HIR
Healthcare Informatics Research

ETL SPECIFICATIONS

I. Introduction

This document considers the requirements, assumptions, business rules, and transformations for implementing the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) ver. 4.0 as implemented in the AUSOM (Ajou University School of Medicine) database. It describes the extraction, transformation, and loading (ETL) mapping of proprietary or licensed data from AUSOM to the OMOP CDM. The process is based on the OMOP ETL specifications. General information that is covered by the OMOP ETL specifications will not be covered here, while the AUSOM-specific aspects of mapping and converting data to the standard CDM are discussed in detail.

The document consists of the Source Data Mapping and Source-Independent Data Mapping sections. The former describes the major tables of the CDM schema and special data handling required for each table. The latter describes the mapping process for the Drug and Condition Era tables.

Each section reviews the tables and their mapping along with any source-specific rules and exceptions. The intended audience for this document is researchers who want to build on our experiences to construct their own CDM.

II. Source Data Mapping

This section describes the mapping process and ETL conversion of EHR data from the subject hospital to the OMOP CDM. The details below are based on the standard variable and file structures of the AUSOM database.

1. Table Name: PERSON

Table 1. ETL mapping rules for Person table

Destination field	Source field	Applied rule	Comment
PERSON_ID		Use random but unique number	The AUSOM use random but unique research ID.
GENDER_ CONCEPT_ID	[PATIENT]. [SEX]	8507 for male 8532 for female	
YEAR_OF_BIRTH	[PATIENT]. [BIRTHDAY]	LEFT (BIRTHDAY,4) from BIRTH-DAY	Datetime format of BIRTH-DAY in the source data: YYYY-MM-DD
MONTH_OF_ BIRTH	[PATIENT]. [BIRTHDAY]	SUBSTRING (BIRTHDAY,6,2) from BIRTHDAY	Datetime format of BIRTH-DAY in the source data: YYYY-MM-DD
DAY_OF_BIRTH	[PATIENT]. [BIRTHDAY]	SUBSTRING (BIRTHDAY,9,2) from BIRTHDAY	Datetime format of BIRTH-DAY in the source data: YYYY-MM-DD
RACE_ CONCEPT_ID	[PATIENT]. [FRNYN]	8552 when unknown 38003585 when Korean	CDC Race Concept
ETHNICITY _CONCEPT_ID		NULL	
LOCATION_ID		NULL	
PROVIDER_ID		NULL	
CARE_SITE_ID		1	The subject hospital has only one care site.
PERSON_SOURCE_VALUE	[PATIENT]. [PATID]	Encrypted ID in the source database	
GENDER_SOURCE_VALUE	[PATIENT]. [SEX]	M=Male F=Female	
RACE_SOURCE_ VALUE	[PATIENT]. [FRNYN]	As a source value	
ETHNICITY _SOURCE_VALUE		NULL	

ETL: extraction, transformation, and loading.

