



ECR® Instruction Book

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(UNIX version)

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Prepared by Masspro, Inc.

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1 BACKGROUND, PURPOSE, AND INITIAL SAS SETTINGS

Evidence-Informed Case Rates®, or ECRs®, are patient-specific, severity-adjusted bundles of services during a defined time period for the treatment of specific conditions. ECR® methodology was developed by the Prometheus Payment design team (www.prometheuspayout.org) and is the property of the Health Care Incentives Improvement Institute, Inc (www.hci3.org) a nonprofit organization devoted to improving healthcare quality by creating and implementing programs that deliver positive financial incentives for providers that deliver high value care.

This document contains instructions on how to calculate ECR® budgets using healthcare claims data and SAS® Software¹. The instructions apply to the following ECRs®:

ECR® Category	ECR® Description	ECR® Name
Chronic Medical ECR® (CH)	Chronic Obstructive Pulmonary Disease	COPD
	Congestive Heart Failure	CHF
	Coronary Artery Disease	CAD
	Diabetes	DM
	Hypertension	HTN
	Asthma	ASTHMA
	Gastro-esophageal Reflux Disease	GERD
Inpatient Procedural ECR® (IPP)	Hip Replacement	HIPR
	Knee Replacement	KNEE
	Coronary Artery Bypass Graft	CABG
	Bariatric Surgery	BARI
	Colon Resection	COLON
Inpatient Medical ECR® (IM)	Acute Myocardial Infarction	AMI
	Pneumonia	PNE
	Stroke	STR
Outpatient Procedural ECR® (OPP)	Coronary Angioplasty	PCI
	Colonoscopy	COLOS
	Pregnancy and Delivery	PREG
	Cholecystectomy	GALL
	Hysterectomy	HYST
	Knee Arthroscopy	KNRP

Healthcare claims data from any governmental or private dataset can be used. In order to construct the ECR®, the claims data must first be mapped to a standard format. This document explains the three steps needed to create an ECR®: (1) Data fields mapping, (2) ECR® dataset construction, and (3) ECR® modeling.

¹ SAS® and all other SAS Institute, Inc. product or service names are registered trademarks of SAS Institute, Inc. in the USA and other countries. The symbol ® indicates USA trademark registration, and henceforth in this instruction book, anytime the word SAS is used the trademark shall be omitted but implied.

The document further describes the outputs that are generated from the SAS programs such as the flow tables, the PAC rates and how to create the full ECR® price, the severity index and other applications that can be derived from these outputs such as regional variation analysis or provider-level analysis.

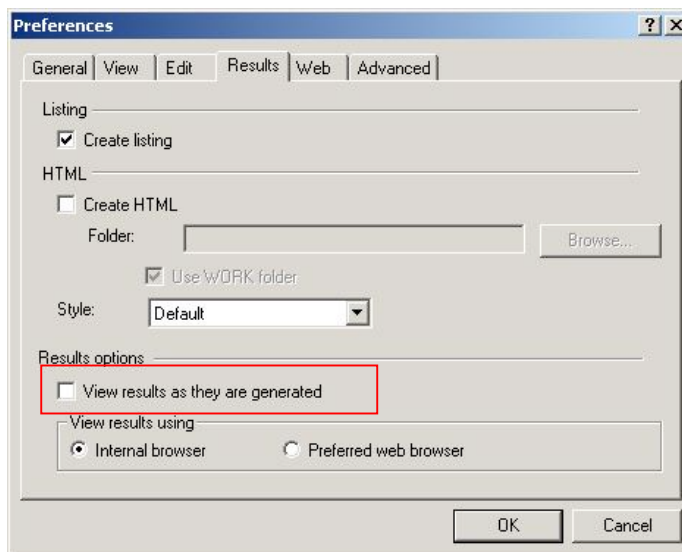
The SAS® programs and meta datasets referred to in this document are attached. The related medical coding systems used for each ECR® are supplied with the SAS® programs.

