Primary Care Connection Prior to Emergency Department Visits for Children with Identifiable Asthma

Section 1. Basic Measure Information

1.A. Measure Name

CAPQuaM Asthma III: Primary Care Connection Prior to Emergency Department Visits for Children with Identifiable Asthma

1.B. Measure Number

0136

1.C. Measure Description

Please provide a non-technical description of the measure that conveys what it measures to a broad audience.

This measure identifies the specified use of primary care services and medications prior to incidence emergency department (ED) visits and/or hospitalizations for children being managed for identifiable asthma. This measure characterizes care that precedes ED visits for children ages 2-21 who can be identified as having asthma, using the specified definitions. We sought to identify children with ongoing asthma who should be able to be identified by their health care providers and/or health care plans as having asthma. The operational definition of an identifiable asthmatic is a child who has utilized health care services that suggest the health care system has enough information to conclude that the child has an asthma diagnosis that requires ongoing care.

1.D. Measure Owner

Collaboration for Advancing Pediatric Quality Measures (CAPQuaM)

1.E. National Quality Forum (NQF) ID (if applicable)

Not applicable.

1.F. Measure Hierarchy

Please note here if the measure is part of a measure hierarchy or is part of a measure group or composite measure. The following definitions are used by AHRQ:

1. **Please identify the name of the collection of measures to which the measure belongs (if applicable). A collection is the highest possible level of the measure hierarchy. A**

collection may contain one or more sets, subsets, composites, and/or individual measures.

This measure belongs to the PQMP CAPQuaM Measures of Emergency Department Use for Children with Asthma – Process 1 Collection.

2. **Please identify the name of the measure set to which the measure belongs (if applicable). A set is the second level of the hierarchy. A set may include one or more subsets, composites, and/or individual measures.**

   This measure belongs to the PQMP CAPQuaM Measures of Emergency Department Use for Children with Asthma – Connection Measure Set.

3. **Please identify the name of the subset to which the measure belongs (if applicable). A subset is the third level of the hierarchy. A subset may include one or more composites, and/or individual measures.**

   Not applicable.

4. **Please identify the name of the composite measure to which the measure belongs (if applicable). A composite is a measure with a score that is an aggregate of scores from other measures. A composite may include one or more other composites and/or individual measures. Composites may comprise component measures that can or cannot be used on their own.**

   Not applicable.

1.G. Numerator Statement

Evidence of connection to the primary care medical system prior to first ED visit and/or hospitalization that has a primary or secondary diagnosis of asthma among children whom our specifications identify as having sufficient asthma or as having "identifiable asthma."

Numerator elements:

1. Visit(s) to a primary care clinician with a primary or secondary diagnosis of asthma that occurred within 6 months prior to an ED visit/hospital admission (but not on the day of the ED visit/hospital admission).
2. Have at least one fill of a short-acting beta agonist within 12 months prior to the ED visit/hospital admission.
3. Have at least one fill of an asthma controller medication within 6 months prior to the ED visit/hospital admission.
    a. Have a prescription filled for both a rescue medication and a controller medication within the specified time frames (BOTH 2 and 3).
    b. Have no prescriptions filled for rescue medications or controller medications within the specified time frames (NEITHER 2 nor 3).
4. a. Have both a qualifying visit with primary care provider and prescriptions filled for both a rescue medication and a controller medication within the specified time frames (BOTH 1 and 4a).
    b. Have neither a qualifying primary care visit nor fills for both a rescue medication and a controller medication within the specified time frames (NEITHER 1 nor 4a).

1.H. Numerator Exclusions

Events occurring in patients who meet numerator but not denominator criteria (including 6 months of continuous enrollment).

1.I. Denominator Statement

All first ED visits and/or hospitalizations, in which asthma was a primary or secondary diagnosis in children ages 2-21 who meet criteria for being managed for identifiable asthma in the assessment period and have been enrolled for the 6 consecutive months prior to the ED visit/admission. The assessment period includes the full year before the reporting year and each full calendar month before the month in which the ED visit (which is referred to as the reporting month).

Excluded are children who have not been continuously enrolled in the index plan for the 6 months immediately prior to the reporting month. A change in eligibility criteria and/or benefit package or plan does not relieve the reporting entity of the need to determine denominator eligibility – all available sources should be linked. For health plans, this includes utilizing any existing data sharing arrangements. For State Medicaid plans, this requires that the unit of analysis for eligibility assessment is the child, not the child-insurer pair.

Descriptive definitions of identifiable asthma management are as follows:

- Any prior hospitalization with asthma as primary or secondary diagnosis.
- Other qualifying events after the 5th birthday at time of event:
    a. One or more ambulatory visits with asthma as the primary diagnosis in the look-back period and an ED visit with a primary or secondary diagnosis of asthma in the Reporting Month prior to the index visit, or
    b. Two or more ambulatory visits with asthma as a diagnosis, or
    c. One ambulatory visit with asthma as a diagnosis and at least one asthma-related prescription, or
    d. Two or more ambulatory visits with a diagnosis of bronchitis.
- Other qualifying events, any age:
    a. Three or more ambulatory visits with diagnosis of asthma or bronchitis, or
    b. Two or more ambulatory visits with a diagnosis of asthma and/or bronchitis and one or more asthma-related prescriptions.

For eligibility purposes, asthma-related medicine refers to a long acting beta agonist (alone or in combination) or inhaled corticosteroid (alone or in combination), anti-asthmatic combinations, methylxanthines (alone or in combination), and/or mast cell stabilizers.

1.J. Denominator Exclusions

- Children with concurrent or pre-existing: Chronic Obstructive Pulmonary Disease (COPD) diagnosis; Cystic Fibrosis diagnosis; Emphysema diagnosis (see Table 4 in the Supporting Documents for exclusion criteria).
- Children who have not been consecutively enrolled with the reporting entity for at least six months prior to the index reporting month.
- Children who do not meet the denominator criteria.

1.K. Data Sources

Check all the data sources for which the measure is specified and tested.

Administrative data (e.g., claims data).

If other, please list all other data sources in the field below.

Not applicable.

Section 2: Detailed Measure Specifications

Provide sufficient detail to describe how a measure would be calculated from the recommended data sources, uploading a separate document (+ Upload attachment) or a link to a URL. Examples of detailed measure specifications can be found in the CHIPRA Initial Core Set Technical Specifications Manual 2011 published by the Centers for Medicare & Medicaid Services. Although submission of formal programming code or algorithms that demonstrate how a measure would be calculated from a query of an appropriate electronic data source are not requested at this time, the availability of these resources may be a factor in determining whether a measure can be recommended for use.

Please see the Supporting Documents for technical specifications and Tables 1-4.

Section 3. Importance of the Measure

In the following sections, provide brief descriptions of how the measure meets one or more of the following criteria for measure importance (general importance, importance to Medicaid and/or CHIP, complements or enhances an existing measure). Include references related to specific points made in your narrative (not a free-form listing of citations).

3.A. Evidence for General Importance of the Measure

Provide evidence for all applicable aspects of general importance:

- **Addresses a known or suspected quality gap and/or disparity in quality (e.g., addresses a socioeconomic disparity, a racial/ethnic disparity, a disparity for**

Children with Special Health Care Needs (CSHCN), a disparity for limited English proficient (LEP) populations).