2. Table Name: DRUG_EXPOSURE

Table 2. ETL mapping rules for Drug_Exposure table

Destination field	Source field	Applied rule	Comment
DRUG_EXPOSURE_ID		Drug exposure sequence	
PERSON_ID		Use random but unique number	Same as 'person_id' in 'Person' table
DRUG_CONCEPT_ID	[MEDICATION].[ORDCODE]	Concept_IDs mapped to the local drug coding system	RxNorm ATC
DRUG_EXPOSURE_START_DATE	[MEDICATION].[ORDDATE]	Transform 'YYYY-MM-DD' into 'DAY-MONTH-YEAR (last two digits)'	Example: '2000-03-01' INTO '01-Mar-00'
DRUG_EXPOSURE_END_DATE	[MEDICATION].[ORDDATE] / [MEDICATION].[DAY]	Dateadd (dd, [DAY], DRUG_EXPOSURE_START_DATE)	DAY column in the subject hospital means 'days supply'
DRUG_TYPE_CONCEPT_ID		38000178	Concept_ID 38000178: 'EHR Medication list entry'
STOP_REASON		NULL	
REFILLS		NULL	
QUANTITY	[MEDICATION].[CONTQTY] / [MEDICATION].[CONTUNIT] / [MEDICATION].[CNT]	Contqty * $unit$ * cnt = dose per day (mg,UNT) If contunit = 'MG', $unit$ = 1 Else if contunit = 'G', $unit$ = 1,000 Else if contunit = 'KG', $unit$ = 1,000,000 Else if contunit = 'IU', $unit$ = 1 Else if contunit = 'KIU', $unit$ = 1,000 Else, NULL	
DAYS_SUPPLY	[MEDICATION].[DAY]	As a source value	
SIG	[MEDICATION].[METHODCD]	Concept_IDs mapped to the local SIG code	
PRESCRIBING_PROVIDER_ID		NULL	
VISIT_OCCURRENCE_ID		VISIT_OCCURRENCE_ID in VISIT_OCCURRENCE table of which DRUG_EXPOSURE_START_DATE between VISIT_START_DATE and VISIT_END_DATE	
RELEVANT_CONDITION_CONCEPT_ID		NULL	
DRUG_SOURCE_VALUE	[MEDICATION].[ORDCODE]	As a source value	Local drug order codes

ETL: extraction, transformation, and loading.

3. Table Name: CONDITION_OCCURRENCE

Table 3. ETL mapping rules for Condition_Occurrence table

Destination field	Source field	Applied rule	Comment
CONDITION_OCCURRENCE_ID		Condition occurrence sequence	
PERSON_ID		Use random but unique number	
CONDITION_CONCEPT_ID	[DIAGNOSIS].[DIAGCODE]	Concept_IDs mapped to the local diagnosis coding system	
CONDITION_START_DATE	[DIAGNOSIS].[MEDDATE]	Transform 'YYYY-MM-DD' into 'DAY-MONTH-YEAR (last two digits)'	Example: '2000-03-01' INTO '01-Mar-00'
CONDITION_END_DATE		NULL	
CONDITION_TYPE_CONCEPT_ID		38000245	Concept_ID 38000245: 'EHR problem list entry'
STOP_REASON		NULL	
ASSOCIATED_PROVIDER_ID		NULL	
VISIT_OCCURRENCE_ID		VISIT_OCCURRENCE_ID in VISIT_OCCURRENCE table of which CONDITION_START_DATE between VISIT_START_DATE and VISIT_END_DATE	
CONDITION_SOURCE_VALUE	[DIAGNOSIS].[DIAGCODE]	As a source value	

ETL: extraction, transformation, and loading.

4. Table Name: VISIT_OCCURRENCE

Table 4. ETL mapping rules for Visit_Occurrence table

Destination field	Source field	Applied rule	Comment
VISIT_OCCURRENCE_ID		Visit occurrence sequence	
PERSON_ID		Use random but unique number	
VISIT_START_DATE	[INPATIENTS].[ADMTIME] / [OUTPATIENTS].[MEDDATE] / [HEALTHEXAM].[ODT]	Transform 'YYYY-MM-DD' into 'DAY-MONTH-YEAR (last two digits)'	Example: '2000-03-01' INTO '01-Mar-00'
VISIT_END_DATE	[INPATIENTS].[DSCHTIME] / [OUTPATIENTS].[MEDDATE] / [HEALTHEXAM].[ODT]	Transform 'YYYY-MM-DD' into 'DAY-MONTH-YEAR (last two digits)'	In outpatient and health examination patient, VISIT_START_DATE is equal to VISIT_END_DATE
PLACE_OF_SERVICE_CONCEPT_ID	[INPATIENTS].[PATFG] / [OUTPATIENTS].[PATFG]	9,201 for Inpatient Visit 9,202 for Outpatient Visit/ Health Examination Visit 9,203 for Emergency Room Visit	
CARE_SITE_ID		-	
PLACE_OF_SERVICE_SOURCE_VALUE	[INPATIENTS].[PATFG] / [OUTPATIENTS].[PATFG]	G for Health Examination Visit E for Emergency Room Visit I for Inpatient Visit O for Outpatient Visit	Patient flags; E means a patient visited emergency department. I means an inpatient. O means an outpatient. G means a patient visited hospital for health examination.

