

Appendix F – Sampling Methods and Episode Grouper Configuration Documentation

The following documents the methods for Sampling and Episode Grouping.

Dataset Selection and Preparation

We utilized the 2009 and 2010 Thomson Reuters MarketScan¹ Commercial Claims Database. The 2010 database included claims from approximately 45 million lives in total, a sizable increase over the 2009 enrollment.

The Milliman data research team processes the Market Scan dataset through the Milliman Health Cost Guidelines (HCG)² grouper, and other data quality filters, as part of an internal quality control process and to flag claims with questionable data quality. Part of this process identifies and eliminates claim reversal lines. We used these HCG data quality filters to identify and eliminate questionable claims data and also excluded those claims with negative allowed or paid amounts. In some cases, this process eliminated an enrollee entirely from the dataset, along with all of that enrollee's claims.

The HCG also has a proprietary claim categorization methodology which allocates each claim line to one of 62 Type of Service categories. These service types are then combined into categories such as Inpatient Medical, Inpatient Psychiatry, Outpatient Emergency Room, Professional Office Visit, etc.. We used these categories to allocate each claim or claim line into a Type of Service category. This process is performed quarterly by our data research team as MarketScan datasets are received.

We included membership and claims data for enrollees under age 65 who had drug benefits. We restricted the plan types to Basic/Major Medical, Comprehensive, Exclusive Provider Organization, Non-Capitated Point of Service, Preferred Provider Organization. We excluded members who had certain membership eligibility types³. After these restrictions, the membership decreased to just under 24 million lives in 2010.

¹ The Thomson Reuters MarketScan® Databases capture person-specific clinical utilization, expenditures, and enrollment across inpatient, outpatient, prescription drug, and carve-out services from a selection of large employers, health plans, and government and public organizations. The MarketScan Databases link paid claims and encounter data to detailed patient information across sites and types of providers, and over time. The annual medical databases include private sector health data from approximately 100 payers.

² The Milliman, Inc. Health Cost Guidelines-Commercial Rating Structures provide a flexible but consistent basis for the determination of claim costs and premium rates for a wide variety of health benefit plans. These Rating Structures can be used to anticipate future claim levels, evaluate past experience and establish interrelationships among various health coverages. The Guidelines are developed as a result of Milliman's continuing research on health care costs. First developed in 1954, the Guidelines have been updated and expanded annually since that time. These Guidelines are continually monitored as we use them in measuring the experience or evaluating the rates of our clients, and as we compare them to other data sources.

³ Active Part Time or Seasonal; Early Retiree; Medicare Eligible Retiree; Retiree (status unknown); COBRA Continuee; Long Term Disability; Surviving Spouse/Dependent

Enrollee Sampling Methods

In order to select a manageable and representative dataset, we separated the remaining 24 million life dataset into four subsets and included both 2009 and 2010 member eligibility periods. These are:

1. Members with continuous, 24 month membership from 2009 to 2010
2. Newborns in 2009 and 2010 (date of birth in 2009 or 2010 and not marked as deceased)
3. Members deceased in 2009 and 2010 (those marked as deceased from a medical facility, i.e. discharge status, including newborns)
4. All other enrollees. A large portion of this subset was members who had been added in 2010.

Subsets one, two and three totaled approximately 10 million lives. Subset Four, with about 14 Million lives, was eliminated from the included membership.

We then pulled a random, stratified sample of 3 million lives from Subset One. We stratifying by age bands and gender to replicate the demographic profile of the 24 million 2010 included membership. We separately pulled random stratified samples from Subset Two and Subset Three. The percentage of total enrollees that were pulled from Subset Two and Subset Three mirror the percentages of deaths and births in the 24 Million 2010 included membership, respectively. We then pulled all claims incurred in 2009 and 2010 for these 3 million selected members.

This finalized sample dataset of 3 Million lives is then fed into the ETG Grouper, as described below.

ETG Grouper Configuration

The ETG grouper uses a claim's Type of Service and Provider Type to identify whether a claim is eligible to initiate an episode (a "sentinel event"). We assigned Inpatient and Outpatient Types of Service to "Facility" and Professional Types of Service to "Clinician" Provider Types, leaving all other Type of Service categories in the "Other" type (e.g. Ambulance, DME, etc). The ETG grouper does not allow claims categorized as "Other" to initiate a new episode. Please see the Appendix for a mapping from Type of Service to ETG Provider Type.