- **Potential for quality improvement (i.e., there are effective approaches to reducing the quality gap or disparity in quality).**
- **Prevalence of condition among children under age 21 and/or among pregnant women.**
- **Severity of condition and burden of condition on children, family, and society (unrelated to cost).**
- **Fiscal burden of measure focus (e.g., clinical condition) on patients, families, public and private payers, or society more generally, currently and over the life span of the child.**
- **Association of measure topic with children's future health – for example, a measure addressing childhood obesity may have implications for the subsequent development of cardiovascular diseases.**
- **The extent to which the measure is applicable to changes across developmental stages (e.g., infancy, early childhood, middle childhood, adolescence, young adulthood).**

Asthma matters for pediatrics (Bollinger, Mudd, Boldt, et al., 2013; Cabana, 2005; Camargo, Ramachandran, Rysinka, et al., 2007; Cloutier, Hall, Wakefield, et al., 2005; deBlic, Ogorodova, Klink, et al., 2009; Leickly, Wade, Crain, et al., 1998; Lozano, Finkelstein, Carey, et al., 2004; National Heart, Lung, and Blood Institute [NHLBI], 2007; Nino, Grunstein, 2010; Samnaliev, Baxter, Clark, 2009; Stanford, Shah, D'Souzza, 2013; Tan, Sarawate, Singer, et al., 2009). It is one of the most common chronic conditions among children. It also is the second most common reason (after allergies) for children to be classified as having a special health care need, accounting for nearly 38.8 percent of such children. Using national annual estimates from the Federal Healthcare Cost and Utilization Project (HCUP) data for 2003, children between the ages of 1 and 17 had more than 673,000 of the 1.9 million ED visits with asthma as the first diagnosis; almost 11 percent (or >71,000) of these pediatric visits resulted in hospitalization (Owens, Thompson, Elixhauser, et al., 2003). Our analysis of New York State Medicaid data confirmed that ED visits for asthma are all too common, and that they vary by age, race, and ethnicity. ED visits are often linked to the management of a child's asthma.

The Agency for Healthcare Research and Quality (AHRQ) and the Centers for Medicare & Medicaid Services (CMS) assigned CAPQuaM the topic "Overuse: Emergency Department Asthma" as a topic for measurement. Within this topic we developed a conceptual model that articulates a series of dichotomies. Children are either sick enough that the ED is an appropriate level of care or they are not. If they are not, they may be there because of reasons that are primarily attributable to the health care system (e.g., no available primary care after hours) or to family (e.g., prefer the ED over an available primary care clinician). Among those who were sick enough to need the ED, their asthma was well managed prior to the visit or it was not. For those whose asthma was not well managed, some will clearly have had system reasons for the lack of management and others family reasons. For many, the reasons will be multiple or unclear. While the model is developed around dichotomies, our work has demonstrated that the measurement of

these constructs is more complicated. Although we are guided by the model, our measures depend upon the 360 degree method including our expert panels to identify where we can make valid distinctions. Further, the research literature suggests that not having a primary care provider (PCP) visit for asthma maintenance, especially in instances where an ED visit is the end result, is a sign of poorly managed asthma (Lozano, Kone, Rivard, et al., 2007).

Two literature reviews as well as focused reviews that we have done to supplement the extensive review of the literature confirm the importance of an integrated approach to managing the health care of children with asthma.

Primary care coordination can be critical: better communication, use and implementation of asthma action plans, and other primary care services can reduce asthma-related ED visits and hospitalizations compared to physicians who only prescribe appropriate asthma medication (Cabana, 2005). The action plan becomes a tool that leads the management of care and around which communications occur to improve asthma outcomes.

Enhanced primary care has been noted to contribute to improvements in asthma care and better health for asthmatic children (Lozano, et al., 2004). Better primary care, including asthma action plans and appropriate prescribing, reduces ED visits substantially (Cloutier, et al., 2005).

We highlight that while successful primary care for asthma requires visits with primary care providers, it also includes adherence to an appropriate medication regimen, specifically, filling prescriptions and utilizing them properly (Bollinger, et al., 2013; Cabana, 2005; Camargo, et al., 2007; Leickly, et al., 1998; NHLBI, 2007; Samnaliev, et al., 2009). The tracking of prescription and pharmaceutical records to show if the asthma medications prescribed are being filled within the recommended amount of time is an accurate way to assess asthma care (Bollinger, et al., 2013; Camargo, et al., 2007; Leickly, et al., 1998).

Prescription and use of controller medications such as inhaled corticosteroids (ICS) or other long-acting medications, as well as short acting beta-agonist medications, or rescue medications, serve as a sign of well-managed asthma (Bollinger, et al., 2013; Brouwer, Brand, 2008; Burns, 2004; Cabana, 2005; Chipps, Murphy, 2005; Courtney, McCarter, Pollart, 2005; deBlic, et al., 2009; Farber, 2010; NHLBI, 2007; Nino, Grunstein, 2010; Stanford, et al., 2013; Tan, et al., 2009). The source for shortcomings in asthma care management may lie with the clinicians (e.g., by failure to prescribe ICS to a child for whom the standard of care would recommend them), the broader system or context (e.g., when caregivers do not have the resources to purchase potentially valuable preventive medications such as ICS), or the families (e.g., potentially through medication non-adherence for a variety of reasons). Although a PCP may prescribe the combination of ICS and long-acting beta-agonist drugs as one of the more effective methods of asthma control, these medications can go unfilled or not refilled (Bollinger, et al., 2013). When prescriptions for both controller and rescue medications are not filled, it can be interpreted as a sign of poorly managed asthma and potentially a failure of the primary care clinician to educate or motivate patients (especially in circumstances such as Medicaid, where there are not profound financial barriers to medication fulfillment). Failure in adequate asthma management can also occur when children with asthma control their condition by relying too heavily on rescue medications as a method of management in preference to controller medications (Bollinger, et

al., 2013). This also is another aspect that may relate to the issue of communication and relationship between the primary care clinician and the family.

After an exacerbation, follow-up with the primary care physician is central for ongoing management (Burns, 2004; Kripalani, LeFevre, Phillips, et al., 2007; Leickly, et al., 1998; Liberman, Shelef, He, et al., 2012; Mansour, 2009; Seid, 2008; Williams, Word, Streck, et al., 2013; Withy, Davis, 2008). If the child was in the ED and did not have a meaningful exacerbation, follow-up is critical to establishing or re-establishing the centrality of primary care for the management of the asthmatic child. The literature suggests that a PCP follow-up within 30 days of the ED discharge is important (Burns, 2004; Cabana, Bruckman, Bratton, et al., 2003; Children's Health Council, 2002; Chipps, Murphy, 2005; Zorc, Sarfone, Li, et al., 2003). Recent literature has identified the potential contribution of the medical home to enhance primary pediatric asthma care (Auger, Kahn, Davis, et al., 2013; Cooley, McAllister, Sherrieb, et al., 2009; Diedhiou, Probst, Hardin, et al., 2010; National Center for Medical Home Implementation Website). The involvement of a primary care provider contributes to the maintenance and control of asthma symptoms and is a characteristic of well-managed asthma (Allcock, 2009; Diedhiou, et al., 2010; Greineder, Loane, Parks, 1995; Lozano, et al., 2007; Mellon, Parasuramam, 2004; Newcomb, 2006; Sin, Bell, Man, 2004; Yawn, 2011).

Characteristics of sufficient primary care involvement may include having an identified site of regular care, an identified primary care clinician, and regular PCP visits with asthma follow-up (Diedhiou, et al., 2010; Greineder, et al., 1995; Lozano, et al., 2007; Newcomb, 2006; Sin, et al., 2004). The medical home model in primary care may contribute to positive outcomes in children with asthma (Auger, et al., 2013; Cooley, et al., 2009; Homer, Klatka, Romm, et al., 2008). When children with asthma experience adequate management of chronic conditions and have access to coordinated care, a reduction in hospital rates is likely to occur. Children who are linked to continuous care utilize less overall care, including ED care (Cooley, et al., 2009).

Finally, we note the importance of creating and implementing a new, innovative method to develop quality measures. This method allows for measure development amidst uncertainty. It engages scientists, clinicians, consumers, payers, and others in a defined process, even if not all areas of science related to a topic are firmly resolved. This is needed to foster accountability in large areas of practice for which science has not forged a consensus. By explicitly modeling evidence and uncertainty, the CAPQuaM process can open up new clinical areas for quality measurement.

3.B. Evidence for Importance of the Measure to Medicaid and/or CHIP

Comment on any specific features of this measure important to Medicaid and/or CHIP that are in addition to the evidence of importance described above, including the following:

- **The extent to which the measure is understood to be sensitive to changes in Medicaid or CHIP (e.g., policy changes, quality improvement strategies).**
- **Relevance to the Early and Periodic Screening, Diagnostic and Treatment benefit in Medicaid (EPSDT).**
- **Any other specific relevance to Medicaid/CHIP (please specify).**

Children with asthma comprise a critically important population of high interest to Medicaid. Low income urban minority children are an important component of this population.