ETL: extraction, transformation, and loading.

5. Table Name: PROCEDURE_OCCURRENCE

Table 5. ETL mapping rules for Procedure_Occurrence table (surgery and anesthesia)

Destination field	Source field	Applied rule	Comment
PROCEDURE_ OCCURRENCE_ID		Procedure occurrence sequence	
PERSON_ID		Use random but unique number	
PROCEDURE_ CONCEPT_ID	[SURGERY]. [EXAMCODE]	Concept_IDs mapped to the local procedure coding system	
PROCEDURE_ DATE	[SURGERY]. [ORDDATE]	Transform 'YYYY-MM-DD' into 'DAY-MONTH-YEAR (last two digits)'	Example: '2000-03-01' INTO '01-Mar-00'
PROCEDURE_ TYPE_CONCEPT_ ID		38000275	Concept_ID 38000178: 'EHR order list entry'
ASSOCIATED_ PROVIDER_ID		NULL	
VISIT_ OCCURRENCE_ID		VISIT_OCCURRENCE_ID in VISIT_ OCCURRENCE table of which PROCEDURE_DATE between VISIT_START_ DATE and VISIT_END_DATE	
RELEVANT_ CONDITION_ CONCEPT_ID		NULL	
PROCEDURE_ SOURCE_VALUE	[SURGERY]. [EXAMCODE]	As a source value	

ETL: extraction, transformation, and loading.

Table 6. ETL mapping rules for Procedure_Occurrence table (laboratory test, pathology test, and radiology test)

Destination field	Source field	Applied rule	Comment
PROCEDURE_OCCURRENCE_ID		Procedure occurrence sequence	
PERSON_ID		Use random but unique number	
PROCEDURE_CONCEPT_ID	[TEST_RESULTS].[EXAMCODE]	Concept_IDs mapped to the local procedure coding system	
PROCEDURE_DATE	[TEST_RESULTS].[ORDDATE]	Transform 'YYYY-MM-DD' into 'DAY-MONTH-YEAR (last two digits)'	Example: '2000-03-01' INTO '01-Mar-00'
PROCEDURE_TYPE_CONCEPT_ID		38003621	Concept_ID 38003621: 'EHR order list entry'
ASSOCIATED_PROVIDER_ID		NULL	
VISIT_OCCURRENCE_ID		VISIT_OCCURRENCE_ID in VISIT_OCCURRENCE table of which PROCEDURE_DATE between VISIT_START_DATE and VISIT_END_DATE	
RELEVANT_CONDITION_CONCEPT_ID		NULL	
PROCEDURE_SOURCE_VALUE	[TEST_RESULTS].[EXAMCODE]	As a source value	

ETL: extraction, transformation, and loading.

6. Table Name: OBSERVATION

Table 7. ETL mapping rules for the Observation table (results of laboratory test)