Episode Start and Finish

All episodes begin with a “sentinel event” or “sentinel claim”, which is defined as the earliest claim related to an episode of care. The sentinel claim is identified by the diagnosis codes included in the claim and must meet the eligibility requirements described above.

For non-chronic episodes, the episode does not have a pre-set time length to completion. Instead, the episode will continue until there is a pre-set length of time without any claims related to the episode (the Clean Period). We have used ETG grouper-defined clean periods. For example, diabetes has a clean period of 365 days, while Gout has a clean period of 60 days.

If the dataset does not cover enough incurred dates such that a Clean Period (of the episode-specific length) is not completed after the last episode-related claim, then the episode is considered to have an “Unknown Finish”. Otherwise, it is considered a “Clean Finish”. In order for an episode to be considered a “Clean Start”, it must start after a (episode-specific) Clean Period has passed, during which no diagnosis codes indicate the presence of a similar condition. Otherwise it is considered an “Unknown Start”. An “Incomplete Episode” occurs whenever there is not both a “Clean Start” and a “Clean Finish”.

For chronic conditions, an episode is defined as 365 days and a Clean Period does not need to be completed prior to the start of the episode. Hence, chronic condition episodes correspond to calendar years.

Episode Types

There are eight Episode Types based on the completeness of the episode as shown in the following table.

Episode Type	Description	Completeness Status
0	Clean start, clean finish	Complete
1	Clean start, unknown finish (full year)	Complete
2	Unknown start, clean finish (full year)	Complete
3	Unknown start, unknown finish (full year)	Complete
4	Clean start, unknown finish	Incomplete
5	Unknown start, clean finish	Incomplete
6	Unknown start, unknown finish	Incomplete
7	Incomplete annual episode	Incomplete

For an episode to be included as a “Complete Episode” in the development of the risk-adjustment algorithms, it must have an Episode Type of 0, 1, 2 or 3. Episodes in categories 4, 5, 6 and 7 will be separately reviewed and summarized, but they will not be risk adjusted. They will also play an important role in translating Per Episode costs to Per Member Per Month (PMPM) costs.

ETG Run Settings

The screenshot shows the 'Optum™ Symmetry™ Configuration' window. The left sidebar lists the configuration tree: Symmetry-Suite (Claims, Member, Member Term, General, ETG). The ETG section is expanded, showing General Properties, File Properties, Provider Types, Types of Service, User-Defined Fields, Dx Crosswalk, Proc Crosswalk, Custom Outlier, and Clean Period. The main area displays the 'Current Configuration File: H:\002450A01_RY_SOA ACO\Work Papers\ETG run\ETG run.xml'. The settings are organized into several sections: 'Chronic Episode Options' with 'Annual Episode Creation' set to 'Eligibility Start Date' and 'Start Month' set to '01 - January'; 'Annual File Options' with 'Start Month' set to '01 - January' and 'Collection Date' set to 'Last Date of Service'; 'Grouping Options' with checkboxes for 'Summarize Complete Episodes Only' (unchecked), 'Unlimited Episode Length' (unchecked), 'First-Listed Diagnosis Code Is Primary' (checked), 'Link Facility Records' (checked), 'Use Alternative Pregnancy-Provider Assignment' (unchecked), 'Output Phantom Episodes' (checked), and 'Output Empty Chronic Episodes' (unchecked), along with a 'Number of Days Between Facility Records' spinner set to 1; 'Running ETG' with a checked 'Run ETG' checkbox; and 'Numbering History' with 'Last Confinement Number Used' at 3751036 and 'Last Episode Number Used' at 3417057. At the bottom right are 'Save', 'Save As...', and 'Exit' buttons.

There are a number of configuration settings that impact the ETG grouper output. The most important of which are (see Grouping Options in screen print above):

- Summarize Complete Episodes Only

When this option is selected, only Episode Types 0 – 3 will be generated. In order to allow output and analyses of all episodes, we did not select this option.

- Unlimited Episode Length

This allows episodes to continue indefinitely as long as anchor records (sentinel claims) satisfy the clinical logic of an episode. Selecting this option will generate Episode Types 0, 4, 5, 6 in the output. We did not select this option so as to generate all Episode Types.