Our analysis of National Survey of Children's Health data (NSCH, 2011/12), estimates that 10.3 million children in the United States have been told that they have asthma. Of these children, 7.6 million live in more urban areas that are characterized as metropolitan statistical areas (MSAs) and have an asthma prevalence rate of 15.4 percent. These data indicate that an absolute difference of 15.8 percent fewer parents of children with asthma report that child's health as very good or excellent compared to those with no asthma. Black and Latino children with asthma show an absolute difference of about 13 percent fewer with very good or excellent health compared to white children with asthma.

Effective delivery of guideline-based care can reduce the gap and decrease consequences of uncontrolled asthma, such as emergency room use and hospitalizations; better asthma care is beneficial and needed across the spectrum of children and primary care settings (Adams, Fuhlbrigge, Finkelstein, et al., 2001; Bell, Grundmeier, Localio, et al., 2010; Diette, Skinner, Markson, et al., 2001; Finkelstein, Lozano, Farber, et al., 2002; Finkelstein, Lozano, Shulruff, et al, 2000; Lob, Boer, Porter, et al., 2011; Scott, Morphew, Bollinger, et al., 2011). About 60 percent of these children are low income and have public insurance.

We have done extensive analysis of various approaches to identifying asthmatic children and counting ED visits using New York State Medicaid data. Depending upon specifics of definitional issues, we have found substantial numbers of children that can be identified as having asthma, with more than 196,000 found to have identifiable asthma in 2011 with approximately 40,000 of these eligible children generating nearly 60,000 ED visits for asthma. This is a substantial issue for New York State Medicaid and beyond. Its importance has been validated by a previous measure having been included as a core Medicaid measure and AHRQ and CMS assigning CAPQuaM to enhance the current measure. Our partners in the New York State Medicaid program have been instrumental in the development of this measure set. The literature provides compelling evidence of the importance of asthma as a clinical and public health concern. Asthma is a prevalent chronic condition in children (typically considered the most prevalent).

The National Asthma Education and Prevention Program (NAEPP) guidelines (NHLBI, 2007) are a well-constructed integration of key patient-centered outcomes research that can enhance outcomes when followed by clinicians and parents/caregivers. The guidelines recommend the identification of that subset of asthmatic children who need ongoing controller medication and those who do not. Those who need controller medication are also recommended to have rescue medications, typically short-acting beta agonists. The guidelines and literature highlight the importance of primary care, asthma education, and typically a patient-centered asthma action plan. This measure captures care processes that indicate the degree of connection to the primary care system as measured by how recently the child was seen by a primary care physician and/or the presence of a recently filled prescription for controller and/or rescue medication.

Demographics

The potential for racial and ethnic disparities is high, and this is an important priority for Medicaid (Oraka, Iqbal, Flanders, et al., 2013). The Survey of Children with Special Health Care Needs (CSHCN), conducted by the CDC and available at www.childhealthdata.org, showed that black children in particular and also Hispanic children are over-represented among children with asthma. Thirty-eight percent of children with asthma have public insurance; one-quarter (26 percent) live in households under the Federal poverty line, with 28 percent under twice the Federal poverty line, and only 24 percent have incomes more than four times the Federal poverty line.

Nearly three-quarters of these children have at least one sibling, and about one-third have a sibling who also has a special health care need, using the Health Resources and Services Administration's (HRSA's) screening tool. Manice's careful analysis of the 2005/2006 survey from which these data are taken also found that minority race, low income, and low household educational attainment were independent predictors of ED utilization among children with asthma (Manice, 2013).

Our analysis of New York State Medicaid data shows about a 2.5-fold increase in the rate of using the ED for non-Hispanic Blacks compared to non-Hispanic whites (non-Hispanic Black > all Hispanic > non-Hispanic white > Asian). Our own analysis of New York State Medicaid data showed that the proposed measure yields results that vary by race, by urbanicity, and by the amount of poverty in the county of residence.

3.C. Relationship to Other Measures (if any)

Describe, if known, how this measure complements or improves on an existing measure in this topic area for the child or adult population, or if it is intended to fill a specific gap in an existing measure category or topic. For example, the proposed measure may enhance an existing measure in the initial core set, it may lower the age range for an existing adult-focused measure, or it may fill a gap in measurement (e.g., for asthma care quality, inpatient care measures).

This measure is part of a measure set developed by CAPQuaM and intended to represent an enhancement to an existing measure in the Medicaid Core Measure Set that was developed by the Alabama Medicaid program.

The initial measure is a count of all ED visits with a diagnosis of asthma, whether or not the patient was known to be an asthmatic before the event. Numerator events alone can qualify children for inclusion in the denominator. Our partners in the New York State Medicaid program have described this characteristic as highly undesirable.

The decision not to require some evidence of asthma in advance of the numerator ED visit has advantages and disadvantages. The biggest advantage is that children for whom receiving any care is challenging are incorporated into the measure, adding a fundamental aspect of access to the measure. We perceive this to be a conflation of two concepts in related but non-identical populations. The two concepts are the management of children with asthma and access to care for children with asthma. The two populations are those children being treated for asthma and

those children who have and/or develop asthma. We suggest that this argues for a direct measure of access or availability for children with asthma.

We have previously submitted two outcomes measures that provide:

1. True epidemiological rate (in visits per 100 child years) for the use of the ED for asthma among children who have used sufficient services for asthma that they may be reasonably concluded to have asthma requiring ongoing treatment.
2. A count of the number of asthmatic children with ED visits for asthma, along with a distribution of how many ED visits each child experiences for asthma.

The current measure provides a description of specific services that are related conceptually to primary care for asthma: visits to primary care providers for asthma within 6 months prior to the first ED visit experienced by that child in the reporting year; filling of a prescription for a rescue medication within a 1-year period before the ED visit, and filling of a prescription for controller medication within a 6-month period before the ED visit. These measures of connection with primary care are designed as floor, rather than ceiling measures, that is they capture a basic level of service that when not met may indicate insufficient primary care management of a child with asthma.

Another measure looks at connection to the primary care system after the ED visit for asthma. It is to be reported stratified by pre-existing asthma according to our specifications and indicates:

- Proportion of ED visits followed by a primary care appointment within 14 and 30 days.
- Proportion of ED visits followed by a prescription fill for a controller medication within 2 months of the ED visit (including the day of the visit).

Section 4. Measure Categories

CHIPRA legislation requires that measures in the initial and improved core set, taken together, cover all settings, services, and topics of health care relevant to children. Moreover, the legislation requires the core set to address the needs of children across all ages, including services to promote healthy birth. Regardless of the eventual use of the measure, we are interested in knowing all settings, services, measure topics, and populations that this measure addresses. These categories are not exclusive of one another, so please indicate "Yes" to all that apply.

Does the measure address this category?

a. **Care Setting – ambulatory:** Yes.
b. **Care Setting – inpatient:** No.
c. **Care Setting – other – please specify:** No.
d. **Service – preventive health, including services to promote healthy birth:** No.
e. **Service – care for acute conditions:** Yes.
f. **Service – care for children with special health care needs/chronic conditions:** Yes.
g. **Service – other (please specify):** No.
h. **Measure Topic – duration of enrollment:** No.

i. **Measure Topic – clinical quality:** Yes.
j. **Measure Topic – patient safety:** No.
k. **Measure Topic – family experience with care:** No.
l. **Measure Topic – care in the most integrated setting:** No.
m. **Measure Topic other (please specify):** No.
n. **Population – pregnant women:** No.
o. **Population – neonates (28 days after birth) (specify age range):** No.
p. **Population – infants (29 days to 1 year) (specify age range):** No.
q. **Population – pre-school age children (1 year through 5 years) (specify age range):** Yes; ages 2-5 years.
r. **Population – school-aged children (6 years through 10 years) (specify age range):** Yes; ages 6-10 years.
s. **Population – adolescents (11 years through 20 years) (specify age range):** Yes; ages 11-20 years.
t. **Population – other (specify age range):** No.
u. **Other category (please specify):** Not applicable.

