Clinical Quality eMeasure Logic and Implementation Guidance v1.5

This guidance document is for use with the 2014 electronic Eligible Professional and Eligible Hospital CQM measures released on December 21, 2012, the updated Eligible Hospital measures released on April 1, 2013, and the updated Eligible Professional measure released June 2013.

Contents

1 Purpose

This document provides guidance for those interested in understanding, using, and/or implementing the clinical quality measure electronic specifications. These specifications are released for use for Clinical Quality Measures (CQM) reporting beginning in 2014 under the Meaningful Use EHR Incentive Program of the Centers for Medicare and Medicaid Services (CMS). We recommend that you review this document along with the electronic specifications for the CQMs, which include human readable descriptions and XML files to build a complete understanding of each measure's intent and operation prior to any implementation. Updates to the information in this document and additional help can be found on the CMS website

This document provides the following information:

1. Sections 2 through 5 provide general implementation guidance including defining how specific logic and data elements should be conceptualized and addressed during CQM implementation.
2. Section 6.1 provides detailed guidance for individual EH measures.
3. Section 6.2 provides detailed guidance for individual EP measures.
4. The appendices provide additional detail on versioning, time interval calculations, and documentation for the calculation in CMS179

For more information regarding measure titles, endorsement, and versioning, please see "Appendix A: Versioning and Endorsement" or refer to the CMS website.

For additional information that is directly relevant to implementing the 2014 CQMs, please refer to the following resources:

1. CMS 2014 Clinical Quality Measures on the CMS Website
2. Quality Data Model 2.1.1.1
3. Measure Authoring Tool
4. HL7 CDA Product Brief
5. HL7 HQMF Product Brief
6. HL7 QRDA-1 Product Brief
7. HL7 QRDA-3 Product Brief
8. Cypress -CQM Certification

2 eMeasure Types

Measures can be classified based on the unit of scoring – patients or episodes – and how the score is computed – proportion or continuous variable. In this section we describe these classifications. Below we will provide more detail on how these measures are computed.

2.1 Patient-Based Measures

Measures that evaluate the care of a patient, and assign the patient to membership in one or more populations are called patient-based measures. The vast majority (57 out of 64) of the EP CQMs are patient-based. All of the information in the patient record must be considered when computing a patient-based measure. The criteria for inclusion of a patient in a measure population may require that conditions be satisfied during multiple episodes of care; for example, a diagnosis occurring in one episode of care and treatment happening in a subsequent episode of care.

2.2 Episode-of-Care Measures

Measures that evaluate the care during a patient-provider encounter, sometimes called an episode of care, and assign the episode of care to one or more populations are called episode-of-care measures. All of the EH measures are episode of care measures, as are 7 of the 64 of the EP measures. In an episode of care measure, the episodes of care are identified in the Initial Patient Population, and are always designated by a specific occurrence. For example, in measure CMS55/NQF0495 the Initial Patient Population (IPP) identifies all inpatient encounters that are to be scored as 'Occurrence A of Encounter, Performed: Encounter Inpatient'. The Measure Population identifies the associated ED visits that lead to inpatient encounters as 'Occurrence A of Encounter, Performed: Emergency Department Visit'. The measure observations average over these ED visits.

There is no clear indication within the HQMF XML file that specifies whether a measure is patient-based or episode of care (see Table 1 and Table 2, below).

2.3 Proportion Measures

Most of the 2014 CQMs are proportion measures. In a proportion measure the scored entities (either patients or episodes) for a collection of patients are assigned to the populations and strata defined by a CQM, and the appropriate 'rates' computed. For example, if one of the MU2 EH CQMs, all of which are episode-of-care, is computed for a collection of 100 patients with a total of 132 episodes-of-care (as defined by the measure), each of the populations defined by the measure can contain between 0 and 132 episodes.

The populations defined by a proportion measure are:

- **Initial Patient Population** (IPP): The set of patients (or episodes of care) to be evaluated by the measure.
- **Denominator** (D): A subset of the IPP.
- **Denominator Exclusions** (DExclusion): A subset of the Denominator that should not be considered for inclusion in the Numerator.
- **Denominator Exceptions** (DException): A subset of the Denominator. Only those members of the Denominator that are considered for Numerator membership and are not included are considered for membership in the Denominator Exceptions.

- **Numerator** (N): A subset of the Denominator. The numerator criteria are the processes or outcomes expected for each patient, procedure, or other unit of measurement defined in the denominator.

The computation of a proportion measure proceeds as follows:

1) Patients or episodes of care are classified using the IPP criteria, and those satisfying the criteria are included in the IPP.

2) The members of the IPP are classified using the Denominator criteria, and those satisfying the criteria are included in the Denominator.

3) The members of the Denominator are classified using the Denominator Exclusion criteria, and those satisfying the criteria are included in the Denominator Exclusions.

4) The members of the Denominator that are not in the Denominator Exclusion population are classified using the Numerator criteria, and those satisfying the criteria are included in the Numerator.

5) Those members of the Denominator that were considered for membership in the Numerator, but were rejected, are classified using the Denominator Exceptions criteria, and those satisfying the criteria are included in the Denominator Exceptions.

For CQMs with multiple numerators and/or strata, each patient/episode must be scored for inclusion/exclusion to *every* population. For example if a CQM has 3 numerators, and the patient is included in the first numerator, the patient should be scored for inclusion/exclusion from the populations related to the other numerators as well. When the measure definition includes stratification, each population in the measure definition should be reported both *without* stratification, and *stratified* by each stratification criteria.

Specific programs may require reporting of performance rates, but these are not required for certification. The performance rate is defined as:

Rate = N/(D – DExclusion – DException)

2.4 Continuous Variable Measures

Continuous Variable Measures can be either episode or patient-based. They include the following elements:

- **Initial Patient Population** (of patients or episodes), roughly analogous to the Denominator in proportion measures
- **Measure Population** (subset of Initial Patient Population), roughly analogous to the Numerator in proportion measures
- **Measure Observations** describe the computation to be performed over the members of the Measure Population. For example, measure CMS55/NQF0495 computes the median for the difference between the Emergency Department arrival and departure, over all ED visits in the Measure population.

The computation of a continuous variable measure proceeds as follows:

1) Patients or episodes of care are classified using the IPP criteria, and those satisfying the criteria are included in the IPP.
2) The members of the IPP are classified using the Measure Population criteria, and those satisfying the criteria are included in the Measure Population.
3) Each member of the Measure Population is evaluated according to the criteria defined in the Measure Observations criteria, and all of these results are aggregated using the specified operator.

Results should be reported for each population without stratification, as well as for each defined stratum separately. For a continuous variable measure, for the IPP and Measure Population, results are required specifying the number of patients or episodes that fall into each of these populations without stratification, as well as stratified by any defined strata. The aggregated continuous variable computed defined by the Measure

Observation should be reported for the unaggregated Measure Population, as well as for each stratum of the Measure Population.

Specific programs may require reporting of specific reporting and performance rates, but these are not required for certification.

Table 1 – EP eMeasure Types and Versions

eMeasure ID#	NQF #	Title	Type	Patient/Episode	Version
2	0418	Preventive Care and Screening: Screening for Clinical Depression and Follow-Up Plan	Proportion	Patient	3
22	XXXX	Preventive Care and Screening: Screening for High Blood Pressure and Follow-Up Documented	Proportion	Patient	2
50	XXXX	Closing the referral loop: receipt of specialist report	Proportion	Patient	2
52	0405	HIV/AIDS: Pneumocystis jiroveci pneumonia (PCP) Prophylaxis	Proportion	Patient	2
56	XXXX	Functional Status Assessment for Hip Replacement	Proportion	Patient	2
61	XXXX	Preventive Care and Screening: Cholesterol – Fasting Low Density Lipoprotein (LDL-C) Test Performed	Proportion	Patient	3
62	0403	HIV/AIDS: Medical Visits	Proportion	Patient	2
64	XXXX	Preventive Care and Screening: Risk-Stratified Cholesterol – Fasting Low Density Lipoprotein (LDL-C)	Proportion	Patient	3
65	XXXX	Hypertension: Improvement in Blood Pressure	Proportion	Patient	3
66	XXXX	Functional Status Assessment for Knee Replacement	Proportion	Patient	2
68	0419	Documentation of Current Medications in the Medical Record	Proportion	Episode	3
69	0421	Preventive Care and Screening: Body Mass Index (BMI) Screening and Follow-Up	Proportion	Patient	2
74	XXXX	Primary Caries Prevention Intervention as Offered by Primary Care Providers, including Dentists	Proportion	Patient	3
75	XXXX	Children Who Have Dental Decay or Cavities	Proportion	Patient	2

eMeasure ID#	NQF #	Title	Type	Patient/Episode	Version
77	XXXX	HIV/AIDS: RNA Control for Patients with HIV	Proportion	Patient	2
82	1401	Maternal Depression Screening	Proportion	Patient	1
90	XXXX	Functional Status Assessment for Complex Chronic Conditions	Proportion	Patient	3
117	0038	Childhood Immunization Status	Proportion	Patient	2
122	0059	Diabetes: Hemoglobin A1c Poor Control	Proportion	Patient	2
123	0056	Diabetes: Foot Exam	Proportion	Patient	2
124	0032	Cervical Cancer Screening	Proportion	Patient	2
125	0031	Breast Cancer Screening	Proportion	Patient	2
126	0036	Use of Appropriate Medications for Asthma	Proportion	Patient	2
127	0043	Pneumonia Vaccination Status for Older Adults	Proportion	Patient	2
128	0105	Anti-depressant Medication Management	Proportion	Patient	2
129	0389	Prostate Cancer: Avoidance of Overuse of Bone Scan for Staging Low Risk Prostate Cancer Patients	Proportion	Patient	3
130	0034	Colorectal Cancer Screening	Proportion	Patient	2
131	0055	Diabetes: Eye Exam	Proportion	Patient	2
132	0564	Cataracts: Complications within 30 Days Following Cataract Surgery Requiring Additional Surgical Procedures	Proportion	Episode	2
133	0565	Cataracts: 20/40 or Better Visual Acuity within 90 Days Following Cataract Surgery	Proportion	Episode	2
134	0062	Diabetes: Urine Protein Screening	Proportion	Patient	2
135	0081	Heart Failure (HF): Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction (LVSD)	Proportion	Patient	2
136	0108	ADHD: Follow-Up Care for Children Prescribed Attention-Deficit/Hyperactivity Disorder (ADHD) Medication	Proportion	Patient	3

eMeasure ID#	NQF #	Title	Type	Patient/Episode	Version
137	0004	Initiation and Engagement of Alcohol and Other Drug Dependence Treatment	Proportion	Patient	2
138	0028	Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention	Proportion	Patient	2
139	0101	Falls: Screening for Future Fall Risk	Proportion	Patient	2
140	0387	Breast Cancer: Hormonal Therapy for Stage IC-IIIC Estrogen Receptor/Progesterone Receptor (ER/PR) Positive Breast Cancer	Proportion	Patient	2
141	0385	Colon Cancer: Chemotherapy for AJCC Stage III Colon Cancer Patients	Proportion	Patient	3
142	0089	Diabetic Retinopathy: Communication with the Physician Managing Ongoing Diabetes Care	Proportion	Patient	2
143	0086	Primary Open Angle Glaucoma (POAG): Optic Nerve Evaluation	Proportion	Patient	2
144	0083	Heart Failure (HF): Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction (LVSD)	Proportion	Patient	2
145	0070	Coronary Artery Disease (CAD): Beta-Blocker Therapy- Prior Myocardial Infarction (MI) or Left Ventricular Systolic Dysfunction (LVEF <40%)	Proportion	Patient	2
146	0002	Appropriate Testing for Children with Pharyngitis	Proportion	Patient	2
147	0041	Preventative Care and Screening: Influenza Immunization	Proportion	Patient	2
148	0060	Hemoglobin A1c Test for Pediatric Patients	Proportion	Patient	2
149	XXXX	Dementia: Cognitive Assessment	Proportion	Patient	2
153	0033	Chlamydia Screening for Women	Proportion	Patient	2
154	0069	Appropriate Treatment for Children with Upper Respiratory Infection (URI)	Proportion	Episode	2

eMeasure ID#	NQF #	Title	Type	Patient/Episode	Version
155	0024	Weight Assessment and Counseling for Nutrition and Physical Activity for Children and Adolescents	Proportion	Patient	2
156	0022	Use of High-Risk Medications in the Elderly	Proportion	Patient	2
157	0384	Oncology: Medical and Radiation – Pain Intensity Quantified	Proportion	Episode	2
158	0608	Pregnant women that had HBsAg testing	Proportion	Patient	2
159	0710	Depression Remission at Twelve Months	Proportion	Patient	2
160	0712	Depression Utilization of the PHQ-9 Tool	Proportion	Patient	2
161	0104	Adult Major Depressive Disorder (MDD): Suicide Risk Assessment	Proportion	Episode	2
163	0064	Diabetes: Low Density Lipoprotein (LDL) Management	Proportion	Patient	2
164	0068	Ischemic Vascular Disease (IVD): Use of Aspirin or Another Antithrombotic	Proportion	Patient	2
165	0018	Controlling High Blood Pressure	Proportion	Patient	2
166	0052	Use of Imaging Studies for Low Back Pain	Proportion	Patient	3
167	0088	Diabetic Retinopathy: Documentation of Presence or Absence of Macular Edema and Level of Severity of Retinopathy	Proportion	Patient	2
169	0110	Bipolar Disorder and Major Depression: Appraisal for alcohol or chemical substance use	Proportion	Patient	2
177	1365	Child and Adolescent Major Depressive Disorder (MDD): Suicide Risk Assessment	Proportion	Episode	2
179	XXXX	ADE Prevention and Monitoring: Warfarin Time in Therapeutic Range.	Continuous Variable	Patient	2
182	0075	Ischemic Vascular Disease (IVD): Complete Lipid Panel and LDL Control	Proportion	Patient	3

Table 2 – EH eMeasure Types and Versions

eMeasureID #	NQF #	Title	Type	Patient/Episode	Version
9	0480	Exclusive Breast Milk Feeding	Proportion	Episode	2
26	0338	Home Management Plan of Care (HMPC) Document Given to Patient/Caregiver	Proportion	Episode	1
30	0639	AMI-10: Statin Prescribed at Discharge	Proportion	Episode	3
31	1354	Hearing Screening Prior To Hospital Discharge (EHDI-1a)	Proportion	Episode	2
32	0496	ED-3: Median Time from ED Arrival to ED Departure for Discharged ED Patients	Continuous Variable	Episode	3
53	0163	AMI-8a: Primary PCI Received Within 90 Minutes of Hospital Arrival	Proportion	Episode	2
55	0495	ED-1: Median Time from ED Arrival to ED Departure for Admitted ED Patients	Continuous Variable	Episode	2
60	0164	AMI-7a: Fibrinolytic Therapy Received Within 30 Minutes of Hospital Arrival	Proportion	Episode	2
71	0436	STK-3: Anticoagulation Therapy for Atrial Fibrillation/Flutter	Proportion	Episode	3
72	0438	STK-5: Antithrombotic Therapy By End of Hospital Day 2	Proportion	Episode	2
73	0373	VTE-4: Venous Thromboembolism Patients with Anticoagulation Overlap Therapy	Proportion	Episode	2
91	0437	STK-4: Thrombolytic Therapy	Proportion	Episode	3
100	0142	AMI-2- Aspirin Prescribed at Discharge	Proportion	Episode	2
102	0441	STK-10: Assessed for Rehabilitation	Proportion	Episode	2
104	0435	STK-2: Discharged on Antithrombotic Therapy	Proportion	Episode	2
105	0439	STK-6: Discharged on Statin Medication	Proportion	Episode	2
107	0440	STK-8: Stroke Education	Proportion	Episode	2

eMeasureID #	NQF #	Title	Type	Patient/Episode	Version
108	0371	VTE-1: Venous Thromboembolism Prophylaxis	Proportion	Episode	2
109	0374	VTE-4: Venous Thromboembolism Patients Receiving Unfractionated Heparin with Dosages/Platelet Count Monitoring by Protocol or Nomogram	Proportion	Episode	2
110	0375	VTE-5: Venous Thromboembolism Discharge Instructions	Proportion	Episode	2
111	0497	ED-2: Median Admit Decision Time to ED Departure Time for Admitted Patients	Continuous Variable	Episode	2
113	0469	Elective Delivery	Proportion	Episode	2
114	0376	VTE-6: Incidence of Potentially-Preventable Venous Thromboembolism	Proportion	Episode	2
171	0527	SCIP-INF-1: Prophylactic Antibiotic Received Within One Hour Prior to Surgical Incision	Proportion	Episode	3
172	0528	SCIP-INF-1: Prophylactic Antibiotic Selection for Surgical Patients	Proportion	Episode	3
178	0453	SCIP-INF-9: Urinary catheter removed on Postoperative Day 1 (POD 1) or Postoperative Day 2 (POD 2) with day of surgery being day zero	Proportion	Episode	3
185	0716	Healthy Term Newborn	Proportion	Episode	2
188	0147	PN-6: Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) in Immunocompetent Patients	Proportion	Episode	3
190	0372	VTE-2: Intensive Care Unit Venous Thromboembolism Prophylaxis	Proportion	Episode	2

3 Measure Logic

The posted HQMF artifacts for the 2014 CQMs together with the documentation provided here have a single, correct interpretation that will be assessed as part of the certification process. This section provides clarification and guidance on the correct interpretation of the CQMs, and their implementation. The CQMs have been carefully reviewed so that the intent of the measure stewards is accurately reflected when the measures are interpreted according to the guidance in this document. The logic and data elements for the CQMs are specified using the NQF Quality Data Model.