All SAS® programs were developed and tested using SAS® Version 9.1.3 on Windows XP and were modified to be run on UNIX Environment. User would require considerable familiarity with UNIX Environment especially in terms of directory structure, file/folder permissions, editors, submitting SAS programs etc. SAS® modules required to run the data handling portion of this package are the SAS® Base Product (which includes base and macro compilers) and SAS/ACCESS Interface to PC Files. The module SAS/STAT is required to run the ECR® models. You may verify your compliment of SAS® modules by running (i.e. submitting) the following code within the Program Editor and viewing its results in the log:

```
proc setinit;  
run;
```

Running SAS programs within this package will generate multiple Microsoft® Excel outputs. To prevent the SAS system from halting when it opens each one, and thereby either delaying running code or requiring a user to sit and wait in front of a computer, it is best to perform the following adjustment to the “View results” SAS system option before running any code.

1. From the “Tools” menu, select the “Options” and then “Preferences” option. The “Preferences” dialogue box will appear.
2. Click on the “Results” tab at the top.
3. Under the section titled “Results options,” make sure that the checkbox labeled “View results as they are generated” is **UNCHECKED**. See the following picture to help locate this option.



4. Click the “OK” button to save the setting change. This option will have to be manually restored back to a checked option after the completion of running this package’s SAS code if the user wishes to restore this option for other applications.

Users running SAS® in UNIX or LINUX could request our separate UNIX SAS package.

This instruction book, as well as the SAS® programs, was prepared by the Massachusetts Peer Review Organization, Inc., better known as Masspro, Inc. (www.masspro.org), for Health Care Incentives Improvement Institute, Inc.

Please note, if your organization is submitting a SAS data file to Prometheus or a Prometheus partner, please use the following check list for test data file and complete data file submission to ensure the following items have been addressed:

Data Checklist:

- The file consists of two years worth of incurred claims with a run-out period of 3 to 6 months**
- All costs are reported as “Allowed Amounts” and have been reconciled to adjust for interim bills and negative dollars. A single “final” bill is submitted for each claim.**
- Inpatient Stay Claims have been rolled up to one claim per admission/discharge**
- A sample of non-rolled up Inpatient Stay Claims has been provided so that the roll up process can be verified.**
- Professional, Outpatient Facility, Ancillary, and Other Claims have NOT been rolled up, and have remained at the claim line level**
- Pharmacy claims are reported with prescription dates, one NDC code per claims and associated costs**

2 INPUT DATA FIELD MAPPING

2.1 Overview

2.1.1 Medical Coding Systems

The user-supplied healthcare claims data should use the following medical coding systems:

- 1) Diagnosis and procedure codes: International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM).
- 2) Procedure codes: Healthcare Common Procedure Coding System (HCPCS)/American Medical Association's Current Procedural Terminology (CPT®) codes.
- 3) Revenue codes: Uniform Billing (UB-04) revenue codes
- 4) Medications: National Drug Codes (NDC).

The supplied SAS programs convert ICD-9-CM diagnosis and procedure codes and HCPCS/CPT codes into Agency for Healthcare Research and Quality (AHRQ) Clinical Classification Software (CCS) codes. NDC codes are converted to Prometheus drug ID codes. Therefore, the user does not need to supply CCS or drug ID codes.

2.1.2 User provided Healthcare Data

The user will need to provide the following healthcare data. These datasets will be used as input datasets to the supplied SAS programs.

- 1) Member: contains member ID, year of birth, and gender.
- 2) Member Enrollment: contains enrollment beginning and ending dates for each member.
- 3) Inpatient Stay Claims: contains inpatient stay claims with service dates, diagnosis and procedure information, associated costs, and provider ID (optional).
- 4) Professional, Outpatient Facility, Ancillary and Other Claims (PFO): includes professional and outpatient facility claims with service dates, diagnosis and procedure information, associated costs, provider ID (optional), and provider specialty (optional).
- 5) Pharmacy Claims: includes all prescription claims with prescription date, NDC codes and associated costs.

