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**Standards & Interoperability Framework**

**Query Health Initiative**

**Clinical Element Data Dictionary (CEDD) Specification**

**Consensus Review – Version 1.0**

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Revision History

| **Date** | **Document Version** | **Document Revision Description** |
| --- | --- | --- |
| 3/19/2012 | 1.0 | Final CEDD specification document – ready for consensus review and comment |
| 3/13/2012 | 0.4 | Clarifying language on what is “core” to a distributed query was added, as well as completion of the NQF QDM 3.0 alignment |
| 3/6/2012 | 0.3 | Includes additional detailed mappings to underlying implementation models and domain recommendations, including:   * PopMedNet * i2b2 * hQuery * ISDS * ACO |
| 2/29/2012 | 0.2 | Revised to include detailed clinical examples below, and mappings to i2b2, PopMedNet, and hQuery:   * 3.4 Immunization * 3.5 Medication * 4.4 Family History (CDA info based on ’97 CMS E/M Guidelines) * 4.8 Physical Exam (CDA info based on ’97 CMS E/M Guidelines)   + Foot Exam, with expansion on Neurologic Exam section * Added 4.10 Review of Systems (CDA info based on ’97 CMS E/M Guidelines) * 4.11 Social History (CDA info based on ’97 CMS E/M Guidelines) * 4.12 Surgery (CDA info based on ’97 CMS E/M Guidelines) |
| 2/7/2012 | 0.1 | Contains the initial draft language for the Query Health Clinical Element Data Dictionary (CEDD) – to begin review with the Query Health Clinical Working Group. Includes language on:   * CEDD Objects and Data Elements, with datatypes and vocabularies defined at a high level * Structure of the overall mapping and implementation guidance documentation |

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# Introduction to CEDD Specification

The Query Health Clinical Element Data Dictionary (CEDD) serves as a tool for implementers to use in setting up clinical source data in support of distributed queries. The CEDD serves as one building block within the larger Query Health technical approach, and is intended to give implementers a foundation of working specifications and examples. As the following figure shows

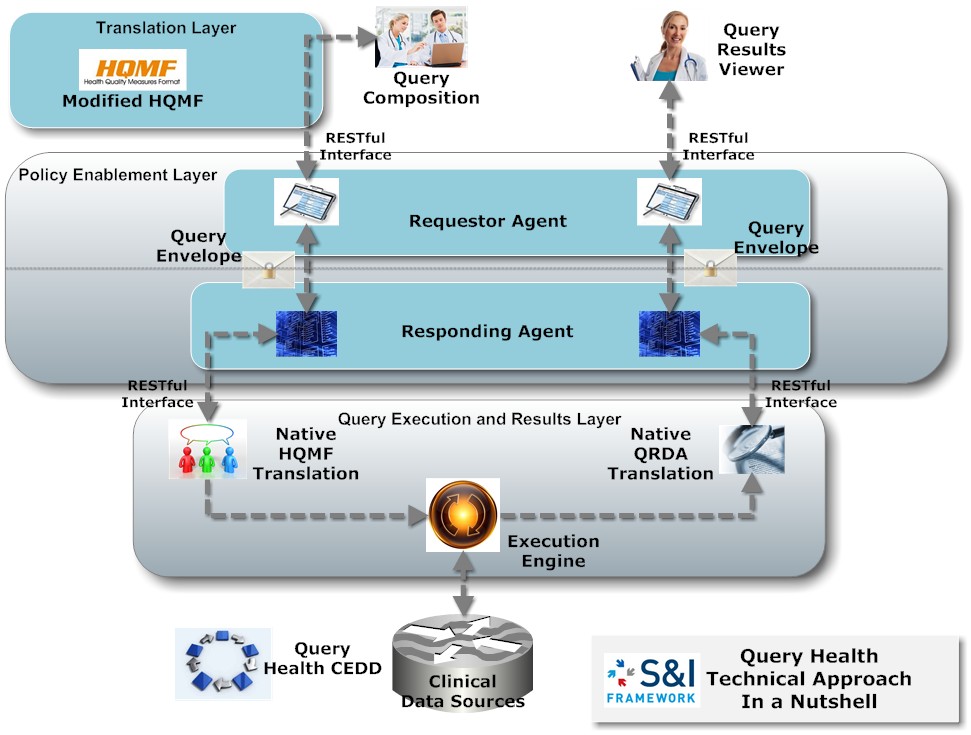
The Query Health CEDD is based on the concept of a distributed data model and data dictionary that can used to give any vendor or organization interested in implementing the Query Health Technical Approach complete independence over access to and use of data in their possession. The Query Health CEDD supports development and implementation for vendors by providing a common view of data to allow queries to be distributed and run identically in each implementation. Because the Query Health technical approach supports multiple implementation models, this “map and model” driven approach allows for common data elements to be mapped to the underlying implementation models, and then models and supporting documentation to help implementers and vendors ensure alignment to the Query Health technical approach.

## Understanding the CEDD

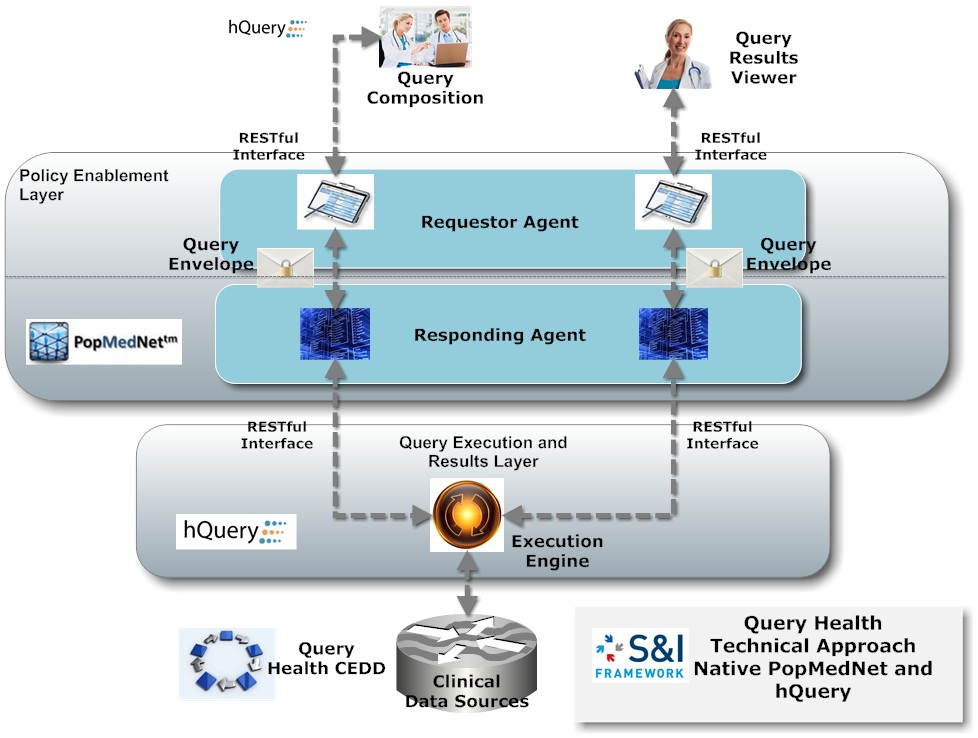
To build the Query Health CEDD specification and model, the S&I Framework Clinical Element Data Dictionary (CEDD) and its repository of data elements and their corresponding definitions and attributes were leveraged. Reuse was encouraged but based on the specified need for clinical information that is used in support of distributed queries. The S&I CEDD lists the data elements and corresponding definitions that are needed to convey the clinical perspective in a manner that is understandable to a variety of stakeholders including functional and technical experts. These data elements support the electronic exchange of health information through providing a core set of unambiguously-defined data elements ensuring semantic compatibility. The CEDD is not a transmission or communication standard such as HL7 and is not specifically defining or endorsing a standard.

There are two specific pieces of the Query Health Technical Approach that the Query Health CEDD Specification is meant to support:

* Query construction and format – how do I construct a distributed query using HQMF and allow for translation into a native format (i2b2, PopMedNet, or hQuery)



* Query construction – how should the query be structured in native approaches to be sent to the data source?



## Understanding CEDD Optionality

The current approach to optionality that is defined in the Query Health CEDD is to define a core set of required data elements that would be needed in every distributed query. Because what is “required” for a specific distributed query may differ substantially depending on what type of query is being used, domains defined in Section 5 of the Query Health CEDD specification further constrain what is required in support of a distributed query.

Within the Query Health CEDD specification, there may also be additional elements defined, which are listed as Required if Known. This allows for implementers to consider those elements that are desirable in their specific context and make data elements available in support of distributed queries that may be needed. Query Health has ensured that it does not require elements that are not readily available in most EMR systems in this first iteration of the Query Health initiative. As EHR capabilities increase over time, it is expected that more data elements will be made available in support of distributed queries. New EHRs already capture the data in discrete fields within sections and subsections.

Also, it is assumed (and is a known feature of most EHR systems) that a count of specific data (such as Review of Systems, Past Family Social History, Physical Exam, etc.) and their data elements is a built-in feature, so a count is not a specific requirement defined with the CEDD specification.

Within each of the core objects of the CEDD Specification there is a coded value defined, so that all EHR vendors can use coded values as a basis for running distributed queries. Where optionality is less constrained in the CEDD specification is for those data elements that may not have a coded value available (for example, where a CCD does not require a coded value and where the EHR might not have information stored with a specific controlled vocabulary, but with text).

To fully understand optionality, it is important to consult the corresponding Query Health catalog to understand how HQMF and QRDA are used to further constrain data elements within the context of each distributed query.

## Query Health and the S&I Framework CEDD

The Query Health CEDD specification is considered an instance of the S&I Framework CEDD. In this manner, reuse of existing data elements defined in healthcare standards and in S&I Framework initiatives can be achieved WHERE APPROPRIATE. Wherever possible, the Query Health CEDD specification specifically reuses data elements defined within other S&I Framework initiatives and within healthcare standards such as the HL7 CCD, HL7 Consolidated CDA, and controlled vocabularies such as LOINC and SNOMED-CT

## Specific CEDD Principles for Query Health

The purpose of the Query Health CEDD is to document the needed data to support distributed queries in a variety of formats. Working examples are provided to assist implementers and vendors in structuring source data to support query and query results.

Several principles underlie development of the Query Health CEDD. They are listed here to help implementers and vendors understand the context of how this specification was developed:

* The Query Health CEDD is designed to support the requirements outlined in the S&I Framework Query Health Use Case, but can accommodate additional requirements required by various healthcare domains.
* The Query Health CEDD is able to incorporate new data types and data elements as needs from interested participants arise.
* Development of the initial Query Health CEDD and any additional enhancements and tools will require piloting and acceptance by all vendors interested in adopting the Query Health Technical Approach.
* Documentation of Query Health CEDD issues and challenges that directly impact use of source data for distributed queries will be crucial to ensuring adoption of the Query Health Technical Approach.
* The Query Health CEDD is built to be transparent, intuitive, well-documented, and easily understood by stakeholders. Supporting examples, code, and models are provided to assist implementers and vendors in using the Query Health CEDD to make source data available for distributed queries.
* The Query Health CEDD leverages evolving healthcare coding standards and maps to existing information modeling efforts, such as the Federal Health Information Model (FHIM), NQF Quality Data Model (QDM) and the Clinical Information Modeling Initiative (CIMI).
* The Query Health CEDD captures values found in the EHR. When necessary, mapping to standard vocabularies is transparent. Source mappings should be included and added by implementers on an implementation-specific basis.
* Calculated variables are not included in the Query Health CEDD.
* Existing implementations should be leveraged as best practices for the Query Health CEDD, to minimize any direct implementation-specific modifications or transitional changes.
* Post-processing of data is expected as query requestors generally have the best understanding of the information being received.
* Implementers and vendors may extend their implementation of the Query Health CEDD with any site or vendor-specific information that is needed.

To make these principles actionable, the S&I Framework Query Health initiative focused work on the Query Health CEDD in the following areas:

* Focus on data elements defined in the S&I Framework Query Health Use Case.
* Leverage the cumulative experience of vendors, implementers and other organizations.
* Rely on existing and standardized coding schemas and ontologies.
* Be compatible with existing implementations such as PopMedNet, i2B2, and hQuery.
* Include all of the data elements needed to support generic distributed queries.

# Structure of CEDD specification

The Query Health CEDD specification is designed to accelerate implementations and adoption of the Query Health technical approach. This specification is supported by mappings to key implementation models and supporting Unified Modeling Language (UML) and ERD models. By leveraging underlying implementation models, the CEDD supports widespread adoption of distributed queries.

Convenience value sets are also defined within the Query Health CEDD to assist implementers in structuring their EHR and clinical data source to support distributed queries. These value sets are defined as part of the S&I Framework CEDD Value Set Index, which provides a list of the commonly used value sets in the S&I Framework.

## CEDD Specification – Object Representation

Each of the CEDD objects is represented with the following values:

|  |  |
| --- | --- |
| **Data Element Name** | The name of the data element |
| **Data Element Definition** | A definition of the data element – specifically focused on its context of use. |
| **Data Element Format** | The type or structure of the data being queried or described. It is important to note that the formats used may vary depending on context |
| **Expected Values** | Denotes expected value that should be used for this data element. It is important to note that the expected values should closely follow two guidelines:   * The expected value should be as closely aligned to the original source of the information as possible * The expected value should draw from the underlying standard that will be used to provide technical representation |
| **Expected Vocabulary** | Denotes the expected vocabulary or value set that is used. |
| **Clinical Examples and Guidelines** | Examples are provided from both the clinical and technical perspective to assist with the representation of the data element. |

## CEDD Examples – Query Catalogs

A set of sample distributed queries have been developed to support implementation of the Query Health Technical Approach. These sample queries are used to map from development of a query (in the specified HQMF query format) to the data source (CEDD) and then through to return of the actual data (using QRDA Category 3). Catalogs are under development in support of the following domains:

* Accountable Care Organizations (ACO’s)
* National Quality Forum (NQF) eMeasures
* New York Primary Care Information Project (PCIP) Pilot

## CEDD Value Sets and Vocabularies

The initial intention is to reuse value sets that are already in place as part of other S&I Framework initiatives and national health IT interoperability initiatives. This includes reuse of the defined NQF value sets for eMeasures, which have been added to the CEDD Value Set Index. The CEDD Value Set Index includes all current value sets (known as Convenience Value Sets) used in S&I Framework initiatives and is available on the S&I Framework CEDD wiki.

There are several additional resources to be used to identify value sets that would be used in support of distributed queries:

* NQF
* UMLS
* PHIN-VADS

Where a value set cannot be identified for a specific coded value, it is important to note that ONLY a vocabulary is listed under “Expected Vocabulary”. This is in keeping with the principle of the S&I CEDD to only reuse what already exists and to not create new standards.

The CEDD Value Set Index is located at:

<http://wiki.siframework.org/file/view/S%26I%20Framework%20-%20Clinical%20Element%20Data%20Dictionary%20%28CEDD%29%20-%20Value%20Set%20Index%20-%20Version%200.1.docx>

# CEDD Specification – Core Objects

The Query Health CEDD specification structures data to support source data requirements that are core to running distributed queries. Not ALL data is needed for a specific distributed query, and this section of the specification would focus on the core data elements that are needed in support of EXPECTED distributed queries that have been defined to date.

Working examples are provided in the Appendix. These working examples show how requirements from a specific distributed query are represented within the query and within the source data. As additional requirements for distributed queries are defined, this library of examples will be expanded.

As part of a core designation, each object meets the following criteria:

* All objects should reference the following data elements:
  + Encounter ID
  + Patient ID
  + Start Date
  + End Date
  + Provider ID
  + Location ID
* Every object represented in a physical data model should start with a coded value, if possible, and then follow with a name as a convention.
* These data elements may be automated by the edge system (EHR)
* These data elements are part of a validated data model used with a clinical data source or electronic health record (EHR)
* These data elements would be accessed as part of every distributed query

## Allergies and Adverse Reactions

In support of distributed queries using existing systems, allergies should include, at a minimum, the elements specified in the CCD. This will ensure that EHRs can support queries for allergy and adverse event information that they already capture as part of Meaningful Use regulations. Additional elements are specified that will be needed to support more robust distributed queries over time.

While medication allergies are the only allergies required for Stage 1 Meaningful Use, the Query Health CEDD covers ALL allergies. Since all allergies are commonly recorded in EHRs, all allergies in this category (food, medication and environmental) are included.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Allergy Type | The type of product and intolerance suffered by the patient | Text or Coded Value | Required | SNOMED-CT | The allergy type would be queried to stratify the number of allergy observations.  Food, Environmental, and Medication allergies may be captured in a variety of ways: SNOMED-CT, text or a variety of codes. |
| Substance | Medication (ingredient or class code, if available) that has been attributed to an allergic reaction or intolerance, or drug code if attribution to ingredient or class is unavailable | Coded Value | Required | RxNORM for Medications  SNOMED-CT for Food or Environmental | Use any of the following:   * Medication class code * Medication ingredient code * Medication drug code   Medication (ingredient or class code, if available) that has been attributed to an allergic reaction or intolerance, or drug code if attribution to ingredient or class is unavailable.  May also use Food or Environmental allergen substances in this field. |
| Reaction | A list of reactions from allergies/intolerances | Coded Value | Required | SNOMED-CT |  |
| Status | Veracity of the data based on source and details available about index reaction(e.g. older patient has been told that had a Rx as a child vs. clinician has healthcare professional documentation of an anaphylactic episode) | Coded Value | Required if Known | HL7 V3 |  |
| Severity of reaction | Severity associated with the reaction. This is a description of the level of severity of the allergy or intolerance | Coded Value | Required | SNOMED-CT |  |
| Reaction Date | Date when this particular Intolerance Condition or Allergy first manifested itself or was confirmed via testing if it had not yet manifested itself. | Date/Time or TS | Required |  |  |
| Reaction Identified By | Who reported the reaction (e.g. patient, provider, care taker) | EN (Entity Name) | Required |  |  |
| Date of last reaction | The last recorded time that a reaction occurred | Date/Time or TS | Required if Known |  |  |

### Allergies and Adverse Reactions Clinical Examples

A distributed query might specifically query against the following information within an EHR or a set of EHRs

* Provide me an active list of adverse drug reactions where the substance taken was Penicillin and the reaction that occurred from usage of Penicillin was hives.