- First-Listed Diagnosis Code is Primary
Selecting this option means only the first diagnosis code is used for grouping episodes. “Phantom Episodes” could be created using other diagnosis codes in the diagnosis string. We selected this option to eliminate Phantom Episodes.
- Use Alternative Pregnancy-Provider Assignment
When this is selected, the grouper assigns pregnancy ETGs through the Provider Type of the pregnancy related provider. We have not selected this option.
- Output Phantom Episodes
We have selected this option so that we may identify if any Phantom Episodes are created.
- Link-Facility Records and the Number of Days Between Facility Records
These options allow the creation of confinement numbers, which identify distinct episodes of facility based care, such as inpatient admissions. With one day between facility records, all sequential claims within one facility admission will be grouped into one episode, regardless of billing format.

Once we have an ETG number for each claim line, we aggregate all claims within a unique episode number to develop that episode’s cost. These episode-level costs are then used to generate descriptive statistics of the underlying population, including average cost by Episode Category, variance of episode costs within an Episode Category, etc. Final selection of ETGs for development of Risk-Adjustment algorithms is then made from this summary.

ETG Grouper Provider Types Setting

Type of Service	Type of Service Description	Provider Type
I11a	FIP Medical - General	Facility
I11b	FIP Medical - Rehabilitation	Facility
I12	FIP Surgical	Facility
I13	FIP Psychiatric	Facility
I14	FIP Alcohol and Drug Abuse	Facility
I21a	FIP Mat Norm Delivery	Facility
I21b	FIP Mat Norm Delivery - Mom\Baby Cmbnd	Facility
I22a	FIP Mat Csect Delivery	Facility
I22b	FIP Mat Csect Delivery - Mom\Baby Cmbnd	Facility
I23	FIP Well Newborn	Facility
I24	FIP Other Newborn	Facility
I25	FIP Maternity Non-Delivery	Facility
I31	FIP SNF	Facility
O11	FOP Emergency Room	Facility
O12a	FOP Surgery - Hospital Outpatient	Facility
O12b	FOP Surgery - Ambulatory Surgery Center	Facility
O13	FOP Radiology General	Facility
O14a	FOP Radiology - CT/MRI/PET - CT Scan	Facility
O14b	FOP Radiology - CT/MRI/PET - MRI	Facility
O14c	FOP Radiology - CT/MRI/PET - PET	Facility
O15	FOP Pathology/Lab	Facility
O16a	FOP Pharmacy - General	Facility
O16b	FOP Pharmacy - Chemotherapy	Facility
O17	FOP Cardiovascular	Facility
O18	FOP PT/OT/ST	Facility
O31	FOP Psychiatric	Facility
O32	FOP Alcohol & Drug Abuse	Facility
O41a	FOP Other - General	Facility
O41b	FOP Other - Blood	Facility
O41c	FOP Other - Oncology	Facility
O41d	FOP Other - Clinic	Facility
O41e	FOP Other - Diagnostic	Facility
O41f	FOP Other - Dialysis	Facility
O41g	FOP Other - DME/Supplies	Facility
O41h	FOP Other - Obs/Trtmt	Facility
O41j	FOP Other - Pulmonary	Facility
O51a	FOP Preventive - General	Facility
O51b	FOP Preventive - Colonoscopy	Facility
O51c	FOP Preventive - Mammography	Facility
O51d	FOP Preventive - Lipid Panel	Facility
P11	PROF Inpatient Surgery	Clinician
P12	PROF Inpatient Surgery - Asst. Surgeon	Clinician
P13	PROF Inpatient Anesthesia	Clinician
P14	PROF Outpatient Surgery	Clinician
P15	PROF Office Surgery	Clinician
P16	PROF Outpatient Anesthesia	Clinician
P21a	PROF Maternity - Normal Deliveries	Clinician
P21b	PROF Maternity - Cesarean Deliveries	Clinician
P21c	PROF Maternity - Non-Deliveries	Clinician
P21d	PROF Maternity - Ancillary	Clinician
P21e	PROF Maternity - Anesthesia	Clinician
P31a	PROF Inpatient Visits - General	Clinician
P31b	PROF Inpatient Visits - Extended Care Visits	Clinician
P31c	PROF Inpatient Visits - Critical Care Visits	Clinician