2.1.3 Meta Data

Prometheus program provides to the users SAS metadata files that contain code definitions for each ECR®. Meta datasets include:

- 1) ICD-9-CM / CPT codes for defining triggers.
- 2) ICD-9-CM codes / CPT /revenue codes for defining expanded triggers and case exclusions, relevant claims, claims with potentially avoidable complications (PACs), and typical claims.
- 3) CCS codes for defining case exclusions, relevant claims, claims with potentially avoidable complications (PACs), and typical claims.
- 4) Prometheus drug ID for defining exclusions, PAC and typical prescriptions.
- 5) Risk factor definition codes.
- 6) CCS and ICD-9-CM / CPT codes crosswalk.
- 7) NDC and Prometheus drug ID crosswalk.

2.2 Data Cleaning and Reconciliation

All source data should be cleaned and reconciled before use.

General instruction:

- 1) Remove all duplicated records and invalid codes.
- 2) Medical claims should be divided into two files as follows:
 - i. The inpatient stay claim file should have just inpatient “facility” claims – anything that is identified as a 1 = Type of facility (Hospital) and 1 = Bill class (inpatient including Medicare part A) on a UB claim,
 - ii. All other claims should be in the PFO (Professional, Outpatient Facility, Ancillary and Other Claims) – these include inpatient professional claims, outpatient facility claims, post-acute facility claims and outpatient professional claims.

All claims that come on an inpatient UB form go into the inpatient stay file. Professional and pharmacy services that are provided during the hospital stay (e.g. services provided by anesthesiologists or radiologist as employees of the hospital), if billed along with the hospital bill, do not need to be separated out. If however, they are billed separately, say on a CMS / HCFA 1500 claim form, those bills go to the PFO file.

- 3) How to roll over the claims and reconcile the dollars
 - i. For inpatient facility bills – there should be one “final” bill per admission (discharge) – the interim bills should be reconciled and accounted for all negative dollars and adjustments. The data will look like the data in the following table:

Consistent_member_id	From_date_s	Thru_date_s	Principal_diag_code	secondary_diag1_code	principal_proc_code	Proc_icd9_2nd1	Allowed_amt	...
00001	02/03/2005	02/15/2005	41071	2875	3613	3961	103169.85	...
00002	05/01/2005	05/20/2005	65661	66712	6902	7359	11386.69	...
00003	08/12/2005	09/11/2005	41401	4111	0066	3606	39740.88	...

- ii. For outpatient facility/professional bills –leave claims at “claim-line” level but heavily populate them with all the diagnosis codes at the claim header level. The data will look like the data in the following table:

Consistent_member_id	From_date_s	Thru_date_s	Principal_diag_code	secondary_diag1_code	secondary_diag2_code	Hcpcs_proc_code	Allowed_amt	...
00001	07/09/2005	07/09/2005	61610	6259	7099	99213	85	...
00001	07/09/2005	07/09/2005	61610	6259	7099	87210	25	...
00002	07/11/2005	07/11/2005	7876	5693	V1859	36415	16.7	...
00002	07/11/2005	07/11/2005	7876	5693	V1859	80076	38.33	...
00002	07/11/2005	07/11/2005	7876	5693	V1859	86706	65.9	...

- 4) All supplemental adjustment claims should, where applicable, be reconciled with original claims that need to be adjusted so that there is only one finalized claim line (i.e. If a claim is adjusted later with an additional claim line, those two claim lines should be reconciled into one claim line).
- 5) Type of claim: Medical claims should be identified with a flag as follows: 1=inpatient facility, 2=outpatient facility, and 3=professional and ancillary

- 6) Place of service codes and Type of admission codes are needed ONLY to help identify emergency room services for both inpatient stay claims and the outpatient facility and professional claims.