Section 5. Evidence or Other Justification for the Focus of the Measure

The evidence base for the focus of the measures will be made explicit and transparent as part of the public release of CHIPRA deliberations; thus, it is critical for submitters to specify the scientific evidence or other basis for the focus of the measure in the following sections.

5.A. Research Evidence

Research evidence should include a brief description of the evidence base for valid relationship(s) among the structure, process, and/or outcome of health care that is the focus of the measure. For example, evidence exists for the relationship between immunizing a child or adolescent (process of care) and improved outcomes for the child and the public. If sufficient evidence existed for the use of immunization registries in practice or at the State level and the provision of immunizations to children and adolescents, such evidence would support the focus of a measure on immunization registries (a structural measure).

Describe the nature of the evidence, including study design, and provide relevant citations for statements made. Evidence may include rigorous systematic reviews of research literature and high-quality research studies.

ED visits for children with identifiable asthma is an intermediate outcomes measure of intrinsic value. It represents utilization of expensive services. There is abundant evidence that ED visits are common, may be reduced through improved primary care or community based interventions, and demonstrate disparities (Adams, Smith, Ruffin, 2000; American Lung Association, 2012; Auger, et al., 2013; Bahadori, Doyle-waters, Marra, et al., 2009; Cerdan, Alpert, Moonie, et al., 2012; Coventry, Weston, Collins, 1996; Ducharme, Zemek, Chalut, et al., 2011; Farber, 2010; Fiese, Winter, Anbar, et al., 2008; Fuhrman, Dubus, Marguet, et al., 2011; Lara, Ramos-

Valencia, Gonzalez-Gavillan, et al., 2013; Manice, 2013; Okelo, Wu, Krishman, et al., 2004; Oraka et al., 2013; Sawicki, Vilk, Schatz, et al., 2010; Self, Chrisman, Mason, et al., 2005; Smith, Wakefield, Cloutier, 2007; Talreja, Soubani, Sherwin, et al., 2012; Weiss, Gergen, Hodgson, 1992).

This measure and its companion connection measure seek to capture aspects of the level of primary care that precedes and follows ED visits for asthma. More primary care is generally seen as better, in this context. Each measure captures visits to a primary care provider within specified time windows and prescription of typically appropriate medications. While unlikely to be sensitive to insufficiencies of primary care (which may take many forms), these measures look at basic attributes of asthma care—continuity of care, follow-up, medication management—that good primary care should promote. A more comprehensive literature review is included in the appendix (see Supporting Documents).

The connection measures and their specifications result from a formal development process that includes stakeholder input including: a parent focus group, the Mount Sinai Pediatrics Department's Parent Advisory Council, interviews with primary care clinicians, the CAPQuaM's multidisciplinary scientific team, a national multidisciplinary expert panel that established key clinical criteria, and a broad group of organizational stakeholders, including the New York State Medicaid Program.

The validity of our work has benefited from our use of a formal method, a pragmatic adaptation of the CAPQuaM 360 degree method. The method, as adapted to asthma and described in the next paragraph, was specifically designed to develop valid and reliable measures in the face of pragmatic epistemological uncertainty. That is, recognizing that practice extends well beyond the research base, we designed this method to allow us to develop reliable and valid state of the science measures, in part by explicitly modeling and accounting for uncertainties in the measure development and in part by the conceptualization and implementation of a Boundary Guideline (explained below).

We have shared and refined this approach in a number of venues including within the Pediatric Quality Measures Program (PQMP), which comprises the various PQMP AHRQ-CMS CHIPRA Centers of Excellence, the State PQMP participants, and AHRQ and CMS participants. All presentations have invited dialogue and feedback. This work has been similarly presented at a number of Grand Rounds / weekly conferences in the New York-New Jersey area as well as to national/international audiences including the Bioethics and children's health services communities. Feedback from these presentations has been extremely positive. Examples of the presentations include:

- 2012 Pediatric Academic Societies State of the Science Plenary (Boston). This presentation is included as an Appendix (see Supporting Documents).
- 2012 Oxford-Mount Sinai Bioethics Consortium (Amsterdam).
- 2012 Child Health Services Research Interest Group at Academy Health (Orlando).

The Boundary Guideline construct has generated particular enthusiasm. We asked the Bioethics Consortium to extrapolate the *primum non nocere* (First, do no harm) principle to apply

regarding this aspect of performance measurement. We received strong feedback that not only is it ethical to measure using systematically developed measures (even in the context of some uncertainty), but that it is ethically preferable to use such measures compared with the alternative of providing care that is not assessed (and perhaps not assessable) because of residual uncertainty.

In this case, we can present both a systematically developed measure and evidence to support its use. Please see Section 6.B Validity for more data and information.

5.B. Clinical or Other Rationale Supporting the Focus of the Measure (optional)

Provide documentation of the clinical or other rationale for the focus of this measure, including citations as appropriate and available.

ED visits for asthma care represent a common, costly, and potentially preventable health service that may serve as a marker for both insufficiency of primary care and insufficiency of clinical management of asthma by the partnership of the family and the health care team (see the Supporting Documents for a detailed literature review in the Appendix). Also, the current core measure on this topic has calculation/validity concerns in the State Medicaid programs. This suggests why CAPQuaM was assigned by AHRQ-CMS to develop this suite of measures for the PQMP.

Clinically, ongoing primary care for asthma with semi-annual or more frequent follow-up may prevent ED visits, as may the judicious use of rescue medications and the appropriate use of controller medications. Once an ED visit for asthma occurs, it may be considered a trigger that should stimulate prompt follow-up with a primary care physician as well ongoing management, often including controller medications. This illustrates broadly the clinical importance of these measures.

Section 6. Scientific Soundness of the Measure

Explain the methods used to determine the scientific soundness of the measure itself. Include results of all tests of validity and reliability, including description(s) of the study sample(s) and methods used to arrive at the results. Note how characteristics of other data systems, data sources, or eligible populations may affect reliability and validity.

6.A. Reliability

Reliability of the measure is the extent to which the measure results are reproducible when conditions remain the same. The method for establishing the reliability of a measure will depend on the type of measure, data source, and other factors.

Explain your rationale for selecting the methods you have chosen, show how you used the methods chosen, and provide information on the results (e.g., the Kappa statistic). Provide appropriate citations to justify methods.

The basis for the scientific soundness of this measure lies in the literature discussed above, in clinical expertise, and with administrative and encounter data. Though they have their limitations, these data types have been shown in multiple studies to be a reliable source of information for population-level quality measurement. Currently, they are used for all of the analogous measures of which we are aware, including the current Core Measure.

Quality measures that can be calculated using administrative data have been shown to have higher rates of performance than indicated by a review of the medical record alone. Claims data are more accurate for identifying services with a high likelihood of documentation due to reimbursement, such as physician visits, ED visits, hospitalizations, and reimbursed prescription drugs (Diamond, Rask, Kohler, 2001). While data systems and their contents are imperfect (Peabody, Luck, Jain, et al., 2004), it is well recognized that there are tradeoffs that need to be made and that both feasibility and accuracy are important considerations (Chubak, Pocobelli, Weiss, 2012).

Most administrative databases contain consistent elements, are available in a timely manner, provide information about large numbers of individuals, and are relatively inexpensive to obtain and use. The validity of many of these databases has been established, and their strengths and weaknesses relative to data abstracted from medical records and obtained via survey have been documented (Virnig, McBean, 2001). The use of administrative data is supported, if not encouraged by Federal agencies, such as the National Institute of Health (NIH), AHRQ, CMS, and the Department of Veterans Affairs (VA). CMS has made clear to the participating AHRQ-CMS CHIPRA Centers of Excellence—funded to develop measures for the PQMP—that it places a premium on feasibility when assessing those measures that it will most highly recommend to States to complete. The sources of data for the existing measure and other similar measures are typically based on administrative data as well, providing consensual validation for the appropriate primary data source.

The use of 2 years of data to validate the diagnosis of asthma has been found to produce substantial agreement with patient surveys and improve performance over the use of 1 year of data (Huze, Roos, Anthonisen, et al., 2002). Others have reported that using administrative databases to identify asthma is both sensitive and specific compared to review of the primary care physician's office chart (To, Dell, Dick, et al., 2006).