Allergy Type: Drug Allergy

Substance: Penicillin

Reaction: Hives

Status: Active

Severity of Reaction: Moderate (as coded in SNOMED-CT – 6736007)

## Diagnosis

|  |
| --- |
| The Diagnosis CEDD object would be expected to contain one record per diagnosis code. The Diagnosis object should capture all observed diagnoses  for all encounters. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Diagnosis Code | Used to capture a specific diagnosis code | Coded Value | Required | SNOMED-CT  ICD-9  ICD-10 | The diagnosis code can be captured in the HITSC recommended standard (SNOMED-CT) or ICD-9 and ICD-10 can be used |
| Diagnosis Name | The name of the diagnosis. Can also be used to capture a local code if the standard code is not mapped | Text | Required if Known |  | The diagnosis name can be captured as text or mapped to a local diagnosis code, which a query may need |
| Diagnosis Flag | Principal diagnosis flag | Coded Value | Required if Known | SNOMED-CT  ICD-9  ICD-10 | Diagnosis Flag is intended to indicate the diagnosis is the principal diagnosis for a clinical note. Secondary diagnoses would not have this flag set  Flag to designate the code is SNOMED, ICD9, ICD10, etc. |
| Diagnosis Type | Describes the type | Coded Value | Required | SNOMED-CT  ICD-9  ICD-10 | Diagnosis type is intended to be for inpatient or outpatient diagnosis |
| Diagnosis Date | Captures the date of the diagnosis | Date/Time or TS | Required if Known |  | The date of the diagnosis |

### Diagnosis Clinical Examples

For the Expanded Analysis user story, the diagnosis codes for Type 1 and/or Type 2 diabetes would be queried. An organization might be interested in looking at common comorbidities and complications associated with Type 2 diabetes mellitus. This might include an examination of incidences of hypertension, lipid disorders, or nephropathy within the target population.

## Encounter

The Encounter object represents one medical encounter and should be linked with the Patient ID defined in the Demographic CEDD object. The purpose of the Encounter object is to allow for the distributed query of any healthcare encounters pertinent to the patient’s current health status or historical health history. Encounters represent sessions where observations were made and each encounter would represent one session, and it is assumed that an encounter represents one billable "visit" such as one outpatient or ED visit or one inpatient stay. Diagnoses and procedures that are captured as part of an encounter should be captured separate from the Encounter CEDD object.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Encounter ID | Used to identify a specific visit or encounter. The ID is intended to be local to the organization | Integer | Required |  | Encounter ID should be tied to all CEDD Objects if available |
| Encounter Code | The encounter code is used to capture | Coded Value | Required | SNOMED-CT  CPT  ICD-9 Procedures  ICD-10 PCS |  |
| Encounter Type | The type of encounter | Coded Value | Required | CPT-4 | Initial coded values should use CPT-4. Not all encounters are billed in a practice, particularly in low-income areas, however.  Used to capture the type of visit/stay, such as inpatient, ED, non-acute, etc…  Commonly defined using Concept Descriptor (CD) |
| Encounter Admission Date | Encounter or admission date. | TS or IVL<TS> can be used, or Date/Time | Required |  |  |
| Discharge Status | The status on discharge – specifically, where after the encounter the patient had been discharged to | Text or coded value | Required if Known |  | Used to track a diagnosis |
| Admitting Source | The source for the admission | Text or coded value | Required if Known |  | Used to define the source of admission. May use a local coding system to define the admitting source (by relationship or role type) |
| Discharge Location | The location where the discharge occurred (can be tied directly to the Facility object or to patient contact information) | Text or coded value | Required if Known |  | May use Zip Code or other patient contact information to target where discharge for a specific patient population occurred |
| Encounter Discharge Date | Discharge date.  Use for inpatient hospital and overnight encounters.  Should be missing for other encounter types such as ambulatory visits. | TS or IVL<TS> can be used, or Date/Time | Required |  |  |
| Reason for Encounter | Should contain a narrative description of the primary reason for admission to a hospital facility. May be returned as aggregated data as part of a distributed query | Text or Coded Value | Required if Known |  | The reason for encounter can be captured as narrative, but a coded value may also be used |

### Encounter Clinical Examples

There are several distributed queries that can be made on encounter information. A query might focus on a target population who were seen on a particular date with a specific diagnosis.

A query might also link together encounter information with allergy and medication information, such as patients who have had one drug-allergy interaction during an encounter.

## Immunization

The Immunization object is used to capture information on immunizations for current immunization status and pertinent immunization history within a given population. Note that future work will be done to ensure alignment to data elements defined in HL7 2.5.1 immunization implementation guides defined within Meaningful Use Stage 2.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Immunization Manufacturer Name | Manufacturer of immunization | Text or Coded Value | Required if Known | MVX |  |
| Category of Immunization | What the immunization is for | Coded Value | Required | CVX |  |
| Date Immunization Delivered | The date and time the immunization was given. | Date/Time or TS | Required |  | To support a distributed query for immunization data, it is necessary to have the immunization delivery date available |
| Immunization ID | Unique id given to the immunization | II (Instance Identifier) | Required |  |  |
| Immunization Lot ID | Unique id to identify the immunization | II (Instance Identifier) | Required if Known |  |  |
| Immunization Series | Indicates which type of series the patient has been given. Current valid values are Series 1 through 8, Partially complete, booster, or complete | Coded Value | Required if Known | CVX | The immunization series type may not be available as part of the distributed query. |
| Immunization Performer | Person who administered the immunization | EN (Entity Name) | Required if Known |  |  |
| Immunization Route | How immunization is administered | Coded Value | Required | SNOMED-CT  LOINC |  |
| Site of Delivery | Body site where immunization was administered | Coded Value | Required if Known | SNOMED-CT  LOINC |  |
| Observed Reaction | The response of cells or tissues to an antigen, as in a test for immunization | Coded Value | Required if Known | SNOMED-CT |  |

### Immunization Clinical Examples

A distributed query might specifically query against the following information within an EHR or a set of EHRs

* Provide me an active list of the percentage of patients age 5-64 with a high-risk condition, or age 65 and older, who received the pneumococcal vaccine

Coded Product Name: [Pneumococcal Pneumonia CVX Code]

Immunization Manufacturer Name: [Name of Manufacturer – MVX]

Date Immunization Delivered: 02/29/2012

Immunization ID: [Alphanumeric]

Immunization Lot ID: [Alphanumeric]

Immunization Route: Intramuscularly

Site of Delivery: Deltoid muscle

Observed Reaction: Fever

## Medication

The Medication CEDD object would be used to support queries that involve medication information that is associated with a specific diagnosis, adverse event reaction, encounter, or procedure, as some examples of the linkage of a medication. The meaning of the medication object is intended to imply a linkage between dispensed medication and other CEDD objects. Medication information can be used with other tables to create longitudinal relationships between medications and other events.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Medication Name | The name of the substance or product without reference to a specific vendor (e.g., generic or other non-proprietary name). If a Coded Product Name is present, this is the text associated with the coded concept. | Text | Required if Known |  | Medication (ingredient or class code, if available) that has been attributed to an allergic reaction or intolerance, or drug code if attribution to ingredient or class is unavailable |
| Medication Code | Used to capture a specific medication code | Coded Value | Required | RxNorm (preferred by HITSC) | NDC, UMLS-linked proprietary codes (i.e. FDB, Multum, Medispan, etc.) - also may be used |
| Medication Type | Describes the classification of the drug based on how the medication is marketed (e.g., prescription, over the counter drug) | Coded Value | Required | SNOMED-CT |  |
| Medication Strength | Describes the strength of the medication (e.g. 25 MG, 100 UNIT/ML) | Text or Coded Value | Required | UNII |  |
| Medication Dose | The amount of the product to be given. This includes a dose in measurable units (e.g., milliliters, or mg), the form (or administrative unit (e.g. tablets, suppository, etc...), and the amount of the form to take. For example Medication XXX 500 mg, tablets; take ½ tablet, administration unit (e.g., tablet), or an amount of active ingredient (e.g., 250 mg). May define a variable dose, dose range or dose options based upon identified criteria (see Dose Indicator)  Need to have both the "dose" as well as the form or administration unit. | PQ (Physical Quantity) | Required | UNII |  |
| Medication Form | This is the physical form of the product as presented to the individual. For example: tablet, capsule, liquid or ointment | Coded Value | Required | RxNORM | Further work will be needed to ensure that subcomponents of a medication form can be queried (to be reviewed in piloting) |
| Medication Route | Indicates how the medication is received by the patient (e.g., by mouth, intravenously, topically, etc.) | Coded Value | Required | NCI | The NCI concept code for route of administration is C38114 and may also be used. |
| Medication Date Range | The period of time that you are to take the medication if it is time limited, e.g. take abx for 10 days | IVL\_TS | Required if Known |  | Some implementation models may not be able to calculate the specific date range associated with a medication |
| Medication Status | If the medication is Active, Discharged, Chronic, Acute, etc. | Coded Value | Required if Known | LOINC |  |
| Medication Frequency | Defines how often the medication is to be administered as events per unit of time. Often expressed as the number of times per day (e.g., four times a day), but may also include event-related information (e.g., 1 hour before meals, in the morning, at bedtime). Complimentary to Interval, although equivalent expressions may have different implications (e.g., every 8 hours versus 3 times a day) | Text | Required if Known |  | Frequency may be a separate field, but it may not be listed separately in most EMRs.  The instructions for SIG text are also included here, typically from the ordering provider, to the patient on the proper means and timing for the use of the product. This information is free-text but can also be represented as a series of Sig Components |
| Medication Initial Prescription Date | Used to express the start date for a medication | Date/Time or TS | Required if Known |  | Populated from pharmacy data, as opposed to claims data in medication history |
| Medication Filled Date | The date of initial fulfillment on the prescription | Date/Time or TS | Required if Known |  | Populated from pharmacy data, as opposed to claims data in medication history |
| Last Refill Date | The last date that the prescription was refilled | Date/Time or TS | Required if Known |  | Populated from pharmacy data, as opposed to claims data in medication history |

### Medication Clinical Examples

A distributed query might specifically query against the following information within an EHR or a set of EHRs

* Provide me an active list of the percentage of adult patients with diabetes, and either hypertension or proteinuria that have a current refill for an angiotensin converting enzyme inhibitor (ACE-I) or an angiotensin receptor blocker (ARB)

Medication Name: [RxNorm/NDC]

Medication Type: OTC

Medication Date Range: 12/20/2011-present

Medication Status: Active

Medication Reconciliation: Yes (using as prescribed)

Medication Initial Prescription Date: 12/20/2011

Medication Filled Date: 12/20/2011

Last Refill Date: 2/20/2012

## Patient Information

The Patient Information CEDD object would contain demographic information for one patient. Each of the data elements listed for patient information would be discrete.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Patient ID | An identifier that uniquely identifies the individual to which the exchange refers and connects that document to the individual's personal health record. Potential security risks associated with use of SSN or driver's license for this element suggest that these should not be used routinely | II (Instance Identifier) | Required |  | For the purposes of the Query Health CEDD, any arbitrary patient identifier may be used.  Patient ID should be tied to all CEDD Objects if available |
| Patient Gender | Gender (i.e., the behavioral, cultural, or psychological traits typically associated with one sex) as defined for administrative purposes | Coded Value | Required | HL7 Administrative Gender |  |
| Patient Date of Birth | The date and time of birth of the individual to which this Exchange refers.  The date of birth is typically a key patient identifier variable and used to enable computation of age at the effective date of any other data element. It is assumed to be unique and fixed throughout the patient's lifetime | Date/Time or TS | Required |  |  |
| Patient Marital Status | A value representing the domestic partnership status of a person. Marital status is important in determining insurance eligibility and other legal arrangements surrounding care. Marital status often changes during a patient's lifetime so the data should relate to the effective date of the patient data object and not be entered with multiple values like an address or contact number. This element should only have one instance reflecting the current status of the individual at the time the Exchange is produced. Former values might be part of the personal and social history | Coded Value | Required if Known | HL7 Marital Status |  |

### Culturally Sensitive Patient Care Information

Within the S&I CEDD structure, information about a patient that is culturally sensitive is defined in a separate object, titled Culturally Sensitive Patient Care. While in many queries, information about a patient’s race or ethnicity might be requested, the information is still listed as optional due to possible restrictions on how this data can be reported, even if it is aggregate information.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Race | Race is usually a single valued term that may be constant over that patient's lifetime. The coding of race is aligned with public health and other federal reporting standards of the CDC and the Census Bureau. Typically the patient is the source of the content of this element. However, the individual may opt to omit race. | Coded Value | Required if Known | CDC Race and Ethnicity Code Sets | For many distributed queries, the target population is not required to be stratified to support a target population by race or ethnicity, so this element is NOT required. |
| Ethnicity | Ethnicity is a term that extends the concept of race. The coding of ethnicity is aligned with public health and other federal reporting standards of the CDC and the Census Bureau | Coded Value | Required if Known | CDC Race and Ethnicity Code Sets | For many distributed queries, the target population is not required to be stratified to support a target population by race or ethnicity, so this element is NOT required. |
| Language | Lists the primary language of the patient | Coded Value | Required if Known | ISO 639-1 |  |

### Patient Information Examples

The Expanded Analysis user story supports multiple denominator elements (e.g. age, gender, etc.) to allow for different queries to be developed that support views of a specific target population.

For more generic user stories, this information would be used to help formulate aggregated data for a specified population of patients within a particular health system over a specific period of time.

Note that this data is NOT used for patient-specified query results. The Query Health Technical Approach supports QRDA Category III reports that contain calculated data (e.g. number of meeting numerator criteria, number of meeting denominator criteria) on the population.

## Payer Information

The Payer Information object is used to capture payer-specific information that may be linked to a patient. It is NOT intended to generate a record for every encounter or transaction, as this would generate many duplicate records in a repository, which would have to be reconciled analytically every time the table is used. The intent of this object is only to capture high-level insurance coverage information for a specific patient as part of analyzing a larger target population.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Primary Insurance Plan ID | The policy or group contract number identifying the contract between a health plan sponsor and the health plan. This is not a number that uniquely identifies either the subscriber or person covered by the health insurance | II (Instance Identifier) | Required |  |  |
| Secondary Payer Type | The type of secondary health plan covering the individual | Coded Value | Required if Known | Health Insurance Type Value Set (ASC X12) | Many patients in a target population may have a Medicare Primary and another payer as the Secondary (e.g. Blue Cross) and can have a Tertiary carrier (e.g. Tricare). |
| Insurance Type | Specifies the type of insurance plan that the patient has | Coded Value | Required | Health Insurance Type Value Set (ASC X12) |  |
| Coverage Type | Specifies the type of insurance coverage that the patient has | Coded Value | Required | HL7 RoleCode |  |
| Plan Enrollment Start Date | Date of the beginning of the enrollment period under the insurance plan. If the exact date is unknown, the first of the month should be used. | Date | Required if Known |  |  |
| Plan Enrollment End Date | Date of the end of the enrollment period under the insurance plan. If the exact date is unknown, the last of the month is used. | Date/Time or TS | Required if Known |  |  |
| Drug Coverage Provided | Outlines if the insurance plan has any responsibility for covering outpatient prescription drug for the member during this enrollment period | BL (Boolean) | Required if Known |  |  |

### Payer Information Examples

A Public Health agency is interested in learning more about the management of diabetic care in a select region. They wish to further stratify these results by looking at those patients who may have insurance and those patients who do not have insurance.

The Expanded Analysis user story specifically requires two denominator counts: Insurance Coverage (Y/N), and Insurance Type (Commercial, Federal, State), which this object would support.

## Primary and Secondary Provider Information

The Primary and Secondary Provider Information object would be expected to support one record for each provider at an institution. The intent of this object would be to capture information needed to support the linking of a provider to other CEDD objects.

Many of the data elements for provider information are listed as optional as detailed information about providers might not be available as part of a specific distributed query.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Provider ID | National Provider Identifier or NPI is a unique identification number issued to healthcare providers in the United States | II (Instance Identifier) | Required |  |  |
| Provider Role | Provider role uses a coded value to classify providers according to the role they play in the healthcare of the patient and comes from a very limited set of values. The purpose of this data element is to express the information often required during patient registration, identifying the patient's primary care provider, the referring physician or other consultant involved in the care of the patient | Coded Value | Required | NUCC (Healthcare Provider Taxonomy) | Work will be done to define a constrained set of values using NUCC. Current value set will be HITSP Provider Type value set. |
| Provider Zip Code | The mailing address to which written correspondence to this provider should be directed | AD (Address) | Required if Known |  |  |
| Provider Organization | The name of the organization that the provider is associated with | Organization | Required if Known |  | Recommend usage of Organization data type |
| Provider Type | Provider type classifies providers according to the type of license or accreditation they hold (e.g. physician, dentist, pharmacist, etc.) or the service they provide | Coded Value | Required | Health Insurance Type Value Set (ASC X12) |  |
| Provider Care Range | The range that a provider has worked with a patient. | IVL\_TS | Required if Known |  |  |

### Primary and Secondary Provider Information Clinical Examples

The Provider ID is included in support of distributed queries to allow for a QRDA Category 3 result to further stratify a target population by a specific provider’s name.

