**Supplement**

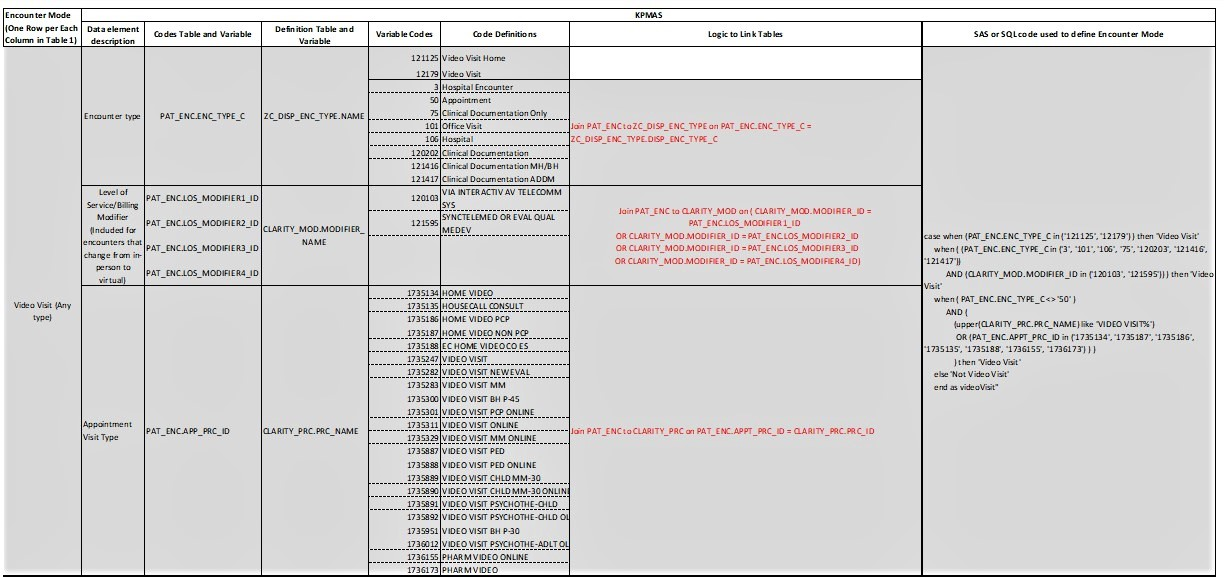
Table S1. Summary of Ambulatory Visit Scoping Review for 3 KP Regions, 2016-June 2021.

|  |  |  |  |
| --- | --- | --- | --- |
| **Encounter Mode** | **Narrative Descriptions** | | |
| **KPCO** | **KPGA** | **KPMAS** |
| Synchronous secure chat | A synchronous secure chat is interactive patient-provider messaging that is: 1) initiated via KP.org, AND 2) conducted via "Start a Chat Now". | (KPCO only) | (KPCO only) |
| Phone visit: Adult primary care (APC) | A scheduled telephone visit that has been booked by either the member or staff with a provider within in a department designated as Primary Care/Family Practice/Internal Medicine. | A phone visit is a patient-provider encounter that is either primarily scheduled as a phone visit or may have been scheduled as a video visit but was completed as a phone visit because of technical issues. | A scheduled telephone visit that has been booked by either the member or staff with a provider within in a department designated as Adult Internal/Family Medicine. |
| Phone visit: Behavioral health | (KPGA and KPMAS only) | A phone visit is a patient-provider encounter that is either primarily scheduled as a phone visit or may have been scheduled as a video visit but was completed as a phone visit because of technical issues. | A phone visit is a patient-provider encounter that may have been scheduled as a video visit but was completed as a phone visit because of technical issues. |
| Video visit: Adult primary care (APC) | (KPGA and KPMAS only) | The provider (MD) typically schedules the video visit. Video visits can be scheduled through the call center, although many patients are calling in for an in-person visit and do not want to be converted to video. | A video APC visit is any patient-provider encounter that is: 1) scheduled to occur via a KPMAS video link, AND 2) with a provider affiliated with a department designated as APC. |
| Video visit: Behavioral health | This is a patient-provider encounter scheduled by the provider as a video visit. Patient must complete at least one in-person visit per year, and initial visit cannot be virtual. Patients with high acuity BH conditions are not candidates for virtual visits. | A video behavioral health visit is any patient-provider encounter that is: 1) scheduled to occur via a KPMAS video link, AND 2) with a provider affiliated with a department designated as behavioral health. |
| Virtual visit: Urgent Care | Patient-initiated telephone visits (TAV), requesting first available provider. TBD if comparable to KPMAS House Calls program. | (KPMAS only) | Any video visit that is: 1) patient initiated via House Calls (KP.org), OR 2) transferred to House Calls by a KPMAS provider. |
| In-person visit: Adult primary care (APC) | Any face-to-face visit in a KPCO office clinic taking place in a department designated as Primary Care/Family Practice/Internal Medicine. | An in-person APC visit is any patient-provider encounter that is: 1) scheduled to occur in a KPGA clinic, AND 2) with a provider affiliated with a department designated as APC. | An in-person APC visit is any patient-provider encounter that is: 1) scheduled to occur in a KPMAS clinic, AND 2) with a provider affiliated with a department designated as APC. |
| In-person visit: Behavioral health | Any face-to-face visit in a KPCO office clinic taking place in a department designated as Mental or Behavioral Health. | An in-person behavioral health visit is any patient-provider encounter that is: 1) scheduled to occur in a KPGA MOB, AND 2) with a provider affiliated with department designated as behavioral health; In-person visits must be scheduled at least once/year for members who use virtual visits. | An in-person behavioral health visit is any patient-provider encounter that is: 1) scheduled to occur in a KPMAS clinic, AND 2) with a provider affiliated with department designated as behavioral health |
| In-person Urgent Care/CDU/ACC | Any encounter taking place in one of four designated Urgent care locations within a KP clinic. LoneTree, ACP, Westminster and Lakewood. Historically, clinics simply had extended office hours that were attributed to an Urgent Care department. | An in-person urgent care visit is any patient-provider encounter that: 1) occurs in a KPGA clinic, AND 2) is in a department designated as urgent care or advanced care center. | An in-person urgent care visit is any patient-provider encounter that: 1) occurs in a KPMAS clinic, AND 2) is in a department designated as urgent care or clinical decision unit. |