3.1 Evaluating QDM Logic

The measure specifications are evaluated in a manner that differs from a typical procedural specification. A measure is composed of populations (e.g., Denominator, Numerator, etc), and each population is composed from "lines" of logic that comprise a single AND/OR statement. The order of the lines within a population does not determine the computed result. Within a line, logic is evaluated according to the order of operations described below. The only way to link the events described in one line of logic with those in another line of logic are through the use of specific occurrences, described below.

3.2 Operator Precedence

Within a single AND/OR statement the precedence of operators is as follows:

1. Event code matches value set code (Select procedures from patient based on matching code as defined by the value set)
2. Events filtered by status (active, ordered, resolved)
3. Events filtered by negation (Negation Rationale, I.e. Not done)
4. Events filtered by fields (source, severity, facility location …)
5. Event filtered by temporal references (i.e. Starts After Start, During …)
6. Events filtered by value restriction (I.e. Ejection Fraction > 40%)
7. Event filtered by subset operator (FIRST, SECOND, MOST RECENT)
8. "Assign" the Occurrence

The order of application of the subset operators is *critical*, since the order that subset operators are applied can change the results of execution. For instance, the result of selecting the first procedure and then restricting temporally to 'during the measurement period' could produce a different result than restricting procedures temporally to 'during the measurement period' and then selecting the first such procedure.

3.3 Specific Occurrences

Specific occurrences are the most challenging aspect of the QDM logic from an implementation perspective. In this section we will describe the use and computation of specific occurrences informally. Section 4 describes QDM idioms that incorporate specific occurrences. The document "Implementing Computation of Specific Occurrences" available via the Cypress testing tool website provides additional detail.

3.3.1 Simple Usage of Specific Occurrence

In the measure logic for 2014 CQMs, some occurrences will be labeled as specific occurrences (e.g. "`Occurrence A of Diagnosis, Active: Diabetes`"). When an occurrence is not specified (e.g., "`Diagnosis, Active: Diabetes`"), the measure refers to any instance of that event. When a specific occurrence of an event is specified in multiple clauses linked by AND logic, the logic is only satisfied if the ANDed logical statements evaluate to true using a specific (single) instance of the event.

In the following example (from CMS169/NQF0110) there must be at least one instance of "`BH Outpatient Encounter`" that satisfies both clauses, falling between the measurement start date, and 42 days before the measurement end date.

```
AND: "Occurrence A of Encounter, Performed: BH Outpatient encounter" >=
42 day(s) starts before start of "Measurement End Date"
AND: "Occurrence A of Encounter, Performed: BH Outpatient encounter"
starts after start of "Measurement Start Date"
```

3.3.2 Multiple Specific Occurrences of the Same Event Type

A logical clause may reference other (distinct) specific occurrences of a particular type, or specific occurrences of a different type. The following example from NQF0405 references two specific occurrences of type "`Encounter, Performed: HIV Visit`".

```
AND: "Occurrence A of Encounter, Performed: HIV Visit" during
"Measurement Period"
AND: "Occurrence B of Encounter, Performed: HIV Visit" during
"Measurement Period"
AND: "Occurrence B of Encounter, Performed: HIV Visit" >= 90 day(s)
starts after end of "Occurrence A of Encounter, Performed: HIV Visit"
```

Specific Occurrences of the same type will be referenced with an alphabetically incrementing label (e.g, "Occurrence B"). The order of the labeling does not have *any* significance other than indicating that they represent different instances. Specifically, no temporal relationship is implied by the alphabetical ordering of the occurrences – Occurrence A does not necessarily occur prior to Occurrence B. When a measure references Occurrence A and Occurrence B of an event type (i.e., `Encounter, Performed: HIV Visit`) the logic of the measure will evaluate true when Occurrence A and Occurrence B reference *distinct* instances of an event type. In the example above, the logic is looking for two *different* HIV Visits. Both visits must occur during the measurement period as defined in the first two statements, and one visit ("Occurrence B") must start 90 days or more after an initial visit ("Occurrence A"), as defined in the last statement.

3.3.3 Multiple Specific Occurrences of the Different Event Types

Logic clauses can also reference occurrences of different types. The example below, also from NQF0405, has specific occurrences referencing two different medications and a laboratory test result.

```
AND: "Occurrence A of Medication, Order: Dapsone and pyrimethamine" <=
3 month(s) starts after end of "Occurrence A of Laboratory Test,
Result: CD4+ Count"
AND: "Occurrence A of Medication, Order: Leucovorin" <= 3 month(s)
starts after end of "Occurrence A of Laboratory Test, Result: CD4+
Count"
```

This logic will evaluate to true when a Laboratory Test, Result: CD4+ Count exists such that there are medication orders for "Dapsone and pyrimethamine" and "Leucovorin", and both start within 3 months of the end of the lab test.

3.3.4 Specific Occurrences in OR Clauses and Negations

When multiple logical statements referencing a specific occurrence are joined by an OR clause, the logic can evaluate to true if there is an event that satisfies the specific occurrence that satisfies the logic in *at least one* of the branches of the OR clause. When logical statements containing specific occurrences are used as part of a negated clause (e.g, "AND NOT") the specific occurrence of the event must either evaluate to false for the negated logic clause, or a viable specific occurrence for the event must not exist. In other words, in a negated clause, the specific occurrence must not evaluate to true, or the event must not exist. The case where an event does not exist is important where a specific occurrence is only referenced in negated clauses within a measure. If a specific occurrence is referenced by both negated and non-negated clauses then it must exist for the logic of the measure to hold, and it must evaluate to false for the negated logic.

3.4 Computing Time Intervals

Assessing the relative timing of events within a patient's medical record is an essential part of computing CQMs. To enable unambiguous interpretation of the CQMs clear definition of the computation of time intervals is required. A simple expression such as "the treatment must occur within 3 days of the diagnosis" has a number of possible interpretations, including "the treatment must occur within 72 hours of the diagnosis", and "the treatment must happen within 3 business days of the diagnosis". A mathematical definition of the computation of time durations in conjunction with the temporal operators used in the CQMs is required to support consistent interpretation. This definition is provided in Appendix A, and should be strictly implemented.

3.5 Subset Operators

Subset operators (e.g., FIRST) require a temporally sorted set of events. Timestamps are determined for each event by first looking for an event start time and then looking for an event end time. FIRST extracts the events with the earliest timestamp, MOST RECENT extracts the event with the latest timestamp. When a subset operator is applied to more than one data criteria, then all events are unioned regardless of the conjunction operator, i.e.:

```
FIRST:
     AND Diagnosis A
     AND Diagnosis B
```

Is equivalent to

```
FIRST:
     OR Diagnosis A
     OR Diagnosis B
```

Additionally, subset operators are non-associative operations with respect to other operations used within the QDM. Therefore, the order that subset operators are applied will impact the result of the calculation. Section 3.2 of this document outlines operator precedence in the QDM. Applying subset operators in a different order can change the results of the calculation.

3.5.1 Subset Operators and Specific Occurrences

Applying subset operators to specific occurrences is awkward. Specific occurrences represent a single instance of an event and all conditions logically bound to a specific occurrence must apply to that instance. The single instance nature of specific occurrences is at odds with subset operators such as FIRST, SECOND, MOST RECENT, etc. which act upon sets of events. Essentially this forces specific occurrences to be treated as both a single instance and a set of events as part of measure calculation.

However, subset operators are applied to specific occurrences almost exclusively within the context of a single logical statement. This allows the specific occurrence to be constrained to a single event before calculation progresses beyond the evaluation of a single statement, limiting the impact of having to treat specific occurrences as both a set of events and a single event. The following example shows a specific occurrence with a subset operator applied.

```
AND: FIRST: Occurrence A of X during "Measurement Period"
AND: Occurrence A of X starts after start of Encounter Performed Y
```

In this example, the defined order of operations restricts 'Occurrence A of X' to the first event X during the measurement period and that first event X must have an encounter of type Y that starts after the start of it.

3.6 COUNT Operator Usage

When the COUNT operator is applied to a disjunction of events, it will assess the size of the set of events reflecting the union of the ORed events. In this example, COUNT is used to assess whether there were more than two encounters of types A-D.

```
COUNT > 2
      OR:   Encounter performed: A
      OR:   Encounter performed: B
      OR:   Encounter performed: C
      OR:   Encounter performed: D
```

In some CQMs (e.g., the denominator of EP measure CMS64), COUNT will be applied to determine how many of the OR branches are true. In these cases, the logic has been constructed with a subset operator in each OR branch and assesses the number of encounter *types*, not the total number of encounters.

```
COUNT > 2
      OR:   FIRST: Encounter performed:A
      OR:   FIRST: Encounter performed:B
      OR:   FIRST: Encounter performed:C
      OR:   FIRST: Encounter performed:D
```

3.7 Temporal Logic Operators

Within the QDM, events (e.g., 'Diagnosis, Active') have start and end times. Some events have attributes that include start and end time (e.g., facility location). The QDM temporal operators are statements that relate the intervals defined by these start and end times to each other. Some intervals may only have start or end times specified. An interval with a 'null' start time is considered to have started at the beginning of time, whereas an interval with a 'null' end time is considered to end in the future.

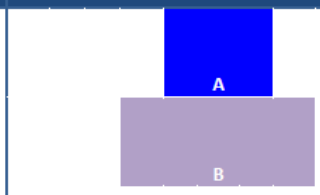
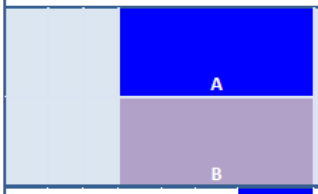
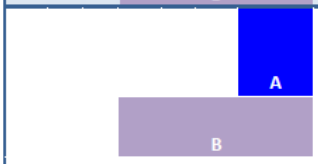
The temporal logic operators in the MU CQMs have strict definitions that differ from standard English usage. For the term "A during B", the definition of during requires that event A start after or concurrent with B, and end before or concurrent with B. In other words, the time interval of event A is *fully contained* within the time interval of B. If A starts before B and ends during or after B, it is not "during" B. To express that "A overlaps B", that is, the time intervals of events A and B intersect, multiple lines of logic are required (see section 4.1).

Note that for "A during B" to be true, A must have specified start and end times. Some data elements in medical records, for example diagnoses of chronic conditions, can be open-ended. Such an event can neither contain another event temporally, or be contained. In other words if a chronic condition, represented without a stop date is event A, there is no event B such that 'A During B', or 'B During A' is true.

Two events are considered “concurrent with” each other only if their start and end times are the same ignoring seconds. (ie. within one minute of each other). This level of time resolution is too precise for most related events in the MU2 CQMs, and thus, the “concurrent with” operator is rarely used.

‘During’, and all other temporal relationships such as “starts before the start of” and “starts after the start of”, are defined in the HL7 v3 Vocabulary Standard. The diagram below provides examples of some of these relationships.

Definitions for During and Concurrent With:

Time Relationships	Illustration	Time Relationships Corresponding to Timeline	Time Relationships Indicator Description
		DURING	A relationship in which the source act's effective time is wholly within the target act's effective time.
		STARTS DURING	A relationship in which the source act's effective time begins within the target act’s effective time.
		ENDS DURING	A relationship in which the source act terminates within the target act’s effective time.
		DURING	A relationship in which the source act's effective time is wholly within the target act's effective time.
		CONCURRENT WITH	A relationship in which the source act's effective time is the same as the target act's effective time.
		DURING	A relationship in which the source act's effective time is wholly within the target act's effective time.
		STARTS AFTER START OF	A relationship in which the source act starts after the start of the target Act
		ENDS CONCURRENT WITH	A relationship in which the source act's effective time ends with the end of the target act's effective time.

4 Common Logic Idioms and their Significance

4.1 A Overlaps B

The “During” operator is defined as a strict containment of the time interval of event A within the time interval of event B. Fairly frequently within the MU2 CQMs, the logic needs to specify that events A and B overlap temporally[1]. In the current collection of CQMs, this is accomplished as follows:

```
AND:      A starts before or during B
AND NOT:  A ends before start of B
```

[1] The overlap operator is an obvious candidate for future extension of the operators used within CQMs.

Here is an example from CMS188/NQF0147:

- `AND NOT: "Patient Characteristic: Clinical Trial Participant" ends before start of "Occurrence A of Encounter, Performed: Encounter Inpatient"`
- `AND: "Patient Characteristic: Clinical Trial Participant" starts before or during "Occurrence A of Encounter, Performed: Encounter Inpatient"`

4.2 Any Past Diagnosis

The presence of a "Diagnosis, Active" at any time prior to an event can be used as an indication of "any past diagnosis". Measure developers used this idiom to detect the presence of some chronic conditions in the medical record prior to the beginning of the measurement period, or prior to an episode of care. Other developers looked for the presence of "Diagnosis, Active" at the start of the measurement period or episode-of-care (see section 4.3). If B is some event of interest, to specify that a Diagnosis of A that preceded B would be written:

```
AND: Diagnosis, Active: A starts before B
```

4.3 Diagnosis Active at a Particular Time

To detect that a Diagnosis D was active at the start of event E (e.g., the start of the measurement period) requires two QDM logic statements and a specific occurrence. The first statement specifies that the diagnosis started prior to T, and the second statement indicates that the diagnosis did not end prior to T. Similar logic could be used to detect that D started during E, and continued through the end of D.

- `AND: "Occurrence A of Diagnosis, Active: D" starts before E`
- `AND NOT: "Occurrence A of Diagnosis, Active: D" ends before start of E`

4.4 Use of Specific Occurrences to Achieve Filtering by Value and Subset

Operator precedence specifies that value restriction filtering precedes the application of subset operators. This introduces some subtlety in interpreting the CQM logic. Let's compare these two pieces of logic:

```
A. MOST RECENT: Lab Result X (result: > 10)
B. AND:  Occurrence A of Lab Result X (result > 10)
   AND:  MOST RECENT: Occurrence A of Lab Result X
```

The statement A will find all Lab Result X's with result>10, and select the most recent instance, whereas statement B will find the most recent Lab Result X, and return true if it's result is > 10.

5 Data Elements and Value Sets

The data elements used in the 2014 CQMs are derived from the Quality Data Model (QDM), 2.1.1.1 October 2012, located on the National Quality Forum (NQF) website:

http://www.qualityforum.org/QualityDataModel.aspx#t=2&s=&p=2%7C.

Further explanation and description of the elements contained in the QDM can be found on that site.

Value Sets – Value Set Authority Center

The National Library of Medicine (NLM), in collaboration with ONC and CMS, maintains the NLM Value Set Authority Center (VSAC) (https://vsac.nlm.nih.gov) The VSAC provides downloadable access to all official versions of vocabulary value sets contained in the 2014 Clinical Quality Measures. The value sets provide lists of the numerical value identifiers and individual names from standard vocabularies used to define the clinical concepts (e.g. diabetes, clinical visit) used in the Clinical Quality Measures.

NLM has an application programming interface (API) to the VSAC content in addition to a web interface. The API Documentation is accessible from the Help tab of the VSAC Web page (https://vsac.nlm.nih.gov). The VSAC also offers a Downloadable Resource Table (DRT), accessible from the Download tab on the VSAC Web page, that provides links to the most recently updated and released 2014 CQM Value Sets as well as to previously released versions. This Downloadable Resource Table provides links to Excel and SVS-compliant XML for all Eligible Hospital (EH), all Eligible Professional (EP), and all EP+EH value sets.

Please note, currently, the VSAC contains some value sets with provisional codes. These provisional codes are preliminary to forthcoming versions of their respective code systems, and the provisional codes will have official versions as the code systems are updated in the near future. In future versions of the measures, these codes will cease to be provisional codes when they are officially released in a version of their code system. The VSAC will be updated on a regular basis as the quality measures are updated.

Access to the Value Set Authority Center requires a free Unified Medical Language System® Metathesaurus License (available at https://uts.nlm.nih.gov/license.html). It is expected that any use of value sets is consistent with these licensing requirements and copyright protections.

Meaningful Use Metadata Portal - United States Health Information Knowledgebase (USHIK)

The Agency for Healthcare Research and Quality (AHRQ), in collaboration with CMS, NLM, and ONC, maintains the Meaningful Use Portal in the United States Health Information Knowledgebase (USHIK) (http://ushik.ahrq.gov). USHIK presents the 2014 clinical quality measures, data elements, and their value sets: including versions from December 2012, April 2013, and June 2013. The 2014 CQM's may be downloaded in HL7's HQMF format (xml), Adobe (pdf), or Excel (xls). The value sets may be downloaded in several formats, including Excel (xls), Adobe (pdf), Integrating the Healthcare Enterprise's Sharing Value Sets format (xml), and comma separated values (csv). For one-stop-shopping in USHIK, you may also obtain a single flat-file format containing all the 2014 CQM clinical data elements and their value sets organized by CQM name and ID and by vocabulary code system (such as ICD-9-CM, SNOMED CT, RxNORM). This flat file is available for download in csv format, in xml format (with schema), and as an Excel spreadsheet.

Using AHRQ's USHIK website to receive public comment, CMS, along with ONC, is releasing draft Clinical Quality Measures that may be used in federal programs. To access and comment on these draft measures, use the menu options in the Meaningful Use portal to navigate to the draft measures. To submit suggestions, questions, or other information regarding a specific measure, click on the "provide feedback" button located at the top of the quality measure's page, fill out the form on the screen and submit. All feedback is sent to CMS and ONC for review.

5.1 QDM Category and Code System

Table 1 "QDM Category and Code System" of the current "Measure Authoring Tool 2013 Update User Guide (February 12, 2013)" document describes the recommended code system for each QDM category. Most data elements are linked to a value set or grouping value set that complies with these recommendations. A small number of data elements could not be represented successfully in the recommended vocabulary due to either

gaps in the vocabulary, or issues with the recommendations. Efforts will continue to bring the published eMeasures into line with the recommendations by either amending the value sets, or the recommendations.

