding the falls data at a zip code level.

Currently, most systems in Maryland are meaningful use compliant and as such do correctly record data on falls related injuries for many visits (>50%) but CRISP receives this data on <10% of patients. This substantial drop is a result of the observation, referrals and preventive services sections not being always required in the C-CDA documents commonly sent to CRISP. If received, the information is available to calculate the first part of the measure, namely number of patients who were screened for a future fall. The information on actual fall frequency and type is not usually available. Unintended and undetermined falls in a specific catchment area might not be available and the specific catchment area should be clearly defined.

Near term (6 months to 2 years): In the next 6 months to 2 years CRISP expects to report falls related injuries for the Maryland population who have sought care at a facility which participates in CRISP. This is due to the newer requirement for clinical systems, which allow a user to export a document specifically built to export and share data for certain clinical quality measures. The system would be able to generate and send QRDA Category 1 and 3 documents. Source systems are only required to generate and send the document if they are certified to do so. Because report on falls related injuries are common CRISP expects most organizations to have the capability to generate the required data.

In the next 6 months to 2 years the MHCC's all payer claims database could be used to measure falls related ED visit and hospitalization. MHCC provides enrollment, provider, and claims information for those with private insurance in Maryland. It also provides limited coverage of Medicare/Medicaid enrollees. Data could be available on a zip code level pending legal/privacy issues. But it would only include data for 2010-2014.

Mid to Long Term (3 to 5 years): CRISP continues to grow in multiple areas such as in population served, provider participation, in quality of data gathered, and in data formats (e.g. QRDA) containing additional data. This makes it possible to address the long-term goals defined by SHIP measures for falls.

Longer Term (5 to 10 years): In a longer term (> 5 years) falls related ED visit and hospitalization from EHRs would help DHMH to establish a falls surveillance system with continuous report on falls status among Marylanders including repeated falls among individuals in a specific catchment area through EHR. This would help DHMH to calculate falls rates in different geographic areas and changes in its pattern as well as support provided over time. This requires the collection of data from those non-traditional locations with potential access to EHRs and other data sources such as local health department clinics, community health clinics, mobile vans, health fairs, school based health centers, and community outreach programs.

Appendix 9 – Recommendations to Improve Data Collection

The following data assessment and recommendations outline a path for DHMH to advance the collection of the four priority measures over the next 10 years. The following data collection plan focuses on the infrastructure necessary to collect all data necessary for the calculation of the four priority measures at a minimum. It is worth noting that as the market continues to mature and new interoperability standards become available, there may be alternative data collection methods employed for each measure, on a case by case basis. With this in mind, the following plan is meant to be a working document. As the market matures and data is more readily available through different methods, this document will be updated to reflect the capabilities available throughout the industry.

Near-Term (6 months to 2 years):

1. C-CDAs that are being generated from EHRs today do not provide sufficient data to calculate all aspects of the four priority measures. DHMH should begin moving from a C-CDA based approach to the QRDA I data format to capture the four priority measures.
    a. Widespread adoption and deployment of the QRDA standard is not anticipated until 2018, when providers are required to adopt the 2015 Edition of Certification to participate in Meaningful Use, the Merit-Based Incentive Program (MIPS), and Alternative Payment Models (APM).
    b. As vendor deployment and provider adoption of the QRDA standard begins over the next year DHMH should actively monitor implementation to determine that the necessary data are being collected and presented in QRDAs. Understanding the real-world experience of what data is actually being populated in QRDAs in products deployed in the field will be essential in determining what additional steps are required to ensure the necessary data is being collected to calculate the four priority measures.
        i. DHMH should work with CRISP and other stakeholders to closely monitor the deployment of 2015 Edition Certified Products and work to actively test providers' real world experience with the ability of QRDAs to capture the data elements necessary to calculate the priority measures. In the past, Certification of a capability has not always been implemented in the field in a manner that enables the performance of the Certified capability as tested.
        ii. DHMH will need to monitor the deployment vendor by vendor to identify challenges at the individual vendor level.
2. DHMH should take steps to respond to any challenges identified through the active monitoring of the deployment of QRDA across the state.
    a. If data elements that can be populated in QRDAs and are necessary to calculate priority measures are identified as not being captured DHMH should provide education to providers on how to collect these data elements.
3. DHMH should take additional steps to support gathering data at the state level and continue to support data gathering from CRISP. DHMH should consider developing a phased approach to data collection starting with incentivizing voluntary submission and moving to mandatory

submission overtime. This aligns with the approach CMS has taken in a number of programs in recent years include moving providers from CQMs to eCQMs

a. Incentivize voluntary submission of QRDAs on the four priority measures to a single state level mechanism.
b. Incentivize sending systems to additionally send C-CDA files, if not doing so currently.
c. Incentivize sending systems to additionally send QRDA 1 & QRDA 3 file formats, if not doing so currently.