**Table S2. Summary of Ambulatory Visit Scoping Review: KPMAS Example.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **KPMAS** | | | | | | |
| **Synchronous Virtual Visit** | | | | | **In-Person** | |
| **Secure Chat (KPCO only)** | **Nurse Advice Line** | **Phone Visit** | **Video Visit**  **(KPMAS & KPGA only)** | **Urgent Care** | **Clinic Care** | **Urgent Care** |
| **Brief Description** | Not available in KPMAS | Phone line for triage of patient reported symptoms/clinical concerns | Scheduled phone appointment | Scheduled video appointment | HouseCalls program: Video appointment with next available physician from dedicated team of emergency physicians for select presenting problems only | Primary or Specialty Care Department | Urgent Care/Clinical Decision Unit Department |
| How initiated? | Member | Member or Provider | Member or Provider | Member | Member | Member or Provider |
| What problems covered? | Any – triage | Provider  discretion/varies | Provider  discretion/varies | Cough, Cold, flu, sinus; sore throat; pink eye; urinary issues; skin infection, rash, or insect bite; sleep problems; vaginal discharge; nausea, vomiting, diarrhea without abdominal pain; medication refills; seen within past 2 weeks and condition not improved | Varies | Varies |
| Acute or Follow-up? | Acute | Either | Either | Acute | Either | Either |
| Scheduled or spontaneous? | Spontaneous | Scheduled | Scheduled | Spontaneous | Scheduled | Scheduled or Spontaneous |
| Regular provider or available provider? | Available provider | Regular provider (primary or specialty) | Regular provider (primary or specialty) | Available provider | Regular provider (primary or specialty) | Regular (primary or specialty) or available |
| Co-Pay? | No | Only if HSA-qualified deductible plan | Only if HSA-qualified deductible plan | Only if HSA-qualified deductible plan | Yes | Yes |

**Table S3. Summary of Scoping Review of KP HealthConnect™ Source Data Specification of Visit: KPMAS Example.**



**Table S4. Key Decisions on Virtual Visit Common Data Model Details.**

|  |  |
| --- | --- |
| Issue / Concern | Action / Resolution |
| Initiated versus completed visit | Rather than making an a priori decision about including or excluding a visit based on “being complete”, the Investigator and Programmer Teams decided to make this an attribute of a visit (e.g., completed, opened in error, cancelled, no show). We envisioned this attribute to be potentially important in ancillary services analysis. For example, interrupted visits or incomplete visits would be less likely to have associated ancillary services. Including those visits in analyses might bias order rates by mode since our content experts noted in our initial scoping review that early in implementation, virtual visits were frequently incomplete due to technical issues that interrupted the connection between patient and provider. |
| Attributing a primary diagnosis / reason for visit | Multiple diagnosis codes might be associated with any ambulatory visit and can be entered and/or designated as the first listed, primary, or reason for visit. Typically, if not so entered or designated, the diagnosis code represents a comorbid or complicating condition. We preserved these coding designations as an attribute of the visit for potential sensitivity analysis if subsequently limiting to one of these 3 coding distinctions influenced the percentages of ancillary service orders or fulfillments associated with a visit. |
| Diagnosis sets selected for study of ancillary services orders and order fulfillment | We selected 4 diagnosis sets for focused study on ancillary services utilization, both for provider variation in ordering a service for diagnosis (e.g., diagnostic radiology exam, laboratory test) or treatment (e.g., prescribed medication) and variation in patient fulfillment of an order. We initially identified four diagnosis sets for study since these conditions were common reasons patients present for care in primary care and behavioral health – which were the departments where implementation of VVs was initiated and most advanced. These diagnosis sets were: neck or back pain (NBP), acute (upper) respiratory infection (ARI), urinary tract infection (UTI), and unipolar major depression (DEP). The frequency of visits for these conditions and the large patient populations in our 3 study sites assured us that we would likely obtain representative samples of VVs and IPVs with adequate sample size for analysis.  For each condition, an Investigator with content knowledge of the condition took the lead in developing an Excel file to define the diagnosis set. Many resources were used to create an “all inclusive” master list of codes, primarily ICD-10 coding manuals, relevant published literature, and clinical practice guidelines. Consultation with physicians helped resolve inclusion or exclusion of ICD-10 codes of uncertain relevance. Excel files with the diagnosis codes and descriptions are available upon request.    The goal was to define for each diagnosis set a cluster of related symptoms or diagnoses:  • NBP: cervical, thoracic, lumbar or sacroiliac pain, neck or back sprains/strains, disorders of the neck, spine, or sacroiliac region  • ARI: nasopharyngitis, pharyngitis, sinusitis, laryngitis, bronchitis, influenza, otitis media, mastoiditis, strep throat, fever, throat pain, cough.  • UTI: urinary tract infection (upper, lower), bacteriuria, pyuria, urosepsis.  • DEP: major depressive disorder (unipolar, brief or recurrent).  The same diagnosis master file was used for visit selection at each of the 3 KP Regions to identify, among all visits, which visit was associated with one of these 4 conditions.  Ultimately, for reasons noted in the Discussion, our study of ancillary services utilization excluded ARI, although we retained this identifier in the CDM. |
| Selection of Ancillary Services Orders and Fulfillments Associated with a Diagnosis Set | Our study of ancillary services utilization also included an analysis of orders at the time of a visit and fulfillment within 30 days. The Investigator who took responsibility for developing the Excel file defining a diagnosis set took responsibility for developing Excel files defining ancillary service classes to be associated with the diagnosis set.  • NBP: neck or back X-ray, neck or back US/CT/MRI, non-narcotic analgesic, narcotic analgesic, skeletal muscle relaxant  • ARI: sinus/upper chest x-ray, sinus/upper chest US/CT/MRI, rapid Strep test, any antibiotic, second-line antibiotic.  • UTI: urinalysis, urine culture, abdominal US/CT/MRI, any antibiotic, second-line antibiotic.  • DEP: mental health screener (e.g., GAD, PHQ2, PHQ9), antidepressant (any class)  As with creation of the diagnosis sets, a range of resources were used to create an “all inclusive” master list of codes, primarily CPT-4 and HCPCS coding manuals, NDC master lists, relevant published literature, and clinical practice guidelines. Consultation with physicians helped resolve inclusion or exclusion of ancillary services of uncertain relevance. Excel files with the service codes and descriptions are available upon request.  The order to fulfillment sequence of events, and how a service might be coded in each step of the sequence at each KP site dictated development of the Excel files for study of ancillary service utilization. The order to fulfillment process in prescribed medications best illustrates the challenges. At the time of the visit (virtual or in-person), the physician orders a medication (e.g., 40 mg lisinopril for hypertension). The order enters a HealthConnect™ dataset, and is identified by medication therapeutic class and subclass identifiers. The order is transferred to the retail pharmacy system which uses NDC codes when the medication is dispensed (“sold”) to the patient. Since the same service might be identified differently in the HealthConnect™ and pharmacy ancillary service systems, we created separately keyed medication order and dispensing master files for each diagnosis class. Additionally, drug formularies differ across KP regions, so order and dispensing master files developed at one KP site had to be checked for completeness at the other KP sites. In the end, the lack of a consistent 1:1 match for a service code between orders and fulfillments caused us to conduct service order and fulfillment matches by service class.  An additional linking issue occurred if a medication order for a visit might be contingent on a diagnostic service result. For example, a medication order for a UTI antibiotic might occur several days after a UTI visit – contingent on a urine culture result for a urine culture ordered at the time of the VV or IPV. For such delayed orders, and delayed opportunities for fulfillments, the services are not always linkable by encounter identifiers since the encounter is “closed”. We adopted a workaround used in a previous study to link by patient and other service-related information.13 |