## Procedure

The Procedure object contains one procedure per patient. The Procedure object should capture every procedure for all encounters. A procedure can be encoded using CPT-4, with support also available for ICD-9 or ICD-10 codes.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Procedure Code | Contains the actual procedure code | Coded Value | Required | CPT-4  ICD-9  ICD-10 |  |
| Procedure Name | Used to store the textual procedural name | Text | Required if Known |  |  |
| Procedure Type | This is a coded value describing the type of the procedure | Coded Value | Required | CPT-4  ICD-9  ICD-10 |  |
| Procedure Date | The date and time of the procedure, including duration if pertinent | Date/Time or TS | Required if Known |  |  |

### Procedure Clinical Examples

An example of looking at procedure information to support a distributed query is shown in the theoretical example below:

* Numerator for the specified query (Numerator is defined by number of patients in birthweight group, where ROP is a coded complication who meet the criteria for birthweight.)
* Denominator for the specified query (Denominator is defined as the total number of patients in birthweight group, including neonatal APR-DRGs 610-640.)

## Result

The Result object is meant to support the distributed query of any type of result. The intention for initial distributed queries supported by the S&I Framework CEDD would be laboratory results, with additional results being supported in later versions of the Query Health Reference Implementation. A result would be considered to the definition of an observation within HL7.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Result Code | A coded value of the result that was returned | Coded Value | Required | LOINC |  |
| Result Type | Categorizes a result into one of several commonly accepted values | Coded Value | Required | LOINC | This result type would differ from Vital Sign Type, which is used to query against specific vital sign result types. |
| Result Narrative | A description of type of results that were generated or received | Text | Required if Known |  | If the result cannot be coded, the result narrative may be used. This may be done in cases where the result is not stored in the EHR being queried. |
| Result Date/Time | Date and time of the results | Date/Time or TS | Required |  |  |
| Result Status | Status of the results | Text | Required if Known |  |  |
| Result Interpretation | The specific details of a lab, radiology, or other study performed on a patient. | Coded Value | Required if Known | LOINC |  |
| Result Reference Range | Adds additional detail on the reference range for the result | IVL\_TS | Required if Known |  |  |

### Result Clinical Examples

The Result object can be used to support NQF eMeasures where a Diagnostic Study – Result or Laboratory Result data element is expected. This provides further granularity to distributed queries that may wish to build a query that focuses on data associated with the result.

## Vital Signs

The Vital Signs object contains relevant vital signs captured with specific detail on the observations and measurements received.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Vital Sign Observation | Uniquely identifies the Vital Signs measurement and its coded value | Coded Value | Required | LOINC |  |
| Vital Sign Type | Identifies the specific type of vital sign being measured | Coded Value | Required | Vital Sign Type Value Set (defined in CEDD Value Set Index) – uses LOINC |  |
| Body Site | Indicates the anatomical site - intended to be specified as left arm, right arm, left leg, etc. | Coded Value | Required if Known | SNOMED-CT |  |
| Body Position | May also indicate whether patient is sitting, standing, supine. | Coded Value | Required if Known | SNOMED-CT |  |
| Vital Signs Observation Method | A code that provides additional detail about the means or technique used to ascertain the observation. | Coded Value | Required if Known | SNOMED-CT | While this information may be available as part of the observation, it is listed as required if known, and may be linked to the Medical Equipment object. |
| Vital Signs Observation Range | The range of time that the specific observation applied for a vital sign observation | IVL\_TS | Required if Known |  |  |
| Observation Time | The date/time on which the measurement was taken. | Date/Time or TS | Required if Known |  |  |
| Patient State | Provides an indication of the state of the patient at the time of the observation. For example, a blood pressure may be taken while the patient is exercising or at rest. Akin to concept of exertion. | Coded Value | Optional | SNOMED-CT | The patient state may be included if a distributed query is looking at the specific condition of an aggregate target population when a specific vital sign observation was made. |

### Vital Signs Clinical Examples

This object is used for simple, vital sign observations that would be queried for an aggregate population, such as “patients with a blood pressure greater than 130/80”

# CEDD Specification – Additional Objects

Several of the objects within the CEDD specification are specified as “required if known”, as they are extraneous to the core data that is accessed as part of every distributed query (e.g. the Patient Information object is included/accessed as part of every query, whereas Social History is only queried against depending on the scope or intent of the specific query). A defining characteristic of these additional objects is that “optionality” or “variability” is governed by applicable policy (i.e. CQM) specifications related to that particular query, and not dictated by the technical requirements for querying against EHRs. Therefore, all additional objects listed in this section of the specification would contain information which would not commonly be queried, or information which is only queried as a follow-up, in order to request further detail on a previous query result received for a target population. However, they are listed as “Required if Known” because much of this information is available in current and future EHR systems.

It is recognized that given the newness of such queries for many groups (as digital data has been scarce), this seems to place limitations on the potential of queries to provide inference, as a beginning. Confusion is likely when the discussion of "required" objects occurs, as the impression is that the requestor is in the best position to understand what is required. Also, if an Information Requestor is unaware of the full context of the data being requested, this could lead to issues with patient safety concerns (specifically, if the aggregate data received in the query results is used for some specific purpose).

## Facility

The Facility Object is used to identify locations and care settings that would apply to specific CEDD objects, such as a procedure or an encounter.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Facility ID | The ID of the facility | II (Instance Identifier) | Required |  | A specific code that is used to identify the specific care setting that applies for the target population |
| Facility Location | The location of the facility | Text | Required |  | The location of the facility |
| Facility Type | The type of the facility being referenced | Text or Coded Value | Required |  | Should indicate the facility type using either a coded value from a terminology or using a coded value local to the organization |

### Facility Clinical Examples

The Query Health initiative is focused on the following initial values for facility types, with further analysis to be conducted on how to code these values:

* Hospital
* ER
* Surgical
* Ambulatory Office
* Clinic
* Provider office
* Specialist
* Nursing Home
* Home Visit

## Family History

The Family History object is used to query information about aggregated family history information. For initial implementations of Query Health, it is expected that Family History will not need to be supported unless a query specifically wishes to further analyze specific patterns associated with a target population’s immediate relatives. It is also expected that the work of the S&I Framework Data Segmentation for Privacy initiative will need to be considered as part of developing the Family History object.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Family History Component | Used to make assessment on family history | Text or Coded Value | Required if Known | LOINC |  |
| Family History Observation | Textual description about the problems, diagnoses, and genetic markers found in genetic relatives. This field may be used to capture unstructured family history information recorded in clinical records. | Text or Coded Value | Required if Known | SNOMED-CT  ICD-9  ICD-10 |  |
| Genetic Relative Relationship | The relationship of the genetic relative to the individual. Coding of the relationship with a terminology is preferred, where possible. | Coded Value | Required if Known | Health Level Seven (HL7) Version 3.0 Vocabulary  RoleCode |  |

### Family History Clinical Examples

The family history observation and relationship type may be used in those situations where a distributed query is looking at aggregate data for a specific population’s relatives or close kin.

## Medical Equipment

The Medical Equipment object allows for linking equipment to other CEDD objects. An organization may wish to query against information associated with a procedure by also looking at the type of equipment.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Equipment Code | Coded manufacturer name | Coded Value | Required | TBD |  |
| Equipment Model Name | The human designated moniker for a device, assigned by the manufacturer | CK (Composite ID with check digit) | Required if Known |  |  |
| Equipment Owner | Entity or person who owns the device | EN (Entity Name) | Required if Known |  |  |
| Equipment Status | Describes state or condition of equipment | Text | Required if Known |  |  |
| Quantity | Number of devices identified by the Equipment ID | PQ (Physical Quantity | Required if Known |  |  |

### Medical Equipment Clinical Examples

The Medical Device object is closely aligned to information that would be captured for a device used for a procedure or vital sign measurement, such as that to support NQF measure “Standardized Infection Ration (SIR) of healthcare-associated, catheter-associated urinary tract infections (CAUTI) among patients in intensive care units (ICUs), excluding patients in neonatal ICUs (NICUs).” The Medical Equipment object also aligns closely to the Device category as defined in the NQF QDM.

## Order

The Order object is meant to support the distributed query of any type of order. The order information can then be associated with an encounter or procedure. Order information would be focused on linkage to interventions or diagnostic tests. The Order object within the CEDD is designed to be analogous to the definition of an order within HL7. In distributed queries, the Order object is also akin to what is defined within the NQF QDM for diagnostic study – both in the Order and Performed state.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Order Code | The identifier used for the order | Coded Value | Required | LOINC |  |
| Order Name | The name of the specific order being captured | String | Required if Known |  |  |
| Order Type | Describes the care setting type associated with an order. | Coded Value | Required | LOINC |  |
| Order Date/Time | The date, including time if available, when the ordering provider wrote the order/prescription | Date/Time or TS | Required |  |  |

### Order Clinical Examples

An order may be used as to define any kind of medical test that is ordered as a specific test or series of tests to aid in diagnosing or detecting a specific problem (e.g., to establish a diagnosis, measure the progress or recovery from a problem, to confirm that a person is free from a specific problem). To support distributed queries, orders may be used to describe test orders such as imaging studies, cardiology studies (electrocardiogram, treadmill stress testing), pulmonary function testing, vascular laboratory testing, and others.

## Patient Contact Information

Additional demographic information is contained in the Patient Contact CEDD Object, to include both primary and secondary contact information. This contact information can be used as a starting point when developing more detailed queries that wish to further detail a specific target population by zip code or country.

Note that additional elements may be considered for patient contact information, including whether the patient uses a Personal Health Record (PHR) or has a Direct Address, or other type of email address available.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Patient Country of Residence | The country of resident for the patient | Coded Value | Required | FIPS 5-2 should be used for country codes |  |
| Patient Zip Code | The specific zip code for the patient | Coded Value | Required | US Postal Codes should be used for Zip Codes |  |

### Patient Contact Information Clinical Examples

The information associated with patient contact is intended to be used to support specific queries that may require more detail on a target population, such as the specific location of an aggregated group of patients.

## Physical Exam

The Physical Exam object is used to capture aggregated data that may be found in a physical examination. This object draws from guidance provided as part of the CMS 1997 examination guidelines. The breadth of the physical exam object is designed to support robust data analysis that might be required to further analyze a target population based on physical exam observations and findings.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Physical Exam Component | Device used by the clinician to make observation (the assessment) | Coded Value | Required | LOINC |  |
| Physical Exam Narrative | Direct observations made by the clinician | Text | Required if Known |  |  |
| Physical Observation | Observations made by the examining clinician using inspection, palpation, auscultation, and percussion | Coded Value | Required | SNOMED-CT |  |

### Use of CMS Guidance for Examinations

The basis for including a Physical Exam object as potential data elements to query is the CMS 1997 findings on physical examinations, which include several related data elements from Vital Signs. An example of these guidelines is shown below, and further details on the physical exam are provided in the Query Catalog – Examination Details (location TBD).

|  |  |  |  |
| --- | --- | --- | --- |
| **System/Body Area**  **(Code with LOINC)** | **Elements of the Examination**  **(Code with LOINC)** | **Examples of Elements**  **(Code with LOINC and/or SNOMED)** | **Cross-Exam Mapping/ Overlap** |
| **Constitutional Exam** |  |  |  |
| VS1 | Vital signs | sitting or standing blood pressure, supine blood pressure, pulse rate and regularity, respiration,  temperature, height, weight |  |
| VS2 | General appearance | development, nutrition, body habitus, deformities, attention to grooming |  |
| VS3 | Assessment of ability to communicate | use of sign language or other communication aids and quality of voice |  |

### Foot Examination Example

In support of Type 1 and Type 2 Diabetes requirements, there may be the need for additional detail surrounding specifics associated with a foot examination. A physician may wish to send a detailed query requesting the number of diabetic patients who have received a foot exam. An organization may utilize the query results in their analysis to meet Meaningful Use and/or other quality measure criteria.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values** | **Expected Vocabulary** | **Guidelines** |
| Visual appearance | Visual inspection of right and left foot (foot deformities, amputation, condition of skin: callus, ulcer, redness, warmth, maceration, pre-ulcerative lesion, fissure, swelling or dryness; condition of the nails: ingrown, deformed, or fungal) | Coded value |  | CPT-4, LOINC, or SNOMED-CT |  |
| Sensory/Neurological | 10-gram Semmes-Weinstein nylon monofilament, test five sites per foot (the total duration of the approach, skin contact, and departure of the filament at each site should be approximately 1 to 2 seconds) | Coded value |  | CPT-4, LOINC, or SNOMED-CT |  |
| Vascular | Pedal pulses (posterior tibial, dorsalis pedis) | Coded value |  | CPT-4, LOINC, or SNOMED-CT |  |

There is a significant body of evidence that correlates the presence of neuropathy in the lower extremity of a diabetic patient with the complications of ulceration with potential of infection and amputation. Neuropathy is one of the major complications of patients with long term diabetes. A public health professional may want to send a detailed query requesting information about the prevalence of diabetic neuropathy of the lower extremity and the presence / absence of pedal ulcerations. Additional queries on patients with diabetes who have not had a neurologic examination would be useful for epidemiologic research and creating programs to educate physicians and patients on the need for a neurologic examination of the lower extremity.

Further details on developing queries for foot examination information is provided in the Query Catalog – Examination Details document (location TBD).

## Review of Systems

The Review of Systems object is included to allow for the querying of information that covers the organ systems, with a focus upon the subjective symptoms perceived by the patient.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values** | **Expected Vocabulary** | **Guidelines** |
| Review of Systems Narrative | Relevant collection of symptoms and functions systematically gathered by a clinician.   * Includes symptoms the patient is currently experiencing, some of which were not elicited during the history of present illness, as well as a potentially large number of pertinent negatives, for example, symptoms that the patient denied experiencing. | Text | Required if Known |  | Patient denies recent history of fever or malaise. Positive for weakness and shortness of breath. One episode of melena. No recent headaches. Positive for osteoarthritis in hips, knees and hands. |
| Review of Systems Observations | Coded values for the observations gathered about the patient | Coded Value | Required if Known | LOINC |  |

### Review of Systems Clinical Examples

The primary method to query a review of systems is to query against specific HITSP C32 social history information in relation to a specific NQF eMeasure and using CMS 1997 guidelines.

|  |  |
| --- | --- |
| **System/Body Area**  **(Code with LOINC)** | **Examples of Elements**  **(Code with LOINC and/or SNOMED)** |
| Constitutional Symptoms | fever, weight loss |
| Integumentary | skin and/or breast |

## Social History

The Social History object is included to allow for the querying of information that has a significant influence on a patient’s physical, psychological and emotional health and wellbeing.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Social History Observation | The specific coded values associated with the social history of a patient | Coded Value | Required | SNOMED-CT |  |
| Social History Additional Detail | Provides textual details surrounding the social history of a specific patient | Text | Required if Known |  |  |
| Social History Range | Expresses the specific range for the social history observation | Date or IVL\_TS | Required if Known |  | The Social History range can be expressed as a date range datatype  IVL\_TS is a proposed datatype that can also be used to capture a range of time |
| Social History Type | Expresses the specific type of social history observation being made. | Coded Value | Required | SNOMED-CT |  |

### Social History Clinical Examples

The general structure of social history information is to define an observation as a coded value, and then elements associated with that observation. For example, the NQF eMeasure “The percentage of patients 18 years of age and older who were current smokers or tobacco users, who were seen by a practitioner during the measurement year and who received advice to quit smoking or tobacco use or whose practitioner recommended or discussed smoking or tobacco use cessation medications, methods or strategies” is looking specifically at social history observations.

As part of a targeted population analysis, an organization may wish to look at additional societal factors associated with the target population. The organization may want to query against the following coded values associated with the targeted population:

|  |  |
| --- | --- |
| **SNOMED CT Code** | **SNOMED CT Code Description** |
| 229819007 | Tobacco use and exposure (observable entity) |
| 256235009 | Exercise (observable entity) |
| 160573003 | Alcohol intake (observable entity) |
| 364393001 | Nutritional observable (observable entity) |
| 364703007 | Employment detail (observable entity) |
| 425400000 | Toxic exposure status (observable entity) |
| 363908000 | Details of drug misuse behavior (observable entity) |
| 228272008 | Health-related behavior (observable entity) |

## Surgery

The Surgery object is meant to provide support for a list of surgeries that could be queried against. It has similarities to the Procedure object and is listed as a separate object for the primary purpose of being able to query against procedures.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Data Element Name** | **Data Element Definition** | **Data Element Format** | **Expected Values/Cardinality** | **Expected Vocabulary** | **Guidelines** |
| Surgery Observation | Clinically significant observations found during surgery. These would be captured as coded values. | Coded Value | Required | CPT-4  ICD-9  ICD-10 | Uses similar values to procedure |
| Surgery Description | Particulars of a surgical procedure that was performed | Text | Required if Known |  | A description may be associated with the surgical procedure |
| Surgery Date | The specific date the surgery was performed. | Date/Time or TS | Required if Known |  | The date the surgical procedure occurred |
| Surgery Complications | Known risks or unidentified problems that were identified before, during and after a surgical procedure is performed | Text | Required if Known |  |  |
| Surgery Type | The type of surgical procedure that was performed | Coded Value | Required | CPT-4  ICD-9  ICD-10 | Uses similar values to procedure |

### Surgery Clinical Examples

The Surgery object uses separate coded values to represent surgical procedures directly. This may be used in cases where, for example, a distributed query is needed on complex, surgical quality measures, such as “Patient Age: All patients age 18 years and older Procedures: surgical procedures for which VTE prophylaxis is indicated in all patients who had an order for LMWH, LDUH, adjusted-dose warfarin, fondaparinux or mechanical prophylaxis given within 24 hours prior to incision time or 24 hours after surgery end time.”