Input file-specific instruction:

- 1) Member file should keep unique record for each member. If the member ID covers the whole family, assign a separate ID for each family member and apply the new ID across all files.
- 2) Member enrollment file should keep complete enrollment start and end date information for each member. If a member has more than one enrollment period, multiple records are allowed for the member, with each record containing one continuous enrollment period. User does not have to bridge the multiple enrollment periods. For members with multiple enrollment records, start date and end date should not overlap among the records.
- 3) Inpatient Stay Claims should be rolled up to one claim per admission/discharge as shown in table 3.i. above.
 1. All diagnosis codes from claim line items within the same hospitalization event should be consolidated into a unique diagnosis code list and stored in the rolled-up claim, i.e. if the same diagnosis code is repeated in multiple claim lines, only one unique code needs to be kept in the rolled-up claim. User should apply appropriate methods to identify the principal diagnosis code in the rolled-up claim.
 2. All procedure codes from claim line items within the same hospitalization event should also be consolidated into a unique procedure code list and stored in the rolled-up claim, i.e. if the same procedure code is repeated in multiple claim lines, only a unique code needs to be kept in the rolled-up claim. User should apply appropriate methods to identify the principal procedure code in the rolled-up claim.
 3. For purposes of identifying bilateral procedures as necessary in Hip or Knee procedures, the DRG codes could be used during the data preparation phase to identify patients who had a bilateral procedure and these members could be excluded. If users do not exclude patients who have stay claims with bilateral procedures during the data preparation phase, they can remove these patients at the reconciliation phase at the end to ensure that higher costs associated with a bilateral procedure does not artificially inflate the ECR® budget.
 4. All revenue codes from claim line items within the same hospitalization event should be consolidated into unique revenue code list and stored in the rolled-up claim. Revenue codes do *not* form an important component of the Prometheus model and are mostly important to help identify emergency room visits in stay records and certain exclusionary criteria such as use of dialysis, oncology services etc. If it is difficult to consolidate revenue codes to the unique one-member-one-stay record, it may be appropriate *not* to use revenue codes at all so long as the emergency room visits are identified and flagged separately.
- 4) Professional, Outpatient Facility, Ancillary and Other Claims should NOT be rolled up, but should remain at claim line level.
- 5) Pharmacy claim should keep one NDC code per claim.

2.3 Calculating Total Reimbursed Allowed Amount (\$)

The cost field used in developing the ECR® price is the “Total Reimbursable Allowed Amount” and represents the amount paid to the provider by the insurance carrier plus the patient portion of the payment.

Medical Claims:

The “total reimbursable allowed amount” for each of the inpatient stay and professional claims is the sum of the following 6 values:

- 1) Paid Amount: Dollar amount paid by insurance carriers for covered services.
- 2) Deductible Amount: The amount of the cost of this service that the member must pay as applied to the total yearly deductible.
- 3) Co-pay Amount: Amount an individual member or insured individual pays directly to a provider at the time the services are rendered.
- 4) COB Amount: Amount paid by another insurance carrier as the result of coordination of benefits.
- 5) Co-insurance Amount: The amount the insured individual pays as a set % cost of covered medical services as out-of-pocket payment to the provider.
- 6) Medicare Savings Amount: Amount of savings the plan recognizes due to Medicare duplicate coverage status of the member at time of service.

The “total reimbursable allowed amount” cost field needs to be constructed using the equivalent of the six cost fields described above from your database.

Pharmacy Claims:

The “total reimbursable allowed amount” for pharmacy claims is the sum of the following 4 values:

- 1) Paid Amount: Dollar amount paid by insurance carriers for covered services (Cost per metric drug unit x Number of metric units)
- 2) Co-pay Amount: Amount an individual member or insured individual pays directly to a provider at the time the services are rendered
- 3) COB Amount: Amount paid by another insurance carrier as the result of coordination of benefits
- 4) Medicare Savings Amount: Amount of savings the plan recognizes due to Medicare duplicate coverage status of the member at time of service

The “total reimbursable allowed amount” cost field needs to be constructed using the equivalent of the four cost fields described above from your database.