**Table S5. Common Data Model: Patient Attributes (VV\_PATIENT\_DEMOGRAPHICS).**

Record Format: One record for each KP member at least 19 years of age as of the first day of any month during the study period January 2016 through June 2021.

|  |  |  |  |
| --- | --- | --- | --- |
| Variable Name | Format | Code Structure | Notes |
| VV\_STUDY\_ID | Character | M<site>nnnnnnn | Unique patient ID assigned at random to be used for this study only. Site is one of ‘CO’, ‘GA’, or ‘MA’. May be shared between sites. |
| DOB | Numeric (Date) | SAS Date value (MMDDYYYY.) | Date of birth. Select into the cohort only those KP members at least 19 years of age during the study period 2016-June 2021 |
| Gender | Character | F = Female  M = Male  O = Other  ‘ ’ = Unknown / Missing | SEX\_ADMIN from the VDW Demographics table |
| Race | Character | 1 = Black/African American  2 = White / Caucasian  3 = Asian  4 = Other  5 = Unknown | Sourced from RACE1-RACE5 in the VDW Demographics table. We prioritized categories using the following order:  -- If any of Race1-Race5 are Black then = 1  -- Else if any of Race1-Race5 are Asian then = 3  -- Else if any of Race1-Race5 are Other then = 4  -- Else if any of Race1-Race5 are White then = 2  Else = 5 |
| Hispanic\_Ethnicity | Character | Y = Yes  N = No  U / blank = Unknown | Sourced from the Hispanic variable in the VDW Demographics table. |
| Study\_Entry\_Date | Numeric (Date) | SAS Date Value | Maximum value of either: 1. The member’s first KP health plan enrollment date,  2. The first day of the month after their 19th birthday, or  3. The study start date (01/01/2016) |
| Study\_Censor\_Date | Numeric (Date) | SAS Date Value | Minimum value of either:   1. The member’s last KP health plan disenrollment date, 2. Member’s death date, or 3. The study end date (12/31/2019) |
| RX\_MailOrder | Numeric (Date) | SAS Date Value | Date of the first known mail order medication fill (dispensing) for this patient.  If prior to 1/1/2016, then use 1/1/2016.  If no evidence of mail order medication fill, then leave blank. |
| ADI2016-ADI2019 | Numeric | National percentile rank ranging from 0 to 100 (higher value is greater deprivation) | Area deprivation index (ADI) is an area-based measure of socioeconomic deprivation. We used the 2018 ADI values based on a 5 year average of census data from 2014-2018.  Use the VDW Census Location table to identify each member’s residential location start date, end date, and FIPS code. If they have more than one residential location in a year, use the “first” (i.e., closest to 1/1/YYYY) in each of the study years. Link the FIPS code to the ADI table at the block group level. If no block group level code is available but a census tract level code is available for a residence, we link the census tract to the median ADI value among all block groups within that census tract. |

**Table S6. Common Data Model: Patient Comorbidities (VV\_PAT\_CHARLSON\_COMORBIDITY).**

Record format: One record for each KP member per month of study eligibility.

|  |  |  |  |
| --- | --- | --- | --- |
| Variable Name | Format | Code Structure | Notes |
| VV\_STUDY\_ID | Character | M<site>nnnnnnn | Unique patient ID assigned at random to be used for this study only. Site is one of ‘CO’, ‘GA’, or ‘MA’. May be shared between sites. |
| IndexMonth | Numeric | 1 = January 2016 through  66 = June 2021 | Numeric representation of the month during the study period. Charlson Comorbidity Index is computed over the 365 days prior to the first day of this month, for each month that the member is eligible for the study. |
| Summary\_Charlson\_Score | Numeric |  | Uses the standard VDW Charlson macro.  Compute the Charlson summary score and individual comorbidity flags (below) according to any diagnosis or procedure codes for any encounters classified to ambulatory visits, urgent/emergency department visits (including clinical decision units), and acute medical/surgical hospital admissions.  The Charlson summary score and individual comorbidity flags on the 365 days preceding the 1st day of the IndexMonth.  For 2016 eligible patients, the 12-month period extends into 2015, so the Charlson score will need to be based on ICD9 and ICD10 codes. |
| MI | Numeric | 1 = Patient had myocardial infarction (MI) DX in the 365 day period prior to IndexMonth  0 = Patient did not have MI DX in the 365 day period prior to IndexMonth | Individual MI comorbidity flag as named in the Charlson VDW standard macro |
| CHD | Numeric | 1 = Patient had congestive heart disease (CHD) DX in the 365 day period prior to IndexMonth  0 = Patient did not have CHD DX in the 365 day period prior to IndexMonth | Individual CHD comorbidity flag as named in the Charlson VDW standard macro |
| PVD | Numeric | 1 = Patient had peripheral vascular disorder (PVD) DX or indicative procedure in the 365 day period prior to IndexMonth  0 = Patient did not have PVD DX or indicative procedure in the 365 day period prior to IndexMonth | Individual PVD comorbidity flag as named in the Charlson VDW standard macro |
| CVD | Numeric | 1 = Patient had cerebrovascular disease (CVD) DX in the 365 day period prior to IndexMonth  0 = Patient did not have CVD DX in the 365 day period prior to IndexMonth | Individual CVD comorbidity flag as named in the Charlson VDW standard macro |
| DEM | Numeric | 1 = Patient had dementia DX in the 365 day period prior to IndexMonth  0 = Patient did not have dementia DX in the 365 day period prior to IndexMonth | Individual DEM comorbidity flag as named in the Charlson VDW standard macro |
| CPD | Numeric | 1 = Patient had chronic pulmonary disease (CPD) DX in the 365 day period prior to IndexMonth  0 = Patient did not have CPD DX in the 365 day period prior to IndexMonth | Individual CPD comorbidity flag as named in the Charlson VDW standard macro |
| RHD | Numeric | 1 = Patient had rheumatologic disease (RHD) DX in the 365 day period prior to IndexMonth  0 = Patient did not have RHD DX in the 365 day period prior to IndexMonth | Individual RHD comorbidity flag as named in the Charlson VDW standard macro |
| PUD | Numeric | 1 = Patient had peptic ulcer disease (PUD) DX in the 365 day period prior to IndexMonth  0 = Patient did not have PUD DX in the 365 day period prior to IndexMonth | Individual PUD comorbidity flag as named in the Charlson VDW standard macro |
| MLIVD | Numeric | 1 = Patient had mild liver disease (MLIVD) DX in the 365 day period prior to IndexMonth  0 = Patient did not have MLIVD DX in the 365 day period prior to IndexMonth | Individual MLIVD comorbidity flag as named in the Charlson VDW standard macro |
| DIAB | Numeric | 1 = Patient had diabetes DX in the 365 day period prior to IndexMonth  0 = Patient did not have diabetes DX in the 365 day period prior to IndexMonth | Individual DIAB comorbidity flag as named in the Charlson VDW standard macro |
| DIABC | Numeric | 1 = Patient had diabetes with chronic complications (DIABC) DX in the 365 day period prior to IndexMonth  0 = Patient did not have DIABC DX in the 365 day period prior to IndexMonth | Individual DIABC comorbidity flag as named in the Charlson VDW standard macro |
| PLEGIA | Numeric | 1 = Patient had hemiplegia or paraplegia (PLEGIA) DX in the 365 day period prior to IndexMonth  0 = Patient did not have PLEGIA DX in the 365 day period prior to IndexMonth | Individual PLEGIA comorbidity flag as named in the Charlson VDW standard macro |
| REN | Numeric | 1 = Patient had renal disease DX in the 365 day period prior to IndexMonth  0 = Patient did not have renal disease DX in the 365 day period prior to IndexMonth | Individual REN comorbidity flag as named in the Charlson VDW standard macro |
| MALIGN | Numeric | 1 = Patient had malignancy, including leukemia and lymphoma (MALIGN) DX in the 365 day period prior to IndexMonth  0 = Patient did not have MALIGN DX in the 365 day period prior to IndexMonth | Individual MALIGN comorbidity flag as named in the Charlson VDW standard macro |
| SLIVD | Numeric | 1 = Patient had moderate or severe liver disease (SLIVD) DX in the 365 day period prior to IndexMonth  0 = Patient did not have SLIVD DX in the 365 day period prior to IndexMonth | Individual SLIVD comorbidity flag as named in the Charlson VDW standard macro |
| MST | Numeric | 1 = Patient had metastatic or solid tumor (MST) DX in the 365 day period prior to IndexMonth  0 = Patient did not have MST DX in the 365 day period prior to IndexMonth | Individual MST comorbidity flag as named in the Charlson VDW standard macro |
| AIDS | Numeric | 1 = Patient had AIDS DX in the 365 day period prior to IndexMonth  0 = Patient did not have AIDS DX in the 365 day period prior to IndexMonth | Individual AIDS comorbidity flag as named in the Charlson VDW standard macro |
| NoVisitFlag | Numeric | 1 = No utilization during the 365 days preceding the first day of the IndexMonth  0 = At least one visit during the 365 days preceding the first day of the IndexMonth | Individual flag from the Charlson VDW standard macro indicating whether the member had any utilization in the 365 days preceding the first day of the IndexMonth |