There are a significant number of data elements that are represented by extensional value sets in a single code system. This occurs most frequently with encounters, where the measure developer has chosen to "OR" sub-clauses rather than use a grouping value set. An example can be found in the Initial Patient Population for CMS131/NQF0055, where 6 distinct types of encounter, each linked to a grouped value set supporting a single code system, are ORed together. Together, these 6 types of encounter provide codes that cover the recommended code system – SNOMED – as well as the transitional code systems (CPT and HCPCS).

There are a small number of data elements that could not be accurately represented across multiple code systems due to inherent representational differences between code systems. For example, CMS9/NQF480, is challenged because the concept "Single Liveborn Newborn Born in Hospital" cannot be represented in the recommended code system -- SNOMED. This leads to branching of the logic, with one branch supporting SNOMED, and the other supporting ICD9 and ICD10.

Users of the 2014 CQMs are encouraged to report suggested additions and deletions to data elements both within value sets and between code systems using the JIRA Clinical Quality Measures Feedback System at www.healthIT.gov/qualityfeedback .

5.2 Drug Representations used in Value Sets

In the 2014 CQMs, all value sets referring to specific medications use generalized drug terms (for example, RxNorm semantic clinical drugs). It is expected that vendors/providers will report drug entities using generalized drug concepts consistent with those included in the defined value sets. This is in accordance with guidance from CMS regarding the preferred use of generalized drug concepts. Implementers should utilize RxNorm relationships to support mapping between specific drug entities found in patient records to those found in the value sets provided.

5.3 Discharge Medications

The use of "Medication, Discharge" has a very specific meaning in the 2014 EH measures. It refers to medications that are on the patient's Discharge Medication List. It should not be confused with medications that are active at the time of discharge. "Medication, Discharge" events should start and end within the time duration of the episode of care even though the medication itself may not be started until after the episode ends. It is expected that, at the time of discharge, that discharge medications will be the same as the subsequent home medication lists but this cannot be assumed at the time of admission as changes may have occurred since the prior episode of care.

Example logic:

"Medication, Discharge: value set "during" Occurrence A of Encounter, Performed: value set"

Vendors/providers generating Quality Reporting Document Architecture (QRDA)-1 output will need to generate "Medication, Discharge" events for all medications on the discharge list with appropriate time stamps to enable the correct function of measure logic.

(See http://www.hl7.org/documentcenter/public/standards/dstu/CDAR2_QRDA_DSTUR2_2012JUL.zip.)

5.4 Medication Allergy

In the initial publication of the 2014 eMeasures, medications were coded using generic terms for specific drug entities. There are a variety of ways to capture medications for allergies in the field. Vendor and implementer

feedback has indicated that medication concepts used to represent allergy and intolerance data in EHR records are typically based on ingredient or equivalent types of concept and not the more detailed “prescribable” representations using discrete drug concepts that include form and strength. In addition, hospital inpatient medications may not be as specified as specific drug entities for reasons related to inpatient pharmacy substitutions. Despite being frequently captured using drug ingredients or other concepts, previously published 2014 eMeasures contained specific medication entities in the value sets used to represent allergies and hospital inpatient medications.

Specifically, in the 2014 v1 eMeasures, measure clauses used to identify patients with an allergy / intolerance to medication agents utilize the same value sets as clauses that identify medication orders and administration (i.e. specific drug entities). For eMeasures updated in April and June 2013, measures that previously contained allergy and intolerance measure clauses now reference value sets that contain the ingredient-type RxNorm medication concepts appropriate for each measure in the same clauses.

With this updated annual release that includes updated allergy-focused value sets and updated measures that reference those value sets, CMS/ONC has implemented the following:

1) All measures that reference allergy value sets have been be updated to reference newly created value sets that contain appropriate medication codes from RxNorm that are aligned to ingredient-level concepts. Users can utilize RxNorm relationships to link ingredients to specific drug entities. The reactions to substances are findings and should be expressed using diagnosis codes, usually SNOMED CT

2) Test cases developed by ONC to test vendor systems will have codes from the published value sets that are appropriate to the measure version. Therefore, for systems conformant to the original v1 measures published in December 2012, they will retain detailed medications as a description of the specific drug entity the patient is allergic/intolerant to. For systems that are conformant to the versions released with April and June 2013 annual updates, drug allergy concepts will be defined as ingredient-level concepts and the value sets will reflect codes that identify drug ingredients.

These changes in the updated value sets and measures should resolve the need for implementers to map patent allergy data to concepts to a more specific drug concept.

5.5 Principal Diagnosis in Inpatient Encounters

The use of “Diagnosis, Active (ordinarily: Principal)” has a specific meaning in the 2014 measures for hospitals and should be consistent with its definition in the Uniform Hospital Discharge Data Set (UHDDS) as "that condition established after study to be chiefly responsible for occasioning the admission of the patient to the hospital for care". It refers to the Principal Diagnosis of an episode of care, as defined above. This is typically determined at or after discharge time by a coder, and is used for the billing transaction. In EHRs, the Principal Diagnosis is typically chosen from among the diagnoses that were active during the encounter and if consistent with the UHDDS definition should be labeled as “Principal. For the purpose of measure computation, the principal diagnosis should be considered to start during the episode of care.

Admission and discharge diagnoses cannot be expressed using current data elements and will be expressed using timing of active diagnoses at the start or end of the episode of care. The admission or discharge diagnoses recorded by the provider should not be used as a substitute for the principal diagnosis unless they are concordant with the principal diagnosis as defined by CMS.

Vendors and providers generating QRDA-1 output will need to label diagnoses appropriately to enable the measure logic to function correctly. Although it is clinically possible for the principal diagnosis to commence prior to the episode of care, the principal diagnosis should **always** be reported with a QRDA-I entry that starts **during** the episode of care.

5.6 Principal Procedure in Inpatient Encounters

The use of “Procedure, Performed (ordinarily: Principal)” has a very specific meaning in the 2014 EH measures. It refers to the principal procedure during an episode of care, as defined by CMS. This is typically determined at or after discharge time, and is used for the billing transaction. The principal procedure is typically chosen from among the procedures performed during the encounter. The procedure that is chosen (post-discharge) as the principal procedure should be labeled as 'Principal', and the timing should reflect the timing of the actual procedure.

Vendors/providers generating QRDA-1 output will need to label procedures appropriate to enable the measure logic to function correctly.

5.7 Medical Reason, Patient Reason, System Reason

Because of limitations in EHRs and use of free text in some record systems, it may be difficult to capture certain data elements that should exclude patients or components of care (e.g., medication administration, physician order not done) from a measure. The use of negation to identify these exclusions is modeled using the concepts of medical reason, patient reason, and system reason and when deemed appropriate by providers, is selected to attest to the reason for the exclusion. For example, a rare but relevant comorbidity would be a medical reason for exclusion, whereas a patient’s religious preference would be a patient reason for exclusion. It is intended that these concepts be used only when the record has a documented reason for exclusion. Although it is not necessary to report that reason electronically, it is expected that there is a legitimate medical, patient or system reason for exclusion. A negation attribute may be used to identify situations where an action did not occur or was not observed for a documented reason. Modeling of negation uses AND NOT to identify NULL values when an action was not performed for a medical, patient or system reason.

Vendors/providers using these concepts are expected to have a documented reason for these exclusions and could be expected to demonstrate the relevant documentation if audited.

5.8 Clinical Trial Participation

Participation in a clinical trial may be a clinical reason to exclude a patient from an expected course of action in some 2014 measures; however, only participation in certain types of trials may be relevant based on the steward’s intent. Due to limitations in data from EHRs, the specific nature of clinical trial participation cannot be captured in the 2014 CQMs. Therefore, in the 2014 CQMs, the code “clinical trial participant” refers to any participation in a clinical trial and therefore all trial participants of any type should be excluded when this term is present. An alternative method of expressing clinical trial participant exclusions via the terms “medical reason” or “patient reason” should be used as exclusions only when providers deem that clinical trial participation is relevant to their exclusion from the measure.

Where the measure steward requested clinical trial participant remain in the electronic specifications, the eCQM intends to exclude any patient participating in any clinical trial. The 2014 CQMs will not certify to clinical trial participation type and therefore it is not expected to be captured unless used as a medical reason for exclusion (see Section 5.7 above).

5.9 Newborn/Gestational Age

Three of the 2014 measures are designed to be used in the encounter including birth or immediately after birth. In the 2014 specifications, a newborn at term indicates the gestational age is ≥ 37 weeks.

Vendors/providers generating QRDA-1 output are expected to capture gestational age for all neonates using the gestational age codes from SNOMED CT.

5.10 Source

Current attributes in the 2014 measures do not allow the electronic expression of the source of a diagnosis (e.g., a nurse versus a physician) and the measures have been structured so that this information is not required at this time for certification. Although the intent of some measures is to use information from a specific source, this is not captured in the 2014 stage of eMeasures and will not be included in certification. It is expected that the ability to electronically capture the source of a data element will be incorporated into future stages of eMeasures.

5.11 Supplemental Value Sets Representing Race

The Meaningful Use 2 rule objectives state that:

Objective § 170.314 (a)(3) an EHR should be able to record that a patient declined to specify his/her race and ethnicity. The CDC value sets for race and ethnicity do not contain code(s) for 'Patient Decline'.

However, QRDA-1 rules based on CDA requirements limit the VS to the CDC VS "Race" 2.16.840.1.113883.1.11.14914 containing the following codes:

Code	Description
1002-5	American Indian or Alaska Native
2028-9	Asian
2054-5	Black or African American
2076-8	Native Hawaiian or Other Pacific Islander
2106-3	White
2131-1	Other Race

Because it is not possible to explicitly include codes in the eMeasures for “Unknown” and “Patient Decline”, the CDC “Race” value set will remain for the time being as the only supplemental VS representing race for all 2014 CMS eCQMs: 2.16.840.1.113883.1.11.14914. An alternate method of capturing “Unknown” or race that cannot be captured can be performed using the “nullFlavor” below.

To communicate that a demographic element is unknown or that the patient declined to provide the information, use the built in “nullFlavor” feature of QRDA designed for this purpose. The nullFlavor feature works for race, ethnicity, preferred language, and other cases where the QRDA calls for a value from a value set.

Normally one would communicate race in a QRDA like this:

```
<raceCode code="2106-3" displayName="White"codeSystem="2.16.840.1.113883.6.238"/>
```

Where the value in unknown, QRDA allows for a “nullFlavor”, which can be used for any coded value, like this:

```
<raceCode nullFlavor="UNK"/>
```

Future updates to the CQM specifications will attempt to improve alignment of this data element with other incentive programs such as the Physician Quality Reporting Program, in an effort to reduce the burden on providers reporting on multiple programs using quality measures.

6 2014 Measure Guidance by CMS ID Measure Number

6.1 Eligible Hospital (EH) Measures

6.1.1 Measure 9v1: Exclusive Breast Milk Feeding, NQF 0480, BF_ExclusiveBreastFeed

For measure 9, the intent is to apply the measure only to single newborns born in the hospital and at term, d3efined as gestational age ≥ 37 weeks.

Maternal reasons for not exclusively breastfeeding are limited to the following situations:

- HIV infection
- Human t-lymphotrophic virus type I or II
- Substance abuse and/or alcohol abuse
- Active, untreated tuberculosis
- Taking certain medications, i.e., prescribed cancer chemotherapy, radioactive isotopes, antimetabolites, antiretroviral medications and other medications where the risk of morbidity outweighs the benefits of breast milk feeding
- Undergoing radiation therapy
- Active, untreated varicella
- Active herpes simplex virus with breast lesions
- Admission to Intensive Care Unit (ICU) post-partum

A discharge to a designated cancer center or children's hospital should be captured as a discharge to another hospital.

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

The logic phrase AND: "Occurrence A of Encounter, Performed: Inpatient Encounter (reason: 'Birth')" intends to capture admission type of newborn for the encounter. Where this information is available in existing EHR structured fields (e.g. data that is fed to UB-04, field location 14), it can be used to map the criterion specified in the logic.

The logic phrase AND: "Diagnosis, Active: Liveborn Born In Hospital" starts during "Occurrence A of Encounter, Performed: Inpatient Encounter" intends to capture the point of origin for the inpatient admission. Where this information is available in existing EHR structured fields (e.g. data that is fed to UB-04, field location 15), it can be used to map the criterion specified in the logic.

6.1.2 Measure 26v1: Home Management Plan of Care (HMPC) Document Given to Patient/Caregiver, NQF 0338, HMPC_HomeCareDoc

The home management plan of care document should be a separate and patient-specific written instruction. The document must be present in the form of an explicit and separate document specific to the patient rather than components or segments of the plan spread across discharge instruction sheets, discharge orders, education sheets, or other instruction sheets.

The home management plan of care is represented in the eMeasure logic by a LOINC code for an asthma action plan document. This form, or equivalent, contains most of the components required for the home management plan of care, including information on:

- Methods and timing of rescue actions: the home management plan of care addresses what to do if asthma symptoms worsen after discharge, including all of the following: 1) When to take action, i.e., assessment of severity (e.g., peak flow meter reading, signs and symptoms to watch for); 2) What specific steps to take, i.e., initial treatment instructions (e.g., inhaled relievers up to three treatments of 2-4 puffs by MDI at 20-minute intervals or single nebulizer treatment); 3) Contact information to be used, when an asthma attack occurs or is about to occur.
- Appropriate use of long-term asthma medications (controllers), including the medication name, dose, frequency, and method of administration.
- Appropriate use of rescue, quick-relief, or short acting medications of choice to quickly relieve asthma exacerbations (relievers), including the medication name, dose, frequency, and method of administration.
- Environmental control and control of other triggers: information on avoidance or mitigation of environmental and other triggers.

In addition to the information outlined in the asthma action plan form (or equivalent document), the home management plan of care is required to include information regarding arrangements for referral or follow-up care with a healthcare provider, namely:

- If an appointment for referral or follow-up care with a healthcare provider has been made, the home management plan of care is required to include the provider/clinic/office name, as well as the date and time of the appointment.
- If an appointment for referral of follow-up care with a healthcare provider has NOT been made, the home management plan of care is required to include information for the patient/caregiver to be able to make arrangements for follow-up care, i.e., provider/clinic/office name, telephone number and time frame for appointment for follow-up care (e.g., 7-10 days).

The home management plan of care can only be considered to comply with the criteria outlined in the measure logic if it meets the requirements outlined above and is appropriately filled-out with information specific to the patient. Although the components of the care plan do not need to be electronically reported, it is expected that the plan given to the patient would include the elements above if the record was to be audited.

6.1.3 Measure 30v2: Statin Prescribed at Discharge, NQF 0639, AMI10_StatinMed

The measurement period is one calendar year but the reporting period is 3 months as a calendar quarter; Q1 is Jan – Mar, Q2 is Apr – Jun, Q3 is Jul – Sep, Q4 is Oct – Dec.

Exclusion element guidance:

The intent for the exclusion for patients who are clinical trial participants was to be limited to patients participating in a clinical trial for acute myocardial infarction (AMI), ST elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (non-STEMI), heart attack, or acute coronary syndrome (ACS), the same conditions as covered by the measure. However, the value set specifying clinical trial participation is not limited to a specific type of trial; therefore, this piece of logic will not be included in certification testing or reviewed on audit at this time.

Medical, patient, or system reasons for not performing a test or giving a medication are categories for valid medical, patient, or system reasons that are not specifically listed in the exclusion section of the measure. Each is expected to be captured and made available for measurement or clinical decision support within the EHR workflow but the exact method or location of capture is a local or vendor decision.

6.1.4 Measure 31v1: Hearing Screening Prior to Hospital Discharge (EHDI-1a), NQF 1354, EHDI_1a_HearScreen

The measurement period is one calendar year but the reporting period is jurisdictionally defined.

The logic phrase AND: “Occurrence A of Encounter, Performed: Inpatient Encounter (reason: 'Birth')” intends to capture admission type of newborn for the encounter. Where this information is available in existing EHR

structured fields (e.g. data that is fed to UB 04, field location 14), it can be used to map the criterion specified in the logic.

The logic phrase AND: "Diagnosis, Active: Liveborn Born In Hospital" starts during "Occurrence A of Encounter, Performed: Inpatient Encounter" intends to capture the point of origin for the inpatient admission. Where this information is available in existing EHR structured fields (e.g. data that is fed to UB-04, field location 15), it can be used to map the criterion specified in the logic.

6.1.5 Measure 32v2: Median Time from ED Arrival to ED Departure for Discharged ED Patients, NQF 0496, ED3_MedianTime

This measure uses a continuous variable. The specification provides elements from the clinical electronic record required to calculate for each ED encounter, i.e., the length of time the patient was in the Emergency Department, also stated as: the Emergency Department departure time minus the Emergency Department arrival time. The calculation requires the median of all ED encounter durations. This measure specification defines how to determine an individual Emergency Department stay. Reporting requires the median of all patient stays ([Encounter: encounter ED].departuredatetime - [Encounter: encounter ED].arrivaldatetime).

The measurement period is one calendar year but the reporting period is 3 months as a calendar quarter; Q1 = Jan – Mar, Q2 = Apr – Jun, Q3 = Jul – Sep, Q4 is Oct – Dec.

Additional guidance on ED Throughput is available on the CMS website at: http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityMeasures/downloads/EH_EDThroughputStratificationTable.pdf

6.1.6 Measure 53v1: Primary PCI Received within 90 Minutes of Hospital Arrival, NQF 0163, AMI8a_PrimaryPCI

The measurement period is one calendar year but the reporting period is 3 months as a calendar quarter; Q1 = Jan – Mar, Q2 = Apr – Jun, Q3 = Jul – Sep, Q4 is Oct – Dec.

Denominator element guidance:

The denominator and numerator criteria indicate scenarios in which the patient is admitted to the hospital directly or the patient is admitted from the Emergency Department (ED). The calculation is to indicate the timing from arrival at the facility to the occurrence of an event.