The constructs underlying these measures are:

- Specifying children whose utilization of services suggests that they have asthma that is being managed by the health plan or system. We call this identifiable asthma.
- Identifying the subset of those children who have had an ED visit.
- Identifying specific services that they received in specified time frames prior to their ED visit, including primary care visits and specified medications.

We have been guided in our definition of identifiable asthma by the results of a formal RAND/UCLA modified Delphi process conducted with a multidisciplinary panel of national experts, which included pediatricians, asthma specialists, a family physician, and ED physicians. The definitions were specified to allow their use with data elements that are typically available in

electronic form to a responsible entity, such as a health plan or State Medicaid program. Potential exceptions to this are elements such as zip code of residence and race and ethnicity of the child.

We understand race and ethnicity are generally available from clinical charts, as is zip code, and our work and the field agree that such structured abstraction of specific data is highly reliable. We have data from a feasibility study conducted at more than a dozen hospitals which demonstrates that these data elements are generally available in the chart, although the definition of race and ethnicity, as well as how it is determined, may vary by institution. Nonetheless, the CHIPRA legislation that authorized funding for the development of this measure specifies that measures be capable of identifying disparities; we have specified it to be so, despite concerns about potential reliability in the collection and assessment of race and ethnicity by health care-providing institutions and practices. We encourage the development of data systems that record parent-reported race and ethnicity and inclusion of these data in administrative data sets (which while done currently is not universal).

As part of our validation process in the New York State Medicaid data, we assessed how stable various measures were to small changes in their specifications and have identified measures that we found to be robust to such changes and consistent with the recommendations of our Expert Panel.

6.B. Validity

Validity of the measure is the extent to which the measure meaningfully represents the concept being evaluated. The method for establishing the validity of a measure will depend on the type of measure, data source, and other factors.

Explain your rationale for selecting the methods you have chosen, show how you used the methods chosen, and provide information on the results (e.g., R2 for concurrent validity).

CAPQuaM's 360 degree method engages collaborators and partners and is informed by the literature. It seeks to have measures emerge from a systematic process. In developing the asthma method, we incorporate:

- A high level of engagement with partnered institutions and senior advisors that include a wide diversity of stakeholders.
- A detailed literature review, updated and supplemented as needed.
- A focus group with parents, using a guide informed by conversation with an existing Advisory Council at Mount Sinai Medical Center.
- Interviews with clinicians (family physicians, pediatricians, and ED specialists).
- The CAPQuaM scientific team: ED physician; internist asthma expert; pediatricians (primary care, pulmonology, ED); social workers; pediatrician-child psychiatrist expert in patient adherence; experts in patient safety, quality measurement and improvement, and public health.
- A geographically diverse, multidisciplinary expert panel; panel members participated in a

two-round RAND/UCLA modified Delphi process, with enhanced follow-up.

- Development of a Boundary Guideline that simultaneously accounts for a variety of gradients, including gradients of importance, relevance, and certainty, as appropriate to the construct being represented.
- Specification and review of approaches to measurement by stakeholders and experts.
- Testing and assessment of measure performance to the extent feasible given resources and available time.

From previous submissions, we incorporate the definition of children with identifiable asthma. The denominator for this measure is children with identifiable asthma who also have had an emergency room visit or hospitalization for asthma (as first or second diagnosis) during a month in which they were eligible.

Pretesting included iterative analyses in New York State Medicaid data that demonstrated our definition of identifiable asthma (termed persistent asthma by the expert panel) was selective but not overly restrictive. It identified nearly 200,000 children with approximately 87 percent of anticipated asthmatics in New York State Medicaid, far more than the HEDIS persistent asthma definition. It achieves our dual goals of selecting from among all children who show signs or symptoms of asthma and being more inclusive than existing measures.

Testing revealed the importance of using revenue codes as well as CPT codes. Consultation with a coding expert confirmed our findings, and we have incorporated revenue codes into our case finding.

We incorporate validated National Committee on Quality Assurance (NCQA) code sets into this measure for numerator determinations, unmodified for medication and slightly modified for primary care visits to restrict to outpatient visits. We include hospitalizations in this measure because Medicaid data are not sensitive for identifying ED visits that result in hospitalizations.

Our analysis of 2009 National Emergency Department Sample (NEDS) data showed that nationwide, more than 11 percent of Medicaid ED visits for asthma result in admissions. National Inpatient Sample (NIS, 2009) data indicated that more than 71 percent of Medicaid admissions for asthma came from the ED. As many as 232,000 ED visits (~128,000 Medicaid) could be missed by excluding hospitalizations (NEDS data), compared to about 31,000 (NIS data) Medicaid admissions that may be incorrectly counted by us as ED visits. Analysis of admissions in New York Medicaid generally supported these findings: approximately 76 percent of asthma admissions were from the ED. Since both ED visits and admissions may represent ‘failures’ of prevention, we conclude that our analyses and our constructs both support the inclusion of hospitalizations along with ED visits as ‘events’ for this measure.

The use of Expert Panels has been demonstrated to be helpful in measure development and health care evaluation, including for children (Mangione-Smith, DeCristofaro, Setodji, et al., 2007). Practitioners have been identified as a resource for researchers in developing and revising measures, since they are on the frontlines working with the populations who often become research participants. Involving practitioners can assist researchers in the creation of measures

that are appropriate and easily administered (Rubio, Berg-Weger, Tebb, et al., 2003). Our panel supported the following statements:

- Regular primary care visits are characteristic of well managed asthma.
- Having had a primary care or asthma specialist visit within 1 month of the ED visit is evidence of well-managed asthma.
- Not having had a primary care or asthma specialist visit within 6 months of the ED visit is evidence of poorly managed asthma.
- Lack of filled prescription of controller medications for a child with persistent symptoms is suggestive of poorly managed asthma.
- At least one prescription for a short-acting beta agonist (SABA) within the preceding 12 months is essential.

From pretesting in New York State Medicaid data we concluded:

- Very few children had asthma specialist visits and not primary care visits, so specialist were not included in the specification.
- Criteria were infrequently met when we used shorter timeframes of 1, 3, and 4 months to the ED visit for primary care visits. While we support conceptually specification of this measure for such time frames, we specify here only the 6-month timeframe.
- Measurement of 12-month SABA prescription fills and 6-month controller fills was complementary and not overlapping.
- Measurement of primary care visit use and fills was complementary and not overlapping.
- The measures were feasible with Medicaid data.

The panel also rated highly the importance of an asthma action plan. We felt that a well implemented asthma action plan was likely to include primary care visits, as well as use of controller medications and the availability of a rescue medication. While we have no direct measure for the presence of an asthma action plan that is valid and reliable and likely to be found in an administrative data set, and we make no claim to be able to use this measure to identify their presence or absence, we feel comfortable that we are incorporating into this measure components that are consistent with the presence of such a plan. We further believe that the absence of both a recent PCP visit and the use of any medication makes the likelihood of a current and implemented asthma action plan very low.

In New York State Medicaid data:

- 28.8 percent of children had a primary care visit with asthma as the primary or secondary diagnosis <= 6 months before the ED visit (18.5 percent <= 4 months and 11.9 percent <= 3 months).
- 72.4 percent of children had filled a SABA prescription <= 12 months prior to the visit 32.1 percent of children also had a prescription for controller medications.

- 25.8 percent of children had a filled controller prescription <= 6 months prior to an ED visit.
- 23.3 percent of children met both medication criteria.
- 16.5 percent of children met criteria for both medications and a primary care visit within 6 months of an ED visit.
- 64.4 percent of children met neither the combined medication criteria nor the 6-month primary care visit criteria.
- Racial variations showed black children less likely (21.5 percent) to have had a controller medication than white children (23.2 percent); both black and white children were less likely than Hispanic children (24.9 percent) to have had a controller medication.
- Visits within 6 months: black children (25.4 percent) < white children (28.1 percent) < Hispanic children (33.0 percent).