**Table S7. Common Data Model: Datasets for Insurance Products and Deductibles/Copayments.**

Record Format: Multiple records for each KP member at least 19 years of age as of the first day of any month during the study period January 2016 through June 2021.

Part 1, Insurance Products: VV\_INSUR\_FLAGS

|  |  |  |  |
| --- | --- | --- | --- |
| Variable Name | Format | Code Structure | Notes |
| VV\_STUDY\_ID | Character | M<site>nnnnnnn | Unique patient ID assigned at random to be used for this study only. Site is one of ‘CO’, ‘GA’, or ‘MA’. May be shared between sites. |
| Study\_entry\_date | Numeric (Date) | SAS Date value (MMDDYYYY.) | From Set 1: VV\_PATIENT\_DEMOGRAPHICS |
| Study\_censor\_date | Numeric (Date) | SAS Date value (MMDDYYYY.) | From Set 1: VV\_PATIENT\_DEMOGRAPHICS |
| Enr\_start | Numeric (Date) | SAS Date value (MMDDYYYY.) | Start of enrollment segment from VDW enrollment |
| Enr\_end | Numeric (Date) | SAS Date value (MMDDYYYY.) | End of enrollment segment from VDW enrollment |
| Ins\_Medicare\_n | Numeric | Y, E – recoded to 1  All other values recoded to 0 | Derive from Ins\_medicare field from VDW enrollment |
| Ins\_Medicaid\_n | Numeric | Y, E - recoded to 1  All other values recoded to 0 | Derive from Ins\_medicaid field from VDW enrollment |
| Ins\_commerical\_n | Numeric | Y, E – recoded to 1  All other values recoded to 0 | Derive from ins\_commercial field in VDW enrollment |
| Ins\_selffunded\_n | Numeric | Y, E – recoded to 1  All other values recoded to 0 | Derive from ins\_selffunded field in VDW enrollment |
| Ins\_other\_n | Numeric | Y, E – recoded to 1  All other values recoded to 0 | Derive from ins\_other field in VDW enrollment |
| Cesr\_ins\_aca\_n | Numeric | Y, E – recoded to 1  All other values recoded to 0 | Derive from cesr\_ins\_aca variable in VDW enrollment |

Part 2, HMO vs. HDHP flag: VV\_HMO\_VS\_HDHP

Record format: Multiple records per patient with start and end dates for benefits from benefit table or enrollment table depending on KP site.

|  |  |  |  |
| --- | --- | --- | --- |
| Variable Name | Format | Code Structure | Notes |
| VV\_STUDY\_ID | Character | M<site>nnnnnnn | Unique patient ID assigned at random to be used for this study only. Site is one of ‘CO’, ‘GA’, or ‘MA’. May be shared between sites. |
| Study\_entry\_date | Numeric (Date) | SAS Date value (MMDDYYYY.) | From Set 1: VV\_PATIENT\_DEMOGRAPHICS |
| Study\_censor\_date | Numeric (Date) | SAS Date value (MMDDYYYY.) | From Set 1: VV\_PATIENT\_DEMOGRAPHICS |
| Benefit\_start\_date \*will be enr\_start if using VDW enrollment | Numeric (Date) | SAS Date value (MMDDYYYY.)  Benefit start date from CESR benefit member table | Start date applicable to benefit characteristics |
| Benefit\_end\_date \*will be enr\_end if using VDW enrollment | Numeric (Date) | SAS Date value (MMDDYYYY.)  Benefit end date from CESR benefit member table | End date applicable to benefit characteristics |
| Hmo\_vs\_hdhp | Numeric | 1 if health maintenance organization (HMO), 0 if high deductible health plan (HDHP). Derive from merging CESR VDW benefit member table to CESR VDW benefit tier on plan\_id. Then categorize benefit\_program\_desc (from benefit tier) into this dichotomy, if possible. If not, then assign a null value. | Will require sites to manually review text descriptions to categorize benefit program descriptions into this dichotomous split. This will be the key variable needed from the benefits table. If you are comfortable doing this from VDW enrollment, then this variable could go into the part I table VV\_INSUR\_FLAGS . |

Part 3, Deductible and Copayment Amounts (when applicable): VV\_DEDUCTIBLE\_COPAY