For the denominator data element "Diagnostic Study, Result: Hospital Measures-ECG Impression" EHR implementations will need to develop mechanisms to capture ECG findings to support denominator criteria for this measure. The measure specification indicates allowable findings. The source of the ECG results should be a physician/APN/PA diagnostic interpretation (rather than the ECG machine's computerized results which may not be electronically captured). Because the result of the ECG must be interpreted by a clinician, it results in a clinical diagnosis and unlike test results, can therefore be captured using diagnostic codes from SNOMED CT as well as ICD 9/10.

CMS anticipates a future move towards limiting the use of interpreted test results to SNOMED CT coding, when possible, to align with guidance requiring the use of LOINC codes for tests and SNOMED CT for test results.

Numerator element guidance:

This measure expects a PCI procedure within 90 minutes of hospital arrival. Those patients receiving PCI procedures greater than 90 minutes after arrival may be excluded from the denominator only if there is a documented reason for a delay or documented occurrence of intubation, cardiopulmonary arrest or mechanical circulatory assist device placement within the first 90 minutes after arrival. Patients receiving PCI procedures greater than 90 minutes after arrival and with no reason provided are not compliant with the numerator criteria and will remain in the denominator.

Exclusion element guidance:

The intent for the exclusion for patients who are clinical trial participants was to be limited to patients participating in a clinical trial for acute myocardial infarction (AMI), ST elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (non-STEMI), heart attack, or acute coronary syndrome (ACS), the same conditions as covered by the measure. However, the value set specifying clinical trial participation is not limited to a specific type of trial; therefore, this piece of logic will not be included in certification testing or reviewed on audit at this time.

Transfers from another hospital are excluded since care may have been delivered in the other setting. Transfers from those hospitals are considered exclusions regardless of whether the receiving hospital has the same or different hospital unique identifier as the transferring hospital. PCI procedures analyzed in this measure must be primary procedures. Primary includes emergent or urgent PCI procedures and not those described by the physician/APN/PA anywhere in the record as elective, not emergent, not immediate, not primary, not urgent, or secondary.

From a clinical standpoint, Primary PCI is loosely defined as percutaneous coronary intervention performed in the acute setting in patients with ST segment elevation MI which is intended to restore perfusion in the infarct-related artery. In randomized trials and observational studies, this therapy is associated with significant reductions in the risks of adverse events, including death, in selected patients with STEMI.

6.1.7 Measure 55v1: Median Time from ED Arrival to ED Departure for Admitted Patients, NQF 0495, ED1

This measure specification defines how to determine an individual Emergency Department stay. Reporting requires the median of all patient stays: [Encounter: encounter ED]*arrival date and time – [Encounter: encounter ED]*ED departure date and time.

Calculate the ED time in minutes for each person in the measure population; report the median time for all calculations performed. The specification provides elements from the clinical electronic record required to calculate for each ED encounter, i.e., the length of time the patient was in the Emergency Department, also stated as: the TIMEDIFF for the Emergency Department departure time minus the Emergency Department arrival time. The calculation requires the median across all ED encounter durations

Additional guidance on ED Throughput is available on the CMS website at: http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityMeasures/downloads/EH_EDThroughputStratificationTable.pdf

6.1.8 Measure 60v1: Fibrinolytic Therapy Received Within 30 Minutes of Hospital Arrival, NQF 0164, AMI7a_FibrinolyticTher

The measurement period is one calendar year but the reporting period is 3 months as a calendar quarter; Q1 = Jan – Mar, Q2 = Apr – Jun, Q3 = Jul – Sep, Q4 is Oct – Dec.

Denominator element guidance:

The denominator and numerator criteria indicate scenarios in which the patient is admitted to the hospital directly or the patient is admitted from the Emergency Department (ED). The calculation is to indicate the timing from arrival at the facility to the occurrence of an event.

For the denominator data element "Diagnostic Study, Result: Hospital Measures-ECG," EHR implementations will need to develop mechanisms to capture ECG findings to support denominator criteria for this measure. The measure specification indicates allowable findings. The source of the ECG results should be a physician/APN/PA (rather than the ECG machine's computerized results) although this is not expected to be electronically captured. Because the result of the ECG must be interpreted by a clinician, it results in a diagnosis and therefore, unlike test results, can be captured using diagnostic codes from SNOMED as well as ICD 9/10.

Numerator element guidance:

This measure expects fibrinolytic therapy within 30 minutes of hospital arrival. Those patients receiving fibrinolysis greater than 30 minutes after arrival may be excluded from the denominator only if there is a documented reason for a delay or documented occurrence of intubation, cardiopulmonary arrest or mechanical circulatory assist device placement within the first 30 minutes after arrival. Patients receiving fibrinolysis greater than 30 minutes after arrival and with no reason provided are not compliant with the numerator criteria and will remain in the denominator.

Exclusion element guidance:

The intent for the exclusion for patients who are clinical trial participants was to be limited to patients participating in a clinical trial for acute myocardial infarction (AMI), ST elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (non-STEMI), heart attack, or acute coronary syndrome (ACS), the same conditions as covered by the measure. However, the value set specifying clinical trial participation is not limited to a specific type of trial; therefore, this piece of logic will not be included in certification testing or reviewed on audit at this time.

Transfers from another hospital are excluded since care may have been delivered in the other setting. Transfers from those hospitals are considered exclusions regardless of whether the receiving hospital has the same or different hospital unique identifier as the transferring hospital.

6.1.9 Measure 71v2: Anticoagulation Therapy for Atrial Fibrillation/Flutter, NQF 0436, Stroke3

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

The facility location arrival datetime and facility location departure datetime are coupled with the emergency department visit value set. They intend to represent arrival date/time at the emergency department and the discharge date/time from the emergency department, respectively.

The “Non-elective admissions” value set intends to capture all non-scheduled hospitalizations. This value set is a subset of the “Inpatient encounter” value set, excluding concepts that specifically refer to elective hospital admissions. Non-elective admissions include emergency, urgent and unplanned admissions, including patients admitted for observation.

6.1.10 Measure 72v1: Antithrombotic Therapy by End of Hospital Day 2, NQF 0438, Stroke5

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

The facility location arrival datetime and facility location departure datetime are coupled with the emergency department visit value set. They intend to represent arrival date and time at the emergency department and the discharge date and time from the emergency department, respectively.

6.1.11 Measure 73v1: Venous Thromboembolism Patients with Anticoagulation Overlap Therapy, NQF 0373, VTE3

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the

measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

For date difference calculations, use the LAST (most recent) of the alternative dates as the end date and the EARLIEST of the alternative dates as the start date.

6.1.12 Measure 91v2: Thrombolytic Therapy NQF 0437, Stroke4

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

The facility location arrival datetime and facility location departure date-time are coupled with the emergency department visit value set. They intend to represent arrival date-time at the emergency department and the discharge date-time from the emergency department, respectively.

The baseline state data value set and its associated stop datetime intend to capture the date and time prior to hospital arrival at which it was witnessed or reported that the patient was last known to be without the signs and symptoms of the current stroke or at his or her baseline state of health

6.1.13 Measure 100v1: Aspirin Prescribed at Discharge, NQF 0142, AMI2_AspirinAtDisch

The measurement period is one calendar year but the reporting period is 3 months as a calendar quarter; Q1 = Jan – Mar, Q2 = Apr – Jun, Q3 = Jul – Sep, Q4 is Oct – Dec.

Exclusion element guidance:

The intent for the exclusion for patients who are clinical trial participants was to be limited to patients participating in a clinical trial for acute myocardial infarction (AMI), ST elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (non-STEMI), heart attack, or acute coronary syndrome (ACS), the same conditions as covered by the measure. However, the value set specifying clinical trial participation is not limited to a specific type of trial; therefore, this piece of logic will not be included in certification testing or reviewed on audit at this time.

6.1.14 Measure 102v1: Assessed for Rehabilitation, NQF 0441, Stroke10

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

6.1.15 Measure 104v1: Discharged on Antithrombotic Therapy, NQF 0435, Stroke2

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

The facility location arrival datetime and facility location departure datetime are coupled with the emergency department visit value set. They intend to represent arrival date/time at the emergency department and the discharge date/time from the emergency department, respectively.

The “Non-elective admissions” value set intends to capture all non-scheduled hospitalizations. This value set is a subset of the “Inpatient encounter” value set, excluding concepts that specifically refer to elective hospital

admissions. Non-elective admissions include emergency, urgent and unplanned admissions, including patients admitted for observation.

6.1.16 Measure 105v1: Discharged on Statin Medication, NQF 0439, Stroke6

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

The facility location arrival date-time and facility location departure date-time are coupled with the emergency department visit value set. They intend to represent arrival date-time at the emergency department and the discharge date-time from the emergency department, respectively.

Lipid-lowering medications are intended as active home medications that the patient may or may not continue to take during hospitalization.

The “Non-elective admissions” value set intends to capture all non-scheduled hospitalizations. This value set is a subset of the “Inpatient encounter” value set, excluding concepts that specifically refer to elective hospital admissions. Non-elective admissions include emergency, urgent and unplanned admissions, including patients admitted for observation.

6.1.17 Measure 107v1: Stroke Education, NQF 0440, Stroke8

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

The facility location arrival date-time and facility location departure date-time are coupled with the emergency department visit value set. They intend to represent arrival date-time at the emergency department and the discharge date-time from the emergency department, respectively.

Communication from provider to patient regarding educational components (activation of emergency medical system, follow-up after discharge, medications prescribed at discharge, risk factors and signs and symptoms) are intended to be specific to stroke. In addition, written information given to the patient should be specific to stroke as well, and address each and every one of the educational components.

The “Non-elective admissions” value set intends to capture all non-scheduled hospitalizations. This value set is a subset of the “Inpatient encounter” value set, excluding concepts that specifically refer to elective hospital admissions. Non-elective admissions include emergency, urgent and unplanned admissions, including patients admitted for observation.

6.1.18 Measure 108v1: Venous Thromboembolism Prophylaxis, NQF 0371, VTE1

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

When unfractionated heparin is not administered due to medical reasons, the intended administration route is subcutaneous.

The facility location arrival datetime and facility location departure datetime are coupled with the emergency department visit value set. They intend to represent arrival date/time at the emergency department and the discharge date/time from the emergency department, respectively.

The value set used for "Medication Administered" is intended to examine actual medication administration, not medication orders. The measure criteria asks whether medication has been given to the patient or not, and, if not, is there a documented reason in the EHR. Since the measure looks for the evidence of medication administered was or was not administered, the measure does not use medication order data.

Numerator criteria for this measure do not exclusively provide the standard of care for VTE prophylaxis. In addition to recommended forms of VTE prophylaxis, numerator criteria include a number of clinical scenarios where the administration of the recommended forms of prophylaxis would not be needed or appropriate.

Recommended forms of VTE prophylaxis include:

- Pharmacological forms of VTE prophylaxis:
    - Subcutaneous unfractionated heparin
    - Low molecular weight heparin
    - Warfarin
    - Injectable Factor Xa inhibitor
- Mechanical forms of prophylaxis:
    - Intermittent pneumatic compression devices
    - Venous foot pumps
    - Graduated compression stockings

Exceptional clinical scenarios where the administration of the recommended forms of prophylaxis would not be needed or appropriate include:

- Patient is on IV heparin
- Certain patients on oral Factor Xa Inhibitor: patients an active or inactive diagnosis of atrial fibrillation/flutter, patients who had a prior hip or knee replacement and patients with a prior active or inactive diagnosis of venous thromboembolism
- Patients on direct thrombin inhibitors

In future versions of the electronic specifications, these fundamentally distinct criteria will be segregated to provide a clear distinction of the appropriate standard of care vs. exceptional clinical scenarios.

6.1.19 Measure 109v1: Venous Thromboembolism Patients Receiving Unfractionated Heparin with Dosages/Platelet Count Monitoring by Protocol or Nomogram, NQF 0374, VTE4

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

The facility location arrival datetime and facility location departure datetime are coupled with the emergency department visit value set. They intend to represent arrival date and time at the emergency department and the discharge datetime from the emergency department, respectively.

Treatment adjustment by protocol and/or use of a clinical pathway must be specific to unfractionated heparin therapy. Heparin protocols and clinical pathways may include use of a nomogram.

6.1.20 Measure 110v1: Venous Thromboembolism Discharge Instructions, NQF 0375, VTE5

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

Written information given to the patient is required to address each and every one of the educational components. These components are modeled in the population criteria and data criteria as communications from provider to patient regarding: adverse reactions and interactions; INR monitoring and medication compliance; and dietary advice and follow-up monitoring and are inscipended to be specific to discharge instructions for warfarin therapy. The educational components are intended as discharge instructions and not as verbal education.

6.1.21 Measure 111v1: Median Admit Decision Time to ED Departure Time for Admitted Patients, NQF 0497, ED2

This measure specification defines how to determine an individual Emergency Department stay. Reporting requires the median of all patient stays [Encounter: encounter ED]. decisiontoadmitdateandtime -[Encounter: encounter ED]. EDdeparturedateandtime.

Calculate the ED time in minutes for each person in the measure population and report the median time for all calculations performed. The specification provides elements from the clinical electronic record required to calculate for each ED encounter, i.e., the length of time the patient was in the Emergency Department from the time of decision to admit, also stated as: the TIMEDIFF for the Emergency Department departure time minus the Decision to Admit Time. The calculation requires the median across all ED encounter durations.Additional guidance on ED Throughput is available on the CMS website at: http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityMeasures/downloads/EH_EDThroughputStratificationTable.pdf

6.1.22 Measure 113v1: Elective Delivery, NQF 0469, PC01

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

Wherever the gestational age is mentioned with relative timing to delivery, the intent is to capture gestational age documented on the day of delivery but prior to delivery.

Gestational age should be rounded off to the nearest completed week, not the following week. For example, an infant born on the 5th day of the 36th week (35 weeks and 5/7 days) is at a gestational age of 35 weeks, not 36 weeks.

The denominator inclusion of patients with a gestational age of 37 or 38 weeks, or gestational age unknown, or gestational age not documented, is achieved implicitly by excluding patients with a gestational age of <37 weeks or >= 39 weeks.

The numerator inclusion for patients with gestational age unknown or not documented in the medical record is achieved by modeling patients who do not have a gestational age of 37 or 38 weeks.

6.1.23 Measure 114v1: Incidence of Potentially-Preventable Venous Thromboembolism, NQF 0376, VTE6

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the

measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

The facility location arrival datetime and facility location departure date-time are coupled with the emergency department visit value set. They intend to represent arrival date and time at the emergency department and the discharge date and time from the emergency department, respectively.

When unfractionated heparin is not administered due to medical reasons, the intended administration route is subcutaneous.

6.1.24 Measure 171v2: Prophylactic Antibiotic Received Within One Hour of Surgical Incision, NQF 0527, SCIPINF1_AntibioticPriorIncision

The measurement period is one calendar year but the reporting period is 3 months as a calendar quarter; Q1 = Jan – Mar, Q2 = Apr – Jun, Q3 = Jul – Sep, Q4 is Oct – Dec.

Denominator Exclusion guidance:

The exclusion for patients who are clinical trial participants is limited to patients participating in a clinical trial for the same conditions as covered by the measure. Other clinical trials are not valid reasons for exclusions.

The intent for the exclusion for patients who are clinical trial participants was to be limited to patients participating in a clinical trial for coronary artery bypass graft surgery, other cardiac surgeries, hip arthroplasty surgery, knee arthroplasty surgery, colon surgery, abdominal or vaginal hysterectomy or vascular surgeries, the same conditions as covered by the measure. However, the value set specifying clinical trial participation is not limited to a specific type of trial; therefore this piece of logic will not be included in certification testing or reviewed on audit at this time.

6.1.25 Measure 172v2: Prophylactic Antibiotic Selection for Surgical Patients, NQF 0528, SCIPINF2_AntibioticForSurg

The measurement period is one calendar year but the reporting period is 3 months as a calendar quarter; Q1 = Jan – Mar, Q2 = Apr – Jun, Q3 = Jul – Sep, Q4 is Oct – Dec.

Denominator Exclusion guidance:

The exclusion for patients who are clinical trial participants is limited to patients participating in a clinical trial for the same conditions as covered by the measure. Other clinical trials are not valid reasons for exclusions.

The intent for the exclusion for patients who are clinical trial participants was to be limited to patients participating in a clinical trial for coronary artery bypass graft surgery, other cardiac surgeries, hip arthroplasty surgery, knee arthroplasty surgery, colon surgery, abdominal or vaginal hysterectomy or vascular surgeries, the same conditions as covered by the measure. However, the value set specifying clinical trial participation is not limited to a specific type of trial; therefore this piece of logic will not be included in certification testing or reviewed on audit at this time.

Numerator element guidance:

Vancomycin is acceptable for CABG, other cardiac procedures, hip arthroplasty, knee arthroplasty and vascular surgery if there is an increased MRSA rate facility-wide or operation-specific. For the purpose of using vancomycin for prophylaxis, it is expected that vancomycin is given ONLY if one of the allowable conditions is TRUE.

6.1.26 Measure 178v2: Urinary Catheter Removed on Postoperative Day 1 (POD1) or Postoperative Day 2 (POD2) with Day of Surgery Being Zero, NQF 0453, SCIPINF9_UrinaryCathRemoved

The measurement period is one calendar year but the reporting period is 3 months as a calendar quarter; Q1 = Jan – Mar, Q2 = Apr – Jun, Q3 = Jul – Sep, Q4 is Oct – Dec.

General guidance:

In this measure the code lists that describe types of surgical procedures remain only in ICD-9 or ICD-10 because the concepts that apply are limited to a very specific subset of all surgical procedures.

Denominator element guidance:

The denominator in this measure specifically excludes surgical procedures that may be associated with post-operative indwelling urinary catheter usage and that occur in close time proximity to the index major surgical procedure.