P32	PROF Office/Home Visits	Clinician
P32a	PROF Office/Home Visits - Office	Clinician
P32b	PROF Office/Home Visits - Home	Clinician
P33	PROF Urgent Care Visits	Clinician
P34a	PROF Office Administered Drugs - General	Clinician
P34b	PROF Office Administered Drugs - Chemotherapy	Clinician
P35	PROF Allergy Testing	Clinician
P36	PROF Allergy Immunotherapy	Clinician
P37a	PROF Miscellaneous Medical - General	Clinician
P37b	PROF Miscellaneous Medical - Gastroenterology	Clinician
P37c	PROF Miscellaneous Medical - Ophthalmology	Clinician
P37d	PROF Miscellaneous Medical - Otorhinolaryngology	Clinician
P37e	PROF Miscellaneous Medical - Vestibular Function Tests	Clinician
P37f	PROF Miscellaneous Medical - Non-Invas. Vasc. Diag. Studies	Clinician
P37g	PROF Miscellaneous Medical - Pulmonology	Clinician
P37h	PROF Miscellaneous Medical - Neurology	Clinician
P37i	PROF Miscellaneous Medical - Central Nervous System Tests	Clinician
P37j	PROF Miscellaneous Medical - Dermatology	Clinician
P37k	PROF Miscellaneous Medical - Dialysis	Clinician
P37l	PROF Miscellaneous Medical - Chemotherapy	Clinician
P40a	PROF Preventive Other - General	Clinician
P40b	PROF Preventive Other - Colonoscopy	Clinician
P40c	PROF Preventive Other - Mammography	Clinician
P40d	PROF Preventive Other - Lab	Clinician
P41	PROF Preventive Immunizations	Clinician
P42	PROF Preventive Well Baby Exams	Clinician
P43	PROF Preventive Physical Exams	Clinician
P43b	PROF Physical Exams - Laboratory Ancillary	Clinician
P43c	PROF Physical Exams - Other Ancillary	Clinician
P44	PROF Vision Exams	Clinician
P45	PROF Hearing and Speech Exams	Clinician
P51	PROF ER Visits and Observation Care	Clinician
P52	PROF Consults	Clinician
P53	PROF Physical Therapy	Clinician
P54	PROF Cardiovascular	Clinician
P55a	PROF Radiology IP - General	Clinician
P55b	PROF Radiology IP - CT Scan	Clinician
P55c	PROF Radiology IP - MRI	Clinician
P55d	PROF Radiology IP - PET	Clinician
P56	PROF Radiology OP - General	Clinician
P57a	PROF Radiology OP- CT/MRI/PET - CT Scan	Clinician
P57b	PROF Radiology OP- CT/MRI/PET - MRI	Clinician
P57c	PROF Radiology OP- CT/MRI/PET - PET	Clinician
P58a	PROF Radiology Office - General	Clinician
P58b	PROF Radiology Office - General - Radiology Center	Clinician
P59a	PROF Radiology Office - CT/MRI/PET - CT Scan	Clinician
P59b	PROF Radiology Office - CT/MRI/PET - MRI	Clinician
P59c	PROF Radiology Office - CT/MRI/PET - PET	Clinician
P59d	PROF Radiology Office - CT/MRI/PET - CT Scan - Radiology Center	Clinician
P59e	PROF Radiology Office - CT/MRI/PET - MRI - Radiology Center	Clinician
P59f	PROF Radiology Office - CT/MRI/PET - PET - Radiology Center	Clinician
P61a	PROF Pathology/Lab - Inpatient & Outpatient - Inpatient	Clinician
P61b	PROF Pathology/Lab - Inpatient & Outpatient - Outpatient	Clinician
P63a	PROF Pathology/Lab - Office - General	Clinician
P63b	PROF Pathology/Lab - Office - Venipuncture	Clinician
P63c	PROF Pathology/Lab - Office - Independent Lab	Clinician
P65	PROF Chiropractor	Clinician
P66	PROF Outpatient Psychiatric	Clinician
P67	PROF Outpatient Alcohol & Drug Abuse	Clinician
P81	OTH Prescription Drugs	Other
P82a	OTH Private Duty Nursing/Home Health - HH	Clinician

P82b	OTH Private Duty Nursing/Home Health - Hospice	Clinician
P83	OTH Ambulance	Other
P84	OTH DME and Supplies	Other
P85	OTH Prosthetics	Other
P89	ADDL Benefits Glasses/Contacts	Other
P99a	ADDL Benefits Other - General	Other
P99b	ADDL Benefits Other - Hearing Aids	Other
P99c	ADDL Benefits Other - Dental	Other
P99d	ADDL Benefits Other - Acupuncture	Other
P99e	ADDL Benefits Other - Reproductive Medicine	Clinician
P99f	ADDL Benefits Other - Temporary Codes	Other
P99g	ADDL Benefits Other - Unclassified	Other
P99h	ADDL Benefits Other - Non-Emergency Transportation	Other