Record format: Multiple records per patient with start and end dates for benefits from benefit table

|  |  |  |  |
| --- | --- | --- | --- |
| Variable Name | Format | Code Structure | Notes |
| VV\_STUDY\_ID | Character | M<site>nnnnnnn | Unique patient ID assigned at random to be used for this study only. Site is one of ‘CO’, ‘GA’, or ‘MA’. May be shared between sites. |
| Study\_entry\_date | Numeric (Date) | SAS Date value (MMDDYYYY.) | From Set 1: VV\_PATIENT\_DEMOGRAPHICS |
| Study\_censor\_date | Numeric (Date) | SAS Date value (MMDDYYYY.) | From Set 1: VV\_PATIENT\_DEMOGRAPHICS |
| Benefit\_start\_date | Numeric (Date) | SAS Date value (MMDDYYYY.)  Benefit start date from CESR benefit member table | Start date applicable to benefit characteristics |
| Benefit\_end\_date | Numeric (Date) | SAS Date value (MMDDYYYY.)  Benefit end date from CESR benefit member table | End date applicable to benefit characteristics |
| Indv\_deductible | Numeric | Join/merge CESR VDW benefit member table to CESR VDW benefit choice table by plan\_id (in each table) and ded\_ind from CESR VDW benefits to benefit\_choice from the CESR VDW benefit choice table. Further, benefit\_type from benefit choice table must have the value ‘DED\_IND’. Then take dollar\_amt\_in\_network as your raw value. If hmo\_vs\_hdhp is 1, then recode to null. | Requires CESR VDW benefit member and benefit choice tables. |
| Family\_deductible | Numeric | Join/merge CESR VDW benefit member table to CESR VDW benefit choice table by plan\_id (in each table) and ded\_fam from CESR VDW benefits to benefit\_choice from the CESR VDW benefit choice table. Further, benefit\_type from benefit choice table must have the value ‘DED\_FAM’. Then take dollar\_amt\_in\_network as your raw value. If hmo\_vs\_hdhp is 1, then recode to null. | Requires CESR VDW benefit member and benefit choice tables. |
| Outpatient\_copay | Numeric | Join/merge CESR VDW benefit member table to CESR VDW benefit choice table by plan\_id (in each table) and ov from CESR VDW benefits to benefit\_choice from the CESR VDW benefit choice table. Further, benefit\_type from benefit choice table must have the value ‘OV’. Then take dollar\_amt\_in\_network as your raw value. | Requires CESR VDW benefit member and benefit choice tables. |
| Outpatient\_sp\_copay | Numeric | Join/merge CESR VDW benefit member table to CESR VDW benefit choice table by plan\_id (in each table) and ov\_sp from CESR VDW benefits to benefit\_choice from the CESR VDW benefit choice table. Further, benefit\_type from benefit choice table must have the value ‘OV\_SP’. Then take dollar\_amt\_in\_network as your raw value. | Requires CESR VDW benefit member and benefit choice tables. |
| ER\_copay | Numeric | Join/merge CESR VDW benefit member table to CESR VDW benefit choice table by plan\_id (in each table) and er from CESR VDW benefits to benefit\_choice from the CESR VDW benefit choice table. Further, benefit\_type from benefit choice table must have the value ‘ER’. Then take dollar\_amt\_in\_network as your raw value. | Requires CESR VDW benefit member and benefit choice tables. |

**Table S8. Common Data Model: Dataset for Distance from KP Member Residence to Clinics (VV\_PAT\_CLINIC\_DIST)**

Record Format: Transactional table containing the minimum distance for any address location for each patient to a clinic that provides at least one of Primary Care, Urgent Care, Behavioral Health, or Ob/Gyn services. The time granularity is at the monthly level – in other words, if the majority of a month is at a given address/clinic combination, the whole month will be assigned to that distance. A new record is created when 1) a patient moves or 2) a closer clinic or department opens (or the closest clinic closes) offering the relevant services, thereby changing the minimum distance relative to the patient within a given month. For Adult/Bonded Primary Care Clinic, the administratively bonded primary care clinic will be considered first. Any periods of time that are not administratively bonded will default to the nearest adult primary care clinic.