Exclusion element guidance:

The exclusion for patients who are clinical trial participants is limited to patients participating in a clinical trial for the same conditions as covered by the measure. Other clinical trials are not valid reasons for exclusions.

The intent for the exclusion for patients who are clinical trial participants was to be limited to patients participating in a clinical trial for the same conditions as covered by the measure. However, the value set specifying clinical trial participation is not limited to a specific type of trial; therefore, this piece of logic will not be included in certification testing or reviewed on audit at this time.

By convention, discharge date post "Encounter inpatient" is used to describe the hospital discharge date. Where logic needs to indicate discharge (or transfer) from one inpatient location to another, the logic uses "Transfer From" or "Transfer To" as the QDS data type.

6.1.27 Measure 185v1: Healthy Term Newborn, NQF 0716, HealthyTermNewborn

For date difference calculations, use the LAST (most recent) of the alternative dates as the end date and the EARLIEST of the alternative dates as the start date. The calculation should be performed as end date minus start date.

The logic phrase AND: “Occurrence A of Encounter, Performed: Inpatient Encounter (reason: 'Birth')” intends to capture admission type of newborn for the encounter. Where this information is available in existing EHR structured fields (e.g. data that is fed to UB-04, field location 14), it can be used to map the criterion specified in the logic.

The logic phrase AND: “Diagnosis, Active: Liveborn Born In Hospital” starts during “Occurrence A of Encounter, Performed: Inpatient Encounter” intends to capture the point of origin for the inpatient admission. Where this information is available in existing EHR structured fields (e.g. data that is fed to UB-04, field location 15), it can be used to map the criterion specified in the logic.

6.1.28 Measure 188v2: Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) for Immunocompetent Patients, NQF 0147, PN6_AntibioticForCAP

The measure criteria indicate scenarios in which the patient is admitted to the hospital directly (to ICU or Non-ICU locations) or the patient is admitted to one of these locations from the Emergency Department (ED).

The calculation is to indicate the timing from arrival at the facility to the occurrence of an event. The arrival, therefore can be determined from the Emergency Department, the Non-ICU location, or the ICU location, whichever is the first location of contact between the patient and the facility.

Exclusion element guidance:

The exclusion for patients who are clinical trial participants is limited to patients participating in a clinical trial for pneumonia, the same condition as covered by the measure. Other clinical trials are not valid reasons for exclusions.

The intent for the exclusion for patients who are clinical trial participants was to be limited to patients participating in a clinical trial for the same conditions as covered by the measure. However, the value set specifying clinical trial participation is not limited to a specific type of trial; therefore, this piece of logic will not be included in certification testing or reviewed on audit at this time.

Transfers from another hospital that is not part of the hospital's organization are excluded since care may have been delivered in the other setting. The measure as specified for abstraction allowed determination of other hospital by hospital billing number.

Transfers within 1 day from those hospitals using the same facility number are not considered transfers for the exclusion section of this measure, those using other facility numbers are considered exclusions.

Respiratory Infection exclusion- the logic indicates that the patient is included if they have a respiratory infection but excluded for any other infection unless the encounter ends <=24 hr after the start.

The exclusion for absolute neutrophil count < 500 may require calculation. The absolute neutrophil count (ANC) = Total WBC x (% "Segs" + % "Bands"), OR WBC x ((Segs/100) + (Bands/100)).

Additional information on medications cited in this measure is available on the QualityNet website in the measure table titled “Measure Information Form, Measure Set: Pneumonia (PN), Pneumonia Antibiotic Consensus Recommendations”: http://qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228772433589

6.1.29 Measure 190v1: Intensive Care Unit Venous Thromboembolism Prophylaxis, NQF 0372, VTE2

The unit of measurement for this measure is an inpatient episode of care. Each distinct hospitalization should be reported, regardless of whether the same patient is admitted for inpatient care more than once during the measurement period. In addition, the eMeasure logic intends to represent events within or surrounding a single occurrence of an inpatient hospitalization.

The definition of an ICU for the purpose of the measures noted above is that used by the CDC in the NHSN Patient Safety Project. An intensive care unit can be defined as a nursing care area that provides intensive observation, diagnosis, and therapeutic procedures for adults and/or children who are critically ill. An ICU excludes nursing areas that provide step-down, intermediate, or telemetry-only care and specialty care areas.

Numerator criteria for this measure do not exclusively provide the standard of care for VTE prophylaxis. In addition to recommended forms of VTE prophylaxis, numerator criteria include a number of clinical scenarios where the administration of the recommended forms of prophylaxis would not be needed or appropriate.

Recommended forms of VTE prophylaxis include:

- Pharmacological forms of VTE prophylaxis:
    - Subcutaneous unfractionated heparin
    - Low molecular weight heparin
    - Warfarin
    - Injectable Factor Xa inhibitor

- Mechanical forms of prophylaxis:
    - Intermittent pneumatic compression devices
    - Venous foot pumps
    - Graduated compression stockings

Exceptional clinical scenarios where the administration of the recommended forms of prophylaxis would not be needed or appropriate include:

- Patient is on IV heparin
- Certain patients on oral Factor Xa Inhibitor: patients an active or inactive diagnosis of atrial fibrillation/flutter, patients who had a prior hip or knee replacement and patients with a prior active or inactive diagnosis of venous thromboembolism
- Patients on direct thrombin inhibitors

In future versions of the electronic specifications, these fundamentally distinct criteria will be segregated to provide a clear distinction of the appropriate standard of care vs. exceptional clinical scenarios.

6.2 Eligible Provider (EP) Measures

6.2.1 Measure 2v3: Preventive Care and Screening: Screening for Clinical Depression and Follow-Up Plan, NQF 0418, Depression_Screening

A clinical depression screen is completed on the date of the encounter using an age appropriate standardized depression screening tool AND if positive, a follow-up plan is documented on the date of the positive screen. This follow-up plan must be related to a positive depression screening, example: “Patient referred for psychiatric evaluation due to positive depression screening.”

Standardized Depression Screening Tools should be normalized and validated for the age appropriate patient population in which they are used and must be documented in the medical record.

6.2.2 Measure 22v2: Preventive Care and Screening: Screening for High Blood Pressure and Follow-Up Documented, NQF XXXX, BP_Screening_and_Follow_Up

Both the systolic and diastolic blood pressure measurements are required for inclusion. If there are multiple blood pressures on the same date of service, use the lowest systolic and lowest diastolic blood pressure on that date as the representative blood pressure.

Providers who report the measure must perform the blood pressure screening at the time of a qualifying visit by an eligible professional and may not obtain measurements from external sources.

The documented follow up plan must be related to the current BP reading as indicated, example: “Patient referred to primary care provider for BP management.”

6.2.3 Measure 50v2: Closing the referral loop: receipt of specialist report, NQF XXXX, Closing_Referral_Loop

The provider to whom the patient was referred should be the same provider that sends the report.

If there are multiple referrals for a patient during the measurement period, use the first referral.

6.2.4 Measure 52v2: HIV/AIDS: Pneumocystis jiroveci pneumonia (PCP) prophylaxis, NQF 0405, HIVAIDS_PCP_Prophylaxis

Denominator 1: The CD4 count below 200 cells/mm3 must occur during the first nine months of the year.

Denominator 2: The CD4 count below 500 cells/mm3 or the CD4 percentage below 15% must occur during the first nine months of the year.

Once all denominators and numerators are calculated, a total rate should be calculated using the sum of the three denominators and the sum of the three numerators.

6.2.5 Measure 56v2: Functional Status Assessment for Hip Replacement, NQF XXXX, FSA_Hip_Replacement

A Functional Status Assessment (FSA) is based on administration of a validated instrument to eligible patients that asks patients to answer questions related to various domains including: pain, physical function, emotional well-being, health-related quality of life, symptom acuity.

The use of patient-reported outcomes data in eMeasures - such as this measure of functional status - demonstrates the need for the Quality Reporting Data Architecture (QRDA) to support a data attribute that indicates that the patient provided the information.

6.2.6 Measure 61v3: Preventive Care and Screening: Cholesterol – Fasting Low Density Lipoprotein (LDL-C) Test Performed, NQF XXXX, Cholesterol_ScreeningA

6.2.7 Measure 64v3: Preventive Care and Screening: Risk-Stratified Cholesterol – Fasting Low Density Lipoprotein (LDL-C), NQF XXXX, Cholesterol_ScreeningB

These two eMeasure packages are part of a single eMeasure regarding cholesterol preventive care and screening. Because the measure is risk-stratified, it is presented in two separate packages, labeled “Cholesterol -- Fasting Low Density Lipoprotein (LDL-C) Test Performed” and “Risk-Stratified Cholesterol – Fasting Low Density Lipoprotein (LDL-C)”. If the fasting LDL-C test is performed by the provider or if the fasting LDL-C results are documented, both measures should be reported.

Both eMeasures have risk stratification criteria based on the patient’s risk category. When a patient could be included in multiple risk categories, the “higher” level of risk will be utilized. The risk categories are as follows:

1. Highest Level of Risk: Coronary Heart Disease (CHD) or CHD Risk Equivalent OR 10-Year Framingham Risk >20%
2. Moderate Level of Risk: Multiple (2+) Risk Factors OR 10-Year Framingham Risk 10-20%
3. Lowest Level of Risk: 0 or 1 Risk Factor OR 10-Year Framingham Risk <10%

To successfully report CMS61: “Cholesterol -- Fasting Low Density Lipoprotein (LDL-C) Test Performed”, patients must have at least one face-to-face visit with the eligible professional during the measurement period and have one LDL-C performed during the same measurement period with the exception of patients with 0 or 1 risk factors who may have an LDL-C performed up to four (4) years prior to the current measurement period.

To successfully report CMS64: “Risk-Stratified Cholesterol – Fasting Low Density Lipoprotein (LDL-C)” you must have reported CMS61, and the patient’s fasting LDL test must meet or exceed the recommended LDL-C goal.

6.2.8 Measure 62v2: HIV/AIDS: Medical Visit, NQF 0403, HIVAIDS_Medical_Visit

A medical visit is any visit with a health care professional who provides routine primary care for the patient with HIV/AIDS (may be but is not limited to a primary care clinician, ob/gyn, pediatrician, infectious disease specialist).

6.2.9 Measure 65v3: Hypertension: Improvement in Blood Pressure, NQF XXXX, Hypertension_BP_Improve

Blood pressure readings must be taken while the patient is sitting. If multiple measurements occur on the same date, the last systolic and diastolic readings should be used.

6.2.10 Measure 66v2: Functional Status Assessment for Knee Replacement, NQF XXXX, FSA_Knee_Replacement

A Functional Status Assessment (FSA) is based on administration of a validated instrument to eligible patients that asks patients to answer questions related to various domains including: pain, physical function, emotional well-being, health-related quality of life, symptom acuity.

The use of patient-reported outcomes data in eMeasures - such as this measure of functional status - demonstrates the need for the Quality Reporting Data Architecture (QRDA) to support a data attribute that indicates that the patient provided the information.

6.2.11 Measure 68v3: Documentation of Current Medications in the Medical Record, NQF 0419, Current_Meds_Documented

This measure is to be reported for every encounter during the measurement period. By reporting this measure, the eligible professional attests to documenting a list of the current medications using all immediate resources available on the date of the encounter.

Eligible professionals reporting this measure may document medication information received from the patient, authorized representative(s), caregiver(s) or other available healthcare resources. This list must include all prescriptions, over-the-counter (OTC) products, herbals, vitamins, minerals, dietary (nutritional) supplements AND must contain the medication names, dosage, frequency and route of administration.

This measure should also be reported if the provider documented the patient is not currently taking any medications.

By reporting the action described in this measure, the provider attests to having documented a list of current medications utilizing all immediate resources available at the time of the encounter.

6.2.12 Measure 69v2: Preventive Care and Screening: Body Mass Index (BMI) Screening and Follow-Up, NQF 0421, BMI_and_Follow_Up

The patient's BMI documented in the medical record may be reported if done in the provider's office/facility or if a BMI is documented within the past six months in outside medical records obtained by the provider.

An eligible professional or their staff is required to measure both height and weight. Both height and weight must be obtained within the same six months. Self-reported values cannot be used

If the most recent BMI is outside of normal parameters, then a follow-up plan must be documented within six months of the abnormal BMI.

The documented follow up interventions must be related to the BMI outside of normal parameters, example: "Patient referred to nutrition counseling for BMI above normal parameters".

6.2.13 Measure 74v3: Primary Caries Prevention Intervention as Offered by Primary Care Providers, including Dentists, NQF XXXX, Primary_Caries_Prevention

No additional guidance provided.

6.2.14 Measure 75v2: Children Who Have Dental Decay or Cavities, NQF XXXX, Children_Dental_Decay

No additional guidance provided.

6.2.15 Measure 77v2: HIV/AIDS: RNA Control for Patients with HIV, NQF XXXX, RNA_Control_HIV

No additional guidance provided.

6.2.16 Measure 82v1: Maternal Depression Screening, NQF 1401, Maternal_Dep_Screening

The endorsed measure relies on notes from the patient's and mother's charts. The eMeasure specifies only patient's record, looking for the newly allocated SNOMED codes that allow providers to record the screening and treatment of the mother.

6.2.17 Measure 90v3: Functional Status Assessment for Complex Chronic Conditions, NQF XXXX, FSA_Complex_Chronic_Cond

Initial encounter: The first encounter during the first 185 days of the measurement year.

Follow-up encounter: The last encounter that is at least 30 days but no more than 180 after the initial encounter.

A Functional Status Assessment (FSA) is based on administration of a validated instrument to eligible patients that asks patients to answer questions related to various domains including: pain, physical function, emotional well-being, health-related quality of life, symptom acuity.

The use of patient-reported outcomes data in eMeasures - such as this measure of functional status - demonstrates the need for the Quality Reporting Data Architecture (QRDA) to support a data attribute that indicates that the patient provided the information.

6.2.18 Measure 117v2: Childhood Immunization Status, NQF 0038, Child_Imm_Status

For the MMR, hepatitis B, VZV and hepatitis A vaccines, numerator inclusion criteria include: evidence of the antigen; documented history of the illness; or, a seropositive test result for the antigen. For the DTaP, IPV, HiB, pneumococcal conjugate, rotavirus, and influenza vaccines, numerator inclusion criteria include only evidence of the antigen. Patients may be excepted from a particular antigen if they had an anaphylactic reaction to the vaccine. Patients may be excepted from the DTaP vaccine if they have encephalopathy. Patients may be excepted from the IPV vaccine if they have had an anaphylactic reaction to streptomycin, polymyxin B, or neomycin. Patients may be excepted from the MMR, VZV, or influenza vaccines if they have immunodeficiency, HIV, cancer of lymphoreticular or histiocytic tissue, multiple myeloma, leukemia, or have had an anaphlyactic reaction to neomycin. Patients may be excepted from the hepatitis B vaccine if they have had an anaphylactic reaction to common baker's yeast.

6.2.19 Measure 122v2: Diabetes: Hemoglobin A1c Poor Control, NQF 0059, Diab_HbA1c_Ctrl

Patient is numerator compliant if most recent HbA1c level >9% or is missing a result or if an HbA1c test was not done during the measurement year.

Only patients with a diagnosis of Type 1 or Type 2 diabetes should be included in the denominator of this measure; patients with a diagnosis of secondary diabetes due to another condition should not be included.

6.2.20 Measure 123v2: Diabetes: Foot Exam, NQF 0056, Diab_Foot

Only patients with a diagnosis of Type 1 or Type 2 diabetes should be included in the denominator of this measure; patients with a diagnosis of secondary diabetes due to another condition should not be included.

6.2.21 Measure 124v2: Cervical Cancer Screening, NQF 0032, Cervical_Cancer_Screen

No additional guidance provided.

6.2.22 Measure 125v2: Breast Cancer Screening, NQF 0031, Breast_Cancer_Screen

No additional guidance provided.

6.2.23 Measure 126v2: Use of Appropriate Medications for Asthma, NQF 0036, Med_for_Asthma

No additional guidance provided.

6.2.24 Measure 127v2: Pneumonia Vaccination Status for Older Adults, NQF 0043, Pneu_Vacc_Status

Pneumococcal vaccination is expected once ever for patients 65 years of age or older.

6.2.25 Measure 128v2: Anti-depressant Medication Management, NQF 0105, Antidep_Med_Mgmt

To identify new treatment episodes for major depression, there must be a 90-day negative medication history (a period during which the patient was not taking antidepressant medication) prior to the first dispensing event associated with the Index Episode Start Date (Index Prescription Start Date).

CUMULATIVE MEDICATION DURATION is an individual's total number of medication days over a specific period; the period counts multiple prescriptions with gaps in between, but does not count the gaps during which a medication was not dispensed.

To determine the cumulative medication duration, determine first the number of the Medication Days for each prescription in the period: the number of doses divided by the dose frequency per day. Then add the Medication Days for each prescription without counting any days between the prescriptions.

For example, there is an original prescription for 30 days with 2 refills for thirty days each. After a gap of 3 months, the medication was prescribed again for 60 days with 1 refill for 60 days. The cumulative medication duration is (30 x 3) + (60 x 2) = 210 days over the 10 month period.

6.2.26 Measure 129v3: Prostate Cancer: Avoidance of Overuse of Bone Scan for Staging of Low Risk Prostate Cancer Patients, NQF 0389, PrCA_OveruseBoneScan

A higher score indicates appropriate treatment of patients with prostate cancer at low risk of recurrence.

Only patients with prostate cancer with low risk of recurrence will be counted in the performance denominator of this measure.

6.2.27 Measure 130v2: Colorectal Cancer Screening, NQF 0034, Colorectal_Cancer_Screen

No additional guidance provided.