2.4 File Formats and Field Mapping for Input Datasets

Users should convert and format their healthcare data into the following SAS datasets, so that the attached SAS programs can use them as input datasets.

2.4.1 General Instruction:

- 1) All of the variables listed should be created using the indicated variable name, type, length, and format (if applicable).

- 2) It is possible that the source data do not contain certain required fields, such as CPT codes in inpatient stay claims or ICD-9 procedure codes in outpatient/professional claims. If a required field cannot be mapped in the source data, a blank column MUST be created as place holder using the indicated variable name, type, and length.
- 3) All ICD-9 codes should be left justified. Leading and trailing zeros should be included. The program can use both ICD-9 codes coded with or without decimal points (Example: 021.8 can be formatted as 021.8 or 0218).
- 4) For variables with defined code (e.g., sex, place of service, type of claims, etc), the input data must be verified for consistency with indicated coding definition. The input data have to be recoded if the definitions do not match to the Prometheus definitions.
- 5) The user can include as many diagnoses and procedures as desired, following the naming convention indicated for each addition variable. For variables naming with X, X indicate the additional variables. User can customize the number to include all available data in that category in the input data. For example, if the input data have a maximum of four CPT codes in a claim, the first CPT code should be assigned to HCPCS_PROC_CODE, and the additional 3 CPT codes should be assigned to CPTCODE1 to CPTCODE3, respectively (X = 3). X does not have to be same across different categories (ICD-9 procedure/ICD-9 diagnosis/CPT/revenue). However, for each category X must > 1. For example you may have only one CPT code in the outpatient/professional claims, which should be named as HCPCS_PROC_CODE, you should still create a blank CPTCODE1 column as the place holder.
- 6) For each CPT field, a corresponding CPT modifier field must be included, i.e., CPTCODEX and CPTCODE_MODX have to be a pair in the input data with same X.
- 7) NDC codes should be 11 characters. Hyphens should be removed. Leading and trailing zeros should be included. For example, 00000-1435-00 should be formatted as 00000143500.
- 8) All calendar dates should be read in as a SAS date value rather than a character or standard numeric value.
- 9) Optional Provider ID: The ID that identifies the serving hospital or the performing physician (such as the claim organization NPI number or the claim performing physician NPI number). This field is not needed for running Prometheus standard analysis. It would be useful if user wishes to perform provider analysis. Patients could be attributed to providers based on the information in this field.
- 10) Optional Provider Specialty: CMS specialty code used for pricing the line item service on the noninstitutional claim. This field is not needed for running Prometheus standard analysis. It would be useful if user wishes to perform provider analysis. Patients could be attributed to providers based on the information in this field.

2.4.2 Field Mapping and File Formats

Users should follow the variable name, type, length, and format indicated in the following tables to prepare the input SAS data files.

Table 2: Field Mapping and Format for Member File			
Variable	Type	Length	Description
CONSISTENT_MEMBER_ID	Char	(varies by data)	Unique member ID.
SEX	Char	1	Patient gender F = Female M = Male
YOB	Num	8	Member's year of birth. Coded as YYYY (e.g., 1965).
Member Zip Code (<i>optional</i>)	Char	5	Member's zip code (not needed for running Prometheus standard analysis. Will be needed if user wishes to perform additional regional variation analysis).

Table 3: Field Mapping and Format for Member Enrollment File			
Variable	Type	Length	Description
CONSISTENT_MEMBER_ID	Char	(varies by data)	Unique member ID.
BEGIN_DATE_s	Num	8	Member enrollment effective date (SAS date).
END_DATE_s	Num	8	Member enrollment termination date (SAS date). If a member is still enrolled, leave this field blank.