|  |  |  |  |
| --- | --- | --- | --- |
| Variable Name | Format | Code Structure | Notes |
| VV\_STUDY\_ID | Character | M<site>*NNNNNNN* | Unique patient ID assigned at random to be used for this study only. Site is one of ‘CO’, ‘GA’, or ‘MA’. May be shared between sites. |
| DEPT | Character | A – Adult Primary Care  B – Behavioral Health  U – Urgent Care  O – Obstetrics/Gynecology | Department indicator |
| START\_DATE | Numeric (Date) | SAS Date value | Start date of address/facility/department combination with the minimum distance |
| END\_DATE | Numeric (Date) | SAS Date value | End date of address/facility/department combination with the minimum distance |
| DISTANCE\_TO\_CLINIC | Numeric | Decimal Value (e.g. 3.12) | Distance (in miles) between patient address and closest clinic/department combination or bonded primary care clinic. |
| PHI\_FACILITY | Character | Varies by site | Facility\_code - to remain at site. |
| PCC\_FLAG\_YN | Char | Y – Indicates that this adult primary care clinic is the member’s bonded primary care clinic  N – Indicates that this is the closest adult primary care clinic, because the member is not bonded to any adult primary care clinic at this time  Null – Not applicable because this row does not indicate an adult primary care department | This value will be null for all dept values other than ‘A’. It indicates that the clinic distance is for the bonded Primary care clinic for the patient. |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table S9. Common Data Model: Dataset for Encounter Attributes (VV\_ENC\_ATTRIB)**  Record Format: One record for each encounter for every KP member at least 19 years of age as of the first day of any month during the study period January 2016 through June 2021. | | | | | | |
|  |  |  |  |  |  |  |
| **VV\_Name** | **UCDA Field Name** | **Format** | **Description** | **Source Field** | **Business Rules** | **Comments** |
| **VV\_STUDY\_ID** |  | character(10) | Patient ID generated for study |  | Unique code to consist of prefix 'M' for member, then 2 characters for study site (MA, CO, GA), then 7 digits for each patient in 2016-June 2021. Example: MCO0123456. | Unique patient ID assigned at random to be used for this study only. May be shared between sites. |
| **VV\_ENC\_ID** |  | character(11) | Encounter ID generated for study |  | Unique appointment/visit identifier that links encounter attributes table to encounters table. Code to consist of prefix 'E' for encounter, then 2 characters for study site (MA, CO, GA), then 8 digits for each encounter in 2016-June 2021. Example: EGA01234567. | Create VV\_ENC\_ID and PHI\_PAT\_ENC\_CSN\_ID crosswalk using Encounters data set. Do not share cross-walk outside of region. |
| **PHI\_PAT\_ENC\_CSN\_ID** | PAT\_ENC\_CSN\_ID | number(any) | Clarity encounter ID | PAT\_ENC.PAT\_ENC\_CSN\_ID | | PHI. Stays at study site. Use UCDA code. |
| **VV\_ENC\_CAT** |  | character(25) | Visit category from Virtual Visits logic tables.  Possible values include:  chat  in\_person\_APC  in\_person\_BH  in\_person\_urg  nurse\_advice\_call  sched\_phone\_APC  sched\_phone\_BH  sched\_phone\_TAV  video\_APC  video\_BH  video\_housecalls | | | Definition taken from encounters table. Encounters table was determined to be redundant if we move VV\_ENC\_CAT and VV\_APPT\_CAT to encounters attributes table.  KPCO is not participating in Video encounters or nurse\_advice\_call analyses |
| **VV\_APPT\_CAT** |  | character(25) | Scheduled appointment category. Possible values are the same as VV\_ENC\_CAT.  Actual values need not match VV\_ENC\_CAT when scheduled appointment type does not match actual visit type. | | | Definition taken from encounters table. Encounters table was determined to be redundant if we move VV\_ENC\_CAT and VV\_APPT\_CAT to encounters attributes table |
| **APPT\_MADE\_DATE** | APPT\_MADE\_DT | date | Date at which the appointment was originally made | COALESCE(datepart(PAT\_ENC\_ES\_AUD\_ACT.ES\_AUDIT\_TIME), datepart(PAT\_ENC.APPT\_MADE\_DATE)) | Join PAT\_ENC to PAT\_ENC\_ES\_AUD\_ACT on PAT\_ENC.PAT\_ENC\_CSN\_ID= PAT\_ENC\_ES\_AUD\_ACT.PAT\_ENC\_CSN\_ID and PAT\_ENC\_ES\_AUD\_ACT.LINE=1 | |
| **APPT\_DATE** | APPT\_TIME | date | Date the appointment is scheduled to take place | datepart(PAT\_ENC.APPT\_TIME) | | Use UCDA code |
| **APPT\_REASON** | REASON\_VISIT\_NAME | character(254) | Name of first reason for appointment/visit/call associated with the encounter | CL\_RSN\_FOR\_VISIT.REASON\_VISIT\_NAME | Join PAT\_ENC to PAT\_ENC\_RSN\_VISIT on PAT\_ENC.PAT\_ENC\_CSN\_ID=PAT\_ENC\_RSN\_VISIT.PAT\_ENC\_CSN\_ID and PAT\_ENC\_RSN\_VISIT.LINE=1; join PAT\_ENC\_RSN\_VISIT to CL\_RSN\_FOR\_VISIT on PAT\_ENC\_RSN\_VISIT.ENC\_REASON\_ID=CL\_RSN\_FOR\_VISIT.REASON\_VISIT\_ID | We want to distinguish reason for the appointment -- initial patient request for care -- from the reason for the encounter. We choose the first Reason For Visit to try to capture this, but some encounters may not have a reason for visit until the encounter occurs. For example, synchronous chats (which occur without an appointment) will not have a reason for visit until the visit occurs. |
| **APPT\_STATUS** | STATUS | character(9) | Derived status for the encounter. Values are 'Complete', 'No Show', 'Cancelled' | derived |  | Use UCDA code. Derived status for the encounter. Values are 'Complete', 'No Show', 'Cancelled' |
| **APPT\_CANCEL\_DATE** | | date | The date the appointment was canceled (or in some cases, rescheduled). If the appointment was not canceled, this value is null. | datepart(PAT\_ENC.APPT\_CANCEL\_DATE) | PAT\_ENC.APPT\_CANCEL\_DATE | In future analyses, consider omitting encounters that were canceled long enough before they actually took place. If the appointment time was re-booked to another patient, the canceled appointment would account for minimal time or resource usage. |
| **PRC\_NAME** | PRC\_NAME | character(200) | Full visit type name | CLARITY\_PRC.PRC\_NAME | Join PAT\_ENC to CLARITY\_PRC on PAT\_ENC.APPT\_PRC\_ID=CLARITY\_PRC.PRC\_ID | Visit type is sometimes referred to as appointment type or appointment PRC. These values are region-specific (each value applies to one region only) |
| **VISIT\_DATE** | CONTACT\_DATE | date | Date the encounter took place | datepart(PAT\_ENC.CONTACT\_DATE) | | Use UCDA code |
| **VV\_PROV\_ID** |  | character(8) | Provider ID generated for this study |  | Unique code to consist of prefix 'P' for provider, then 2 characters for study site (MA, CO, GA), then 5 digits for each provider in 2016-June 2021. Example: PMA01234. | Unique VV study identifier generated at a site for each provider. Cross-walk between VV\_PROV\_ID and VISIT\_PROV\_ID stays at study site. |
| **PHI\_VISIT\_PROV\_ID** | VISIT\_PROV\_ID | character(any) | Clarity Provider ID of the visit provider associated with the encounter | PAT\_ENC.VISIT\_PROV\_ID | If PAT\_ENC.ENC\_TYPE\_C <> 3 then PAT\_ENC.VISIT\_PROV\_ID | PHI. Stays at study site. Use UCDA code. |
| **VISIT\_PROV\_TYPE** | VISIT\_PROV\_TYPE | character(254) | Provider type of visit provider associated with the encounter | CLARITY\_SER.PROV\_TYPE | |  |