Meeting criteria for the visits and both medications ranged from 9.9 percent in blacks to 11.1 percent in whites to 13.7 percent in Hispanics. Variation was also seen using county-level variables for poverty and urbanicity.

Section 7. Identification of Disparities

CHIPRA requires that quality measures be able to identify disparities by race, ethnicity, socioeconomic status, and special health care needs. Thus, we strongly encourage nominators to have tested measures in diverse populations. Such testing provides evidence for assessing measure's performance for disparities identification. In the sections below, describe the results of efforts to demonstrate the capacity of this measure to produce results that can be stratified by the characteristics noted and retain the scientific soundness (reliability and validity) within and across the relevant subgroups.

7.A. Race/Ethnicity

This measure has been tested in New York State Medicaid data and shows variation by race/ethnicity as described in the Validity section (6.B, above) of this report. We also found variation using county level variables for poverty and urbanicity.

7.B. Special Health Care Needs

The Maternal and Child Health Bureau (MCHB) has defined CSHCN as children "[w]ho have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally" (McPherson, Arango, Fox,, et al., 1998).

Considering this definition, children with identifiable asthma typically are children with special health care needs. This measure describes the care for such children.

7.C. Socioeconomic Status

Our analyses were conducted using Medicaid data. The measure is specified to be stratified in two ways to assess aspects related to socioeconomic status: Public versus Commercial Insurance, and by five strata defined by the percent of the population in poverty in the county of residence. As we expect this measure primarily to be generated by insuring entities, these data are expected to be present and available in the administrative data. Zip codes of residence are typically available in both medical records and administrative data sets and can be linked to county of residence as described in the specifications. We have identified five distinct strata based on the proportion of individuals living beneath the poverty line. Such ecological data have been found to be independent predictors of health outcomes and are readily available using United States Department of Agriculture (USDA) data (Kawachi, Berkman, 2003).

The five strata represent the three quartiles of lowest poverty each as one stratum, and the highest quartile divided into two strata, the 75th through 90th percentiles and the highest 10 percent. In New York State, only quartiles 1 through 3 are present, so we were not able to demonstrate the sensitivity of the measure specifically, but we were able to demonstrate the practicality of the method. We did find that the highest income stratum had meaningfully better performance than the other two available strata. For example, in stratum 1, 18.65 percent (of 9,982) met criteria for both medication measures and the 6-month primary care measure, compared to 15.9 percent (of 15,464) in stratum 2 and 14.6 percent (of 5,753) in stratum 3.

7.D. Rurality/Urbanicity

These measures are specified to be reported by Urban Influence Codes (UIC), which have been developed by the USDA based on a number of criteria to describe the levels of urbanicity and rurality. This is intended not only to report within-plan differences but also to allow for aggregation as appropriate. While each UIC has its own meaningful definition, some researchers choose to aggregate various codes.

We recommend consideration of the aggregation schema of Bennett and colleagues at the South Carolina Rural Research Center (Bennett, Olatosi, Probst, 2008). Their aggregation scheme brings together Codes 1 & 2 as Urban; 3, 5, and 8 as micropolitan rural; 4, 6, and 7 as rural adjacent to a metro area; and 9, 10, 11, and 12 as remote rural. We observe that UIC 5 might as well be aggregated with 4, 6, and 7 as an adjacent rural area. Further, while this approach to rurality does not map exactly to the population density-based definition of frontier (< 6 persons per square mile) as articulated in the Affordable Care Act, use of such categories is consistent with the ACA's intent that the Secretary ask that data collected for racial and ethnic disparities also look at underserved frontier counties.

Frontier health care may be approximated by analysis of the remote rural categories (Hart, 2012). This judgment was confirmed after CAPQuaM consulted with Gary Hart, Director of the Center for Rural Health at the University of North Dakota School of Medicine & Health Sciences, who is heading a HRSA-funded project to develop new methods to analyze frontier health. We clarified that his work suggests that UIC 9-12 is the best overall approach to using county-level data to study frontier health. Inclusion of UIC 8 would make the analysis more sensitive to including frontier areas but at a meaningful cost in sensitivity.

Those interested in care specific to large cities may wish to aggregate the rural area and analyze UIC 1 and 2 separately. Frontier health care may be approximated by analysis of the remote rural categories (Hart, 2012). The New York State Medicaid data were sensitive to urbanicity with higher rates of ED utilization in the most urban areas and lowest in the most rural areas; other areas were intermediate between the two.

For aggregation and as an imperfect approximation one can also group as urban (1 and 2), suburban (3-6) and rural (7-9). This is what we have used for our New York Medicaid analysis to demonstrate that variations are observed for this measure using UIC codes. For example, both medication measures and the 6-month primary care visit measure are met for 13.8 percent (N=806) of those in rural counties, 14.7 percent (N=4,066) of those in suburban counties, and 16.9 percent (N=26,327) of those in urban counties.

7.E. Limited English Proficiency (LEP) Populations

We have not tested or specified this measure for this specific purpose. There are no barriers to stratifying on this variable should it be collected in charts or elsewhere.

Section 8. Feasibility

Feasibility is the extent to which the data required for the measure are readily available, retrievable without undue burden, and can be implemented for performance measurement. Using the following sections, explain the methods used to determine the feasibility of implementing the measure.

8.A. Data Availability

1. What is the availability of data in existing data systems? How readily are the data available?

The definitions were specified to allow their use with data elements that ought to be available in electronic form as administrative data to a responsible entity, such as a health plan or State Medicaid program. While zip code is sometimes a hidden or non-public variable when such data sets are released, it generally is available to a responsible entity, such as an insurer or a Medicaid program. While race and ethnicity are typically available to Medicaid programs and are on institutional medical records (e.g., hospitals), such information may or may not be on an individual physician practice's chart. Information on race and ethnicity is often but not always recorded in insurance databases. We have data from a feasibility study conducted at more than a dozen hospitals that confirms that both data elements are generally available in the hospital chart, frequently electronically. The CHIPRA legislation that funded this work indicates that measures are to be able to assess racial and ethnic disparities; hence these data points need to be specified in this measure.

2. If data are not available in existing data systems or would be better collected from future data systems, what is the potential for modifying current data systems or creating new data systems to enhance the feasibility of the measure and facilitate implementation?

This measure is not currently in use.

8.B. Lessons from Use of the Measure

1. Describe the extent to which the measure has been used or is in use, including the types of settings in which it has been used, and purposes for which it has been used.

This measure is not currently in use.

2. If the measure has been used or is in use, what methods, if any, have already been used to collect data for this measure?

This measure is not currently in use.

3. What lessons are available from the current or prior use of the measure?

This measure is not currently in use.

Section 9. Levels of Aggregation

CHIPRA states that data used in quality measures must be collected and reported in a standard format that permits comparison (at minimum) at State, health plan, and provider levels. Use the following table to provide information about this measure's use for reporting at the levels of aggregation in the table.

For the purpose of this section, please refer to the definitions for provider, practice site, medical group, and network in the Glossary of Terms.

If there is no information about whether the measure could be meaningfully reported at a specific level of aggregation, please write "Not available" in the text field before progressing to the next section.

Level of aggregation (Unit) for reporting on the quality of care for children covered by Medicaid/ CHIP†:

State level* Can compare States

Intended use: **Is measure intended to support meaningful comparisons at this level? (Yes/No)**
Yes.

Data Sources: **Are data sources available to support reporting at this level?**
Yes.

Sample Size: **What is the typical sample size available for each unit at this level? What proportion of units at this level of aggregation can achieve an acceptable minimum sample size?**
In New York State, in 1 year, there were 61,327 asthma-related ED visits in 40,855 children (1.5 visits per child) among 200,769 children with identifiable asthma who contributed 185,606 person-years of exposure.

In Use: **Have measure results been reported at this level previously?**
No.

Reliability & Validity: **Is there published evidence about the reliability and validity of the measure when reported at this level of aggregation?**
No.

Unintended consequences: **What are the potential unintended consequences of reporting at this level of aggregation?**
The measure is intended to be reported at this level.

Other geographic level: Can compare other geographic regions (e.g., MSA, HRR)

Intended use: **Is measure intended to support meaningful comparisons at this level? (Yes/No)**
Yes.

