

# Issues With Synthea Generated Patient Data for Use in Clinical Quality Measure – Hypertension Case Study

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# Objective

- Determine what is needed for Synthea to generate patient data for use in clinical quality measure (CQM).

# Gap Analysis and Validation

- Start with a CQM where the disease of interest has been modeled by Synthea
- Match CQM data elements with those generated by the Synthea data.
- Provide a list of CQM required data elements:
  - Missing from Synthea
  - Using terminology (SNOMED code) not included in the value set
  - Unmet result values
- Test Synthea data in C-CDA format against popHealth – a CQM Reporting Tool

# CMS165 – Controlling High Blood Pressure

- CQM definition - <https://ecqi.healthit.gov/system/files/ecqm/measures/CMS165v7.html>
- Data criteria used in the Denominator:
  - Diagnosis: Essential Hypertension
  - Encounter, Performed: Adult Outpatient Visit
- Data criteria used in the Numerator
  - Physical Exam, Performed: Diastolic blood pressure (Has Diastolic Blood Pressure Less Than 90)
  - Physical Exam, Performed: Systolic blood pressure (Has Systolic Blood Pressure Less Than 140)
- Data criteria used in the Denominator Exclusions
  - Diagnosis: Chronic Kidney Disease, Stage 5
  - Diagnosis: End Stage Renal Disease
  - Diagnosis: Kidney Transplant Recipient
  - Diagnosis: Pregnancy
  - Intervention, Order: Hospice care ambulatory
  - Intervention, Performed: Hospice care ambulatory
  - Procedure, Performed: Dialysis Services
  - Procedure, Performed: Kidney Transplant
  - Procedure, Performed: Vascular Access for Dialysis

# CQM Data Criteria Value Set

- Diagnosis: Essential Hypertension as defined by the value set - 2.16.840.1.113883.3.464.1003.104.12.1011

SNOMEDCT	78975002	Malignant essential hypertension (disorder)
SNOMEDCT	65518004	Labile diastolic hypertension (disorder)
SNOMEDCT	59720008	Sustained diastolic hypertension (disorder)
SNOMEDCT	59621000	Essential hypertension (disorder)
SNOMEDCT	56218007	Systolic hypertension (disorder)
SNOMEDCT	48146000	Diastolic hypertension (disorder)
SNOMEDCT	46481004	Low-renin essential hypertension (disorder)
SNOMEDCT	429457004	Systolic essential hypertension (disorder)
SNOMEDCT	371125006	Labile essential hypertension (disorder)
SNOMEDCT	276789009	Labile hypertension (disorder)
SNOMEDCT	1201005	Benign essential hypertension (disorder)
SNOMEDCT	10725009	Benign hypertension (disorder)
ICD9CM	401.9	Unspecified essential hypertension
ICD9CM	401.1	Benign essential hypertension
ICD9CM	401	Malignant essential hypertension
ICD10CM	I10	Essential (primary) hypertension

## Example of Using Terminology Outside of the Value Set

- The Synthea module - Metabolic Syndrome Standards of Care generates the Hypertension diagnosis; however, the SNOMED code used, 38341003 (Hypertensive Disorder), is a more general classification of hypertension. The CQM data criteria for Diagnosis: Essential Hypertension is more specific. Therefore, we will need to change the Synthea Hypertension Diagnose code to one of the code in the value set, i.e., 59621000 (Essential hypertension)

# Example of Unmet Result Values

- The CMS165 numerator requires indication that the hypertension is under control, i.e.,
  - Physical Exam, Performed: Diastolic blood pressure (Has Diastolic Blood Pressure Less Than 90)
  - Physical Exam, Performed: Systolic blood pressure (Has Systolic Blood Pressure Less Than 140)
- The Synthea module - Metabolic Syndrome Standards of Care, only generates Diastolic/Systolic blood pressure  $\geq 90/140$  once hypertension diagnose is set. Even after the medication, the BP values doesn't drop, so no patient will fall into the numerator.

# Example of Missing Data Elements

- Diagnosis: Chronic Kidney Disease, Stage 5
- Diagnosis: Kidney Transplant Recipient
- Intervention, Order: Hospice care ambulatory
- Intervention, Performed: Hospice care ambulatory
- Procedure, Performed: Kidney Transplant
- Procedure, Performed: Vascular Access for Dialysis



# Next Step

- Modified Synthea “Metabolic Syndrome Standards of Care” module accordingly or create a new Hypertension module
- Test Synthea data in C-CDA format against popHealth – a CQM Reporting Tool