Destination field	Source field	Applied rule	Comment
OBSERVATION_ID		Observation sequence	
PERSON_ID		Use random but unique number	
OBSERVATION_CONCEPT_ID	[TEST_RESULTS].[EXAMCODE]	Concept_IDs mapped to the local laboratory test coding system	
OBSERVATION_DATE	[TEST_RESULTS].[RECTIME]	Transform 'YYYY-MM-DD' into 'DAY-MONTH-YEAR (last two digits)'	Example: '2000-03-01' INTO '01-Mar-00'
OBSERVATION_TIME	[TEST_RESULTS].RECTIME	RIGHT (CONVERT(VARCHAR(19), RECTIME, 120), 9)	
VALUE_AS_NUMBER	[TEST_RESULTS].[RSLTNUM]	As a source value	When source value is numeric
VALUE_AS_STRING		NULL	
VALUE_AS_CONCEPT_ID		NULL	
UNIT_CONCEPT_ID	[TEST_RESULTS].[UNIT]	Concept_IDs mapped to the local laboratory test units	
RANGE_LOW	[TEST_RESULTS].[NORMMINVAL]	As a source value	
RANGE_HIGH	[TEST_RESULTS].[NORMMAXVAL]	As a source value	
OBSERVATION_TYPE_CONCEPT_ID		38000277	Concept_ID 38000277: 'Lab observation numeric result'
ASSOCIATED_PROVIDER_ID		NULL	
VISIT_OCCURRENCE_ID		VISIT_OCCURRENCE_ID in VISIT_OCCURRENCE table of which OBSERVATION_DATE between VISIT_START_DATE and VISIT_END_DATE	
RELEVANT_CONDITION_CONCEPT_ID		NULL	
OBSERVATION_SOURCE_VALUE	[TEST_RESULTS].[RSLTNUM]	As a source value	
UNITS_SOURCE_VALUE	[TEST_RESULTS].[UNIT]	As a source value	

ETL: extraction, transformation, and loading.

Table 8. ETL mapping rules for Observation table (vital sign)

Destination field	Source field	Applied rule	Comment
OBSERVATION_ID		Observation sequence	
PERSON_ID		Use random but unique number	
OBSERVATION_CONCEPT_ID	[VITAL].[BODYTEMP] / [VITAL].[PULSE] / [VITAL].[BRETH] / [VITAL].[BPH] / [VITAL].[BPL]	3020891 for body temperature 4224504 for body pulse rate 4090659 for body number of breath 3004249 for systolic blood pressure 3012888 for diastolic blood pressure	
OBSERVATION_DATE	[VITAL].[RECTIME]	Transform 'YYYY-MM-DD' into 'DAY-MONTH-YEAR (last two digits)'	Example: '2000-03-01' INTO '01-Mar-00'
OBSERVATION_TIME	[VITAL].[RECTIME]	RIGHT (CONVERT(VARCHAR(19), RECTIME, 120), 9)	
VALUE_AS_NUMBER	[VITAL].[BODYTEMP] / [VITAL].[PULSE] / [VITAL].[BRETH] / [VITAL].[BPH] / [VITAL].[BPL]	As a source value	
VALUE_AS_STRING		NULL	
VALUE_AS_CONCEPT_ID		NULL	
UNIT_CONCEPT_ID		NULL	
RANGE_LOW		NULL	
RANGE_HIGH		NULL	
OBSERVATION_TYPE_CONCEPT_ID		38000280	Concept_ID 38000280: 'Observation recorded from EHR'
ASSOCIATED_PROVIDER_ID		NULL	
VISIT_OCCURRENCE_ID		VISIT_OCCURRENCE_ID in VISIT_OCCURRENCE table of which OBSERVATION_DATE between VISIT_START_DATE and VISIT_END_DATE	
RELEVANT_CONDITION_CONCEPT_ID		NULL	
OBSERVATION_SOURCE_VALUE	[VITAL].[BODYTEMP] / [VITAL].[PULSE] / [VITAL].[BRETH] / [VITAL].[BPH] / [VITAL].[BPL]	As a source value	
UNITS_SOURCE_VALUE		NULL	

ETL: extraction, transformation, and loading.

III. Source-Independent Data Mapping

1. Table Name: DRUG_ERA

The table DRUG_ERA is constructed by aggregating the individual drug exposures recorded in the table DRUG_EXPO-SURE.

