Welcome to the Data Analytics Toolkit PowerPoint presentation on clinical quality measures, meaningful use, and data analytics.
According to the Centers for Medicare and Medicaid Services, Clinical Quality Measures (or CQMs) are tools that help us measure and track the quality of healthcare services provided by eligible professionals (EPs), eligible hospitals (EHs) and critical access hospitals (CAHs) within our health care system. These measures use a wide variety of data that are associated with a provider’s ability to deliver high-quality care or relate to long term goals for health care quality. CQMs measure many aspects of patient care including: health outcomes, clinical processes, patient safety, efficient use of healthcare resources, care coordination, patient engagements, population and public health, and clinical guidelines. (CMS, 2014)
In order to effectively capture, calculate and report clinical quality measures electronically, organizations must use data analytics.
CQMs and Data Analytics

- Healthcare analytics is the systematic use of data and related clinical and business (C&B) insights developed through applied analytical disciplines such as statistical, contextual, quantitative, predictive, and cognitive spectrums to drive fact-based decision making for planning, management, measurement and learning. (HIMSS, 2013)

HIMSS, the Health Information Management Systems Society, defines healthcare analytics as “the systematic use of data and related clinical and business (C&B) insights developed through applied analytical disciplines such as statistical, contextual, quantitative, predictive, and cognitive spectrums to drive fact-based decision making for planning, management, measurement and learning.” (HIMSS, 2013)

Thus, the CQMs included in the EHR incentive program are considered health data analytics. The purpose of the CQMs are to collect data on specific populations to improve decision-making and overall
population health.
Clinical quality measures are required to be reported for multiple state and federal programs. This table illustrates how the same measure may be reported to multiple programs. For example, NQF# 0031 measures breast cancer screening and it can be reported for the CMS EHR Incentive Program, the Physician Quality Reporting System, the Accountable Care Organization shared savings program, and the Medicare Advantage Program.
The EHR Incentive Program is broken into three different Stages. Stage 1 is focused on data capture and reporting; Stage 2 is focused on advanced clinical processes; and Stage 3 is focused on improved outcomes. The measures and objectives of the program are known as “meaningful use” of certified EHR technology.

Within Stage 1 meaningful use, Clinical Quality Measures are a required core objective for eligible professionals and eligible hospitals. Through 2013, eligible professionals must submit 3 core measures and 3 menu measures (core measures are required for all professionals and menu refer to those
measures that are most relevant for the professional’s specific practice).

Eligible hospitals are required to submit 15 clinical quality measures, regardless of hospital size, type or location.
The timeline of the EHR Incentive Program includes a major upgrade based upon updated EHR certification standards. Beginning in 2014, Eligible Professionals and Eligible Hospitals are required to report CQMs based upon the 2014 specification, regardless of their particular stage of meaningful use. The 2014 CQM reporting requirements include:

- Eligible Professionals must report 9 of 64 approved CQMs
- Eligible Hospitals must report 16 of 29 approved CQMs
- Must be reported electronically from the certified EHR
- Selected measures must cover at least three of the National Quality Strategy domains (see next slide).

- Eligible Professionals must report 9 of 64 approved CQMs (the total number of approved CQMS has been increased from 38)

- Eligible Hospitals must report 16 of 29 approved
CQMs—there were 15 eligible CQMs for hospitals previously.

-The CQMs must be reported using data captured directly within the certified EHR technology and reported directly to CMS using the certified technology.

-Measures selected by both Eligible Hospitals and Eligible Professionals must cover at least three of the National Quality Strategy domains.
The purpose of the National Quality Strategy is to align national quality measure and quality improvement actions. The Strategy is focused on better care, healthy people and communities, and affordable care. The Strategy has six priority areas.

1. Improving patient safety;
2. Engaging patients;
3. Promoting care coordination;
4. Promoting prevention;
5. Promoting best practices within communities;
6. Reducing costs.
The EHR Incentive Program and its clinical quality measure requirement provide a great example of data analytics, which involves the analysis of high quality data. To successfully attest to meaningful use and receive incentive payments, eligible professionals and hospitals are required to use certified EHR technology to collect, calculate, and report CQMs to the Center for Medicare and Medicaid Services.
To further illustrate the point of how clinical quality measures are related to data analytics, let’s turn to the structure of the CQMs themselves. For each clinical quality measure, specific data elements are required to determine if a patient will be included or excluded in the measure. In order to accurately include or exclude patients from a measure, the certified EHR technology must have the defined data elements constructed properly and the measures defined accurately to reflect care provision within the ambulatory or acute care setting. Just as a point of reference, there are an average of 27 data elements required to calculate each EH CQM and 16 for each EP CQM. This point
reflects the complexity of clinical quality measure specifications and calculations.
To demonstrate the relationship between clinical quality measures and data analytics, take for example this image. It is the interface used by EHR vendors when testing their software for EHR Certification, which is also required for meaningful use. The EHR software must be able to calculate the number of patients included in the population, the denominator and whether there were any exclusions, the numerator and any exclusions, and finally exceptions for each measure. Exceptions refer to such things as the measure falling outside of the provider’s scope of practice.
The complexity of calculating clinical quality measures underscores the importance of data quality itself. The old adage of “garbage in, garbage out” is relevant here. If the data collected within the EHR lacks integrity, the validity of the CQM is questionable. This is the reason why data analytics is on a continuum from data collection to knowledge utilization. Without high quality data to analyze, the findings of the analysis are irrelevant. For example, it is important that the measures are constructed in a way that pulls data from the correct fields and that there are not duplicate fields for data entry.
Let’s turn to an example of how key clinical activities are essential for capturing high quality data that can be used for calculating and reporting clinical quality measures. NQF measure 0001 is related to completing asthma assessments for patients with specific symptoms.