This would allow implementations to separate surgical procedures (considered invasive) into a separate entity or table to be queried against directly.

# CEDD Implementation Model Mapping

Implementation guidance is provided in this package to assist vendors and developers in ensuring that the clinical data source they wish to make available can be queried successfully. Analysis of the implementation models that the Query Health technical approach are used to provide developers and other technical stakeholders clear and tangible guidance on how to implement the conceptual/logical aspects of the Query Health CEDD within their own internal environments.

The intent in using an implementation model-aligned approach is to encourage greater adoption of the Query Health technical approach, to support multiple implementation paths. Since much of the information generated by clinical workflow and usage of clinical data systems can be captured in clinical data sources, including an Electronic Health Record (EHR), the distributed query approach within Query Health attempts to leverage that data at the source, by outlining a conceptual design closely aligned to successful current approaches, such as i2b2, PopMedNet, and hQuery, as well as existing specifications such as HITSP C32, the Continuity of Care Document (CCD), and the Consolidated CDA Implementation Guide.

In the following sections, additional clarity is provided on the alignment of these various implementation models to the Query Health CEDD.

## CEDD i2b2 Implementation

The following section provides guidance to implementers who may wish to implementation the Query Health CEDD within an i2b2 environment.

Detailed guidance will be provided for implementation of the Query Health technical approach in the ***Query Health i2b2 Implementation Guide.***

For this section and the Query Health i2b2 Implementation Guide, a detailed analysis of i2b2 software components and documentation was conducted, including a close look at both the SHRINE data model and the i2b2 CRC design structure.

### i2b2 CEDD Implementation – Expanded Analysis Type II Diabetes

The Query Health CEDD reuses many of the data elements defined in the S&I CEDD to support the requirements of the Expanded Analysis user story. Within i2b2, it is important to note that an observation of Type 2 Diabetes may not represent the onset or date of the condition, but instead is simply a recording or a notation of that Type 2 Diabetes has been diagnosed. For example, the observation of ‘diabetes’ recorded in the database as a ‘fact’ at a particular time does not mean that the condition of diabetes began exactly at that time, only that a diagnosis was recorded at that time (there may be many diagnoses of diabetes for this patient over time).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S&I CEDD Defined Object** | **S&I CEDD Data Elements** | **i2b2 CRC Dimension** | **i2b2 Dimension Data Element** | **Implementation Guidelines** |
| **Time Period** | n/a | Visit Dimension | start\_date  end\_date | Calculated by using the range of the start\_date to end\_date, or start\_date to current date. |
| **Patient Information** | Race | Patient Dimension | race\_ cd | Race is represented in i2b2 as CDC Race & Ethnicity Code Sets |
| Ethnicity | Patient Dimension | ethnicity\_cd | Ethnicity is represented in i2b2 as CDC Race & Ethnicity Code Sets  Please see Query Health i2b2 Implementation Guide for how to implement the ethnicity\_cd element using the CODE\_LOOKUP table |
| Gender | Patient Dimension | gender\_cd | Gender is represented in i2b2 as HL7 Administrative Gender  Please see Query Health i2b2 Implementation Guide for how to implement the gender\_cd element using the CODE\_LOOKUP table |
| Age | Patient Dimension | age\_in\_years\_num |  |
| Zip Code | Patient Dimension | zip\_cd |  |
| **Provider Information** | Provider Name | Provider Dimension | provider\_id  provider\_path |  |
| Provider Location | Observation Fact | location\_cd OR  provider\_id | The provider location can be drawn from the observation\_fact using the location\_cd, which represents the location where the observation occurred.  A location for the provider could alternatively be provided using a provider\_id |
| **Insurance Information** | Insurance Coverage | Patient Dimension | insurance\_coverage\_cd | Please see Query Health i2b2 Implementation Guide for how to implement the insurance\_coverage\_cd element using the CODE\_LOOKUP table |
| Insurance Type | Patient Dimension | insurance\_type\_cd | Insurance type can be drawn from the Consolidated CDA implementation guide.  Please see Query Health i2b2 Implementation Guide for how to implement the insurance\_type\_cd element using the CODE\_LOOKUP table |
| **Encounter** | Last Seen/Visit | Visit Dimension | end\_date  active\_status\_cd | In i2b2, this can be drawn from looking at both the end\_date and the active\_status\_cd and determining the |
| **Diagnosis** | Diagnosis Code | Observation Fact | concept\_cd | Diagnosis is represented in i2b2 using the ICD-9 CM ontology  The diagnosis concept code is used to join to other information, such as diagnoses, procedures, and medications, which also use concept codes. |
| **Vital Signs** | Alive (part of Vital Sign Observation) | Patient Dimension | vital\_result\_cd | Use the value within vital\_result\_cd to determine if the patient is alive.  A value of Y, M, or X indicates deceased. |
| Systolic/Diastolic Blood Pressure (part of Vital Sign Observation) | Concept Dimension | concept\_cd | Represented as a value within concept\_cd for a specific patient\_id |
| HBA1C (part of Vital Sign Observation) | Concept Dimension  Modeled as a lab result | concept\_cd |  |
| Eye Examination (part of Vital Sign Observation) | Concept Dimension | concept\_cd | Represented as a value within concept\_cd for a specific patient\_id |
| BMI (part of Vital Sign Observation) | Concept Dimension | concept\_cd | Represented as a value within concept\_cd for a specific patient\_id |
| Smoking Status (part of Vital Sign Observation) | Concept Dimension | concept\_cd | Represented as a value within concept\_cd for a specific patient\_id |
| Foot Examination (part of Vital Sign Observation) | Concept Dimension | concept\_cd | Represented as a value within concept\_cd for a specific patient\_id |
| LDL (part of Vital Sign Observation) | Concept Dimension | concept\_cd | Modeled as a laboratory test |
| Microalbumin level (part of Vital Sign Observation) | Concept Dimension | concept\_cd | Modeled as a laboratory test |
| Microalbumin result (part of Vital Sign Observation) | Concept Dimension | concept\_cd | Modeled as a laboratory test |
| **Medication** | Medication Name | Concept Dimension | concept\_cd | RxNorm/ NDF-RT ontologies are represented in i2b2 for Medication information |
| Medication Type | Concept Dimension | concept\_cd | RxNorm/ NDF-RT ontologies are represented in i2b2 for Medication information  Looking specifically for prescribed medications |

### i2b2 CEDD Implementation – Generic Use Case

I2b2 is designed to support most distributed queries that would be generated as part of generic distributed queries that an organization may wish to use. This is due to the structure of the i2b2 design, which supports a star schema that allows for the linking of patient information to encounters, diagnoses, medications, and procedures.

The mapping below shows how this generally would apply:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S&I CEDD Defined Object** | **S&I CEDD Data Elements** | **i2b2 CRC Dimension** | **i2b2 Dimension Data Element** | **Implementation Guidelines** |
| **Time Period** | n/a | Visit Dimension | start\_date  end\_date | Calculated by using the range of the start\_date to end\_date, or start\_date to current date. |
| **Patient Information** | Race | Patient Dimension | race\_ cd | Race is represented in i2b2 as CDC Race & Ethnicity Code Sets |
| Ethnicity | Patient Dimension | ethnicity\_cd | Ethnicity is represented in i2b2 as CDC Race & Ethnicity Code Sets  Please see Query Health i2b2 Implementation Guide for how to implement the ethnicity\_cd element using the CODE\_LOOKUP table |
| Gender | Patient Dimension | gender\_cd | Gender is represented in i2b2 as HL7 Administrative Gender  Please see Query Health i2b2 Implementation Guide for how to implement the gender\_cd element using the CODE\_LOOKUP table |
| Age | Patient Dimension | age\_in\_years\_num |  |
| Zip Code | Patient Dimension | zip\_cd |  |
| **Provider Information** | Provider Name | Provider Dimension | provider\_id  provider\_path |  |
| Provider Location | Observation Fact | location\_cd OR  provider\_id | The provider location can be drawn from the observation\_fact using the location\_cd, which represents the location where the observation occurred.  A location for the provider could alternatively be provided using a provider\_id |
| **Insurance Information** | Insurance Coverage | Patient Dimension | insurance\_coverage\_cd | Please see Query Health i2b2 Implementation Guide for how to implement the insurance\_coverage\_cd element using the CODE\_LOOKUP table |
| Insurance Type | Patient Dimension | insurance\_type\_cd | Insurance type can be drawn from the Consolidated CDA implementation guide.  Please see Query Health i2b2 Implementation Guide for how to implement the insurance\_type\_cd element using the CODE\_LOOKUP table |
| **Encounter** | Last Seen/Visit | Visit Dimension | end\_date  active\_status\_cd | In i2b2, this can be drawn from looking at both the end\_date and the active\_status\_cd and determining the |
| Encounter Type |  |  |  |
| **Diagnosis** | Diagnosis Code | Observation Fact | concept\_cd | Diagnosis is represented in i2b2 using the ICD-9 CM ontology  The diagnosis concept code is used to join to other information, such as diagnoses, procedures, and medications, which also use concept codes. |
| Diagnosis Flag |  |  |  |
| **Vital Signs** | Vital Sign Observation | Concept Dimension | Concept\_cd |  |
| Vital Sign Type | Patient Dimension | vital\_result\_cd | Use the value within vital\_result\_cd to determine if the patient is alive.  A value of Y, M, or X indicates deceased. |
| **Medication** | Medication Name | Concept Dimension | concept\_cd | RxNorm/ NDF-RT ontologies are represented in i2b2 for Medication information |
| Medication Type | Concept Dimension | concept\_cd | RxNorm/ NDF-RT ontologies are represented in i2b2 for Medication information  Looking specifically for prescribed medications |
| Medication Route | Concept Dimension | concept\_cd |  |
| Medication Dose | Concept Dimension | concept\_cd |  |
| **Result** | Result Type | Concept Dimension | concept\_cd |  |
| Result Code | Concept Dimension |  |  |
| Result Date | Concept Dimension | concept\_cd |  |
| **Procedure** | Procedure Type | Concept Dimension | concept\_cd |  |
| Procedure Code | Concept Dimension | concept\_cd |  |
| Procedure Date | Concept Dimension |  |  |
| **Problem** | Problem Type | Concept Dimension | concept\_cd |  |
| Problem Date | Concept Dimension |  |  |
| Problem Value | Concept Dimension | concept\_cd |  |

## CEDD PopMedNet implementation

The PopMedNet architecture is designed to support any data model that an organization wishes to develop in support of its distributed query needs. The Query Health CEDD analyzed the ESP, Mini-Sentinel, and HMORN VDW which are currently used in PopMedNet implementations to ensure that the objects and data elements defined in the CEDD were capable of being “plugged into” the PopMedNet architecture. PopMedNet support is provided through close alignment and supporting implementation guidance drawn from three existing implementations that are currently using the structure of PopMedNet to support distributed queries:

|  |  |
| --- | --- |
| **ESP/MDPHnet** | The ESP data model contains tables for patient demographics, vital signs, diagnosis codes, test orders, test results, medication prescriptions, allergies, social history, and provider contact details. |
| **Mini-Sentinel** | The Mini Sentinel Common Data Model is available here:  <http://www.mini-sentinel.org/data_activities/details.aspx?ID=105> |
| **HMO Research Network VDW Data Model** | The HMO Research Network VDW data model is here: <http://www.hmoresearchnetwork.org/resources/toolkit/HMORN_CollaborationToolkit.pdf#4> with additional information here |

### PopMedNet CEDD Implementation – Expanded Analysis Type II Diabetes

Analysis of various PopMedNet implementation models shows that they align closely to the requirements outlined for Expanded Analysis Type II Diabetes user story.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S&I CEDD Defined Object** | **S&I CEDD Data Elements** | **PopMedNet** | **PopMedNet Data Element** | **Implementation Guidelines** |
| **Time Period** | n/a | Enrollment, Encounter |  | Dates of enrollment and encounters are recorded |
| **Patient Information** | Race | Demographic | Race |  |
| Ethnicity | Demographic | Hispanic |  |
| Gender | Demographic | Sex |  |
| Age | Demographic | Birth\_Date |  |
| Zip Code | Encounter | Facility\_Location | Draws from where the patient encounter occurred |
| **Provider Information** | Provider Name | Encounter  Diagnosis  Procedure | Provider | Provider name is not included – use provider ID instead |
| Provider Location | Encounter | Facility\_Location | Can draw from the specific location for an encounter |
| **Insurance Information** | Insurance Coverage | Enrollment | MedCov  DrugCov |  |
| Insurance Type | Enrollment | MedCov  DrugCov |  |
| **Encounter** | Last Seen/Visit | Encounter | Discharge Date | Calculation from Encounter/Admission Date or Discharge Date |
| **Diagnosis** | Diagnosis Code | Diagnosis | DX |  |
| **Vital Signs** | Alive (part of Vital Sign Observation) | Death | Death Date | Calculation from Death Date  (where Death Date IS NULL) |
| Systolic/Diastolic Blood Pressure (part of Vital Sign Observation) | Vital Signs | Diastolic, systolic |  |
| HBA1C (part of Vital Sign Observation) | Laboratory | MS\_test\_name= HGBA1C |  |
| Eye Examination (part of Vital Sign Observation) | Procedure | PX |  |
| BMI (part of Vital Sign Observation) | Vital Signs | Height, weight |  |
| Smoking Status (part of Vital Sign Observation) | Vital Signs | Tobacco, tobacco type, |  |
| Foot Examination (part of Vital Sign Observation) | Procedure | PX |  |
| LDL (part of Vital Sign Observation) | Procedure | PX |  |
| Microalbumin level (part of Vital Sign Observation) | Procedure | PX |  |
| Microalbumin result (part of Vital Sign Observation) | Procedure | PX |  |
| **Medication** | Medication Name | Dispensing | NDC | (Dispensing Table Limited to NDC Codes) |
| Medication Type | Dispensing | NDC | Looking specifically for prescribed medications |

### PopMedNet CEDD Implementation – Generic Use Case

For generic distributed queries, the PopMedNet infrastructure supports querying specific information based on data models established as part of ESP and MDPHnet. The ESP data model contains tables for patient demographics, vital signs, diagnosis codes, test orders, test results, medication prescriptions, allergies, social history, and provider contact details. This table mapping uses the Mini-Sentinel data model as a starting point with additional mappings applying to ESP.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S&I CEDD Defined Object** | **S&I CEDD Data Elements** | **PopMedNet Entity** | **PopMedNet Entity Data Elements** | **Implementation Guidelines** |
| **Time Period** | n/a | Enrollment, Encounter |  | Dates of enrollment and encounters are recorded |
| **Patient Information** | Race | Demographic | Race |  |
| Ethnicity | Demographic | Hispanic |  |
| Gender | Demographic | Sex |  |
| Age | Demographic | Birth\_Date |  |
| Zip Code | Encounter | Facility\_Location | The facility location from a specific encounter would include information used to define the zip code. |
| **Provider Information** | Provider ID | Encounter  Diagnosis  Procedure | Provider |  |
| Provider Location | Encounter | Facility\_Location |  |
| Provider Type | Encounter  Diagnosis  Procedure | EncType |  |
| **Insurance Information** | Insurance Coverage | Enrollment | MedCov  DrugCov |  |
| Insurance Type | Enrollment | MedCov  DrugCov |  |
| **Encounter** | Admission Date | Encounter | ADate |  |
| Discharge Date | Encounter | DDate |  |
| Encounter Type | Encounter | EncType |  |
| **Diagnosis** | Diagnosis Date | Diagnosis | ADate |  |
| Diagnosis Code | Diagnosis | DX |  |
| Diagnosis Type | Diagnosis | DX\_CodeType |  |
| Diagnosis Flag | Diagnosis | PDX |  |
| **Vital Signs** | Vital Sign Type | Diagnosis | DX\_CodeType | A vital sign measurement is an observation that can be captured |
| Vital Sign Observation | Diagnosis | (many variables would apply) | Can support specific measurements directly, such as BP, height, tobacco, etc… |
| Vital Sign Observation Date/ Time | Diagnosis | Measure\_Time |  |
| Vital Sign Observation Range | Diagnosis | Measure\_Date |  |
| **Medication** | Medication Name | Dispensing | NDC |  |
| Medication Date | Dispensing | RXDate |  |
| Medication Type | Dispensing | NDC | Rxnorm has NDC to name lookups. |
| Medication Dose | Dispensing | RXAmt | Strength part of NDC |
| **Result** | Result Type | Laboratory | Result\_loc | LOINC can be used here |
| Result Code | Laboratory | LOINC |  |
| Result Date | Laboratory | Result\_dt |  |
| **Procedure** | Procedure Type | Procedure | PX\_CodeType |  |
| Procedure Code | Procedure | PX |  |
| Procedure Date | Procedure | ADate |  |
| **Problem** | Problem Type | Diagnosis | DX\_CodeType | SNOMED-CT ontology can be used here |
| Problem Date | Diagnosis | ADate |  |
| Problem Value | Diagnosis | DX |  |