6.2.28 Measure 131v2: Diabetes: Eye Exam, NQF 0055, Diab_Eye

Only patients with a diagnosis of Type 1 or Type 2 diabetes should be included in the denominator of this measure; patients with a diagnosis of secondary diabetes due to another condition should not be included.

The eye exam must be performed by an ophthalmologist or optometrist.

6.2.29 Measure 132v2: Cataracts: Complications within 30 Days Following Cataract Surgery Requiring Additional Surgical Procedures, NQF 0564, CATARACTS_30daycomp

The unit of analysis is cataract surgery. If a patient had more than one cataract surgery during the measurement period, each cataract surgery will be evaluated.

6.2.30 Measure 133v2: Cataracts: 20/40 or Better Visual Acuity within 90 Days Following Cataract Surgery, NQF 0565, CATARACTS_2040

The unit of analysis for this measure is each cataract procedure, including instances where more than one cataract procedure was performed during the measurement period. Only procedures performed during January 1-September 30 of the reporting period will be considered for this measure, in order to determine if 20/40 or better visual acuity has been achieved within the 90 days following the cataract procedure. Cataract procedures performed during October 1 – December 31 are excluded from the initial patient population.

6.2.31 Measure 134v2: Diabetes: Urine Protein Screening, NQF 0062, Diab_Urine

Only patients with a diagnosis of Type 1 or Type 2 diabetes should be included in the denominator of this measure; patients with a diagnosis of secondary diabetes due to another condition should not be included.

6.2.32 Measure 135v2: Heart Failure (HF): Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction (LVSD), NQF 0081, HF_ACEARB

To meet this measure, it must be reported for all heart failure patients a minimum of once during the measurement period when seen in the outpatient setting AND reported at each hospital discharge during the measurement period.

6.2.33 Measure 136v3: ADHD: Follow-Up Care for Children Prescribed Attention-Deficit/ Hyperactivity Disorder (ADHD) Medication, NQF 0108, ADHD_FollowUp

CUMULATIVE MEDICATION DURATION is an individual's total number of medication days over a specific period; the period counts multiple prescriptions with gaps in between, but does not count the gaps during which a medication was not dispensed.

To determine the cumulative medication duration, determine first the number of the medication Days for each prescription in the period: the number of doses divided by the dose frequency per day. Then add the Medication Days for each prescription without counting any days between the prescriptions.

For example, there is an original prescription for 30 days with 2 refills for thirty days each. After a gap of 3 months, the medication was prescribed again for 60 days with 1 refill for 60 days. The cumulative medication duration is (30 x 3) + (60 x 2) = 210 days over the 10 month period.

6.2.34 Measure 137v2: Initiation and Engagement of Alcohol and Other Drug Dependence Treatment, NQF 0004, Ini_Eng_Alc_Drug_Dep

The new episode of alcohol and other drug dependence should be the first episode of the measurement period that is not preceded in the 60 days prior by another episode of alcohol or other drug dependence.

6.2.35 Measure 138v2: Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention, NQF 0028, PREV_Tobacco

If tobacco use status of a patient is unknown, the patient cannot be counted in the numerator and should be considered a measure failure. Instances where tobacco use status of "unknown" is recorded include: 1) the patient was not screened; or 2) the patient was screened and the patient (or caregiver) was unable to provide a definitive answer. If tobacco use status of “unknown” is recorded but the patient has an allowable medical exception, then the patient should be removed from the denominator of the measure and reported as a valid exception.

If a patient uses any type of tobacco (ie, smokes or uses smokeless tobacco), the expectation is that they should receive tobacco cessation: either counseling and/or pharmacotherapy.

6.2.36 Measure 139v2: Falls: Screening for Future Fall Risk, NQF 0101, Falls_Screening

No additional guidance provided.

6.2.37 Measure 140v2: Breast Cancer: Hormonal Therapy for Stage IC-IIIC Estrogen Receptor/Progesterone Receptor (ER/PR) Positive Breast Cancer, NQF 0387, BrCA_HormonalTherapy

The denominator for this measure has been limited to patients with a first recorded breast cancer diagnosis within the past 5 years. The numerator captures patients who are prescribed adjuvant tamoxifen or aromatase inhibitors (AI), or received adjuvant tamoxifen or AI during the 12 month period. Date of breast cancer diagnosis is defined as date of pathologic diagnosis.

6.2.38 Measure 141v3: Colon Cancer: Chemotherapy for AJCC Stage III Colon Cancer Patients, NQF 0385, ColonCA_ChemoStageIII

The measure logic includes the combination of 5-FU/LV/oxaliplatin which will capture either mFOLFOX6 or FLOX, category 1, as referenced in the definitions section.

The denominator for this measure has been limited to patients with a first recorded colon cancer diagnosis during the 12 month reporting period. The numerator captures patients who are prescribed adjuvant chemotherapy or received adjuvant chemotherapy during the 12 month period. "Referred for Chemotherapy" is not separately specified, as this option can be captured either through the “Medication Order: Chemotherapy for Colon Cancer" numerator option or the patient reason exception: "Medication, Administered not done: Patient reason" for "Chemotherapy for Colon Cancer". Additional valid medical reason exceptions might include acute renal insufficiency, neutropenia, or leukopenia. Date of diagnosis is defined as the date of pathologic diagnosis.

6.2.39 Measure 142v2: Diabetic Retinopathy: Communication with the Physician Managing Ongoing Diabetes Care, NQF 0089, DR_Communication

No additional guidance provided.

6.2.40 Measure 143v2: Primary Open-Angle Glaucoma (POAG): Optic Nerve Evaluation, NQF 0086, POAG_OpticNerve

Optic nerve head evaluation includes examination of the cup to disc ratio and identification of optic disc or retinal nerve abnormalities. Both of these components of the optic nerve head evaluation are examined using ophthalmoscopy.

6.2.41 Measure 144v2: Heart Failure (HF): Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction (LVSD), NQF 0083, HF_BB

LVEF < 40% corresponds to qualitative documentation of moderate dysfunction or severe dysfunction.

To meet this measure, it must be reported for all heart failure patients a minimum of once during the measurement period when seen in the outpatient setting AND reported at each hospital discharge during the measurement period.

Beta-blocker therapy:

- For patients with prior LVEF < 40%, beta-blocker therapy should include bisoprolol, carvedilol, or sustained release metoprolol succinate.

6.2.42 Measure 145v2: Coronary Artery Disease (CAD): Beta-Blocker Therapy--Prior Myocardial Infarction (MI) or Left Ventricular Systolic Dysfunction (LVEF <40%), NQF 0070, CAD_BB

Beta-blocker therapy:

- For patients with prior MI, beta-blocker therapy includes any agent within the beta-blocker drug class. As of 2011, during the development process, no recommendations or evidence cited in current chronic stable angina guidelines for preferential use of specific agents
- For patients with prior LVEF <40%, beta-blocker therapy includes the following: bisoprolol, carvedilol, or sustained release metoprolol succinate

6.2.43 Measure 146v2: Appropriate Testing for Children with Pharyngitis, NQF 0002, Pharyngitis

This is an episode of care measure that examines all eligible episodes for the patient during the measurement period. If the patient has more than one episode, include all episodes in the measure.

6.2.44 Measure 147v2: Preventive Care and Screening: Influenza Immunization, NQF 0041, PREV_Influenza

The timeframe for the visit during the "Encounter, Performed: Encounter-Influenza" or “Procedure, Performed: Peritoneal Dialysis” or “Procedure, Performed: Hemodialysis” in the Population Criteria-Denominator, refers to the influenza season defined by the measure: October through March (October 1 for the year prior to the start of the reporting period through March 31 during the reporting period). The “Encounter-Influenza” Grouping OID detailed in the data criteria section below is comprised of several individual OIDs of different encounter types. The individual OIDs are included in the value set and should be reviewed to determine that an applicable visit occurred during the timeframe for "Encounter, Performed: Encounter-Influenza” as specified in the denominator.

To enable reporting of this measure at the close of the reporting period, this measure will only assess the influenza season that ends in March of the reporting period. The subsequent influenza season (ending March of the following year) will be measured and reported in the following year.

6.2.45 Measure 148v2: Hemoglobin A1c Test for Pediatric Patients, NQF 0060, HbA1c_Test_Ped

Only patients with a diagnosis of Type 1 or Type 2 diabetes should be included in the denominator of this measure; patients with a diagnosis of secondary diabetes due to another condition should not be included.

6.2.46 Measure 149v2: Dementia: Cognitive Assessment, NQF XXXX, DEMENTIA_Cognitive

Use of a standardized tool or instrument to assess cognition other than those listed will meet numerator performance. Standardized tools can be mapped to the concept "Intervention, Performed: Cognitive Assessment" included in the numerator logic below.

6.2.47 Measure 153v2: Chlamydia Screening for Women, NQF 0033, Chlamydia_Screen

Codes to identify sexually active women include codes for: pregnancy, sexually transmitted infections, contraceptives or contraceptive devices, and infertility treatments.

The denominator exclusion does not apply to patients who qualify for the initial patient population based on services other than the pregnancy test alone.

6.2.48 Measure 154v2: Appropriate Treatment for Children with Upper Respiratory Infection (URI), NQF 0069, URI

This is an episode of care measure that examines all eligible episodes for the patient during the measurement period. If the patient has more than one episode, include all episodes in the measure.

6.2.49 Measure 155v2: Weight Assessment and Counseling for Nutrition and Physical Activity for Children and Adolescents, NQF 0024, Weight_Assess_Counseling

The visit must be performed by a PCP or OB/GYN.

Because BMI norms for youth vary with age and gender, this measure evaluates whether BMI percentile is assessed rather than an absolute BMI value.

6.2.50 Measure 156v2: Use of High-Risk Medications in the Elderly, NQF 0022, HighRisk_Med_Elderly

The intent of Numerator 1 of the measure is to assess if the patient has been prescribed one high-risk medication. The intent of Numerator 2 of the measure is to assess if the patient has been prescribed at least two different high-risk medications.

CUMULATIVE MEDICATION DURATION is an individual's total number of medication days over a specific period; the period counts multiple prescriptions with gaps in between, but does not count the gaps during which a medication was not dispensed.

To determine the cumulative medication duration, determine first the number of the Medication Days for each prescription in the period: the number of doses divided by the dose frequency per day. Then add the Medication Days for each prescription without counting any days between the prescriptions.

For example, there is an original prescription for 30 days with 2 refills for thirty days each. After a gap of 3 months, the medication was prescribed again for 60 days with 1 refill for 60 days. The cumulative medication duration is (30 x 3) + (60 x 2) = 210 days over the 10 month period.

6.2.51 Measure 157v2: Oncology: Medical and Radiation—Pain Intensity Quantified, NQF 0384, ONC_PainQuantified

The level of analysis for this measure is every visit for patients with a diagnosis of cancer who are also receiving chemotherapy or radiation therapy during the measurement period. For patients receiving radiation therapy, pain intensity should be quantified at each radiation treatment management encounter. For patients receiving chemotherapy, pain intensity should be quantified at each face-to-face encounter with the physician while the patient is receiving treatment. For purposes of calculating this measure, eligible encounters for patients receiving chemotherapy will include those encounters where the patient has been administered chemotherapy within 30 days prior to the encounter and also been administered chemotherapy within 30 days after the date of the encounter. For example, at every visit for patients with a diagnosis of cancer who are also receiving chemotherapy or radiation therapy, the patient should have pain intensity quantified.

Pain intensity should be quantified using a standard instrument, such as a 0-10 numeric rating scale, a categorical scale, or the pictorial scale.

6.2.52 Measure 158v2: Pregnant women that had HBsAg testing, NQF 0608, Preg_HBsAg

No additional guidance provided.

6.2.53 Measure 159v2: Depression Remission at Twelve Months, NQF 0710, Dep_Rem_12

No additional guidance provided.

6.2.54 Measure 160v2: Depression Utilization of the PHQ-9 Tool, NQF 0712, Dep_PHQ9

No additional guidance provided.

6.2.55 Measure 161v2: Adult Major Depressive Disorder (MDD): Suicide Risk Assessment, NQF 0104, MMD_Suicide Risk

It is expected that a suicide risk assessment will be completed at the visit during which a new diagnosis is made or at the visit during which a recurrent episode is first identified (ie, at the initial evaluation).

Use of a standardized tool or instrument to assess suicide risk will meet numerator performance. Standardized tools can be mapped to the concept “Intervention, Performed: Suicide Risk Assessment” included in the numerator logic below.

The measure description outlined in the header for this measure states, ‘patients aged 18 years and older’ while the logic statement states, ‘>= 17 year(s) starts before start of "Measurement Period"’. The logic statement, as written, captures patients who turn 18 years old during the measurement period so that these patients are included in the measure. To ensure all patients with major depressive disorder (MDD) are assessed for suicide risk, there are two clinical quality measures addressing suicide risk assessment; CMS 177 covers children and adolescents aged 6 through 17, and CMS 161 covers the adult population aged 18 years and older.

6.2.56 Measure 163v2: Diabetes: Low Density Lipoprotein (LDL) Management, NQF 0064, Diab_LDL

The patient is not numerator compliant if the result for the most recent LDL-C test during the measurement period is >= 100 mg/dL, or is missing, or if an LDL-C test was not performed during the measurement period.

Only patients with a diagnosis of Type 1 or Type 2 diabetes should be included in the denominator of this measure; patients with a diagnosis of secondary diabetes due to another condition should not be included.

6.2.57 Measure 164v2: Ischemic Vascular Disease (IVD): Use of Aspirin or Another Antithrombotic, NQF 0068, IVD_Aspirin

Only patients who were discharged alive for acute myocardial infarction (AMI), coronary artery bypass graft (CABG) or percutaneous coronary interventions (PCI) should be included in the measure.

6.2.58 Measure 165v2: Controlling High Blood Pressure, NQF 0018, High_Blood_Pressure

In reference to the numerator element, only blood pressure readings performed by a clinician in the provider office are acceptable for numerator compliance with this measure. Blood pressure readings from the patient's home (including readings directly from monitoring devices) are not acceptable.

If no blood pressure is recorded during the measurement period, the patient's blood pressure is assumed "not controlled."

6.2.59 Measure 166v3: Use of Imaging Studies for Low Back Pain, NQF 0052, Low_Back_Pain

The outpatient or emergency department visit in the Initial Patient Population needs to occur during the first 337 days of the measurement period (337 days allows 28 days for the numerator event). This visit must be the first visit for low back pain during the measurement period.

6.2.60 Measure 167v2: Diabetic Retinopathy: Documentation of Presence or Absence of Macular Edema and Level of Severity of Retinopathy, NQF 0088, DR_MacularEdema

No additional guidance provided.

6.2.61 Measure 169v2: Bipolar Disorder and Major Depression: Appraisal for alcohol or chemical substance use, NQF 0110, Bipolar_Dep_Substance_Use

The intent of the measure is that the assessment be performed for a single episode for each patient. Due to current limitations of the eMeasure specification system, it is possible for there to be up to two treatment episodes per patient, identified through up to two index episodes. As a result, the numerator criteria of this measure can be satisfied if a substance use assessment is performed within either treatment episode. Future versions of the measure should address this issue.

6.2.62 Measure 177v2: Child and Adolescent Major Depressive Disorder (MDD): Suicide Risk Assessment, NQF 1365, CAMDD_SuicideRisk

A suicide risk assessment should be performed at every visit for major depressive disorder during the measurement period.

The level of analysis for this measure is every visit for major depressive disorder during the measurement period. A minimum of two encounters are required during the measurement period for a patient to be included in this measure; if the patient is only seen once by the eligible professional, the patient is not included in the measure. Once it has been established that the patient has been seen at least twice by the eligible professional, every visit for major depressive disorder should be counted as a measurable event for the measure calculation. For example, at every visit for MDD, the patient should have a suicide risk assessment.

Use of a standardized tool or instrument to assess suicide risk will meet numerator performance. Standardized tools can be mapped to the concept "Intervention, Performed: Suicide Risk Assessment" included in the numerator logic.

6.2.63 Measure 179v2: ADE Prevention and Monitoring: Warfarin Time in Therapeutic Range, NQF XXXX, ADE_TTR

Please note that the logic expressions in the body section of the HQMF of this measure should *not* be used to calculate this clinical quality measure. They are only provided to represent the data elements needed for the calculation. In order to calculate this clinical quality measure correctly, only use the narrative specifications contained in the header section of the HQMF and the annotated database query found in the supplemental file named “CMS179v2_Supplemental_SQL_Logic_Reference.pdf”.

The calculation of TTR should include all available INR values for a given patient during the measurement period. When generating a QRDA-1 document for this measure, all available INR values during the measurement period should be included.

The following filters are applied to each patient’s INRs in order to calculate a patient-level TTR. INR values must be at least 0.8. Values less than 0.8 may represent aberrant results. INR values greater than 10 (i.e., outliers) must be replaced with a value of 10. An INR of 10 represents an abnormally high INR and would skew the results of the calculated TTR less than extreme values would (i.e., INR > 10). The INR value closest to "2.5" is used to calculate TTR, when there are more than one INR result on a single date.

In this measure, the active drug ingredient of primary interest is warfarin. CUMULATIVE MEDICATION DURATION should be calculated for all active warfarin-containing medications. All of the entries in the value set for warfarin must be included when determining the cumulative medication duration. All medication occurrences considered for the calculation of cumulative medication duration for this measure must be active within 200 days immediately prior to the measurement period. This lookback period of 200 days is based on the original warfarin TTR measure used by the Veterans Affairs health care system. Please refer to the supplemental file named “CMS179v2 _Supplemental_SQL_Logic_Reference.pdf” for this logic.

To be excluded from the initial patient population, patients must have an active diagnosis of valvular heart disease during the measurement period.

To determine the proportion of patients with atrial fibrillation who are on chronic warfarin therapy and have sufficient INR monitoring to calculate a TTR, the reporting provider can divide the Measure Population by the Initial Patient Population.