Data Sources: **Are data sources available to support reporting at this level?**
Yes.

Sample Size: **What is the typical sample size available for each unit at this level? What proportion of units at this level of aggregation can achieve an acceptable minimum sample size?**
Not specifically assessed. In New York State, there were 61,327 asthma-related ED visits in a year for children with identifiable asthma.

In Use: **Have measure results been reported at this level previously?**
No.

Reliability & Validity: **Is there published evidence about the reliability and validity of the measure when reported at this level of aggregation?**
No.

Unintended consequences: **What are the potential unintended consequences of reporting at this level of aggregation?**
The measure is intended to be reported at this level.

Medicaid or CHIP Payment model: Can compare payment models (e.g., managed care, primary care case management, FFS, and other models)

Intended use: **Is measure intended to support meaningful comparisons at this level? (Yes/No)**
Yes.

Data Sources: **Are data sources available to support reporting at this level?**
Yes.

Sample Size: **What is the typical sample size available for each unit at this level? What proportion of units at this level of aggregation can achieve an acceptable minimum sample size?**
Not specifically assessed; there were 61,327 eligible ED visits statewide in New York in 1 year.

In Use: **Have measure results been reported at this level previously?**
No.

Reliability & Validity: **Is there published evidence about the reliability and validity of the measure when reported at this level of aggregation?**
No.

Unintended consequences: **What are the potential unintended consequences of reporting at this level of aggregation?**
Measure is designed to be reported at this level.

Health plan*: Can compare quality of care among health plans.

Intended use: **Is measure intended to support meaningful comparisons at this level? (Yes/No)**
Yes.

Data Sources: **Are data sources available to support reporting at this level?**
Yes.

Sample Size: **What is the typical sample size available for each unit at this level? What proportion of units at this level of aggregation can achieve an acceptable minimum sample size?**
Not specifically assessed; there were 61,327eligible ED visits statewide in New York in 1 year.

In Use: **Have measure results been reported at this level previously?**
No.

Reliability & Validity: **Is there published evidence about the reliability and validity of the measure when reported at this level of aggregation?**
No.

Unintended consequences: **What are the potential unintended consequences of reporting at this level of aggregation?**
Measure is designed to be reported at this level.

Provider Level
Individual practitioner: Can compare individual health care professionals

Intended use: **Is measure intended to support meaningful comparisons at this level? (Yes/No)**
No.

Data Sources: **Are data sources available to support reporting at this level?**
No.

Sample Size: **What is the typical sample size available for each unit at this level? What proportion of units at this level of aggregation can achieve an acceptable minimum sample size?**
Not designed for this use.

In Use: **Have measure results been reported at this level previously?**
No.

Reliability & Validity: **Is there published evidence about the reliability and validity of the measure when reported at this level of aggregation?**
No.

Unintended consequences: **What are the potential unintended consequences of reporting at this level of aggregation?**
Bias and error.

Provider Level
Hospital: Can compare hospitals

Intended use: **Is measure intended to support meaningful comparisons at this level? (Yes/No)**
No.

Data Sources: **Are data sources available to support reporting at this level?**
No.

Sample Size: **What is the typical sample size available for each unit at this level? What proportion of units at this level of aggregation can achieve an acceptable minimum sample size?**
Not intended for use at this level.

In Use: **Have measure results been reported at this level previously?**
No.

Reliability & Validity: **Is there published evidence about the reliability and validity of the measure when reported at this level of aggregation?**
No.

Unintended consequences: **What are the potential unintended consequences of reporting at this level of aggregation?**
Misattribution of accountability.

Provider Level
Practice, group, or facility:** Can compare: (i) practice sites; (ii) medical or other professional groups; or (iii) integrated or other delivery networks

Intended use: **Is measure intended to support meaningful comparisons at this level? (Yes/No)**
Yes.

Data Sources: **Are data sources available to support reporting at this level?**
Yes.

Sample Size: **What is the typical sample size available for each unit at this level? What proportion of units at this level of aggregation can achieve an acceptable minimum sample size?**
Not assessed.

In Use: **Have measure results been reported at this level previously?**
No.

Reliability & Validity: **Is there published evidence about the reliability and validity of the measure when reported at this level of aggregation?**
No.

Unintended consequences: **What are the potential unintended consequences of reporting at this level of aggregation?**
Suitable for integrated delivery networks only. Others would be inappropriate and biased.

Section 10. Understandability

CHIPRA states that the core set should allow purchasers, families, and health care providers to understand the quality of care for children. Please describe the usefulness of this measure toward achieving this goal. Describe efforts to assess the understandability of this measure (e.g., focus group testing with stakeholders).

We have had conversations about this measure and its understandability with our broad stakeholder partnership. Our collective conclusion is that the definition of the measure to only include those children who were known to be asthmatic prior to the index ED visit and/or hospitalization is important for both understandability and acceptability. Understandability begins with an understanding of the population being assessed, which in this case is children with ongoing asthma who are likely to require ongoing management, such as for persistent asthma. Our definition of identifiable asthma was not only intended to be a filter, but also to be inclusive. We found 196,623 children in New York State with identifiable asthma. This

compares to the 45,155 identified by the much more stringent HEDIS criteria for hospitalizations for children with persistent asthma and is an important filter from the approximately 1.4 million children in New York State whose record has some mention of an asthma diagnosis. We conclude that we have identified a meaningful and inclusive group of children known to have asthma who are at risk for ED visits/hospitalizations, contributing to the measure's understandability.

The measure is a straightforward approach to identifying effective connection with the health care system prior to the ED visit and/or hospitalization. Well-managed ongoing asthma care should have three components that are identifiable using administrative data: (1) visits to the primary care clinician, (2) use of controller medications, and (3) availability of rescue medications. As this measure is new to market and our pretesting suggests that performance for two of these three measures is well below 50 percent, we chose to use more relaxed rather than more stringent standards. For example, our panel supported that a visit within 1 month prior to the ED visit and/or hospitalization likely would be a positive indicator of care. They also supported the idea that the lack of a visit within 6 months was an affirmative indicator of suboptimal care. We used the less stringent requirement of a visit within 6 months prior to the ED visit and/or hospitalization.

The panel only asks that a SABA (rescue inhaler) must have been prescribed within 1 year, and most children receive this. The panel calls for the regular and ongoing use of a controller medication for those children who are being managed for ongoing asthma. This reflects the panel's belief that the large majority of children who meet the specified criteria for identifiable asthma are likely to meet clinical criteria for persistent asthma. We were unable to empirically verify this in our work. But the clinical driver for the panel's recommendations is the NAEPP Asthma Guideline (NHLBI, 2007), which is the prevailing clinical recommendation for children with asthma. Thus, we felt that a prescription fill for a controller medication was an important indicator of care for children managed for asthma. We found very small numbers who had such fills in the month or 2 months preceding the ED visit and/or hospitalization. As a result, we chose to use a more specific but less sensitive specification by assessing whether or not the child had a prescription fill within 6 months prior to the ED visit and/or hospitalization.

By combining the two medication measures, we can identify those children with filled prescriptions for both categories of medicines, controllers and rescue medications, as well as those who did not have any asthma medication filled within the previous 6 (controller) to 12 (rescue) months. Adding the primary care visit measure allows for detection of children who have recently received controller medications and rescue medications and who had a timely primary care visit.

We have not specifically tested the understandability of this measure with patients. Our team and partners have found the notion of connection to primary care before the ED visit and/or hospitalization to be readily understandable with high face validity.

We would describe the measure and the various numerators as follows: Evidence of connection to the primary care medical system prior to first ED visit and/or hospitalization that has a

primary or secondary diagnosis of asthma among children whom our specifications identify with asthma.