## CEDD hQuery Implementation

### CEDD hQuery Implementation – Expanded Analysis Type II Diabetes

Since the underlying S&I CEDD retains many elements of the HITSP C154 data dictionary, alignment from the Query Health technical approach to the underlying hQuery implementation model is straightforward.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S&I CEDD Defined Object** | **S&I CEDD Data Elements** | **hQuery Table** | **hQuery Data Element** | **Implementation Guidelines** |
| **Time Period** | n/a | Time Interval | Lo:DateTime  Hi:DateTime |  |
| **Patient Information** | Race | Patient | Race |  |
| Ethnicity | Patient | Ethnicity |  |
| Gender | Patient | Gender |  |
| Age | Patient | birthDate |  |
| Zip Code | Patient | personAddress |  |
| **Provider Information** | Provider ID | HealthcareProvider | providerID |  |
| Provider Location | HealthcareProvider | providerAddress |  |
| **Insurance Information** | Insurance Coverage | InsuranceProvider | coverageDates |  |
| Insurance Type | InsuranceProvider | insuranceType |  |
| **Encounter** | Last Seen/Visit | Encounter | Date |  |
| **Diagnosis** | Diagnosis Code | DiagnosticResults | Value |  |
| **Vital Signs** | Alive (part of Vital Sign Observation) | VitalSign | Value |  |
| Systolic/Diastolic Blood Pressure (part of Vital Sign Observation) | VitalSign | Value |  |
| HBA1C (part of Vital Sign Observation) | VitalSign | Value |  |
| Eye Examination (part of Vital Sign Observation) | VitalSign | Value |  |
| BMI (part of Vital Sign Observation) | VitalSign | Value |  |
| Smoking Status (part of Vital Sign Observation) | VitalSign | Value |  |
| Foot Examination (part of Vital Sign Observation) | VitalSign | Value |  |
| LDL (part of Vital Sign Observation) | VitalSign | Value |  |
| Microalbumin level (part of Vital Sign Observation) | VitalSign | Value |  |
| Microalbumin result (part of Vital Sign Observation) | VitalSign | Value |  |
| **Medication** | Medication Code | Medication | codedProduct |  |
| Medication Type |  |  |  |

### CEDD hQuery Implementation – Generic Use Case

The hQuery model also supports most data elements needed for distributed queries. This is due to its design as an enhancement to the current PopHealth design.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S&I CEDD Defined Object** | **S&I CEDD Data Elements** | **hQuery Table** | **hQuery Data Element** | **Implementation Guidelines** |
| **Time Period** | n/a |  |  |  |
| **Patient Information** | Race | Patient | Race |  |
| Ethnicity | Patient | Ethnicity |  |
| Gender | Patient | Gender |  |
| Age | Patient | birthDate |  |
| Zip Code | Patient | personAddress |  |
| **Provider Information** | Provider ID | HealthcareProvider | providerID |  |
| Provider Location | HealthcareProvider | providerAddress |  |
| Provider Type | HealthcareProvider | providerType |  |
| **Insurance Information** | Insurance Coverage | InsuranceProvider | insuranceType |  |
| Insurance Type | InsuranceProvider | insuranceType |  |
| **Encounter** | Encounter Code | Encounter | ID |  |
| Encounter Type | Encounter | type |  |
| **Diagnosis** | Diagnosis Code | DiagnosticResults | value |  |
| Diagnosis Type | DiagnosticResults | Interpretation |  |
| Diagnosis Date | DiagnosticResults | referenceRange or effectiveTime |  |
| Diagnosis Flag | DiagnosticResults | InformationSource |  |
| **Vital Signs** | Vital Sign Type | VitalSign | Intepretation |  |
| Vital Sign Observation | VitalSign | Value |  |
| Vital Sign Observation Date/Time | VitalSign | effectiveTime |  |
| Vital Sign Observation Range | VitalSign | referenceRange |  |
| **Medication** | Medication Code | Medication | codedProduct |  |
| Medication Date | Medication | dispenseDate |  |
| Medication Type | Medication | brandName | Needs to be correlated to an OTC or prescription drug name to determine type |
| Medication Frequency | Medication | medicationFrequency |  |
| Medication Dose | Medication | doseValue |  |
| **Result** | Result Type | DiagnosticResults | intepretation |  |
| Result Code | DiagnosticResults | value |  |
| Result Date | DiagnosticResults | effectiveTime |  |
| **Procedure** | Procedure Type | Procedure | freeTextType |  |
| Procedure Code | Procedure | codedValue |  |
| Procedure Date | Procedure | entryDateTime |  |
| **Problem** | Problem Type | Condition |  |  |
| Problem Date | Condition | problemDate |  |
| Problem Code | Condition | problemCode |  |

## CEDD Domain Implementation

The Query Health CEDD is designed to support additional domains as part of the requirements specified in the Generic User Story. This user story lays out a set of functional requirements to support a generic set of distributed queries that can be used across a variety of care settings. The purpose of these domains is to provide some level of “scoping” for generic distributed queries, which can cover a broad segment of healthcare information. The domains that were used for representation of generic distributed queries were as follows::

* Public Health
* Quality Measurement (including Medicaid)
* Comparative Effectiveness Research (CER) and Accountable Care (ACO)

### Public Health Domain

ISDS recommendations on syndromic surveillance serve as a source of requirements for distributed queries in the public health domain. The alignment shown in this mapping to ISDS is intended to cover a relatively small subset of public health information, as outlined in the ISDS recommendations. This is not intended to be an exhaustive list of data elements for all public health needs, but a high level mapping to key elements that are reused across many contexts within the public health domain.

The ISDS data elements listed here are recommended as a “minimum data set” for syndromic surveillance reporting, while the S&I CEDD data elements listed on the right would be the “minimum data set” needed to respond to a distributed query from a public health data source.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ISDS Recommendation Data Element Name** | **ISDS Optionality** | **ISDS Cardinality** |  | **S&I CEDD Object** | **S&I CEDD Data Element** | **S&I CEDD Optionality** | **Implementation Guidelines** |
| Facility ID | Required |  | Facility | Facility ID | Required | TBD |
| Facility Name | Required if Known |  | Facility Name | Required if Known | TBD |
| Facility Location | Required if Known |  | Facility Location | Required | TBD |
| Unique Visiting ID | Required |  | Encounter | Encounter Code | Required | TBD |
| Unique Patient Id | Required |  | Patient Information | Patient Identifiers | Required | TBD |
| Visit Date/Time | Required |  | Encounter | Admission Date | Required | TBD |
| Medical Record Number | Optional |  | *No CEDD Data Element* | | | |
| Age | Required |  | Patient Information | Patient Date of Birth | Required | TBD |
| Age Units | Required |  | *No CEDD Data Element* | | | |
| Gender | Required if Known |  | Culturally Sensitive Patient Care | Gender | Required if Known | TBD |
| Zip Code | Required if Known |  | Patient Contact Information | Patient Home Address | Required if Known | TBD |
| Country | Required if Known |  | Patient Contact Information | Patient Home Address | Required if Known | TBD |
| State | Required if Known |  | Patient Contact Information | Patient Home Address | Required if Known | TBD |
| Race | Required if Known |  | Culturally Sensitive Patient Care | Race | Required if Known | TBD |
| Ethnicity | Required if Known |  | Culturally Sensitive Patient Care | Ethnicity | Required if Known | TBD |
| Diagnosis/Injury Code | Required if Known |  | Diagnosis | Diagnosis Code | Required | TBD |
| Diagnosis Type | Required if Known |  | Diagnosis | Diagnosis Type | Required | TBD |
| Discharge Disposition | Required if Known |  | Encounter | Encounter Type | Required if Known | TBD |
| Discharge Date/Time | Required if Known |  | Encounter | Discharge Date | Required if Known | TBD |
| Patient Class | Required if Known |  | *No CEDD Data Element* | | | |
| Chief Complaint/Reason for Visit | Required if Known |  | Chief Complaint | Chief Complaint Narrative | Required if Known | TBD |
| Triage Notes | Optional |  | *No CEDD Object* | | | |
| Temperature | Required if Known |  | Vital Signs | Vital Sign Type | Required | TBD |
| Pulse Oximetry | Required if Known |  | Vital Signs | Vital Sign Type | Required | TBD |
| Date of Onset | Required if Known |  | Problem | Date of Onset | Required | TBD |
| Report Date/Time | Required |  | *No CEDD Object* | | | |

### Quality Domain

The quality domain includes alignment both to the National Quality Forum (NQF) Quality Data Model (QDM) version 3.0, and the 113 eMeasures developed by NQF as clinical quality measures (CQM). Work between the S&I Framework and NQF to refine and improve the S&I Framework CEDD and these mappings.

#### NQF Quality Data Model (QDM) Alignment

The QDM is intended to enable automation of data contained in Electronic Health Records (EHRs), Personal Health Records (PHRs), and clinical applications. This aligns closely to the objectives of the Query Health CEDD specification. The QDM 3.0 alignment is focused on identifying QDM categories that are of specific importance to distributed queries and then ensuring that the Query Health CEDD is aligned to those categories. This ensures some level of alignment from the NQF work on eMeasures to the Query Health initiative.

One factor introduced by the QDM is the concept of state, as this concept applies to each of the QDM categories. To capture state in support of distributed query requirements, the Query Health CEDD will test an approach whereby an implementation would calculate the state of the specific category on

This state data element could also be applied across other objects as well. For other objects in the QDM that align to the CEDD, the application of state will be tested by computation of state based on the available data elements. The following table shows the mapping of QDM categories to the Query Health CEDD. For those entries in italics, there is no clear alignment between the CEDD and the QDM, and a proposed response is listed.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **QDM Category Name** | **QDM Data Element** | **QDM State** | | **NQF Vocabulary** | | **Supporting CEDD Objects** | **Supported CEDD Data Elements** | | **CEDD Vocabulary** | |
| Adverse Effect - Allergy | Causative Agent | Document  Update | | SNOMED-CT  RXNorm for Medication as causative agent | | Allergy and Adverse Reactions | Reaction Attributes | | SNOMED-CT  RxNORM for medication as substance | |
|  | | | | | | | | | | |
| Adverse Effect – Non-Allergy | Causative Agent | Document  Update | | SNOMED-CT  RXNorm for Medication as causative agent | | Allergy and Adverse Reactions | Reaction Attributes | | SNOMED-CT  RxNORM for medication as substance | |
|  | | | | | | | | | | |
| Characteristic | Source = Patient or Provider | Acknowledge  Document  Order  Report | | **Language**  ISO 639-1 | | Culturally Sensitive Patient Care | Language | | ISO 639-1 | |
| **Gender**  HL7 Administrative Gender | | Gender | | HL7 Administrative Gender | |
| **Race**  PHIN-VADS (HL7) | | Race | | CDC Race and Ethnicity | |
| **Ethnicity**  PHIN-VADS (HL7) | | Ethnicity | | CDC Race and Ethnicity | |
| **Assessment**  LOINC | | Social History | Social History Attributes | | LOINC (assessment) | |
| **Response**  SNOMED-CT | | Social History Attributes | | SNOMED-CT (response) | |
| **Payer**  X12 | | Payer Information | Primary Insurance ID | | NUCC | |
|  | | | | | | | | | | |
| Communication | Health Record Artifact | Record  Acknowledge  Decline  Transmit | | SNOMED-CT | | *In the Query Health initiative, would refer to both the query format and the query result* | *Not Applicable* | | *Not Applicable* | |
|  | | | | | | | | | | |
| Condition/Diagnosis  /Problem | *Condition/*  *Diagnosis/*  *Problem Code* | Active  Inactive | | SNOMED-CT | | Problem | Problem Code | SNOMED-CT | |
| Diagnosis | Diagnosis Code | SNOMED-CT | |
|  | | | | | | | | | | |
| Device | *Device Code* | Apply  Order  Plan  Decline | | SNOMED-CT | | Medical Equipment | Equipment Code | | SNOMED-CT | |
|  | | | | | | | | | | |
| Diagnostic Study  (Non-Laboratory) | *Diagnostic Study* | Decline  Order  Perform  Recommend | | **Study**  LOINC  **Findings**  SNOMED-CT  **Units of Measure**  UCUM | | *Difficult to determine if there is a specific S&I CEDD object that can be referenced* | *Requires further review* | | *Requires further review* | |
|  | | | | | | | | | | |
| Encounter | *Encounter Code* | Order | | SNOMED-CT | | Encounter | Encounter Code | | CPT-4  ICD-9  ICD-10 | |
| Perform | |
| Recommend | |
| Decline | |
|  | | | | | | | | | | |
| Experience | *Experience* | Acknowledge | | **Assessment**  LOINC  **Response**  SNOMED-CT | | *No CEDD object aligns to this category. For the Query Health initiative, it is not clear this QDM category would be needed* | *Not Applicable* | | *Not Applicable* | |
| Document | |
| Report | |
| Order | |
|  | | | | | | | | | | |
| Family History | Family History Code | Document | | **Assessment**  LOINC  **Response**  SNOMED-CT | | Family History | Family History Attributes | | LOINC  (Assessment) | |
| Update | | Family History Attributes | | SNOMED-CT  (Response) | |
| Decline | |
|  | | | | | | | | | | |
| Functional Status | Result | Order | | **Functions**  ICF  **Assessment**  LOINC  **Response**  SNOMED-CT | | *It is recommended that a future version of the Query Health CEDD create an object to represent*  *Functional Status. No object currently exists to align to this QDM category* | *Not Applicable – Propose Functional Status Result data element* | | *Not Applicable – Propose reuse of QDM vocabulary* | |
| Perform | |
| Decline | |
|  | | | | | | | | | | |
| Health Record Component | *Component* | Access | | | **Naming**  LOINC  **Messaging**  HL7 | *The S&I CEDD supports components like active medication lists and active problem lists, but it is unclear for the Query Health initiative whether a health record component would be queried as part of an aggregate query result* | *Not Applicable* | | *Not Applicable* | |
| Acknowledge | | |
| Alert | | |
| Calculate | | |
| Create | | |
| Discontinue | | |
| Document | | |
| Implement | | |
| Notify | | |
| Order | | |
| Perform | | |
| Receive | | |
| Recommend | | |
| Reconcile | | |
| Remind | | |
| Review | | |
| Transmit | | |
| Update | | |
|  | | | | | | | | | | |
| Laboratory Test | Result | Order | | **Laboratory Test**  LOINC | | Specimen | Specimen Code | | SNOMED-CT | |
| Perform | | **Laboratory Result**  SNOMED-CT | | Result | Result Code | | SNOMED-CT | |
| Decline | |
|  | | | | | | | | | | |
| Medication | *Medication Code* | Active | | RxNORM or CVX (for immunizations) | | Active Medication List | Medication List Attributes | | RxNORM | |
| *Medication Code* | Administer | | Medication  Immunization | Medication Code  Immunization Code | | RxNORM | |
| *Medication Code* | Order | | Medication | Medication Code | | RxNORM | |
| *Medication Code* | Dispense | | Medication | Medication Code | | RxNORM | |
| *Medication Code* | Decline | | Medication | Medication Code | | RxNORM | |
|  | | | | | | | | | | |
| Physical Exam | Result | Perform | | **Assessment**  LOINC  **Response**  SNOMED-CT | | Physical Exam | Physical Exam Observation | | LOINC  (Assessment) | |
| Order | | Physical Exam Observation | | SNOMED-CT  (Response) | |
| Decline | |  | |
|  | | | | | | | | | | |
| Preference | *Preference* | Acknowledge | | | **Assessment**  LOINC  **Response**  SNOMED-CT | *Patient Consent Directive – to be further defined by S&I Framework Data Segmentation Initiative*  *(Can acknowledge and document)* | Patient Consent Directive | | *TBD* | |
| Document | | |  | *Advance Directive*  *(Can acknowledge and document)* | Advance Directive Type | | *TBD* | |
|  | | | | | | | | | | |
| Procedure | *Procedure Code* | Order | | SNOMED-CT | | Procedure | Procedure Code | | CPT-4  ICD-9  ICD-10 | |
| Perform | |
| Recommend | |
|  | | | | | | | | | | |
| Risk Evaluation | Result | Perform | | **Assessment**  LOINC  **Response**  SNOMED-CT | | *No CEDD object aligns to this category. For the Query Health initiative, it is not clear this QDM category would be needed* | *Not Applicable* | | *Not Applicable* | |
| Record | |
| Administer | |
|  | | | | | | | | | | |
| Substance | *Substance* | Administer | | SNOMED-CT | | *Refers to non-pharmaceuticals – it is not clear how the Query Health initiative would use this QDM category* | *Not Applicable* | | *Not Applicable* | |
| Order | |
|  | | | | | | | | | | |
| Symptom | *Symptom* | Active | | SNOMED-CT | | Problem | Problem Code | | SNOMED-CT | |
| Assessed | |
| Inactive | |
| Resolved | |
|  | | | | | | | | | | |  |
| System Resources | *Resource* | Acknowledge | | | **Staffing resources**  LOINC  **EHR Functions** HL7  **Equipment**  SNOMED-CT | Facility  (*There is no current use of system resources except as attributes of other QDM data elements for which the resource was used to indicate the location in which an action occurred)* | Facility Code | | n/a | |
| Document | | |
| Report | | |
| Order | | |
|  | | | | | | | | | | |
| Transfer | Sending and Receiving Organization | | Order | SNOMED-CT | | Facility | Facility Code | | n/a | |
| Sending and Receiving Organization | | Perform | Facility Code | | n/a | |

#### CEDD Quality Measurement Implementation Alignment

This version of the CEDD is intended to support the following NQF measures as part of implementation of the Query Health technical approach. This information is contained in more detail as part of the Query Health Sample Query Catalog – NQF, which contains details drawn from each of the NQF 113 eMeasures.