| **VISIT\_PROV\_CAT** |  | character(30) | Categorized provider type group for provider associated with the encounter. Values are 'Physician', 'Nurse practitioner', 'Physician assistant', 'Registered nurse', and 'Other' | | | Values are 'Physician' (MD or DO), 'Nurse practitioner', 'Physician assistant', 'Registered nurse', and 'Other' |
| **VISIT\_LOCATION** | loc\_id | number(19) | Location ID for the location associated with the department of the encounter | CLARITY\_DEP.REV\_LOC\_ID | JOIN PAT\_ENC to CLARITY\_DEP on PAT\_ENC.DEPARTMENT\_ID=CLARITY\_DEP.DEPARTMENT\_ID | Use UCDA code. For a VV, this may be the physical location of the provider (as if the visit had happened in-person), or it may be a dummy virtual location (eg, 'Call Center'). |
| **VISIT\_DEPT** | department\_id | number(19) | Department ID associated with the encounter | PAT\_ENC\_DEPARTMENT\_ID | | Use UCDA code. This may be department with which the provider is associated at the clinic at the time of the encounter, or it may be a dummy department for virtual visits (eg, 'Call Center') |
| **VISIT\_PRIMARY\_DX\_CODE** | prmy\_dx\_id | number(19) | Clarity ID code for the primary diagnosis associated with the encounter. If no diagnosis is flagged as primary, the first listed diagnosis is used. | PAT\_ENC\_DX.DX\_ID |  | Use UCDA code. Note that primary DX is not always a meaningful distinction. When no primary DX is indicated, the DX on line 1 is chosen. The line 1 DX may not be meaningfully higher priority than a DX on another line. |
| **VISIT\_PRIMARY\_DX\_NAME** | prmy\_dx\_nm | character(200) | Description for the primary diagnosis associated with the encounter | CLARITY\_EDG.DX\_NAME | | Use UCDA code. Note that this is not always a meaningful distinction. When no primary DX is indicated, the DX on line 1 is chosen. The line 1 DX may not be meaningfully higher priority than a DX on another line. |
| **NB\_DX\_CATEGORY** |  | number | Categorical variable indicating whether a neck or back pain ICD-10 DX code was used in this encounter, and whether it is classified as the primary DX. Possible values are:  0 = no Neck or Back pain DX coded for this encounter  1 = at least one Neck or Back pain DX was coded for this encounter, but wasn’t classified as “primary DX” (per VISIT\_PRIMARY\_DX\_CODE, defined by UCDA code)  2 = a Neck or Back pain DX was coded as “primary DX” for this encounter (per VISIT\_PRIMARY\_DX\_CODE, defined by UCDA code) | CLARITY\_EDG.CURRENT\_ICD10\_LIST (or equivalently, EDG\_CURRENT\_ICD10.CODE) | JOIN PAT\_ENC to PAT\_ENC\_DX on PAT\_ENC.PAT\_ENC\_CSN\_ID = PAT\_ENC\_DX.PAT\_ENC\_CSN\_ID;  then JOIN PAT\_ENC\_DX to CLARITY\_EDG on PAT\_ENC\_DX.DX\_ID = CLARITY\_EDG.DX\_ID (or equivalently, JOIN PAT\_ENC\_DX to EDG\_CURRENT\_ICD10 on PAT\_ENC\_DX.DX\_ID = EDG\_CURRENT\_ICD10.DX\_ID) | A list of diagnosis codes for this condition can be found in the Common Data Model folder in the programmer team channel: https://teams.microsoft.com/\_#/files/Programmer%20Team?threadId=19%3Aa734333a209648d5ae14b338aca9b9d0%40thread.skype&ctx=channel&context=Common\_Data\_Model&rootfolder=%252Fsites%252FVirtualVisits-ProgrammerTeam%252FShared%2520Documents%252FProgrammer%2520Team%252FCommon\_Data\_Model |
| **ARI\_DX\_CATEGORY** |  | number | Categorical variable indicating whether an acute respiratory infection (ARI) ICD-10 DX code was used in this encounter, and whether it is classified as the primary DX. Possible values are:  0 = no ARI DX coded for this encounter  1 = at least one ARI DX was coded for this encounter, but wasn’t classified as “primary DX” (per VISIT\_PRIMARY\_DX\_CODE, defined by UCDA code)  2 = an ARI DX was coded as “primary DX” for this encounter (per VISIT\_PRIMARY\_DX\_CODE, defined by UCDA code) | CLARITY\_EDG.CURRENT\_ICD10\_LIST (or equivalently, EDG\_CURRENT\_ICD10.CODE) | JOIN PAT\_ENC to PAT\_ENC\_DX on PAT\_ENC.PAT\_ENC\_CSN\_ID = PAT\_ENC\_DX.PAT\_ENC\_CSN\_ID;  then JOIN PAT\_ENC\_DX to CLARITY\_EDG on PAT\_ENC\_DX.DX\_ID = CLARITY\_EDG.DX\_ID (or equivalently, JOIN PAT\_ENC\_DX to EDG\_CURRENT\_ICD10 on PAT\_ENC\_DX.DX\_ID = EDG\_CURRENT\_ICD10.DX\_ID) | A list of diagnosis codes for this condition can be found in the Common Data Model folder in the programmer team channel: https://teams.microsoft.com/\_#/files/Programmer%20Team?threadId=19%3Aa734333a209648d5ae14b338aca9b9d0%40thread.skype&ctx=channel&context=Common\_Data\_Model&rootfolder=%252Fsites%252FVirtualVisits-ProgrammerTeam%252FShared%2520Documents%252FProgrammer%2520Team%252FCommon\_Data\_Model |
| **UTI\_DX\_CATEGORY** |  | number | Categorical variable indicating whether a urinary tract infection (UTI) ICD-10 DX code was used in this encounter, and whether it is classified as the primary DX. Possible values are:  0 = no UTI DX coded for this encounter  1 = at least one UTI DX was coded for this encounter, but wasn’t classified as “primary DX” (per VISIT\_PRIMARY\_DX\_CODE, defined by UCDA code)  2 = a UTI DX was coded as “primary DX” for this encounter (per VISIT\_PRIMARY\_DX\_CODE, defined by UCDA code) | CLARITY\_EDG.CURRENT\_ICD10\_LIST (or equivalently, EDG\_CURRENT\_ICD10.CODE) | JOIN PAT\_ENC to PAT\_ENC\_DX on PAT\_ENC.PAT\_ENC\_CSN\_ID = PAT\_ENC\_DX.PAT\_ENC\_CSN\_ID;  then JOIN PAT\_ENC\_DX to CLARITY\_EDG on PAT\_ENC\_DX.DX\_ID = CLARITY\_EDG.DX\_ID (or equivalently, JOIN PAT\_ENC\_DX to EDG\_CURRENT\_ICD10 on PAT\_ENC\_DX.DX\_ID = EDG\_CURRENT\_ICD10.DX\_ID) | A list of diagnosis codes for this condition can be found in the Common Data Model folder in the programmer team channel: https://teams.microsoft.com/\_#/files/Programmer%20Team?threadId=19%3Aa734333a209648d5ae14b338aca9b9d0%40thread.skype&ctx=channel&context=Common\_Data\_Model&rootfolder=%252Fsites%252FVirtualVisits-ProgrammerTeam%252FShared%2520Documents%252FProgrammer%2520Team%252FCommon\_Data\_Model |
| **DEP\_DX\_CATEGORY** |  | number | Categorical variable indicating whether a depression ICD-10 DX code was used in this encounter, and whether it is classified as the primary DX. Possible values are:  0 = no depression DX coded for this encounter  1 = at least one depression DX was coded for this encounter, but wasn’t classified as “primary DX” (per VISIT\_PRIMARY\_DX\_CODE, defined by UCDA code)  2 = a depression DX was coded as “primary DX” for this encounter (per VISIT\_PRIMARY\_DX\_CODE, defined by UCDA code) | CLARITY\_EDG.CURRENT\_ICD10\_LIST (or equivalently, EDG\_CURRENT\_ICD10.CODE) | JOIN PAT\_ENC to PAT\_ENC\_DX on PAT\_ENC.PAT\_ENC\_CSN\_ID = PAT\_ENC\_DX.PAT\_ENC\_CSN\_ID;  then JOIN PAT\_ENC\_DX to CLARITY\_EDG on PAT\_ENC\_DX.DX\_ID = CLARITY\_EDG.DX\_ID (or equivalently, JOIN PAT\_ENC\_DX to EDG\_CURRENT\_ICD10 on PAT\_ENC\_DX.DX\_ID = EDG\_CURRENT\_ICD10.DX\_ID) | A list of diagnosis codes for this condition can be found in the Common Data Model folder in the programmer team channel: https://teams.microsoft.com/\_#/files/Programmer%20Team?threadId=19%3Aa734333a209648d5ae14b338aca9b9d0%40thread.skype&ctx=channel&context=Common\_Data\_Model&rootfolder=%252Fsites%252FVirtualVisits-ProgrammerTeam%252FShared%2520Documents%252FProgrammer%2520Team%252FCommon\_Data\_Model |