Table 9. ETL mapping rules for Drug_Era table

Destination field	Source field	Applied rule	Comment
DRUG_ERA_ID		Drug Era sequence	
PERSON_ID	[DRUG_EXPOSURE.[PERSON_ID]	Use random but unique number	
DRUG_CONCEPT_ID	[DRUG_EXPOSURE].[DRUG_CONCEPT_ID]	As a source value	
DRUG_ERA_START_DATE	[DRUG_EXPOSURE].[DRUG_EXPOSURE_START_DATE]	Suppose that there are data in order by person_id,drug_concept_id,drug_expoure_start date. Rule: select * into DRUG_ERA_STEP1 from (SELECT *, ROW_NUMBER() over (PARTITION BY person_id,drug_concept_id ORDER by DRUG_EXPOSURE_START_DATE) as ordRk FROM [DBO].DRUG_EXPOSURE)v DATEDIFF(dd,a.drug_exposure_end_date,b.drug_exposure_start_date) as days from DRUG_EXPOSURE a join DRUG_EXPOSURE b on a.PERSON_ID=b.person_id and a.DRUG_CONCEPT_ID=b.DRUG_CONCEPT_ID and a.ordRk=cast(b.ordRk as int)-1 Min(drug_exposure_start_date)	
DRUG_ERA_END_DATE	[DRUG_EXPOSURE].DRUG_EXPOSURE_END_DATE]	Max(drug_exposure_end_date)	
DRUG_TYPE_CONCEPT_ID		NULL	
DRUG_EXPOSURE_COUNT		NULL	

ETL: extraction, transformation, and loading.

2. Table Name: CONDITION_ERA

The table CONDITION_ERA is constructed by aggregating the individual condition occurrences recorded in the table CONDITION_OCCURRENCE.

Table 10. ETL mapping rules for Condition_Era table

Destination field	Source field	Applied rule	Comment
CONDITION_ERA_ID		CONDITION_ERA_ID sequence	
PERSON_ID	[CONDITION_OCCURRENCE].[PERSON_ID]	Use random but unique number	
CONDITION_CONCEPT_ID	[CONDITION_OCCURRENCE].[CONDITION_CONCEPT_ID]	As a source value	
CONDITION_ERA_START_DATE	[CONDITION_OCCURRENCE].[CONDITION_START_DATE]	Suppose that there are data in order by PERSON_ID,CONDITION_CONCEPT_ID,CONDITION_START_DATE. select * into CONDITION_ERA_STEP1 from (SELECT *,ROW_NUMBER() over (PARTITION BY person_id,CONDITION_concept_id ORDER by CONDITION_START_DATE) as ordRk FROM [DBO].CONDITION_OCCURRENCE)v SELECT * INTO CONDITION_ERA_STEP1_TMP FROM (SELECT CONDITION_OCCURRENCE_ID,PERSON_ID,CONDITION_CONCEPT_ID,CONDITION_START_DATE,CONDITION_END_DATE=CASE WHEN CONDITION_END_DATE IS NULL THEN CONDITION_START_DATE ELSE CONDITION_END_DATE END,ORDRK FROM CONDITION_ERA_STEP1)V ORDER BY PERSON_ID,CONDITION_CONCEPT_ID,CONDITION_START_DATE GO	