Several of the measures listed below are still being developed as distributed queries and have been left blank.

Note that the measures currently supported as part of the Expanded Analysis Type II Diabetes user story are highlighted below **in bold.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NQF Measure ID** | **NQF Measure Title** | **NQF Measure Description** | **CEDD Object in Numerator** | **CEDD Object in Denominator** |
| 0001 | Asthma Assessment | Percentage of patients aged 5 through 40 years with a diagnosis of asthma who were evaluated during at least one office visit within 12 months for the frequency (numeric) of daytime and nocturnal asthma symptoms. | Problem  Encounter | Patient Information  Diagnosis  Encounter |
| 0002 | Appropriate Testing for Children with Pharyngitis | The percentage of children 2-18 years of age who were diagnosed with Pharyngitis, dispensed an antibiotic and received a group A streptococcus (strep) test for the episode. | Order  Medication  Encounter | Patient Information  Diagnosis  Encounter  Medication |
| 0004 | Initiation and Engagement of Alcohol and Other Drug Dependence Treatment: (a) Initiation, (b) Engagement | The percentage of adolescent and adult patients with a new episode of alcohol and other drug (AOD) dependence who initiate treatment through an inpatient AOD admission, outpatient visit, intensive outpatient encounter or partial hospitalization within 14 days of the diagnosis and who initiated treatment and who had two or more additional services with an AOD diagnosis within 30 days of the initial visit. | Encounter  Procedure  Diagnosis | Patient Information  Diagnosis  Encounter  Procedure |
| 0012 | Prenatal Care: Screening for Human Immunodeficiency Virus (HIV) | Percentage of patients, regardless of age, who gave birth during a 12-month period who were screened for HIV infection during the first or second prenatal visit. | Order  Procedure  Encounter | Diagnosis  Patient Information  Procedure  Encounter |
| 0013 | Hypertension: Blood Pressure Measurement | Percentage of patient visits for patients aged 18 years and older with a diagnosis of hypertension with blood pressure (BP) recorded. | Physical Exam  Encounter | Encounter  Patient Information  Diagnosis |
| 0014 | Prenatal Care: Anti-D Immune Globulin | Percentage of D(Rh) negative, unsensitized patients, regardless of age, who gave birth during a 12-month period who received anti-D immune globulin at 26-30 weeks gestation. | Patient Information  Medication | Diagnosis  Procedure  Patient Information  Result  Encounter |
| 0018 | Controlling High Blood Pressure | The percentage of patients 18-85 years of age who had a diagnosis of hypertension and whose BP was adequately controlled during the measurement year. | Physical Exam  Encounter | Patient Information  Diagnosis  Encounter |
| 0022 | Drugs to be avoided in the elderly: a. Patients who receive at least one drug to be avoided, b. Patients who receive at least two different drugs to be avoided | Percentage of patients ages 65 years and older who received at least one drug to be avoided in the elderly in the measurement year. Percentage of patients 65 years of age and older who received at least two different drugs to be avoided in the elderly in the measurement year. | Medication | Patient Information  Encounter |
| 0024 | Weight Assessment and Counseling for Children and Adolescents | The percentage of patients 2-17 years of age who had an outpatient visit with a PCP or OB/GYN and who had evidence of BMI percentile documentation, counseling for nutrition and counseling for physical activity during the measurement year. | Physical Exam | Patient Information  Encounter  Diagnosis |
| 0027 | Smoking and Tobacco Use Cessation, Medical assistance: a. Advising Smokers and Tobacco Users to Quit, b. Discussing Smoking and Tobacco Use Cessation Medications, c. Discussing Smoking and Tobacco Use Cessation Strategies | The percentage of patients 18 years of age and older who were current smokers or tobacco users, who were seen by a practitioner during the measurement year and who received advice to quit smoking or tobacco use or whose practitioner recommended or discussed smoking or tobacco use cessation medications, methods or strategies. | Patient Information  Encounter | Encounter  Social History |
| 0028a | Preventive Care and Screening Measure Pair: a. Tobacco Use Assessment | Percentage of patients aged 18 years or older who have been seen for at least 2 office visits, who were queried about tobacco use one or more times within 24 months. | Encounter  Patient Information | Encounter  Social History |
| 0028b | Preventive Care and Screening Measure Pair: b. Tobacco Cessation Intervention | Percentage of patients aged 18 years and older identified as tobacco users within the past 24 months who have been seen for at least 2 office visits, who received cessation intervention. | Encounter  Procedure  Medication | Encounter  Patient Information |
| 0031 | Breast Cancer Screening | The percentage of women 40-69 years of age who had a mammogram to screen for breast cancer. | Diagnosis | Patient Information  Encounter |
| 0032 | Cervical Cancer Screening | The percentage of women 21-63 years of age who received one or more Pap tests to screen for cervical cancer. | Result | Encounter  Patient Information |
| 0033 | Chlamydia Screening for Women | The percentage of women 15-24 years of age who were identified as sexually active and who had at least one test for chlamydia during the measurement year. | Result | Patient Information  Procedure  Medical Equipment  Order  Diagnosis  Result  Medication  Encounter |
| 0034 | Colorectal Cancer Screening | The percentage of adults 50-75 years of age who had appropriate screening for colorectal cancer. | Order  Procedure | Patient Information  Encounter  Procedure |
| 0036 | Use of Appropriate Medications for Asthma | The percentage of patients 5-50 years of age during the measurement year who were identified as having persistent asthma and were appropriately prescribed medication during the measurement year. | Medication | Patient Information  Encounter  Diagnosis  Medication |
| 0038 | Childhood immunization Status | The percentage of children 2 years of age who had four diphtheria, tetanus and acellular pertussis (DTaP); three polio (IPV); one measles, mumps and rubella (MMR); two H influenza type B (HIB); three hepatitis B (Hep B), one chicken pox (VZV); four pneumococcal conjugate (PCV); two hepatitis A (Hep A); two or three rotavirus (RV); and two influenza (flu) vaccines by their second birthday. The percentage of children 2 years of age who had the complete series of vaccines by 2 years of age. There are 12 rates calculated for this measure 10 for the individual immunizations and 2 for the series of immunizations. | Medication  Procedure  Patient Information  Diagnosis | Patient Information  Encounter |
| 0041 | Preventive Care and Screening: Influenza Immunization for Patients >= 50 Years Old | Percentage of patients aged 50 years and older who received an influenza immunization during the flu season (September through February). | Procedure  Medication  Encounter | Patient Information  Encounter |
| 0043 | Pneumonia Vaccination Status for Older Adults | The percentage of patients 65 years of age and older who have ever received a pneumococcal vaccine. | Medication  Procedure | Encounter  Patient Information |
| 0045 | Osteoporosis: Communication with the Physician Managing Ongoing Care Post-Fracture of Hip, Spine or Distal Radius for Men and Women Aged 50 Years and Older | Percentage of patients aged 50 years and older treated for a hip, spine, or distal radial fracture with documentation of communication with the physician managing the patient’s on-going care that a fracture occurred and that the patient was or should be tested or treated for osteoporosis. | Diagnosis  Medication  Encounter  Procedure | Patient Information  Diagnosis  Encounter  Procedure |
| 0046 | Osteoporosis: Screening or Therapy for Osteoporosis for Women Aged 65 Years and Older | Percentage of female patients aged 65 years and older who have a central dual-energy X-ray absorptiometry measurement ordered or performed at least once since age 60 or pharmacologic therapy prescribed within 12 months. | Medication  Diagnosis | Patient Information  Encounter |
| 0047 | Asthma Pharmacologic Therapy | Percentage of patients aged 5 through 40 years with a diagnosis of mild, moderate, or severe persistent asthma who were prescribed either the preferred long-term control medication (inhaled corticosteroid) or an acceptable alternative treatment. | Medication | Patient Information  Diagnosis  Encounter |
| 0048 | Osteoporosis: Management Following Fracture of Hip, Spine or Distal radius for Men and Women Aged 50 Years and Older | Percentage of patients aged 50 years or older with fracture of the hip, spine or distal radius that had a central dual-energy X-ray absorptiometry measurement ordered or performed or pharmacologic therapy prescribed. | Medication  Diagnosis | Patient Information  Diagnosis  Encounter  Procedure |
| 0049 | Osteoporosis: Pharmacologic Therapy for Men and Women Aged 50 Years and Older | Percentage of patients aged 50 years and older with a diagnosis of osteoporosis who were prescribed pharmacologic therapy within 12 months. | Medication | Patient Information  Diagnosis  Encounter |
| 0051 | Osteoarthritis: assessment for use of anti-inflammatory or analgesic over-the-counter (OTC) medications | Percentage of patient visits for patients aged 21 years and older with a diagnosis of OA with an assessment for use of anti-inflammatory or analgesic OTC medications. | Medication  Active Medication List | Encounter  Patient Information  Diagnosis |
| 0052 | Low Back Pain: Use of Imaging Studies | The percentage of patients with a primary diagnosis of low back pain who did not have an imaging study (plain X-ray, MRI, CT scan) within 28 days of diagnosis. | Diagnosis | Patient Information  Diagnosis  Encounter |
| **0055** | **Eye Exam** | The percentage of patients 18-75 years of age with diabetes (type 1 or type 2) who had a retinal or dilated eye exam or a negative retinal exam (no evidence of retinopathy) by an eye care professional. | Diagnosis  Procedure | Patient Information  Diagnosis  Encounter  Medication |
| **0056** | **Diabetes: Foot Exam** | The percentage of patients aged 18-75 years with diabetes (type 1 or type 2) who had a foot exam (visual inspection, sensory exam with monofilament, or pulse exam). | Physical Exam | Patient Information  Diagnosis  Encounter  Medication |
| **0059** | **Diabetes: HbA1c Poor Control** | The percentage of patients 18-75 years of age with diabetes (type 1 or type 2) who had HbA1c > 9.0%. | Result | Patient Information  Encounter  Diagnosis  Medication |
| **0060** | **Hemoglobin A1c Test for Pediatric Patients** | Percentage of pediatric patients with diabetes with a HBA1c test in a 12-month measurement period. | Result | Patient Information  Diagnosis  Encounter  Medication |
| **0061** | **Diabetes: Blood Pressure Management** | The percentage of patients 18-75 years of age with diabetes (type 1 or type 2) who had BP < 140/90 mmHg. | Physical Exam  Encounter | Patient Information  Encounter  Diagnosis  Medication |
| **0062** | **Diabetes: Urine Screening** | The percentage of patients 18-75 years of age with diabetes (type 1 or type 2) who had a nephropathy screening test or evidence of nephropathy. | Procedure  Diagnosis  Medication  Order | Patient Information  Medication  Diagnosis  Encounter |
| **0064** | **Diabetes: LDL Management & Control** | The percentage of patients 18-75 years of age with diabetes (type 1 or type 2) who had LDL-C <100mg/dL. | Result | Patient Information  Encounter  Diagnosis  Medication |
| 0066 | Coronary Artery Disease (CAD): Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Patients with CAD and Diabetes and/or Left Ventricular Systolic Dysfunction (LVSD) | Percentage of patients aged 18 years and older with a diagnosis of CAD who also have diabetes and/or left ventricular systolic dysfunction (LVSD) who were prescribed ACE Inhibitor or ARB therapy. | Medication | Patient Information  Diagnosis  Procedure  Encounter  Result |
| 0067 | Coronary Artery Disease (CAD): Oral Antiplatelet Therapy Prescribed for Patients with CAD | Percentage of patients aged 18 years and older with a diagnosis of CAD who were prescribed oral antiplatelet therapy. | Medication | Patient Information  Diagnosis  Procedure  Encounter |
| 0068 | Ischemic Vascular Disease (IVD): Use of Aspirin or another Antithrombotic | The percentage of patients 18 years of age and older who were discharged alive for acute myocardial infarction (AMI), coronary artery bypass graft (CABG) or percutaneous transluminal coronary angioplasty (PTCA) from January 1 - November 1 of the year prior to the measurement year, or who had a diagnosis of ischemic vascular disease (IVD) during the measurement year and the year prior to the measurement year and who had documentation of use of aspirin or another antithrombotic during the measurement year. | Medication | Patient Information  Diagnosis  Procedure |
| 0069 | Treatment for Children with Upper Respiratory Infection (URI): Avoidance of Inappropriate Use | Percentage of children who were given a diagnosis of URI and were not dispensed an antibiotic prescription on or three days after the episode date. | Medication  Diagnosis  Encounter | Encounter  Diagnosis  Patient Information |
| 0070 | Coronary Artery Disease (CAD): Beta-Blocker Therapy for CAD Patients with Prior Myocardial Infarction (MI) | Percentage of patients aged 18 years and older with a diagnosis of CAD and prior MI who were prescribed beta-blocker therapy. | Medication | Patient Information  Diagnosis  Encounter  Procedure |
| 0073 | Ischemic Vascular Disease (IVD): Blood Pressure Management | The percentage of patients 18 years of age and older who were discharged alive for acute myocardial infarction (AMI), coronary artery bypass graft (CABG) or percutaneous transluminal coronary angioplasty (PTCA) from January 1-November 1 of the year prior to the measurement year, or who had a diagnosis of ischemic vascular disease (IVD) during the measurement year and the year prior to the measurement year and whose most recent blood pressure is in control (<140/90 mmHg). | Physical Exam  Encounter | Patient Information  Diagnosis  Procedure |
| 0074 | Coronary Artery Disease (CAD): Drug Therapy for Lowering LDL-Cholesterol | Percentage of patients aged 18 years and older with a diagnosis of CAD who were prescribed a lipid-lowering therapy (based on current ACC/AHA guidelines). | Medication | Patient Information  Diagnosis  Procedure  Encounter |
| 0075 | Ischemic Vascular Disease (IVD): Complete Lipid Panel and LDL Control | The percentage of patients 18 years of age and older who were discharged alive for acute myocardial infarction (AMI), coronary artery bypass graft (CABG) or percutaneous transluminal coronary angioplasty (PTCA) from January 1- November 1 of the year prior to the measurement year, or who had a diagnosis of ischemic vascular disease (IVD) during the measurement year and the year prior to the measurement year and who had a complete lipid profile performed during the measurement year and whose LDL-C was < 100 mg/dL. | Result | Patient Information  Diagnosis  Procedure  Encounter |
| **0081** | **Heart Failure (HF): Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction (LVSD)** | Percentage of patients aged 18 years and older with a diagnosis of heart failure and LVSD (LVEF < 40%) who were prescribed ACE inhibitor or ARB therapy. | Medication | Patient Information  Diagnosis  Encounter  Result |
| 0083 | Heart Failure (HF): Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction (LVSD) | Percentage of patients aged 18 years and older with a diagnosis of heart failure who also have LVSD (LVEF < 40%) and who were prescribed beta-blocker therapy. |  |  |
| 0084 | Heart Failure (HF) : Warfarin Therapy Patients with Atrial Fibrillation | Percentage of all patients aged 18 and older with a diagnosis of heart failure and paroxysmal or chronic atrial fibrillation who were prescribed warfarin therapy. | Medication | Patient Information  Diagnosis  Encounter  Result |
| 0086 | Primary Open Angle Glaucoma (POAG): Optic Nerve Evaluation | Percentage of patients aged 18 years and older with a diagnosis of POAG who have been seen for at least 2 office visits, who have an optic nerve head evaluation during one or more office visits within 12 months. | Procedure  Encounter | Encounter  Diagnosis  Patient Information |
| 0088 | Diabetic Retinopathy: Documentation of Presence or Absence of Macular Edema and Level of Severity of Retinopathy | Percentage of patients aged 18 years and older with a diagnosis of diabetic retinopathy who had a dilated macular or fundus exam performed which included documentation of the level of severity of retinopathy and the presence or absence of macular edema during one or more office visits within 12 months. | Encounter  Procedure  Physical Exam | Encounter  Diagnosis  Patient Information |
| 0089 | Diabetic Retinopathy: Communication with the Physician Managing Ongoing Diabetes Care | Percentage of patients aged 18 years and older with a diagnosis of diabetic retinopathy who had a dilated macular or fundus exam performed with documented communication to the physician who manages the on-going care of the patient with diabetes mellitus regarding the findings of the macular or fundus exam at least once within 12 months. | Encounter | Patient Information  Diagnosis  Encounter |
| 0097 | Medication Reconciliation | Percentage of patients aged 65 years and older discharged from any inpatient facility (e.g. hospital, skilled nursing facility, or rehabilitation facility) and seen within 60 days following discharge in the office by the physician providing on-going care who had a reconciliation of the discharge medications with the current medication list in the medical record documented. | Encounter | Patient Information  Encounter |
| 0102 | Chronic Obstructive Pulmonary Disease (COPD): Bronchodilator Therapy | Percentage of symptomatic patients aged 18 years and older with a diagnosis of COPD who were prescribed an inhaled bronchodilator. | Medication | Patient Information  Diagnosis  Encounter  Result  Problem |
| 0103 | Major Depressive Disorder (MDD): Diagnostic Evaluation | Percentage of patients with a diagnosis of major depressive disorder who met the DSM-IV™ criteria during the visit in which the new diagnosis or recurrent episode was identified. | Problem  Encounter | Patient Information  Diagnosis  Encounter |
| 0104 | Major Depressive Disorder (MDD): Suicide Risk Assessment | Percentage of patients who had a suicide risk assessment completed at each visit. |  |  |
| 0105 | Anti-depressant medication management: (a) Effective Acute Phase Treatment, (b)Effective Continuation Phase Treatment | The percentage of patients 18 years of age and older who were diagnosed with a new episode of major depression, treated with antidepressant medication, and who remained on an antidepressant medication treatment. |  |  |
| 0106 | Diagnosis of attention deficit hyperactivity disorder (ADHD) in primary care for school age children and adolescents | Percentage of patients newly diagnosed with ADHD whose medical record contains documentation of DSM-IV-TR or DSM-PC criteria. |  |  |
| 0107 | Management of attention deficit hyperactivity disorder (ADHD) in primary care for school age children and adolescents | Percentage of patients treated psychostimulant with medication for the diagnosis of ADHD whose medical record contains documentation of a follow-up visit at least twice a year. |  |  |
| 0108 | ADHD: Follow-Up Care for Children Prescribed Attention-Deficit/Hyperactivity Disorder (ADHD) Medication | a. Initiation Phase: Percentage of children 6 - 12 years of age as of the Index Prescription Episode Start Date with an ambulatory prescription dispensed for and ADHD medication and who had one follow-up visit with a practitioner with prescribing authority during the 30-Day Initiation Phase. b. Continuation and Maintenance (C&M) Phase: Percentage of children 6 - 12 years of age as of the Index Prescription Episode Start Date with an ambulatory prescription dispensed for ADHD medication who remained on the medication for at least 210 days and who in addition to the visit in the Initiation Phase had at least two additional follow-up visits with a practitioner within 270 days (9 months) after the Initiation Phase ends. |  |  |