The measure is defined as the “Percentage of patients aged 5 through 40 years with a diagnosis of asthma and who have been seen for at least at least 2 office visits, who were evaluated during at least one office visit within 12 months for the frequency (numeric) of daytime and nocturnal asthma symptoms.”
This measure is presently a menu set measure for meaningful use.
The rationale for the clinical quality measure is outlined in the clinical guidelines, which drive clinical documentation to support the provision of care. The clinical guideline for this measure include monitoring of signs and symptoms, pulmonary function, quality of life/functional status, pharmacotherapy, and patient-provider communication.

http://www.qualitymeasures.ahrq.gov/content.aspx?id=28054&search=asthma+assessment
In order to measure asthma assessments, numerous types of data are required to be captured within the electronic health record, including different types of data for calculating the numerator and denominators. For example, in order to accurately calculate and report this measure, six different structured data points are used, including both SNOMED and ICD-9/ICD-10 (both of which are also required for EHR certification).
Again, the collection of high quality data is required to accurately calculate CQMs. Using the asthma assessment measure, we can see that there are key clinical activities that are required to ensure the proper data elements are captured for both the denominator and numerator measures. The data elements are likely not collected by one individual within an organization, nor in one module or application with the EHR. Yet, it is critical that all members of the care team understand the importance of accurately collecting the data that eventually drive the calculation of quality measures—from accurate date of birth, to encounter codes, to diagnoses.
To drill further into the calculation of this measure, the measure is limited to only those patients aged 5-40 with an active diagnosis of asthma who have had at least two encounters within the past twelve months where one of the visits included the evaluation of asthma symptoms. To calculate encounters, CPT codes are required.
To complicate matters, there are multiple asthma diagnoses that must be included in the analysis to define the measure population. There are a total of 13 ICD-9 diagnosis codes for asthma—they are all shown here.

### Example: NQF 0001: Asthma Assessment

- Denominator Inclusion Criteria (cont.)

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extrinsic asthma, unspecified</td>
<td>493.00</td>
</tr>
<tr>
<td>Extrinsic asthma with status asthmaticus</td>
<td>493.01</td>
</tr>
<tr>
<td>Extrinsic asthma with acute exacerbation</td>
<td>493.02</td>
</tr>
<tr>
<td>Intrinsic asthma, unspecified</td>
<td>493.10</td>
</tr>
<tr>
<td>Intrinsic asthma with status asthmaticus</td>
<td>493.11</td>
</tr>
<tr>
<td>Intrinsic asthma with acute exacerbation</td>
<td>493.12</td>
</tr>
<tr>
<td>Chronic obstructive asthma, unspecified</td>
<td>493.20</td>
</tr>
<tr>
<td>Chronic obstructive asthma, with acute exacerbation</td>
<td>493.22</td>
</tr>
<tr>
<td>Other forms of asthma</td>
<td>493.81</td>
</tr>
<tr>
<td>Cough variant asthma</td>
<td>493.82</td>
</tr>
<tr>
<td>Asthma, unspecified</td>
<td>493.90</td>
</tr>
<tr>
<td>Unspecified asthma with status asthmaticus</td>
<td>493.91</td>
</tr>
<tr>
<td>Unspecified asthma with acute exacerbation</td>
<td>493.92</td>
</tr>
</tbody>
</table>
The CQM also calculates patients based upon a diagnosis of asthma captured by SNOMED codes. There are a total of 52 SNOMED diagnosis codes for asthma, including those shown here.
The numerator for this measure is defined by calculating the number of included patients with asthma who have been evaluated for the frequency of daytime and nocturnal asthma symptoms. Both daytime and nighttime asthma symptoms (either assessed or active) are calculated using SNOMED codes—there are 5 codes related to daytime asthma symptoms and there are 8 SNOMED codes for Nighttime asthma symptoms, which are all shown here. The numerator also includes patients that have been evaluated using an asthma symptom assessment tool, which also has an associated SNOMED code.
For the purpose of meeting meaningful use, the certified EHR technology must be able to electronically collect, calculate and report clinical quality measures. In order to accurately calculate the measures, the data must be queried from databases, including specific calculations for the numerators, denominators, and any exclusions for each measure. To provide an example of the complexity of calculating these measures, please review this white paper produced by the Computer Sciences Corporation. It shows that one meaningful use hospital measure requires 27 data elements to be analyzed from six different EHR source systems, including the admission system, CPOE, provider documentation, the electronic medication administration record, the problem list and nursing documentation. (CSC, 2010)
While the topic of clinical quality measures and data analytics is complicated, there are many resources available to assist with the work of proper data collection and analysis. The National Learning Consortium has developed reference guides to detail the data elements required for calculating each measure. These tools are a great place to start. (NLC, 2014)
Additionally, CMS has developed documentation to guide the technical development of clinical quality measures for meaningful use. It has published specifications for data standards and sample database programming to calculate each meaningful use measure. This is a great guide for those individuals and organizations looking to understand the structure of measures and how to develop queries to extract measures from databases.
References