Destination field	Source field	Applied rule	Comment
CONDITION_ERA_ START_DATE	[CONDITION_ OCCURRENCE]. [CONDITION_ START_DATE]	select * into CONDITION_ERA_STEP3_TMP FROM (select *,fg=CASE WHEN [days]<30 then 1 when (select [days] from CONDITION_ERA_STEP2_TMP a WHERE a.person_id=b.person_id and a.CONDITION_CON-CEPT_ID=b.CONDITION_CONCEPT_ID and a.ordrk=b.ordrk-1)<30 THEN 1000 end ,fg2=null from CONDITION_ERA_STEP2_TMP b)v Go SELECT IDENTITY(INT,1,1) AS CONDITION_ERA_ID, * INTO CONDITION_ERA FROM (SELECT PERSON_ID, CONDITION_CONCEPT_ID, min(CONDITION_start_date) as CONDITION_ERA_START_DATE, max(CONDITION_end_date) as CONDITION_ERA_END_DATE, CONDITION_TYPE_CONCEPT_ID=null, count(*) AS CONDITION_OCCURRENCE_COUNT FROM CONDITION_ERA_STEP4_tmp_notnull group by PERSON_ID, CONDITION_CONCEPT_ID,fg2	
CONDITION_ERA_ END_DATE	[CONDITION_ OCCURRENCE]. [CONDITION_ ERA_END_DATE]	max(CONDITION_end_date) as CONDITION_ERA_END_ DATE,	
CONDITION_ TYPE_CONCEPT_ID		NULL	
CONDITION_ OCCURRENCE_ COUNT		NULL	

ETL: extraction, transformation, and loading.

3. Data Cleaning by Achilles Heel

Data cleaning is an essential process of detection and correcting the irrelevant or incomplete part of the database. We used an open-source data quality assessment tool, Achilles Heel, for cleaning the converted data. After our initial ETL process, Achilles Heel issued 36 errors and 13 warnings on the AUSOM database (Table 11). The identified error messages can be categorized into three types: invalid id or person, date-time issues, and concept or vocabulary problems. For example, invalid id or person errors, 'Number of visit records with invalid person_id' occurred because some person_ids in the visit_occurrence table were not in the person table. Another example of date and time problems, 'Number of drug exposure records outside valid observation period' were caused by the difference of date types among tables in the original data. In the original database, the visit occurrence date contains year, month, day and time information (e.g., '2015-03-25' 11:25:40), while the date in the drug prescription table does not include time information (e.g., '2015-03-25 00:00:00'). Therefore, if drug prescriptions were recorded on the first day of a patient's visit, it can be calculated as that drugs were prescribed before the patient visited the hospital, contrary to the fact. To correct this problem, we deleted time information from the all datetime type data. Among 36 identified errors 28 were corrected, and the 8 remaining errors related to incomplete code mapping will be corrected as we revise and update code mappings.

Table 11. Error and warning messages identified by Achilles Heel on AUSOM database

Errors and warnings (code number–description)	Corrected (Y/N)	Reason for not-correction
Errors on invalid id or person		
9-Number of persons with invalid care_site_id; count (n=2408722) should not be > 0	Y	-
101-Number of persons by age, with age at first observation period; should not have age < 0, (n=12292)	Y	-
2207-Number of visit records with invalid person_id; count (n=48408) should not be > 0	Y	-
609-Number of procedure occurrence records with invalid person_id; count (n=293) should not be > 0	Y	-
709-Number of drug exposure records with invalid person_id; count (n=266712) should not be > 0	Y	-
809-Number of observation records with invalid person_id; count (n=154459) should not be > 0	Y	-
812-Number of observation records with invalid provider_id; count (n=157463602) should not be > 0	Y	-
813-Number of observation records with invalid visit_id; count (n=27) should not be > 0	Y	-
908-Number of drug eras without valid person; count (n=52687) should not be > 0	Y	-
Errors on date and time		
103-Distribution of age at first observation period (count = 1); min value should not be negative	Y	-
114-Number of persons with observation period before year-of-birth; count (n=12307) should not be > 0	Y	-
206-Distribution of age by visit_concept_id (count = 6); min value should not be negative	Y	-
208-Number of visit records outside valid observation period; count (n=69) should not be > 0	Y	-
209-Number of visit records with end date < start date; count (n=21) should not be > 0	Y	-
406-Distribution of age by condition_concept_id (count = 1340); min value should not be negative	Y	-
606-Distribution of age by procedure_concept_id (count = 6); min value should not be negative	Y	-
610-Number of procedure occurrence records outside valid observation period; count (n=5006) should not be > 0	Y	-
706-Distribution of age by drug_concept_id (count = 2161); min value should not be negative	Y	-
710-Number of drug exposure records outside valid observation period; count (n=635130) should not be > 0	Y	-
711-Number of drug exposure records with end date < start date; count (n=1410647) should not be > 0	Y	-
806-Distribution of age by observation_concept_id (count = 271); min value should not be negative	Y	-
810-Number of observation records outside valid observation period; count (n=30968537) should not be > 0	Y	-
906-Distribution of age by drug_concept_id (count = 2161); min value should not be negative	Y	-
907-Distribution of drug era length, by drug_concept_id (count = 41); min value should not be negative	Y	-
909-Number of drug eras outside valid observation period; count (n=368034) should not be > 0	Y	-
910-Number of drug eras with end date < start date; count (n=108684) should not be > 0	Y	-
1006-Distribution of age by condition_concept_id (count = 2376); min value should not be negative	Y	-
1009-Number of condition eras outside valid observation period; count (n=1062921) should not be > 0	Y	-