CRISP Near-Term Proposed Strategy to Improve Data Collection:

CRISP is currently pursing, through parallel initiatives, broad connectivity and data exchange that would support a population health measurement program. Specific industry and market events have been taken into consideration when creating this timeline, and as a result each milestone is subject to change should additional market factors be introduced that could speed up or slow down progress. In addition, it is assumed that a funding source is secured to support broad connectivity with provider organizations across the state.

2017 Calendar Year

1. By Summer 2017, CRISP anticipates having 2,000 providers sending C-CDA's connections.
    a. Approximately 80 of these practice sites will be integrated with CAliPHR, and have the ability to partially calculate each priority measure (ex. In CMS69 BMI Screening & Follow-Up, only the first half of the measure can be calculated with data found in a C-CDA. This means that CRISP will be able to capture BMI on all patients from participating healthcare practices). In addition, because CAliPHR has yet to be integrated with CRISP's Master Patient Index (MPI), patients seen at multiple care settings cannot be de-duplicated.
2. In the Summer/Fall of 2017, CRISP will pilot QRDA Category 1 connections with one to five practices.
    a. CRISP will assess how well the vendor files follow the QRDA specification, and the richness of data found in the files to determine if the four priority measures are fully calculatable.

2018 Calendar Year

1. By Summer 2018, CRISP anticipates having 3,500 providers sending C-CDAs.
    a. Approximately 130 of these practice sites will be integrated with CAliPHR. The same limitations listed above would apply to these measure results.
2. Beginning in 2018, all future CRISP participants will integrate with QRDA Cat 1 feeds (may be in addition to C-CDA feeds).
3. In the spring of 2018, CRISP will plan and deploy a strategy to implement QRDA Cat 1 feeds from all participating practices that have previously connected to CRISP with C-CDA interfaces.

4. By late 2018, CRISP should begin receiving claims data from Medicare, and potentially Medicaid.
    a. Claims data will be analyzed to determine if information can supplement clinical data feeds to improve quality and accuracy of measure results.

CAliPHR Near-Term Roadmap:

The following roadmap provides an outline of the enhancements necessary for CAliPHR to serve as the statewide population health measurement tool. It is assumed that a funding source is secured to support development and deployment efforts of these enhancements.

2017 Calendar Year

1. By Summer of 2017, CAliPHR will achieve 2015 of ONC Certification.
    a. Enhancements required for Certification will allow for eCQM calculations at the organization level. This functionality can be further enhanced to run calculations on all patients within the CAliPHR clinical data repository (CDR).
2. By the Fall/Winter of 2017, CAliPHR will be integrated with CRISP's MPI (feature dependent on identifying a funding source).
    a. This functionality will allow CAliPHR to de-duplicate patients seen across multiple healthcare settings, which is necessary to determine accurate population health metrics.

2018 Calendar Year

1. In the Spring of 2018, CAliPHR will be integrated with the Measure Authoring Tool (MAT), and enhanced to display custom measures (feature dependent on identifying a funding source).
    a. This functionality is necessary to author SHIP and Obesity outcome measures.

Mid to Long Term (3 to 5 years):

1. DHMH should continue to monitor CMS programs that require CQM reporting such as MIPS, APMs, and the Hospital Inpatient Quality Reporting program and align state required measures as much as possible.
    a. This will be particularly important with eCQMs as it may be difficult to get EHR vendors to calculate Maryland specific eCQMs.
    b. Starting in 2019, the Maryland All Payer Model could be considered an "Other Advanced APM" under the Quality Payment Program. One of the requirements to meet the definition of an "Other Advanced APM" is that the APM must base payment on at least one quality measure comparable to those used in MIPS. This will be an important consideration in Maryland's process for selecting quality measures in the future.

c. DHMH should submit any new measures developed for Maryland to CMS for consideration in their annual call for measures.