| 0112 | Bipolar Disorder: Monitoring change in level-of-functioning | Percentage of patients aged 18 years and older with an initial diagnosis or new episode/presentation of bipolar disorder. |  |  |
| 0132 | Aspirin at Arrival | Acute myocardial infarction (AMI) patients who received aspirin within 24 hours before or after hospital arrival. |  |  |
| 0137 | ACEI or ARB for LVSD | Acute myocardial infarction (AMI) patients with left ventricular systolic dysfunction (LVSD) who are prescribed an ACEI or ARB at hospital discharge. For purposes of this measure, LVSD is defined as chart documentation of a left ventricular ejection fraction (LVEF) less than 40% or a narrative description of left ventricular systolic (LVS) function consistent with moderate or severe systolic dysfunction. |  |  |
| 0138 | Urinary catheter-associated urinary tract infection for intensive care unit (ICU) patients | Standardized Infection Ration (SIR) of healthcare-associated, catheter-associated urinary tract infections (CAUTI) among patients in intensive care units (ICUs), excluding patients in neonatal ICUs (NICUs). |  |  |
| 0139 | Central line catheter-associated blood stream infection rate for ICU and high-risk nursery (HRN) patients | Standardized Infection Ration (SIR) of healthcare-associated, central line-associated bloodstream infections (CLABSI) among patients in intensive care units (ICUs) and Neonatal Intensive Care Units (NICUs). | Result  Encounter  Medical Equipment  Physical Exam  Problem  Patient Information | Encounter  Medical Equipment |
| 0142 | Aspirin Prescribed at Discharge | Acute myocardial infarction (AMI) patients who are prescribed aspirin at hospital discharge. | Medication  Encounter | Encounter  Diagnosis  Patient Information |
| 0147 | Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) in Immunocompetent Patients | Immunocompetent patients with Community-Acquired Pneumonia who receive an initial antibiotic regimen during the first 24 hours that is consistent with current guidelines. | Medication  Encounter  Diagnosis | Patient Information  Encounter  Diagnosis  Result |
| 0148 | Blood Cultures Performed in the Emergency Department Prior to Initial Antibiotic Received in Hospital | Pneumonia patients whose initial emergency room blood culture specimen was collected prior to first hospital dose of antibiotics. This measure focuses on the treatment provided to Emergency Department patients prior to admission orders. | Medication  Encounter  Order | Encounter  Patient Information  Diagnosis  Result |
| 0151 | Initial Antibiotic Received Within 6 Hours of Hospital Arrival | Pneumonia patients who receive their first dose of antibiotics within 6 hours after arrival at the hospital. | Medication  Diagnosis  Encounter | Encounter  Medication  Result  Diagnosis |
| 0160 | Beta-Blocker Prescribed at Discharge | Acute myocardial infarction (AMI) patients who are prescribed a beta-blocker at hospital discharge. | Medication  Encounter | Diagnosis  Patient Information  Encounter |
| 0163 | Primary PCI Received Within 90 Minutes of Hospital Arrival | Acute myocardial infarction (AMI) patients with ST-segment elevation or LBBB on the ECG closest to arrival time receiving primary PCI during the hospital stay with a time from hospital arrival to PCI of 90 minutes or less. | Encounter  Procedure | Diagnosis  Patient Information Encounter |
| 0164 | Fibrinolytic Therapy Received Within 30 Minutes of Hospital Arrival | Acute myocardial infarction (AMI) patients with ST-segment elevation or LBBB on the ECG closest to arrival time receiving fibrinolytic therapy during the hospital stay and having a time from hospital arrival to fibrinolysis of 30 minutes or less. | Medication  Encounter | Patient Information  Diagnosis  Encounter  Procedure  Result |
| 0239 | Perioperative Care: Venous Thromboembolism (VTE) Prophylaxis (when indicated in ALL patients) | Patient Age: All patients age 18 years and older Procedures: surgical procedures for which VTE prophylaxis is indicated in all patients who had an order for LMWH, LDUH, adjusted-dose warfarin, fondaparinux or mechanical prophylaxis given within 24 hours prior to incision time or 24 hours after surgery end time. | Medication  Medical Equipment  Surgery | Patient Information  Surgery |
| 0241 | Stroke and Stroke Rehabilitation: Anticoagulant Therapy Prescribed for Atrial Fibrillation at Discharge | Percentage of patients aged 18 years and older with a diagnosis of ischemic stroke or transient ischemic attack (TIA) with documented permanent, persistent, or paroxysmal atrial fibrillation who were prescribed an anticoagulant at discharge. | Medication  Encounter | Patient Information  Diagnosis  Encounter |
| 0246 | Stroke and Stroke Rehabilitation: Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) Reports | Percentage of final reports for CT or MRI studies of the brain performed either: In the hospital within 24 hours of arrival, OR In an outpatient imaging center to confirm initial diagnosis of stroke, TIA or intracranial hemorrhage For patients aged 18 years and older with either a diagnosis of ischemic stroke or transient ischemic attack (TIA) or intracranial hemorrhage OR at least one documented symptom consistent with ischemic stroke or TIA or intracranial hemorrhage that includes documentation of the presence or absence of each of the following: hemorrhage and mass lesion and acute infarction. | Result  Encounter | Patient Information  Encounter  Result |
| 0268 | Perioperative Care: Selection of Prophylactic Antibiotic - First OR Second Generation Cephalosporin | Percentage of surgical patients aged 18 years and older undergoing procedures with the indications for a first OR second generation cephalosporin prophylactic antibiotic who had an order for cefazolin OR cefuroxime for antimicrobial prophylaxis. | Medication  Surgery | Patient Information  Surgery |
| 0270 | Perioperative Care: Timing of Prophylactic Antibiotics - Ordering Physician | Percentage of surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic parenteral antibiotics who have an order for an antibiotic to be given within one hour (if fluoroquinolone or vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required). | Medication  Surgery | Patient Information  Surgery |
| 0271 | Perioperative Care: Discontinuation of Prophylactic Antibiotics (Non-Cardiac Procedures) | Percentage of non-cardiac surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic antibiotics AND who received a prophylactic antibiotic, who have an order for discontinuation of prophylactic antibiotics within 24 hours of surgical end time. | Medication  Surgery | Patient Information  Surgery |
| 0298 | Central Line Bundle Compliance | The percentage of intensive care patients in the included ICUs with central lines for who all five elements of the central line "bundle" are documented on the daily goals sheet, central line checklist, patient’s medical record, or other documentation tool. | Medication  Procedure | Patient Information  Procedure |
| 0300 | Cardiac Surgery Patients With Controlled 6 A.M. Postoperative Blood Glucose | Cardiac surgery patients with controlled 6 A.M. blood glucose (less than or equal to 200 mg/dL) on postoperative day one (POD 1) and postoperative day two (POD 2) with Anesthesia End Date being postoperative day zero (POD 0). | Result  Procedure | Patient Information  Encounter  Surgery  Diagnosis |
| 0302 | Ventilator Bundle | The percentage of intensive care patients on mechanical ventilation for whom all five elements of the ventilator "bundle" are implemented and documented. | Procedure  Medical Equipment  Medication | Patient Information  Physical Exam |
| 0321 | End Stage Renal Disease (ESRD): Plan of Care for Inadequate Peritoneal Dialysis | Percentage of patients aged 18 years and older with a diagnosis of ESRD receiving peritoneal dialysis who have a Kt/V>=1.7 OR patients who have a Kt/V<1.7 with a documented plan of care 3 times a year (every 4 months) during the 12 month reporting period. | Order  Result  Procedure  Encounter | Patient Information  Diagnosis  Encounter  Procedure |
| 0323 | End Stage Renal Disease (ESRD): Plan of Care of Inadequate Hemodialysis in ESRD Patients | Percentage of patient calendar months during the 12 month reporting period in which patients aged 18 years and older with a diagnosis of ESRD and receiving hemodialysis have a Kt/V>=1.2 OR have a Kt/V<1.2 with a documented plan of care. | Order  Result  Procedure  Encounter | Patient Information  Encounter  Diagnosis  Procedure |
| 0329 | All Cause Readmission Index (risk adjusted) | 30-day Readmission Index for Non-Maternity and Non-Pediatric Discharges. | Encounter  Diagnosis | Patient Information  Encounter |
| 0341 | PICU Pain Assessment | Percentage of PICU patients receiving pain assessment on admission. | Encounter | Encounter  Patient Information |
| 0342 | PICU Periodic Pain Assessment | Percentage of PICU patients receiving periodic pain assessment. | Encounter | Encounter  Patient Information |
| 0348 | Iatrogenic Pneumothorax in Non-Neonates (risk adjusted) (PDI5) | Percent of medical and surgical discharges, age under 18 years, with ICD-9-CM code of iatrogenic pneumothorax in any secondary diagnosis field. | Encounter  Diagnosis | Encounter  Patient Information  Diagnosis |
| 0356 | Blood Cultures Performed Within 24 Hours Prior to or 24 Hours After Hospital Arrival for Patients Who Were Transferred or Admitted to the ICU Within 24 Hours of Hospital Arrival | Pneumonia patients transferred or admitted to the ICU within 24 hours of hospital arrival, who had blood cultures performed within 24 hours prior to or the day prior to arrival, the day of arrival, or within 24 hours after arrival to the hospital. | Order  Encounter | Encounter  Patient Information  Diagnosis  Result |
| 0362 | Foreign Body left after procedure (PDI3) | Discharges with foreign body accidently left in during procedure per 1000 discharges. |  | Encounter  Patient Information  Diagnosis  Physical Exam |
| 0385 | Oncology Colon Cancer: Chemotherapy for Stage III Colon Cancer Patients | Percentage of patients aged 18 years and older with Stage IIIA through IIIC colon cancer who are referred for adjuvant chemotherapy, prescribed adjuvant chemotherapy, or have previously received adjuvant chemotherapy within the 12-month reporting period. | Medication  Encounter | Patient Information  Encounter  Diagnosis  Procedure |
| 0387 | Oncology Breast Cancer: Hormonal Therapy for Stage IC-IIIC Estrogen Receptor/Progesterone Receptor (ER/PR) Positive Breast Cancer | Percentage of female patients aged 18 years and older with Stage IC through IIIC, ER or PR positive breast cancer who were prescribed tamoxifen or aromatase inhibitor (AI) during the 12-month reporting period. | Medication | Patient Information  Diagnosis  Encounter  Procedure |
| 0389 | Prostate Cancer: Avoidance of Overuse of Bone Scan for Staging Low Risk Prostate Cancer Patients | Percentage of patients, regardless of age, with a diagnosis of prostate cancer at low risk of recurrence receiving interstitial prostate brachytherapy, OR external beam radiotherapy to the prostate, OR radical prostatectomy, OR cryotherapy who did not have a bone scan performed at any time since diagnosis of prostate cancer. | Order  Diagnosis | Diagnosis  Patient Information  Procedure  Result |
| 0397 | Hepatitis C: Antiviral Treatment Prescribed | Percentage of patients aged 18 years and older with a diagnosis of chronic hepatitis C who were prescribed peginterferon and ribavirin therapy within the 12 month reporting period. | Medication | Diagnosis  Patient Information  Encounter |
| 0399 | Hepatitis C: Hepatitis A Vaccination in Patients with HCV | Percentage of patients aged 18 years and older with a diagnosis of hepatitis C who have received at least one injection of hepatitis A vaccine, or who have documented immunity to hepatitis A. | Procedure  Medication  Result | Patient Information  Diagnosis  Encounter |
| 0400 | Hepatitis C: Hepatitis B Vaccination in Patients with HCV | Percentage of patients aged 18 years and older with a diagnosis of hepatitis C who have received at least one injection of hepatitis B vaccine, or who have documented immunity to hepatitis B. | Procedure  Medication  Result | Patient Information  Diagnosis  Encounter |
| 0401 | Hepatitis C: Counseling Regarding Risk of Alcohol Consumption | Percentage of patients aged 18 years and older with a diagnosis of hepatitis C who were counseled regarding the risks of alcohol consumption at least once within the 12 month reporting period. |  | Patient Information  Diagnosis  Encounter |
| 0416 | Diabetic Foot and Ankle Care, Ulcer Prevention - Evaluation of Footwear | Percentage of patients aged 18 years and older with a diagnosis of diabetes mellitus who were evaluated for proper footwear and sizing. | Diagnosis  Procedure  Encounter  Physical Exam | Patient Information  Encounter  Procedure  Diagnosis |
| 0421 | Preventive Care and Screening: Body Mass Index (BMI), Screening and Follow-Up | Percentage of patients aged 18 years and older with a calculated BMI in the past six months or during the current visit documented in the medical record AND if the most recent BMI is outside parameters, a follow-up plan is documented. | Medical Equipment  Procedure | Patient Information  Encounter  Procedure  Medical Equipment  Physical Exam |
| 0453 | Urinary catheter removed on Postoperative Day 1 (POD 1) or Postoperative Day 2 (POD 2) with day of surgery being day zero | Surgical patients with urinary catheter removed on Postoperative Day 1 or Postoperative Day 2 with day of surgery being day zero. | Medical Equipment  Procedure | Patient Information  Encounter  Procedure  Medical Equipment  Physical Exam |
| 0471 | Cesarean Rate for Low-Risk Birth Women | Cesarean Rate for low-risk first birth women (aka NTSV CS rate: nulliparous, term, singleton, vertex) identifies the portion of cesarean births that has the most variation among practitioners, hospitals, regions and states. Unlike other cesarean measures, it focuses attention on the proportion of cesarean births that is affected by elective medical practices such as induction and early labor admission. Furthermore, the success (or lack thereof) of management of the first labor directly impacts the remainder of the woman's reproductive life especially given the current high rate of repeat cesarean births. This is also the measure used in Healthy Person 2010 (Objective 16.9a, US DHS, 2000) and previously received endorsement from the American College of Obstetricians and Gynecologists (American College of Obstetricians and Gynecologists: Task Force on Cesarean Delivery, 2000). A recent European review of cesarean birth measures also identified that this measure pinpointed the portion of cesarean births that had the greatest variation and contributed the most to the rise in overall rates in every country studied (Brennan, 2009). | Procedure  Encounter | Patient Information  Encounter  Procedure  Diagnosis |
| 0484 | Proportion of Infants 22 to 29 Weeks Gestation Treated with Surfactant who are Treated within 2 Hours of Birth | Proportion of infants with gestational age between 22 and 29 completed weeks who were treated with surfactant and were treated within two hours of birth. |  |  |
| 0496 | Median Time from ED Arrival to ED Departure for Discharged ED Patients | Median time from emergency department arrival to time of departure from the emergency room for patients discharged from the emergency department. |  |  |
| 0507 | Stenosis Measurement in Carotid Imaging Studies | Percentage of final reports for carotid imaging studies (neck MR angiography [MRA], neck CT angiography [CTA], neck duplex ultrasound, carotid angiogram) performed that include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement. | Result | Result |
| 0508 | Radiology: Inappropriate Use of "Probably Benign" Assessment Category in Mammography Screening | Percentage of final reports for screening mammograms that are classified as "probably benign". | Result | Encounter  Result |
| 0510 | Radiology: Exposure Time Reported for Procedures Using Fluoroscopy | Percentage of final reports for procedures using fluoroscopy that include documentation of radiation exposure or exposure time. | Procedure | Procedure |
| 0511 | Nuclear Medicine: Correlation with Existing Imaging Studies for All Patients Undergoing Bone Scintigraphy | Percentage of final reports for all patients, regardless of age, undergoing bone scintigraphy that include physician documentation of correlation with existing relevant imaging studies (e.g., x-ray, MRI, CT) that were performed. | Result | Result |
| 0513 | Use of Contrast: Thorax CT | This measure calculates the percentage of thorax studies that are performed with and without contrast out of all thorax studies performed (those with contrast, those without contrast, and those with both). | Order | Patient Information  Order |
| 0519 | Diabetic Foot Care and Patient/Caregiver Education Implemented During Short Term Episodes of Care | Percentage of short term home health episodes of care during which diabetic foot care and education were included in the physician-ordered plan of care and implemented for patients with diabetes. | Encounter  Procedure | Encounter  Diagnosis  Procedure |
| 0527 | Prophylactic Antibiotic Received Within One Hour Prior to Surgical Incision | Surgical patients with prophylactic antibiotics initiated within one hour prior to surgical incision. Patients who received vancomycin or a fluoroquinolone for prophylactic antibiotics should have the antibiotics initiated within two hours prior to surgical incision. Due to the longer infusion time required for vancomycin or a fluoroquinolone, it is acceptable to start these antibiotics within two hours prior to incision time. |  |  |
| 0528 | Prophylactic Antibiotic Selection for Surgical Patients | Surgical patients who received prophylactic antibiotics consistent with current guidelines (specific to each type of surgical procedure). |  |  |
| 0529 | Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time | Surgical patients whose prophylactic antibiotics were discontinued within 24 hours after Anesthesia End Time. The Society of Thoracic Surgeons (STS) Practice Guideline for Antibiotic Prophylaxis in Cardiac Surgery (2006) indicates that there is no reason to extend antibiotics beyond 48 hours for cardiac surgery and very explicitly states that antibiotics should not be extended beyond 48 hours even with tubes and drains in place for cardiac surgery. |  |  |
| 0575 | Diabetes: HbA1c Control (<8%) | The percentage of patients 18-75 years of age with diabetes (type 1 or type 2) who had HbA1c <8.0%. | Result | Encounter  Diagnosis  Medication |
| 0608 | Pregnant women that had HBsAg testing | This measure reports compliance to hepatitis B surface antigen (HBsAg) testing during pregnancy; if the HBsAg test is absent, then the exclusion criteria (diagnosis of hepatitis B infection) is applied. | Procedure  Result | Patient Information |
| ACP-017-10 | Endoscopy & Polyp Surveillance: Colonoscopy Interval for Patients with a History of Adenomatous Polyps - Avoidance of Inappropriate Use | Percentage of patients aged 18 years and older receiving a surveillance colonoscopy, with a history of a prior colonic polyp in previous colonoscopy findings who had a follow-up interval of 3 or more years since their last colonoscopy documented in the colonoscopy report. |  |  |
| OT3-011-10 | Depression Remission at Twelve Months | Adult patients age 18 and older with major depression or dysthymia and an initial PHQ-9 score > 9 who demonstrate remission at twelve months defined as PHQ-9 score less than 5. This measure applies to both patients with newly diagnosed and existing depression whose current PHQ-9 score indicates a need for treatment. | Encounter  Problem  Diagnosis | Patient Information |
| OT3-012-10 | Depression Remission at Six Months | Adult patients age 18 and older with major depression or dysthymia and an initial PHQ-9 score > 9 who demonstrate remission at six months defined as PHQ-9 score less than 5. This measure applies to both patients with newly diagnosed and existing depression whose current PHQ-9 score indicates a need for treatment. | Encounter  Problem  Diagnosis | Patient Information |
| OT3-022-10 | Depression Utilization of the PHQ-9 Tool | Adult patients age 18 and older with the diagnosis of major depression or dysthymia who have a PHQ-9 tool administered at least once during a 4 month period in which there was a qualifying visit. |  |  |