Table 11. Continued

Errors and warnings (code number–description)	Corrected (Y/N)	Reason for not-correction
Errors on concept or vocabulary		
400-Number of persons with at least one condition occurrence, by condition_concept_id; 46 concepts in data are not in correct vocabulary (SNOMED)	N	Incomplete code mapping
600-Number of persons with at least one procedure occurrence, by procedure_concept_id; 16 concepts in data are not in vocabulary	N	Incomplete code mapping
600-Number of persons with at least one procedure occurrence, by procedure_concept_id; 158 concepts in data are not in correct vocabulary (CPT4/HCPCS/ICD9P)	N	Incomplete code mapping
700-Number of persons with at least one drug exposure, by drug_concept_id; 272 concepts in data are not in correct vocabulary (RxNorm)	N	Incomplete code mapping
705-Number of drug exposure records, by drug_concept_id by drug_type_concept_id; 1 concepts in data are not in vocabulary	N	Incomplete code mapping
800-Number of persons with at least one observation occurrence, by observation_concept_id; 3 concepts in data are not in correct vocabulary (LOINC)	N	Incomplete code mapping
900-Number of persons with at least one drug era, by drug_concept_id; 272 concepts in data are not in correct vocabulary (RxNorm)	N	Incomplete code mapping
1000-Number of persons with at least one condition era, by condition_concept_id; 50 concepts in data are not in correct vocabulary (SNOMED)	N	Incomplete code mapping
Warnings		
402-Number of persons by condition occurrence start month, by condition_concept_id; 370 concepts have a 100% change in monthly count of events	N	-
420-Number of condition occurrence records by condition occurrence start month; there is a 100% change in monthly count of events	N	-
602-Number of persons by procedure occurrence start month, by procedure_concept_id; 114 concepts have a 100% change in monthly count of events	N	-
620-Number of procedure occurrence records by procedure occurrence start month; there is a 100% change in monthly count of events	N	-
702-Number of persons by drug exposure start month, by drug_concept_id; 928 concepts have a 100% change in monthly count of events	N	-
720-Number of drug exposure records by drug exposure start month; there is a 100% change in monthly count of events	N	-
800-Number of persons with at least one observation occurrence, by observation_concept_id; data with unmapped concepts	N	-
802-Number of persons by observation occurrence start month, by observation_concept_id; 131 concepts have a 100% change in monthly count of events	N	-
820-Number of observation records by observation start month; there is a 100% change in monthly count of events	N	-
902-Number of persons by drug era start month, by drug_concept_id; 1015 concepts have a 100% change in monthly count of events	N	-
920-Number of drug era records by drug era start month; there is a 100% change in monthly count of events	N	-
1002-Number of persons by condition era start month, by condition_concept_id; 496 concepts have a 100% change in monthly count of events	N	-
1020-Number of condition era records by condition era start month; there is a 100% change in monthly count of events	N	-