2. DHMH should take additional steps to support gathering data at the state level and continue to support data gathering from CRISP.
    a. Mandate providers submit QRDA data on the four priority measures to a single state level mechanism
    b. Incentivize voluntary submission of other key population quality measures.
    c. Contract with an organization to provide practice level implementation support to providers to collect and report the four priority measures via QRDA.
3. Priority measure specific items:
    a. BMI
        i. Incorporate and aggregate multi payer claims data (commercial, Medicaid and Medicare) to measure BMI follow up intervention activities.
        ii. Consider supporting and gathering data from home health and/or self-reported BMI information (e.g. smart watch, tablet in patient's home, telehealth activities).
    b. High BP
        i. Incorporate and aggregate multi payer claims data (commercial, Medicaid and Medicare) to measure BP follow up intervention activities.
        ii. Consider supporting and gathering data from home health and/or self-reported BP information (e.g. smart watch, tablet in patient's home, telehealth activities).
    c. Smoking Status
        i. Consider recording of tobacco use status outside standard clinical (inpatient, ambulatory, ED) environments.
        ii. Consider measurements of patient engagement strategies, incentives and deterrents, not just status reporting of tobacco, perhaps add these to measurements calculations in the future.
    d. Falls-Related Injury Rate
        i. Incorporate and aggregate multi payer claims data (commercial, Medicaid and Medicare) to measure Falls Risk intervention activities (e.g. education).
        ii. Consider supporting and gathering data from home health and/or self-reported falls assessment and occurrence information (e.g. tablet in patients' home, telehealth activities).

CRISP Mid to Long-Term Proposed Strategy to Improve Data Collection:

2019 Calendar Year

1. By Summer 2019, CRISP anticipates having roughly 5,000 providers contributing QRDA Cat 1 files to CRISP/CAliPHR, in addition to C-CDAs (optional).
    a. CRISP will rely fully on QRDAs for eCQM calculations but C-CDAs and other HIE sources will serve as supplementary data to close clinical gaps.

2. Spring 2019, CRISP will assess claims data feeds to determine what data elements exist pertinent to measure calculation exist. CRISP will also assess the market's use of advanced API specifications like FHIR and Quick/QiCore to determine if these methods can improve extraction of data from EHRs.
3. Fall/Winter of 2019, CRISP will pilot FHIR or Quick/QiCore data extraction methods with one to five practice sites for purposes of measure calculation.
4. By Winter 2019, CRISP anticipates having 5,500 practice sites contributing QRDA Cat 1 files to CRISP/CAliPHR, in addition to C-CDAs (optional).
    a. CRISP will continue to rely on QRDAs for eCQM calculations and C-CDAs and other HIE sources will still serve as supplementary data. In addition, CRISP will begin integrating claims data with clinical data to create a complete longitudinal view of each patient.

2020 through 2021

1. CRISP will continue to pursue ambulatory integration through clinical data feeds with providers throughout the state.
    a. CRISP will supplement this data with C-CDA, claims, and API data feeds as well.
    b. CRISP will assess the progress with clinical data integrations across the state to determine total market coverage.
2. CRISP will assess whether API methods for data extraction should serve as a replacement to QRDA Cat 1s as the primary data source for measure calculation.

CAliPHR Mid to Long-Term Roadmap:

2019 Calendar Year

1. January 2019, the CAliPHR team will assess providers use of the FHIR & QUICK/Qi-Core API standards to determine whether these data extraction methods will be useful to CAliPHR.
    a. CAliPHR will coordinate findings with the ambulatory integration team.
2. December 2019, CAliPHR will begin accepting data through FHIR and/or QUICK/Qi-Core standard data feeds, in addition to claims feeds (if necessary).
3. December 2019, initial SHIP Outcome measures are loaded into CAliPHR to analyze results of calculations.

2020 through 2021

1. Final SHIP Outcome measures will be loaded into CAliPHR for ongoing population health measurement.
2. Final Outcome measures (draft first, then final) will be loaded into CAliPHR for ongoing population health surveillance.

3. Additional sources of data to supplement clinical and claims data for population health will be considered.
    a. This includes patient generated data and/or home health.

Longer Term (5 to 10 years):

1. DHMH should take additional steps to support gathering data at the state level and continue to support data gathering from CRISP.
    a. Mandate providers submit QRDA data on the four priority measures and additional key population quality measures to a single state level mechanism.
2. DHMH should work with stakeholders to monitor the evaluation of emerging standards, such as FHIR, to determine if additional data collection/submission mechanisms should be incorporated in the Maryland Population Health Measurement approach.
3. DHMH should continue to support ongoing APMs efforts in the state.
4. Continued monitoring/incorporation of home health, self-monitoring, and/or data gathering.

CRISP Long-Term Proposed Strategy to Improve Data Collection:

1. CRISP will continue its work to integrate and accept data feeds from healthcare providers in Maryland.
    a. Additional data sources and methods for data extraction will be considered on a regular basis.
    b. The normalization and improvement of data quality will continue to be a priority to support advance population health measurement.
    c. CRISP will assess the progress with clinical data integrations across the state to determine total market coverage.