Numerator elements:

1. Visit(s) to a primary care provider with a primary or secondary diagnosis of asthma that occurred within 6 months prior to an ED visit/hospital admission (but not on the day of the ED visit/hospital admission).
2. Have at least one fill of a short-acting beta agonist within 12 months prior to the ED visit/hospital admission.
3. Have at least one fill of an asthma controller medication within 6 months prior to the ED visit/hospital admission.
    a. Have a prescription filled for both a rescue medication and a controller medication within the specified time frames (BOTH 2 and 3).
    b. Have no prescriptions filled for rescue medications or controller medications within the specified time frames (NEITHER 2 nor 3).
4. a. Have both a qualifying visit with primary care provider and prescriptions filled for both a rescue medication and a controller medication within the specified time frames (BOTH 1 and 4a).
    b. Have neither a qualifying primary care visit nor fills for both a rescue medication and a controller medication within the specified time frames (NEITHER 1 nor 4a).

Section 11. Health Information Technology

Please respond to the following questions in terms of any health information technology (health IT) that has been or could be incorporated into the measure calculation.

11.A. Health IT Enhancement

Please describe how health IT may enhance the use of this measure.

Using integrated administrative data sets that include clinical services, pharmacy fills, and patient demographics, including patient (parent) reported race/ethnicity and State and county of residence will enhance use of this measure.

11.B. Health IT Testing

Has the measure been tested as part of an electronic health record (EHR) or other health IT system?

No.

If so, in what health IT system was it tested and what were the results of testing?

Not applicable.

11.C. Health IT Workflow

Please describe how the information needed to calculate the measure may be captured as part of routine clinical or administrative workflow.

Not applicable.

11.D. Health IT Standards

Are the data elements in this measure supported explicitly by the Office of the National Coordinator for Health IT Standards and Certification criteria (see healthit.hhs.gov/portal/server.pt/community/healthit_hhs_gov__standards_ifr/1195)?

No.

If yes, please describe.

Not applicable.

11.E. Health IT Calculation

Please assess the likelihood that missing or ambiguous information will lead to calculation errors.

Not applicable.

11.F. Health IT Other Functions

If the measure is implemented in an EHR or other health IT system, how might implementation of other health IT functions (e.g., computerized decision support systems in an EHR) enhance performance characteristics on the measure?

Not applicable.

Section 12. Limitations of the Measure

Describe any limitations of the measure related to the attributes included in this CPCF (i.e., availability of measure specifications, importance of the measure, evidence for the focus of the measure, scientific soundness of the measure, identification of disparities, feasibility, levels of aggregation, understandability, health information technology).

Administrative data are imperfect and at times may imperfectly describe clinical reality. Nevertheless, using those imperfect data enhances feasibility, and our preliminary results do indicate that the measure performs well in spite of the potential limitations. Further, the literature supports specifically the use of administrative data to describe asthma care and indicates that the use of more than 1 year of data (as we do) enhances validity. We acknowledge that some States may be unable to include prescription fills in their data. Our formative analysis suggests that less than 5 percent of included children are included specifically because of medication fills. Most of the numerators, but not all, require prescription fills. Where these data are not available, Numerator A will still be able to be calculated. The use of county rather than individual data on

poverty is both a strength (in that it can be reliably assessed and has substantive meaning as a contextual variable) and a limitation, in that it is an ecological variable.

The eligibility of the criteria that restrict the measure to children identified as those being managed for identifiable asthma is both a strength and a limitation. It avoids conflation with the construct of basic access to care and makes the measure more specific to the management of asthma. The specifications were intended to be and are less restrictive than the persistent asthma specifications written for the HEDIS asthma hospitalization measure.

The measure requires that primary care provider visits can be identified. If they cannot, our pretesting suggests that visits to clinicians with the specified codes are infrequent, so the measure can be used, but findings related to the 6-month primary care visit will be somewhat inflated. The validity of the measure is based on a systematic process that incorporates the literature and expert panel review. The panel attempted to integrate widely accepted and evidence-grounded guidelines as they translated that information into criteria. The CAPQuaM team in turn translated the panel's criteria in to this measure, which is a proxy for an underlying construct.

Section 13. Summary Statement

Provide a summary rationale for why the measure should be selected for use, taking into account a balance among desirable attributes and limitations of the measure. Highlight specific advantages that this measure has over alternative measures on the same topic that were considered by the measure developer or specific advantages that this measure has over existing measures. If there is any information about this measure that is important for the review process but has not been addressed above, include it here.

This measure and its specifications result from a formal development process that includes stakeholder input throughout. ED visits/hospitalizations for asthma are common, costly, and potentially preventable. They may serve as a marker for both insufficiency of primary care and insufficiency of clinical management of asthma by the partnership of the family and the health care team. This measure considers practices that precede ED visits/hospitalizations for children 2-21 years who have identifiable asthma, a construct that our expert panel used to operationalize ongoing asthma that was likely to require ongoing management. It seeks to describe independently and in combination the connection of children to primary care practices by measuring whether or not children who have ED visits and/or hospitalizations for asthma have had:

1. Visit(s) to a primary care provider with a primary or secondary diagnosis of asthma that occurred within 6 months prior to an ED visit/hospital admission (but not on the day of the ED visit/admission).
2. At least one fill of a short-acting beta agonist within 12 months prior to the ED visit/hospital admission.
3. At least one fill of an asthma controller medication within 6 months prior to the ED visit/hospital admission.
4. a. A prescription filled for *both* a rescue medication and a controller medication within the

specified time frames (BOTH 2 and 3).

b. *No* prescriptions filled for rescue medications or controller medications within the specified time frames (NEITHER 2 nor 3).

5. a. *Both* a qualifying visit with primary care provider and prescriptions filled for *both* a rescue medication and a controller medication within the specified time frames (BOTH 1 and 4a).

   b. Neither a qualifying primary care visit, *nor* had fills for *both* a rescue medication and a controller medication within the specified time frames (NEITHER 1 nor 4a).

The literature demonstrates that both clinical, system, and community interventions may improve care for asthma and reduce ED visits/hospitalizations. The potential for racial and ethnic disparities is high. We found large racial and ethnic differences in New York State Medicaid. Poverty may also be associated with increased ED use for children with asthma, as higher incomes were associated with better performance on this measure. More than 196,000 children had persistent asthma (using our definition) in New York State Medicaid data in 2011 (almost 11 percent), and nearly 60,000 ED visits for asthma were for the eligible children.

As a part of the CAPQuaM measure set, this measure offers a number of advantages over existing measures. The definition of identifiable asthma is more inclusive than other existing definitions. The linkage of this process measure to the previously submitted outcomes measure and the other connection measure offers an opportunity to provide better insight into clinical practices as articulated in our conceptual model, which acknowledges that some proportion of ED visits/hospitalizations result from failures of processes of care before the ED visit and/or hospitalization.

Our analyses in New York State Medicaid data confirmed feasibility, usability, and responsiveness of the measures to substantive constructs including race/ethnicity, and county level measures of poverty and urbanicity.

We find these data and their consistency with expected findings to be persuasive that the measure is both valid and sensitive to real differences. The measure is based on administrative data and therefore is very feasible with generally available data. It can readily be aggregated up from the level of a single insurance plan or purchaser.

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The CHIPRA Pediatric Quality Measures Program (PQMP) Candidate Measure Submission Form (CPCF) was approved by the Office of Management and Budget (OMB) in accordance with the Paperwork Reduction Act.

The OMB Control Number is 0935-0205 and the Expiration Date is December 31, 2015.

Public Disclosure Requirements

Each submission must include a written statement agreeing that, should U.S. Department of Health and Human Services accept the measure for the 2014 and/or 2015 Improved Core Measure Sets, full measure specifications for the accepted measure will be subject to public disclosure (e.g., on the Agency for Healthcare Research and Quality [AHRQ] and/or Centers for Medicare & Medicaid Services [CMS] websites), except that potential measure users will not be permitted to use the measure for commercial use. In addition, AHRQ expects that measures and full measure specifications will be made reasonably available to all interested parties. "Full measure specifications" is defined as all information that any potential measure implementer will need to use and analyze the measure, including use and analysis within an electronic health record or other health information technology. As used herein, "commercial use" refers to any sale, license or distribution of a measure for commercial gain, or incorporation of a measure into any product or service that is sold, licensed or distributed for commercial gain, even if there is no actual charge for inclusion of the measure. This statement must be signed by an individual authorized to act for any holder of copyright on each submitted measure or instrument. The authority of the signatory to provide such authorization should be described in the letter.

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