### Accountable Care Organization (ACO) Domain

The S&I Framework CEDD supports the 33 measures defined in the ACO Final Rule, as part of implementation of the Query Health Technical Approach:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ACO Measure ID** | **ACO Measure Name (from ACO Final Rule)** | **ACO Measure Description** | **CEDD Object in Numerator** | **CEDD Object in Denominator** |
| ACO #1  NQF #5 | CG-CAHPS: Getting Timely Care, Appointments, and Information | Not applicable at this time – Survey Data | | |
| ACO #2  NQF #5 | CG-CAHPS: How Well Your Doctors Communicate | Not applicable at this time – Survey Data | | |
| ACO #3  NQF #5 | CG-CAHPS: Patients’ Rating of Doctor | Not applicable at this time – Survey Data | | |
| ACO#4  NQF#5 | CAHPS: Access to Specialists | Not applicable at this time – Survey Data | | |
| ACO #5  NQF #5 | CG-CAHPS: Health Promotion and Education | Not applicable at this time – Survey Data | | |
| ACO #6  NQF #5 | CG-CAHPS: Shared Decision Making | Not applicable at this time – Survey Data | | |
| ACO#7  NQF#6 | Medicare Advantage CAHPS: Health Status/Functional Status | Not applicable at this time – Survey Data | | |
| ACO #8 | Risk-Standardized, All Condition Readmission | Risk-adjusted percentage of Accountable Care Organization (ACO) assigned beneficiaries who were hospitalized who were readmitted to a hospital within 30 days following discharge from the hospital for the index admission | Facility  Encounter | Facility  Encounter  Patient Information  Diagnosis  Payer Information  Primary and Secondary Provider Information |
| ACO #9 | Ambulatory Sensitive Conditions Admissions: Chronic Obstructive Pulmonary Disease (AHRQ PQI #8) | All discharges of age 40 years and older with ICD-9-CM principal diagnosis code for COPD or Asthma in adults ages 40 years and older, per 1,000 ACO assigned beneficiaries | Facility  Encounter  Diagnosis | Facility  Encounter  Payer Information  Patient Information |
| ACO #10 | Ambulatory Sensitive Conditions Admissions: Congestive Heart Failure (AHRQ PQI #8) | All discharges, age 18 years and older, with ICD-9-CM principal diagnosis code for CHF, per 1,000 ACO assigned beneficiaries. | Encounter  Patient Information  Facility  Diagnosis | Patient Information  Facility  Payer Information |
| ACO #11 | Percent of PCPs who Successfully Qualify for an EHR Incentive Program Payment | Percentage of Accountable Care Organization (ACO) primary care physicians (PCPs) who successfully qualify for either a Medicare or Medicaid Electronic Health Record (EHR) Incentive Program incentive payment. | Primary and Secondary Provider Information  Facility  *(additional data element for CMS MU qualification)* | Primary and Secondary Provider Information  Facility |
| ACO #12 | Medication Reconciliation: Reconciliation after Discharge from an Inpatient Facility | Percentage of patients aged 65 years and older discharged from any inpatient facility (e.g., hospital, skilled nursing facility, or rehabilitation facility) and seen within 60 days following discharge in the office by the physician providing on-going care who had a reconciliation of the discharge medications with the current medication list in the medical record documented | Patient Information  Active Medication List | Facility  Patient Information  Encounter  Primary and Secondary Provider Information |
| ACO #13 | Falls: Screening for Fall Risk | Percentage of patients aged 65 years and older who were screened for future fall risk at least once within 12 months | Order  Problem | Patient Information |
| ACO #14 | Influenza Immunization | Percentage of patients aged 6 months and older seen for a visit between October 1 and March 31 of the one-year measurement period who received an influenza immunization OR who reported previous receipt of an influenza immunization | Immunization | Patient Information  Encounter |
| ACO #15 | Pneumococcal Vaccination | Percentage of patients aged 65 years and older who have ever received a pneumococcal vaccine | Immunization | Patient Information  Encounter |
| ACO #16 | Adult Weight Screening and Follow-Up | Percentage of patients aged 18 years and older with a calculated BMI in the past six months or during the current visit documented in the medical record AND if the most recent BMI is outside of normal parameters, a follow-up plan is documented | Vital Sign  Plan of Care | Patient Information |
| ACO #17 | Tobacco Use Assessment and Tobacco Cessation Intervention | Percentage of patients aged 18 years and older who were screened for tobacco use one or more times within 24 months AND who received cessation counseling intervention if identified as a tobacco user | Social History  Plan of Care | Patient Information |
| ACO #18 | Depression Screening | Percentage of patients ages 12 and older screened for clinical depression using an age appropriate standardized tool AND follow-up plan documented | Behavioral Health  Plan of Care | Patient Information |
| ACO #19 | Colorectal Cancer Screening | Percentage of patients aged 50 through 75 years who received the appropriate colorectal cancer screening | Order | Patient Information |
| ACO #20 | Mammography Screening | Percentage of women aged 40 through 69 years who had a mammogram to screen for breast cancer within | Order | Patient Information |
| ACO #21 | Proportion of Adults 18+ who had their Blood Pressure Measured within the preceding 2 years | Percentage of patients aged 18 and older who are screened for high blood pressure | Vital Sign | Patient Information |
| ACO #22 | Diabetes Composite (All-Or-Nothing Scoring): HbA1c Control (<8%) | Percentage of patients ages 18 to 75 years of age with diabetes mellitus who had HbA1c < 8.0 percent | Vital Signs | Patient Information  Diagnosis  Encounter |
| ACO #23 | Diabetes Composite (All-Or-Nothing Scoring): LDL (<100) | Percentage of patients ages 18 to 75 years of age with diabetes mellitus who had LDL-C < 100 mg/dL | Vital Signs | Patient Information  Diagnosis  Encounter |
| ACO #24 | Diabetes Composite (All-Or-Nothing Scoring): Blood Pressure <140/90 | Percentage of patients ages 18 to 75 years of age with diabetes mellitus who had a blood pressure < 140/90 mmHg | Vital Signs | Patient Information  Diagnosis  Encounter |
| ACO #25 | Diabetes Composite (All-Or-Nothing Scoring): Tobacco Non-Use | Percentage of patients with a diagnosis of diabetes who indicated they were tobacco non-users | Patient Information  Social History | Patient Information  Diagnosis  Encounter |
| ACO #26 | Diabetes Composite (All-Or-Nothing Scoring): Aspirin Use | Percentage of patients ages 18 to 75 years of age with diabetes mellitus and ischemic vascular disease with documented daily aspirin use during the measurement year unless contraindicated | Diagnosis  Medication | Patient Information  Diagnosis  Encounter |
| ACO #27 | Diabetes Mellitus: HbA1c Poor Control (>9%) | Percentage of patients aged 18 through 75 years with diabetes mellitus who had most recent hemoglobin A1c greater than 9.0% | Vital Sign | Patient Information  Diagnosis |
| ACO #28 | HTN: Blood Pressure Control | Percentage of patients aged 18 through 85 years of age who had a diagnosis of hypertension (HTN) and whose blood pressure (BP) was adequately controlled (< 140/90 mmHg) during the measurement year | Vital Sign | Patient Information  Diagnosis |
| ACO #29 | IVD: Complete Lipid Profile and LDL Control <100 mg/dl | Percentage of patients aged 18 years and older with ischemic vascular disease (IVD) who received at least one lipid profile within 12 months and whose most recent LDL-C level was in control (less than 100 mg/dL) | Vital Sign  Order | Patient Information  Diagnosis  Encounter |
| ACO #30 | IVD: Use of Aspirin or Another Antithrombotic | Percentage of patients aged 18 years and older with ischemic vascular disease (IVD) with documented use of aspirin or other antithrombotic | Medication | Patient Information  Diagnosis  Encounter |
| ACO #31 | HF: Beta-Blocker Therapy for Left Ventricular Systolic Dysfunction (LVSD) | Percentage of patients aged 18 years and older with a diagnosis of heart failure (HF) with a current or prior left ventricular ejection fraction (LVEF) < 40% who were prescribed beta-blocker therapy either within a 12 month period when seen in the outpatient setting or at hospital discharge | Medication  Encounter | Patient Information  Diagnosis  Vital Sign |
| ACO #32 | CAD Composite, All-Or-Nothing Scoring: Drug Therapy for Lowering LDL-Cholesterol | Percentage of patients aged 18 years and older with a diagnosis of coronary artery disease seen within a 12 month period who have a LDL-C result < 100 mg/dL OR patients who have a LDL-C result ≥ 100 mg/dL and have a documented plan of care to achieve LDL-C < 100 mg/dL, including at a minimum the prescription of a statin | Medication  Plan of Care  Vital Sign | Patient Information  Diagnosis |
| ACO #33 | CAD Composite, All-Or-Nothing Scoring: ACE Inhibitor or ARB Therapy for Patients with CAD and Diabetes and/or LVSD | Percentage of patients aged 18 years and older with a diagnosis of coronary artery disease seen within a 12 month period who also have diabetes OR a current or prior Left Ventricular Ejection Fraction (LVEF) < 40% who were prescribed ACE inhibitor or ARB therapy | Medication | Patient Information  Diagnosis  Vital Sign |

# Working Examples

## Support for Type II Diabetes Expanded Analysis

### Querying Type II Diabetes in ICD-10 CM

If the patient is admitted with a diabetic condition or has a condition due to diabetes, the diabetic code from category 250 must be sequenced as the principal diagnosis followed by the manifestations as secondary diagnoses. There are five categories for diabetes mellitus (DM) in ICD-10-CM that might be queried against as a **Diagnosis Code (using an ICD-10 CM code)**

* Diabetes mellitus due to underlying condition (E08);
* Drug- or chemical-induced diabetes mellitus (E09);
* Type 1 diabetes mellitus (E10);
* Type 2 diabetes mellitus (E11); and
* Other specified diabetes mellitus (E13).

An information requester may also wish to query an ICD-10 code directly in querying for type 2 diabetes. For example, type 2 DM with mild non-proliferative diabetic retinopathy with macular edema is completely classified with one ICD-10-CM code (E11.321). A query could be made on a target population with exclusions that specifically looks for this ICD-10 CM code.

## Support for Generic User Story Distributed Queries (Sample Query Catalog)

### Querying for TBI using ICD-9 CM

A traumatic brain injury (TBI) occurs when a sudden trauma causes damage to the brain as a result of the head hitting an object or vice versa.

TBI without further specification is classified to a code from ICD-9-CM category 854. This **diagnosis code** can be queried for a target population.

If the TBI is documented only as a closed head injury without further description, **Diagnosis Code** 959.01 can be queried. A closed head injury occurs when a person receives a hard blow to the head from striking an object, but the object did not break the skull. However, if there was a loss of consciousness in the case of either a closed head injury or a TBI, the query might need to look at category 850, Concussion, instead of either 959.01 or a code from category 854.

If a TBI or a closed head injury included additional documented injuries, then a more specified code can be queried as follows:

* Category 851, Cerebral laceration and contusion;
* Category 852, Subarachnoid, subdural, and extradural hemorrhage, following injury; or
* Category 853, Other and unspecified intracranial hemorrhage following injury.

A fifth digit subclassification is required for categories 851 to 854 to identify loss of consciousness, if any, and the length of time as follows:

* 0, unspecified state of consciousness;
* 1, with no loss of consciousness;
* 2, with brief (less than one hour) loss of consciousness;
* 3, with moderate (one to 24 hours) loss of consciousness;
* 4, with prolonged (more than 24 hours) loss of consciousness and return to preexisting conscious level;
* 5, with prolonged (more than 24 hours) loss of consciousness without return to preexisting conscious level. (Use this fifth digit to designate when a patient is unconscious and dies before regaining consciousness, regardless of the duration of the loss of consciousness.);
* 6, with loss of consciousness of unspecified duration; and
* 9, with concussion, unspecified.

Each of these sub-classifications could also be queried as **Diagnosis Codes**.

### Querying Vital Signs and Results to assist in TBI Diagnosis

To diagnose a TBI, the physician assesses a patient’s ability to follow directions regarding blinking his or her eyes or moving extremities. In addition, the physician may order X-rays or a CT scan to determine if the TBI can be further identified as a brain hemorrhage, brain hematoma, contused (bruised) brain tissue, or brain tissue swelling.

For examinations, the **Vital Sign Observation** and the **Physical Exam Observation** can be queried for the target population. **Result Codes** for imaging studies can also be reviewed for determine whether specific CT scan results have been identified for a target population.

### Querying Symptoms of TBI

Symptoms of a brain injury can range from mild to moderate to severe depending on the extent of brain damage. Symptoms of a mild brain injury would include a brief loss of consciousness (few seconds to a few minutes); being dazed, confused, or disoriented; headache; memory or concentration problems; dizziness or loss of balance; nausea or vomiting; blurred vision; ringing in the ears; bad taste in the mouth; sensitivity to light or sound; mood changes or mood swings; feeling depressed or anxious; fatigue or drowsiness; sleeping more than usual or difficulty sleeping; and trouble with memory, concentration, attention, or thinking.

Symptoms of a moderate or severe brain injury include the same symptoms of a mild brain injury; a more severe and persistent headache; nausea or repeated vomiting or nausea; seizures; inability to awaken from sleep; dilation of one or both pupils; slurred speech; weakness or numbness in the extremities; loss of coordination; and increased confusion, restlessness, or agitation.

A researcher wishing to look at symptoms in cases of Traumatic Brain Injury (TBI) within a population would be able to query on specific **Problem Codes** that have been identified. Each of the symptoms listed for TBI can be queried as coded values.