The calculation for TTR is provided in the supplemental file named “CMS179v2 _Supplemental_SQL_Logic_Reference.pdf”.

The Measure Observation is the average of all patients’ percent TTR, which can be calculated by dividing the sum of all patients’ percent TTR by the number of patients in the Measure Population.

6.2.64 Measure 182v3: Ischemic Vascular Disease (IVD): Complete Lipid Panel and LDL Control, NQF 0075, IVD_Lipid_LDL

Only patients who were discharged alive for acute myocardial infarction (AMI), coronary artery bypass graft (CABG) or percutaneous coronary interventions (PCI) are included in this measure

7 JIRA- Clinical Quality Measure Feedback System

CMS and ONC will be using JIRA to track issues or bugs associated with the electronic Clinical Quality Measures.

The JIRA software program allows end users to report on new identified issues and/or quickly search issues that have been resolved or are currently being addressed.

Access JIRA @ www.healthit.gov/qualityfeedback

Appendices

Appendix A: Versioning and Endorsement

The 2014 eMeasures are labeled in a standard fashion. The names of the measure directories and Health Quality Measure Format (HQMF)[1] files are assigned automatically using the following conventions:

HQMF files are identified by the CMS eMeasure identifier. This is a unique number that refers only to eMeasures recommended by CMS. The eMeasures released with the 2014 Stage 2 Meaningful Use incentive Program are appended with the label "v1", or "v2". The measures labeled v2 were part of the December update. Those measures which have had changes since the most recent publication will be labeled as v2, v3, and so on as updates are released.

File name structure: CMS eMeasure ID + extension

Example: CMS130v1.xml, CMS130v1.html

Names of measure directories contain additional information so that users can search measures by care setting, NQF ID (when applicable) and short description. Here is an illustration of the naming conventions for the measure directories and HQMF files, using measure CMS130v1 (EP measure, with NQF ID = 0034, and short description =Colorectal_Cancer_Screen) as an example:

For the Entire Collection of EP and EH measures

Directory name structure: <EP|EH>_<Hospital|Professional>_eMeasures_<date>
Example: EH_Hospital_eMeasures_2012_10_17 (assuming the release date for these EH measures is 10/17/2012)

Individual measure directories

Directory name structure: <EP|EH>_<CMSeMeasureID>_<NQFID>_<shortDescription>
Example: EP_CMS130v1_NQF0034_Colorectal_Cancer_Screen

Note: The NQFID reads NQFXXXX when it has not been endorsed by NQF.

All measures have been recommended by CMS but not all have yet been endorsed by the National Quality Forum (NQF). We recommend use of the CMS eMeasure ID to identify measures and their versions.

The Health Quality Measure Format (HQMF) is an HL7 standard for representing a health quality measure as an electronic document.

Appendix B: Time Unit and Time Interval Definitions

Time Unit and Time Interval Definitions

ISO 8601:2004 defines data elements and interchange formats for the representation of dates and times, including time intervals. Below is a summary of important terms defined in the standard that are of particular importance and can be drawn upon to be used in time interval calculations for eMeasures.

Term	ISO Definition	ISO Notes
Time interval	Part of the time axis limited by two instants.	• A time interval comprises all instants between the two limiting instants and, unless otherwise stated, the limiting instants themselves.
Duration	Non-negative quantity attributed to a time interval, the value of which is equal to the difference between the time points of the final instant and the initial instant of the time interval, when the time points are quantitative marks.	• In case of discontinuities in the time scale, such as a leap second or the change from winter time to summer time and back, the computation of the duration requires the subtraction or addition of the change of duration of the discontinuity. • The SI unit of duration is the second.
Nominal duration	Duration expressed amongst others in years, months, weeks or days.	• The duration of a calendar year, a calendar month, a calendar week or a calendar day depends on its position in the calendar. Therefore, the exact duration of a nominal duration can only be evaluated if the duration of the calendar years, calendar months, calendar weeks or calendar days used are known.
Second	Base unit of measurement of time in the International System of Units (SI) as defined by the International Committee of Weights and Measures	
Minute	Unit of time, equal to 60 seconds	
Hour	Unit of time, equal to 60 minutes	
Day <unit of time>	Unit of time, equal to 24 hours	
Calendar day	Time interval starting at midnight and ending at the next midnight, the latter being also the starting instant of the next calendar day	• A calendar day is often also referred to as a day. • **The duration of a calendar day is 24 hours**; except if modified by: o the insertion or deletion of leap seconds, by decision of the International Earth Rotation Service (IERS) or o the insertion or deletion of other time intervals, as may be prescribed by local authorities to alter the time scale of local time.
Day <duration>	Duration of a calendar day.	• The term “day” applies also to the duration of any time interval which starts at a certain time of day at a certain calendar day and ends at the same time of day at the next calendar day.
Calendar week	Time interval of seven calendar days starting with a Monday.	• A calendar week is also referred to as week.

Term	ISO Definition	ISO Notes
Week	Duration of a calendar week.	• The term “week” also applies to the duration of any time interval which starts at a certain time of day at a certain calendar day and ends at the same time of day at the same calendar day if the next calendar week.
Calendar month	Time interval resulting from the division of a calendar year in 12 time intervals, each with a specific name and containing a specific number of calendar days.	• A calendar month is often referred to as month. •
Month	Duration of 28, 29, 30 or 31 calendar days depending on the start and/or the end of the corresponding time interval within the specific calendar month.	• The term “month” applies also to the duration of any time interval which starts at a certain time of day at a certain calendar day of the calendar month and ends at the same time of day at the same calendar day of the next calendar month, if it exists. In other cases the ending calendar day has to be agreed on. • In certain applications a month is considered as a duration of 30 calendar days.
Calendar year	Cyclic time interval in a calendar which is required for one revolution of the Earth around the Sun and approximated to an integral number of calendar days.	• A calendar year is also referred to as year. • Unless otherwise specified the term designates in this International Standard a calendar year in the Gregorian calendar.
Year	Duration of 365 or 366 calendar days depending on the start and/or the end of the corresponding time interval within the specific calendar year.	• The term “year” applies also to the duration of any time interval which starts at a certain time of day at a certain calendar date of the calendar year and ends at the same time of day at the same calendar date of the next calendar year, if it exists. In other cases the ending calendar day has to be agreed on.
Common year	Calendar year in the Gregorian calendar that has 365 calendar days.	
Leap year	Calendar year in the Gregorian calendar that has 366 days.	

The standard also defines multiple formats for the representation of date and time as well as time intervals and durations. ISO 8601 postulates that duration can be expressed by a combination of components with accurate duration (hour, minute and second) and components with nominal duration (year, month, week and day). The standard allows for the omission of lower level components for “reduced accuracy” applications.

Appendix C: Time Interval Calculation Conventions

Time interval calculation conventions

The unit in which a time interval (or its duration) is expressed may be dependent upon the necessary level of accuracy for the purposes of measurement. As such, the selection of the time unit to be used should be made according to the level of granularity needed to meet the intent of the measure.

These conventions are intended to standardize the interpretation of time calculation units for durations, i.e., difference between two date/time elements, typically with time relationships defined in the QDM, such as "starts after start of" and "ends before start of".

Calculation Unit	Definition	Calculation[2,3,4]
Year	Duration of any time interval which starts at a certain time of day at a certain calendar date of the calendar year and ends at: • the same time of day at the same calendar date of the next calendar year, if it exists; • the same time of day at the immediately following calendar date of the ending calendar year, if the same calendar date of the ending calendar year does not exist **Notes:** 1. When in the next calendar year the same calendar date does not exist, the ISO states that the ending calendar day has to be agreed upon. The above convention is proposed as a resolution to this issue. 2. The ISO permits the representation of dates and times with "reduced accuracy", when necessary. For the purposes of quality measures, duration expressed in years ignores the time of day associated with the date/time stamps used in the calculation, i.e., the number of years will not change until the month and day of date 2 reach (or surpass) the month and day of date 1; time of day should be ignored or set to 00:00:00 for this calculation.	**1. Month (date 2) < month (date 1):** Duration (years) = year (date 2) – year (date 1) – 1 Example 1: Date 1: 2012-**03**-10 22:05:09 Date 2: 2013-**02**-18 19:10:03 Duration = year (date 2) – year (date 1) – 1 = 2013 – 2012 – 1 **= 0 years** **2. Month (date 2) = month (date 1) and day (date 2) >= day (date 1)** Duration (years) = year (date 2) – year (date 1) Example 2.a: day (date 1) = day (date 2) Date 1: 2012-03-**10** 22:05:09 Date 2: 2013-03-**10** 08:01:59 Duration = year (date 2) – year (date 1) = 2013 – 2012 **= 1 year** **Note:** Time of day is ignored in this calculation. If time of day were to be considered for the calculation, the duration of the time interval would be 0 years according to the definition. Example 2.b: day (date 2) > day (date 1) Date 1: 2012-03-**10** 22:05:09 Date 2: 2013-03-**20** 04:01:30 Duration = year (date 2) – year (date 1) = 2013 – 2012 **= 1 year** **3. Month (date 2) = month (date 1) and day (date 2) < day (date 1)** Duration (years) = year (date 2) – year (date 1) – 1 Example 3.a: Date 1: 2012-02-**29** Date 2: 2014-02-**28** Duration = year (date 2) – year (date 1) – 1 = 2014 – 2012 – 1 = **1 year**

[2] For the purposes of this document, date 2 is assumed to be more recent than date 1.
[3] All dates are represented according to the extended formatted designated in ISO 8601: YYYY-MM-DD HH:MM:SS and a 24 hour timekeeping system.
[4] The result of the calculation is always an integer; if the result includes decimals, it should be truncated (rounded down) to the unit.

Calculation Unit	Definition	Calculation[2,3,4]
Year (continued)		**4. Month (date 2) > month (date 1)** Duration (years) = year (date 2) – year (date 1) Example 4.a: Date 1: 2012-**03**-10 11:16:02 Date 2: 2013-**08**-15 21:34:16 Duration = year (date 2) – year (date 1) = 2013 – 2012 **= 1 year** Example 4.b: Date 1: 2012-**02**-29 10:18:56 Date 2: 2014-**03**-01 19:02:34 Duration = year (date 2) – year (date 1) = 2014 – 2012 **= 2 years** **Note:** Because there is no February 29 in 2014, the number of years can only change when the date reaches March 1st, the first date in 2014 that surpasses the month and day of date 1 (February 29).
Month	Duration of any time interval which starts at a certain time of day at a certain calendar day of the calendar month and ends at: • the same time of day at the same calendar day of the ending calendar month, if it exists; • the same time of day at the immediately following calendar date of the ending calendar month, if the same calendar date of the ending month year does not exist **Notes:** 1. When in the next calendar year the same calendar date does not exist, the ISO states that the ending calendar day has to be agreed upon. The above convention is proposed as a resolution to this issue. 2. The ISO permits the representation of dates and times with "reduced accuracy", when necessary. For the purposes of quality measures, duration expressed in months ignores the time of day associated with the date/time stamps used in the calculation, i.e., the number of months will not change until the month and day of date 2 reach (or surpass) the month and day of date 1; time of day should be ignored or set to 00:00:00 for this calculation.	**1. Day (date 2) >= day (date 1)** Duration (months) = (year (date 2) – year (date 1))*12 + (month (date 2) – (month date 1)) Example 1.a: Date 1: 2012-03-01 14:05:45 Date 2: 2012-03-31 23:01:49 Duration = (year (date 2) – year (date 1))*12 + (month (date 2) – (month date 1)) = (2012 – 2012)*12 + (3 – 3) **= 0 months** Example 1.b: Date 1: 2012-03-10 22:05:09 Date 2: 2013-06-30 13:00:23 Duration = (year (date 2) – year (date 1))*12 + (month (date 2) – (month date 1)) = (2013 – 2012)*12 + (6 – 3) = 12 + 3 **= 15 months** 2. **Day (date 2) < day (date 1)** Duration (months) = (year(date 2) – year(date 1))*12 + (month(date 2) –month (date 1)) – 1 Example 2: Date 1: 2012-03-10 22:05:09 Date 2: 2013-01-09 07:19:33 (currently the date is 2013-01-29, so 29 isn't less than 10) Duration = (year(date 2) – year(date 1))*12 + (month (date 2) – (month date 1)) – 1 = (2013 – 2012)*12 + (1 – 3) - 1 = 12 – 2 - 1 = 9 months (missing -1)

Calculation Unit	Definition	Calculation[2,3,4]
Week	Duration of any time interval which starts at a certain time of day at a certain calendar day at a certain calendar week and ends at the same time of day at the same calendar day of the ending calendar week. **Notes:** 1. The ISO permits the representation of dates and times with "reduced accuracy", when necessary. For the purposes of quality measures, duration expressed in weeks ignores the time of day associated with the date/time stamps used in the calculation, i.e., a complete week is always seven days long: a week has passed when the same weekday in the following week is reached; time of day should be ignored or set to 00:00:00 for this calculation.	**1. Duration = [date 2 – date 1 (days[5])]/7** Example 1: Date 1: 2012-03-10 22:05:09 Date 2: 2012-03-20 07:19:33 Duration = [# days (month (date 1)) – day (date 1) + # days (month (date 1) + 1) + # days (month (date 1) + 2) + … + # days (month (date 2) – 1) + day (date 2)]/7 = (20 – 10)/7 = 10/7 **= 1 week** (result truncated to integer).
Day	Duration of any time interval which starts at a certain calendar day and ends at the next calendar day (1 second to 47 hours, 59 minutes and 59 seconds); the number of times midnight is crossed. **Notes:** 1. The ISO permits the representation of dates and times with "reduced accuracy", when necessary. For the purposes of quality measures, duration expressed in days ignores the time of day associated with the date/time stamps used in the calculation, i.e., the number of years will not change until the month and day of date 2 reach (or surpass) the month and day of date 1; time of day should be ignored or set to 00:00:00 for this calculation.	The duration in days between two dates, will be generally given by subtracting the start calendar date to the end calendar date, regardless of the time of day between the two dates. Example 1: Date 1: 2012-01-31 12:30:00 Date 2: 2012-02-01 09:00:00 Duration = 02-01 – 01-31 **= 1 day** Example 2: Date 1: 2012-01-31 12:30:00 Date 2: 2012-02-01 14:00:00 Duration = 02-01 – 01-31 **= 1 day**

[5] For information on how to calculate the duration, in days, of a time interval, please see "day".

Calculation Unit	Definition	Calculation[2,3,4]
Hours	The number of 60 minute cycles between two given dates. **Notes:** 1. Use the date, hour and minute of the date/time stamps to compute the interval. 2. Seconds are not used in the calculation.	The duration in hours between two dates is the number of minutes between the two dates, divided by sixty. The result is truncated to the unit. Example 1: Date/Time 1: 2012-03-01 03:10 Date/Time 2: 2012-03-01 05:09 Duration **= 1 hour** Example 2: Date/Time 1: 2012-02-29 23:10 Date/Time 2: 2012-03-01 00:10 Duration **= 1 hour** Example 3: Date/Time 1: 2012-03-01 03:10 Date/Time 2: 2012-03-01 04:00 Duration = **0 hours**
Minutes	The number of minutes between two given dates. **Notes:** 1. Seconds are **not** used in the calculation.	Example 1: Date/Time 1: 2012-03-01 03:10 Date/Time 2: 2012-03-01 05:20 Duration **= 130 minutes** Example 2: Date/Time 1: 2012-02-29 23:10 Date/Time 2: 2012-03-01 00:20 Duration **= 70 minutes**

Timing relationships with no calculation unit defined

When no threshold is defined in a measure phrase that compares timing between two elements, a common level of granularity needs to be established for comparisons within and across EHRs. For instance, the criterion:

A starts before start of B

Depending on the level of granularity of the data (e.g. HH:MM:SS vs. HH:MM), the result of the timing comparison may vary if no comparison unit is defined:

Example 1

A: 2012-01-01 11:00:01
B: 2012-01-01 11:00:02
A starts before B = TRUE

Example 2

A: 2012-01-01 11:00
B: 2012-01-01 11:00
A starts before B = FALSE

In order to resolve this type of issue, calculations should be performed with dates represented with reduced accuracy to the minute (date/time truncated to minute prior to calculation, i.e., seconds not used in calculation):

Example 3

A: 2012-01-01 11:00:01
B: 2012-01-01 11:00:02
A starts before B = FALSE

Note: Seconds are not used in the calculation.

Example 4

A: 2012-01-01 11:00
B: 2012-01-01 11:00
A starts before B = FALSE

If no unit of comparison has been defined in the logic (e.g. A starts before start of B), minutes will be used as the default unit for the calculation. This convention effectively renders the following criteria equivalent:

- A starts before start of B
- A > 0 minute(s) starts before start of B
- A > 1 minute(s) starts before start of B

If another unit is intended, it should be specified in the criterion, for instance:

- If the intended unit of comparison is the second:
  - A starts before start of B would "default" to comparison in minutes
  - A > 1 second(s) starts before start of B would explicitly refer the granularity intended for the calculation of duration between the two date/time stamps (criterion would be true if A started at least one second before B).
- If the intended unit of comparison is the day:
  - A > 1 day(s) starts before start of B (criterion would be true if A started at least one day before B).

The best practice is to always explicitly define the unit of calculation, as this shows intent on the part of the measure developer and provides a completely unambiguous interpretation of the level of granularity with which the computation should be performed. However, if no unit is defined, the above convention determines that the computation unit should be minutes.

Other date/time-related calculations using QDM functions

The above definitions are focused on the calculation of durations. However, for certain applications it may be necessary to compare portions of the date/time elements directly, e.g., comparing years or months. This can be achieved by using existing QDM/MAT functions that allow the extraction of specific portions of date/time elements. A complete list of these functions is available on the Measure Authoring Tool User Guide (http://www.qualityforum.org/MAT/).