**Table S10. Common Data Model: Dataset for Ancillary Service Orders and Fulfillments for Neck or Back Pain Encounters (VV\_CONDITION\_NB\_PAIN)**

Record format: One record per neck or back pain encounter in the Encounters Dataset.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CDM Variable | Description | Source Table | Source Variable | Notes |
| VV\_Study\_ID |  |  |  |  |
| VV\_Enc\_ID | Unique VV study encounter ID |  |  | Links to Encounters Attributes Table |
| NB\_DX\_CATEGORY | Whether a qualifying neck/back pain diagnosis code is primary (first listed) or other. Pulled from Encounters Attributes table. |  |  | 1 = at least one depression DX was coded for this encounter, but wasn’t classified as “primary DX” (per VISIT\_PRIMARY\_DX\_CODE, defined by UCDA code)   2 = a depression DX was coded as “primary DX” for this encounter (per VISIT\_PRIMARY\_DX\_CODE, defined by UCDA code) |
| NB\_Xray\_Ordered | One or more neck or back X-ray associated with this encounter was ordered |  |  | -1 = at least one of the qualifying service codes are associated with the encounter, but it was cancelled within 30 days of the order date  0 = none of the qualifying service order codes are associated with the encounter  1 = at least one of the qualifying service order codes are associated with the encounter, and it was not cancelled within 30 days |
| NB\_Xray\_Completed | One or more of these X-ray orders was fulfilled (completed by the patient) within 30 days of the order date |  |  | . = there was no service order to complete  0 = the service order was not completed by the patient within 30 days of the service order date  1 = the service order was completed by the patient within 30 days of the order date |
| NB\_CTMRI\_Ordered | One or more neck or back CT or MRI associated with this encounter was ordered |  |  | -1 = at least one of the qualifying service codes are associated with the encounter, but it was cancelled within 30 days of the order date  0 = none of the qualifying service order codes are associated with the encounter  1 = at least one of the qualifying service order codes are associated with the encounter, and it was not cancelled within 30 days |
| NB\_CTMRI\_Completed | One or more of these CT or MRI orders was fulfilled (completed by the patient) within 30 days of the order date |  |  | . = there was no service order to complete  0 = the service order was not completed by the patient within 30 days of the service order date  1 = the service order was completed by the patient within 30 days of the order date |
| NB\_NNarRx\_Ordered | One or more non-narcotic analgesic medications associated with this encounter was ordered |  |  | -1 = at least one of the qualifying service codes are associated with the encounter, but it was cancelled within 30 days of the order date  0 = none of the qualifying service order codes are associated with the encounter  1 = at least one of the qualifying service order codes are associated with the encounter, and it was not cancelled within 30 days |
| NB\_NNarRx\_Completed | One or more of these non-narcotic analgesic medication orders was completed (filled, dispensed) within 30 days of the order date |  |  | . = there was no service order to complete  0 = the service order was not completed by the patient within 30 days of the service order date  1 = the service order was completed by the patient within 30 days of the order date |
| NB\_NarRx\_Ordered | One or more of the narcotic analgesic medications associated with this encounter was ordered |  |  | -1 = at least one of the qualifying service codes are associated with the encounter, but it was cancelled within 30 days of the order date  0 = none of the qualifying service order codes are associated with the encounter  1 = at least one of the qualifying service order codes are associated with the encounter, and it was not cancelled within 30 days |
| NB\_NarRx\_Completed | One or more of these narcotic analgesic medications orders was completed (filled, dispensed) within 30 days of the order date |  |  | . = there was no service order to complete  0 = the service order was not completed by the patient within 30 days of the service order date  1 = the service order was completed by the patient within 30 days of the order date |
| NB\_SMRRx\_Ordered | One or more skeletal muscle relaxant medications associated with this encounter was ordered |  |  | -1 = at least one of the qualifying service codes are associated with the encounter, but it was cancelled within 30 days of the order date  0 = none of the qualifying service order codes are associated with the encounter  1 = at least one of the qualifying service order codes are associated with the encounter, and it was not cancelled within 30 days |
| NB\_SMRRx\_Completed | One or more of these skeletal muscle relaxant dications orders was completed (filled, dispensed) within 30 days of the order date |  |  | . = there was no service order to complete  0 = the service order was not completed by the patient within 30 days of the service order date  1 = the service order was completed by the patient within 30 days of the order date |

**Table S11. Sample Sizes for Validation of Visit Mode and Diagnoses for Specific Conditions in the Common Data Model: KPMAS Example of the Sampling Framework.**

Table S11a. Validation of Visit Mode (Round 1).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **KPMAS** | | | | | |
|  | **Visit Year** | **Behavioral Health** | **Adult Care** | **House Calls** | **Total** |
| **Phone**  **(n=50)** | **2016** | 3 | 8 | x | **11** |
| **2017** | 3 | 8 | x | **11** |
| **2018** | 3 | 8 | x | **11** |
| **2019** | 3 | 8 | x | **11** |
| **Video**  **(n=50)** | **2016** | 3 | 8 | 8 | **19** |
| **2017** | 3 | 8 | 8 | **19** |
| **2018** | 3 | 8 | 8 | **19** |
| **2019** | 3 | 8 | 8 | **19** |
| **Total** | | **24** | **64** | **32** | **120** |

Table S11b. Validation of Visit Diagnosis (Round 2).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **KPMAS** | | | | |
| **Condition** | **Visit Mode** | **Adult Care** | **Behavioral Health** | **Total** |
| **Neck or Back Pain** | **Chat** | x |  | **x** |
| **Phone** | 9 |  | **9** |
| **Video** | 9 |  | **x** |
| **In-Person** | 9 |  | **9** |
| **Urinary Tract Infection** | **Chat** | x |  | **9** |
| **Phone** | 12 |  | **12** |
| **Video** | 12 |  | **12** |
| **In-Person** | 12 |  | **12** |
| **Acute Respiratory Infection** | **Chat** | x |  | **x** |
| **Phone** | 12 |  | **12** |
| **Video** | 12 |  | **12** |
| **In-Person** | 12 |  | **12** |
| **Depression** | **Chat** | x | x | **x** |
| **Phone** | 12 | 12 | **24** |
| **Video** | 12 | 12 | **24** |
| **In-Person** | 12 | 12 | **24** |
| **Total** | | **135** | **36** | **171** |

NOTES:

1. Validation was done only on datasets created in Year 1 of the study, which covered 2016-2019 visits.