CAliPHR Long-Term Roadmap:

1. CAliPHR will be enhanced to accept new data sources as necessary.
    a. Socio-economic data can be considered as a new source.
2. CAliPHR infrastructure will be enhanced to support the increased volume of data being captured, and increased number of users interacting with the tool.

Appendix 10 – Summary Timeline of Data Infrastructure and Measure Development

Industry Events:

- **Throughout 2017**: Providers can choose 2014 or 2015 Edition ONC CEHRT for use in QPP-MIPS, Advanced APMs and the Medicare and Medicaid EHR Incentive Programs.
- **Summer 2017–2018**: 2015 Edition ONC Certified EHRs/Technology Implemented. QRDA Cat I and new C-CDAs will be available to export by new Certified Technology.
- **January 2018**: Mandated use of 2015 Edition Certified Technology for use in QPP-MIPS and the Medicare and Medicaid EHR Incentive Programs.
- **January 2018**: 50 percent of participants in an Advanced APM (through MACRA), must utilize 2015 Edition Certified Technology.
- **Summer 2018** – Should begin to see vendors utilizing FHIR & QUICK/Qi-Core API standards to exchange data (estimated)

CRISP Connectivity:

- **December 2016:** 1,213 providers sending C-CDAs to CRISP overall (825 practices).
    - 30 Practice C-CDA Connections to CAliPHR.
- **Summer 2017**: estimated 2,000 providers sending C-CDAs to CRISP overall.
    - 80 Practice C-CDA Connections to CAliPHR.
- **Summer/Fall 2017**: 1-5 Practice QRDA Connections established for CAliPHR Pilot Initiative.
- **Summer 2018**: estimated 3,500 providers sending C-CDAs to CRISP overall.
    - 130 Practice C-CDA Connections to CAliPHR.
- **January 2018**: All future CRISP Participants will integrate with QRDA Cat I feeds (may be in addition to C-CDA feeds as well).
- **Spring 2018**: CRISP implements strategy to include QRDA Cat I feeds in the existing C-CDA channels connected in 2016 and prior.
- **Summer 2019:** estimated 5,000 providers sending QRDA Cat I or C-CDAs (if applicable) to CRISP.
- **2018/2019**: CRISP begins receiving Medicaid/Medicare/Commercial Claims feeds.

CAliPHR Development:

- **Summer 2017:** CAliPHR achieves 2015 Edition ONC Certification.
- **Fall/Winter 2017**: CAliPHR integrated with CRISP Master Patient Index (MPI) Initiate.
- **Spring 2018**: CAliPHR integrated with Measure Authoring Tool (MAT) and enhanced to display custom measures (**Funding Needed**).
- **Summer 2018:** New pilot population health measures loaded into CAliPHR. Measure results analyzed for data gaps **(Funding Needed)**
- **Winter 2018:** Investigate benefits of integrating with claims databases to ensure gaps from clinical data feeds are filled.

- **January 2019**: Investigate FHIR & QUICK/Qi-Core API standards for clinical data exchange to determine whether transmission method will improve EHR data extraction process.
- **Fall/Winter 2019**: SHIP Process/Outcome measure loaded into CAliPHR.
- **Fall/Winter 2019**: Enhance CAliPHR to accept data through FHIR & QUICK/Qi-Core, and/or claims data feeds.

Measure Progression:

- **January 2018**: All current priority eCQM measures (ex. CMS69 BMI Screening& Follow-up) deployed for CRISP/CAliPHR participants.
- **Spring 2018**: Investigate whether draft measures exist for patient age ranges not covered by existing measures.
- **Summer-Winter 2018:** Pilot and/or author measures to cover patient age ranges not covered by existing measures.
- **Winter 2018**: Investigate whether draft measure exists (Ship Process/Outcome Measure) to capture those patients who are receiving weight counseling/taking prescription medications.
- **January 2019**: All priority eCQMs and measures that cover patient age ranges not previously covered deployed to CRISP/CAliPHR participants.
- **January-June 2019**: Convene necessary clinical SMEs, Measure Authors, and CRISP Resources to author SHIP Process/Outcome measure, and determine whether all data attributes available through current infrastructure.
- **Summer 2019**: Investigate whether draft measure exists for Final Outcome Measures.
- **Fall/Winter 2019:** SHIP Process/Outcome measure piloted with select practices.
- **Fall/Winter 2019**: Convene necessary clinical SMEs, Measure Authors, and CRISP Resources to author Final Outcome Measures.