Appendix D: CMS179v2_Supplemental_SQL_Logic_Reference

ADE Prevention and Monitoring: Warfarin Time in Therapeutic Range
Supplemental SQL Logic Reference
(CMS179, version 2, updated 5/15/13)

The purpose of this document is to support the implementation of the clinical quality measure "ADE Prevention and Monitoring: Warfarin Time in Therapeutic Range" by providing an example of the structured query language (SQL) that underwent field testing. The defined SQL logic below provides a full view of its content, but the specifications supplied in the header section of the Health Quality Measure Format (HQMF) of the clinical quality measure should be the primary basis for implementation of the measure. The HQMF files for this clinical quality measure contain instructions in the Definition and Guidance section which indicate the ultimate purpose of the SQL logic defined in this document. Since the SQL implementation may vary depending on an EHR system's table structure and data definitions, EHR system programmers and vendors should replace the field names and table names as needed based on their knowledge of their EHR system and its requirements in order to fulfill the measure's intent.

TTR percentage will be calculated for each patient that meets the criteria for the Measure Population. The average of these values is reported as the Measure Observation.

ADE Prevention and Monitoring
Percent of Time in Therapeutic Range (TTR)

The initial part of the SQL logic calculates the percent TTR for each patient (PctTTR in the temporary table #PatientTTR). Percent of time in therapeutic range (TTR) is calculated within the logic originally developed by the Veterans Affairs (VA).

Warfarin time in therapeutic range is the percentage of time in which patients with atrial fibrillation or flutter who are on chronic warfarin therapy have INR test results within the therapeutic range (2.0 - 3.0) during the measurement period.

The following filters are applied to the INR results prior to the calculation of TTR for each patient:

1. INR value closest to 2.5 when there are more than one INR result on a single date
2. INR values greater than 10 will be replaced with an INR value of 10
3. INR values less than 0.8 are ignored and eliminated from the final TTR calculation for each patient

The logic keeps track of the number of valid INR intervals for each patient. A Valid INR Interval is defined as a pair of INR start dates that are less than or equal to 56 days apart. Patients without 2 such intervals will be excluded from the calculation of the providers' Average PctTTR later on.

Identifiers for the patient's provider and the practice site are also included. The identifier for the provider that is ultimately responsible for warfarin management should be used. The identifier for the practice site at which the patient's warfarin is managed should be used.

```
USE [Datamart_Staging]
GO
/****** Object:  StoredProcedure [dbo].[ADE_TTRCalculationWithFilters]
Script Date: 04/10/2013 09:01:41 ******/
SET ANSI_NULLS ON
GO
```

```
SET QUOTED_IDENTIFIER ON
GO

ALTER PROCEDURE [dbo].[ADE_TTRCalculationWithFilters]

AS

SET NOCOUNT ON;

SELECT
          Patient_ID,
          Practice_Site,
          provider_ID,
          [QDM_Attribute Result Value],
          ABS(2.5 - [QDM_Attribute Result Value])AS ValDiff,
          DATEADD(DAY,0, DATEDIFF(DAY, 0,[Start DateTime])) AS [Start
DateTime]
INTO
          #LabResults1
FROM    dbo.ADE_LabResults a JOIN
            ADE_VocabularyDictionary b ON a.DataElement_Code = b.Code
WHERE
            b.[QDM Category] = 'Laboratory Test, Result' AND b.[Value Set
Name] = 'INR'
ORDER BY patient_ID, [Start DateTime]
SELECT      Patient_ID,
          [Start DateTime],
          MIN(ValDiff) AS ValDiff
INTO   #LabResults2
FROM   #LabResults1
GROUP BY Patient_ID,
            [Start DateTime]

SELECT  a.Patient_ID,
            Practice_Site,
            Provider_ID,
         a.[Start DateTime],
CASE WHEN a.[QDM_Attribute Result Value] >10 THEN 10 ELSE a.[QDM_Attribute
Result Value] END AS [QDM_Attribute Result Value]

INTO   #FilteredLabResults
FROM   #LabResults1 a
JOIN   #LabResults2 b ON a.Patient_ID = b.Patient_ID
AND    a.[Start DateTime] = b.[Start DateTime]
AND    a.ValDiff = b.ValDiff
WHERE  a.[QDM_Attribute Result Value] >= 0.8


DROP TABLE #LabResults2
DROP TABLE #LabResults1


SELECT
            Patient_ID,
            Practice_Site,
```

```
            Provider_ID,
            [QDM_Attribute Result Value],
            [Start datetime],
            RANK () OVER (PARTITION BY Patient_ID ORDER BY [Start
datetime]) AS INROrder
INTO
          #OrderedINRList
FROM    #FilteredLabResults

ORDER BY
          [Start datetime]

DECLARE           @INRLowerBound AS DECIMAL(20,4)
SET               @INRLowerBound = 2.0
DECLARE           @INRUpperBound AS DECIMAL(20,4)
SET               @INRUpperBound = 3.0

SELECT
            Patient_ID,
            Practice_Site,
            Provider_ID,
            INROrder,
            INR1Date,
            INR1Result,
            TimeBetweenSamples,
            INRDiff,
            INRShiftKPI2,
            IsValidInterval,
CASE
      WHEN
            INRShiftKPI2 = 0.0 AND (INR1Result >= @INRLowerBound AND
INR1Result <= @INRUpperBound
            AND INR2Result >= @INRLowerBound AND INR2Result <=
@INRUpperBound)THEN CAST(TimeBetweenSamples AS DECIMAL)
      ELSE isnull(cast(TimeBetweenSamples AS DECIMAL) * ABS((INRShiftKPI2
/ NULLIF(INRDiff,0))),0)
      END  AS TherapeuticDaysKPI2

INTO
      #TherapeuticDays
FROM
(
      SELECT
            inr1.Patient_ID,
            inr1.Practice_Site,
            inr1.Provider_ID,
            inr1.INROrder,
            inr1.[Start datetime] AS INR1Date,
            inr1.[QDM_Attribute Result Value] AS INR1Result,
            inr2.[Start datetime] AS INR2Date,
            inr2.[QDM_Attribute Result Value] AS INR2Result,
            DATEDIFF(DAY,inr1.[Start datetime],inr2.[Start datetime]) AS
TimeBetweenSamples,
            inr2.[QDM_Attribute Result Value] - inr1.[QDM_Attribute Result
Value] AS INRDiff,
```

```
            dbo.DifferenceWithinRange_v2  (inr1.[QDM_Attribute Result
Value],inr2.[QDM_Attribute Result Value],@INRLowerBound,@INRUpperBound) AS
INRShiftKPI2,
            CASE
                  WHEN (ABS(DATEDIFF(DAY,inr1.[Start datetime],inr2.[Start
datetime])) <= 56)
                        THEN 1
                        ELSE 0
            END AS IsValidInterval
      FROM
            #OrderedINRList inr1
            INNER JOIN #OrderedINRList inr2
            ON inr2.INROrder = inr1.INROrder + 1 AND inr1.Patient_ID =
inr2.Patient_ID
      WHERE
            inr2.[Start datetime] >= inr1.[Start datetime]
) x
ORDER BY
      INR1Date
SELECT
      Patient_ID ,
      Practice_Site,
      Provider_ID,
      ROUND(100 * (SUM(TherapeuticDaysKPI2) / SUM(TimeBetweenSamples)),2)
AS PctTTR,
      SUM(IsValidInterval) as NumValidIntervals
INTO
      #PatientTTR
FROM
      #TherapeuticDays

GROUP BY Patient_ID,Practice_Site, Provider_ID
ORDER BY Patient_ID


DROP TABLE #FilteredLabResults
DROP TABLE #TherapeuticDays
DROP TABLE #OrderedINRList
```

Cumulative Medication Duration

Cumulative medication duration (CMD) includes the total number of calendar days the patient is actively using Warfarin. The SQL logic below does not include the specific medication codes that are used to identify each individual warfarin prescription for a patient. In the HQMF file for the clinical quality measure, the value set for the data element Medication, Active "Warfarin" contains the RxNorm codes that should be used to identify patients on warfarin therapy. The HQMF file for the clinical quality measure also defines cumulative medication duration >=180 days.

For testing purposes, the measurement start date was set to 1/1/2011, and the look-back period for an active medication of warfarin is 200 days prior to measurement start date. Depending on how cumulative medication duration is captured in the site's EHR, SQL logic may need to be modified in order to include this particular data set.

```
DECLARE @MeasurementStartDate DATETIME
DECLARE @LookBackDate DATETIME

SET @MeasurementStartDate = '1/1/2011'
SET @LookBackDate = @MeasurementStartDate - 200

SELECT DISTINCT a.Patient_ID,
                      a.Practice_Site,
                      a.Provider_ID,
                      a.PctTTR,
                      B.[Start DateTime],
                      B.[Stop DateTime],
                      DATEDIFF(DAY,B.[Start DateTime] , B.[Stop
DateTime]) AS DateDifference,
                      CASE WHEN  b.[Start DateTime] < @LookBackDate THEN
DATEDIFF(DAY,B.[Start DateTime] ,
                                        B.[Stop DateTime]) -
DATEDIFF(DAY,B.[Start DateTime] , @LookBackDate)
                      WHEN       b.[Stop DateTime] >=
@MeasurementStartDate THEN DATEDIFF(DAY,B.[Start DateTime] ,
                                        B.[Stop DateTime]) -
DATEDIFF(DAY,@MeasurementStartDate,B.[Stop DateTime])
                      ELSE DATEDIFF(DAY,B.[Start DateTime] , B.[Stop
DateTime])  END AS ActualUsageIn200DayPeriod
INTO            #PatientTTRWithMedDates
FROM            #PatientTTR A
     JOIN       ADE_Medications B ON A.Patient_ID = B.Patient_ID
     JOIN       ADE_VocabularyDictionary C ON B.DataElement_Code = C.Code
WHERE           B.[Start DateTime] IS NOT NULL
                      AND   (b.[Start DateTime] >= @LookBackDate or
b.[Stop DateTime] >= @LookBackDate)
                      AND (b.[Start DateTime] <= @MeasurementStartDate)
                      AND C.[QDM Category] = 'Medication, Active'

SELECT     Patient_ID,
                Practice_Site,
                Provider_ID,
                PctTTR,
```

```
                SUM(ActualUsageIn200DayPeriod) AS
CumlativeMedicationUsage
INTO        #PatientTTRWithMin180DaysMeds
FROM        #PatientTTRWithMedDates
GROUP BY    Patient_ID,Practice_Site, Provider_ID,PctTTR
HAVING      SUM(ActualUsageIn200DayPeriod) >=180
ORDER BY    Patient_ID,Practice_Site, Provider_ID
```

Age Requirements

The logic in this section contains a filter that states the patient must be 18 years or older during the measurement period.

```
SELECT  a.Patient_id,
           b.BirthDate,
           a.Practice_Site,
           a.Provider_ID,
           a.PctTTR
INTO   #PatientTTRAbove18WithMin180DaysMeds
FROM   #PatientTTRWithMin180DaysMeds a
JOIN   ADE_Patients B ON a.Patient_ID = b.Patient_ID
WHERE  DATEDIFF(YEAR,b.birthdate,@MeasurementStartDate) >=18
ORDER BY A.Practice_Site
```

Active Diagnosis (including exclusion criteria)

Atrial Fibrillation Diagnosis

Patients who have an active diagnosis of atrial fibrillation or atrial flutter that started and did not end before the first day of the measurement period must be included in this measure.

Valvular Heart Disease

If patients contain an active diagnosis of valvular heart disease that started and did not end before the start of the measurement period, they should be excluded from the data set.

```
SELECT   a.Patient_Id,
           a.BirthDate,
           a.Practice_Site,
           a.Provider_ID,
           a.PctTTR
INTO     #PatientTTRAbove18WithMin180DaysMedsAndDiagnosis
FROM     #PatientTTRAbove18WithMin180DaysMeds a JOIN
           ADE_Diagnosis b ON a.Patient_id =B.Patient_ID
WHERE
           b.[start DateTime] < @MeasurementStartDate
           AND b.[Stop DateTime] > @MeasurementStartDate
```

```
            AND b.DataElement_Code IN (SELECT CODE FROM
ADE_VocabularyDictionary WHERE [QDM Category] = 'Diagnosis, Active' AND
([Value Set Name] = 'Atrial Fibrillation/Flutter'))
            AND b.Patient_id NOT IN (SELECT Patient_Id FROM ADE_Diagnosis
where (DataElement_Code IN (SELECT CODE FROM ADE_VocabularyDictionary
WHERE [QDM Category] = 'Diagnosis, Active' AND ([Value Set Name] =
'Valvular Heart Disease'))))
            AND (b.[start DateTime] <= @MeasurementStartDate AND b.[Stop
DateTime] >= @MeasurementStartDate)

ORDER BY A.Patient_ID

DROP TABLE #PatientTTRAbove18WithMin180DaysMeds
```

Valid INR Intervals

The SQL logic below calculates patients who have at least two valid INR intervals during the measurement period. A valid INR interval is defined as a pair of INR results that are less than or equal to 56 days apart. If multiple INR results are present on the same day, only one is noted for the TTR calculation (filter mentioned in Percent TTR section).

```
SELECT    A.Patient_Id,
              A.BirthDate,
              A.Practice_Site,
              A.Provider_ID,
              A.PctTTR
INTO      #PatientsWithTwoValidIntervals
FROM      #PatientTTRAbove18WithMin180DaysMedsAndDiagnosis A
JOIN    #PatientTTR B ON A.Patient_ID = B.Patient_ID
WHERE
            B.NumValidIntervals >= 2
```

Encounter Data

The logic below includes patients that have at least one outpatient visit during the measurement period. Patient encounter codes and definitions are site specific and must capture the relative encounters needed to meet the criteria of the measure.

```
SELECT    a.Patient_Id,
              a.BirthDate,
              a.Practice_Site,
              a.Provider_ID,
              a.PctTTR
INTO      #PatientTTRWithDaysAgeDiagnosisEncounter
FROM      #PatientsWithTwoValidIntervals a
JOIN      ADE_Encounters B ON A.Patient_Id = b.Patient_ID
JOIN    ADE_VocabularyDictionary C ON B.DataElement_Code = C.Code
WHERE
```

```
             (C.[Value Set Name] = 'Face-to-Face Interaction' OR C.[Value
Set Name] = 'Office Visit')
           AND b.[start datetime] >= @MeasurementStartDate
ORDER BY  Practice_site
```

Average TTR by Provider and Practice

In order to calculate an AverageTTR by provider, patients who meet all the criteria above will be grouped by unique provider identifier. The provider IDs should be assigned by the site (e.g., actual provider identifier). The identifier for the provider that is ultimately responsible for warfarin management should be used.

Note: the logic also includes the calculation of AverageTTR by practice site (e.g., an anticoagulation clinic). This is for reference purposes only and is not required for the quality measure or its reporting. Ideally, the identifier for the practice site at which the patient's warfarin is managed should be used.

```
SELECT Practice_Site,AVG(PctTTR) AS AvgTTRByPracticeSite
FROM #PatientTTRWithDaysAgeDiagnosisEncounter
GROUP BY Practice_Site

SELECT Provider_ID,AVG(PctTTR) AS AvgTTRByProvider
FROM #PatientTTRWithDaysAgeDiagnosisEncounter
GROUP BY Provider_ID
```

FUNCTION [dbo].[DifferenceWithinRange_v2]

The following function is required for the calculation of TTR. This function calculates the difference between two numbers that falls within a specified range. For example, given a range of 2.0 to 3.0, the difference between 1.5 and 2.5 within this range is 0.5. The function is intended for use in calculating differences between INR values within the context of the Rosendaal method of calculating TTR (time in therapeutic range), which requires the proportion of an INR difference from one sample to the next that falls within the therapeutic range.

```
USE [V01DW]
GO

/****** Object:  UserDefinedFunction [dbo].[DifferenceWithinRange_v2]
Script Date: 01/03/2013 13:51:42 ******/
SET ANSI_NULLS ON
GO

SET QUOTED_IDENTIFIER ON
GO

CREATE FUNCTION [dbo].[DifferenceWithinRange_v2]
(     --inputs:
      @Val1 as decimal(10,5),
      @Val2 as decimal(10,5),
      @LowerBound as decimal(10,5),
      @UpperBound as decimal(10,5)
```

```
)
RETURNS decimal(10,5)
AS
BEGIN
      -- Declare the return variable here
      DECLARE @result as decimal(10,5)


      set @result =
      (
      SELECT
            case
      -- inr values are both outside the range in the same direction
            when @Val1 > @UpperBound and @Val2 > @UpperBound then null
            when @Val1 < @LowerBound and @Val2 < @LowerBound then null
      -- inr values are straddling the range
            when (@Val1 > @UpperBound and @Val2 < @LowerBound)
                  OR (@Val2 > @UpperBound and @Val1 < @LowerBound)

                  then @UpperBound - @LowerBound
      -- both inr values are within the range
            when @Val1 between @LowerBound and @UpperBound
                        and @Val2 between @LowerBound and @UpperBound
                  then (@Val2 - @Val1)
      -- one value is in the range and one is outside
            when @Val1 > @Val2
                        and @Val1 > @UpperBound
                  then (@UpperBound - @Val2)*(-1) --/ (@Val1 - @Val2)
            when @Val2 > @Val1
                        and @Val2 > @UpperBound
                  then (@UpperBound - @Val1)*(-1) --/ (@Val2 - @Val2)

            when @Val1 > @Val2
                        and @Val2 < @LowerBound
                  then (@Val1 - @LowerBound)*(-1)
            when @Val2 > @Val1
                        and @Val1 < @LowerBound
                  then (@Val2 - @LowerBound)*(-1)
            else null
      end
      )

      -- Return the result of the function
      RETURN @result

END
GO
```