Table 4: Field Mapping and Format for Inpatient Stay Claims File			
Variable	Type	Length	Label and/or Description
CONSISTENT_MEMBER_ID	Char	(varies by data)	Unique member ID.
PROVIDER ID	Char	(varies by data)	The ID that identifies the serving hospital, such as the claim organization NPI number.
ALLOWED_AMT	Num	8	Total Reimbursed Allowed Amount. Please do not include dollar sign. See Section 2.3 for the calculation of Total Reimbursed Allowed Amount.
FROM_DATE_s	Num	8	First Date of Service (SAS date).
THRU_DATE_s	Num	8	Last Date of Service (SAS date).

Table 4: Field Mapping and Format for Inpatient Stay Claims File			
Variable	Type	Length	Label and/or Description
DISCHARGE_STATUS	Char	2	Code indicating status at discharge from the hospital, as defined in the Medicare Carrier manual for the claim. This field is used to identify left against medical advice (LAMA) or death. Codes that will be used by the Prometheus program are listed below. ‘07’ = Left against medical advice or discontinued care ‘20’ = Expired (or did not recover - Christian Science patient). ‘40’ = Expired at home (hospice claims only). ‘41’ = Expired in a medical facility (e.g. hospital, SNF, ICF or free standing hospice). (Hospice claims only) ‘42’ = Expired - place unknown (hospice claims only). Other discharge status is allowed in this field, as long as above status is coded as indicated.
ADMIT_TYPE_CODE	Num	1	Type of Admission/Source of Admission. This field is used to identify admission through emergency room. 1 = Emergency room service 0 = Not emergency room service If no such a field is directly available in the original claims data, the user should use other source of information to identify ER services and populate this field as indicated.
PLACE_OF_SVC_CODE	Char	2	Place of service. This field is used to identify emergency room service. ‘23’ = Emergency Room Other place of service codes are allowed in this field, as long as emergency room is coded as indicated.
TYPE_OF_CLAIM	Char	1	Type of claim: this field should be generated by the user. ‘1’= Inpatient Facility Claims ‘2’= Outpatient Facility Claims ‘3’= Professional, Ancillary and Other Claims The inpatient stay claims file should only contain claims that carry a ‘1’ for this field.
REV_CPTX	Char	5	Revenue Code <i>X (Nx)</i>
HCPCS_PROC_CODE	Char	5	HCPCS CPT4 Procedure Code.
HCPCS_CPT_MOD	Char	2	Initial (functional) CPT modifier for HCPCS_PROC_CODE
CPTCODEX	Char	5	Additional HCPCS CPT4 Procedure Code <i>X (N1)</i>
CPTCODE_MODX	Char	2	Initial (functional) CPT modifier for CPTCODEX <i>(N1)</i>
PRINCIPAL_DIAG_CODE	Char	6	ICD-9 Principal Diagnosis code
SECONDARY_DIAGX_CODE	Char	6	ICD-9 Secondary Diagnosis code <i>X (N2)</i>

Table 4: Field Mapping and Format for Inpatient Stay Claims File

Variable	Type	Length	Label and/or Description
PRINCIPAL_PROC_CODE	Char	6	ICD-9 Principal Procedure code
PROC_ICD9_2NDX	Char	6	ICD-9 Secondary Procedure code <i>X</i> (<i>N3</i>)

Where *X* could be any of the values below:

- N1 represents a fixed number of multiple CPT Codes on claims.
- N2 represents a fixed number of multiple ICD-9 Diagnosis Codes on claims.
- N3 represents a fixed number of multiple ICD-9 Procedure Codes on claims.
- N1, N2, and N3 should be determined by the user during extract based on available data.
- Nx (Revenue codes are mostly important to help identify emergency room visits in stay records: 45x and certain exclusionary criteria such as use of dialysis: 80x, oncology services 28x and labor & delivery: 72x)

For reference, in the Prometheus developmental database N1=20; N2=9; N3=21; and Nx=20.

Table 5: Field Mapping and Format for Professional, Outpatient Facility, Ancillary and Other Claims file

Variable	Type	Length	Label and/or Description
CONSISTENT_MEMBER_ID	Char	(varies by data)	Unique member ID.
ALLOWED_AMT	Num	8	Total Reimbursed Allowed Amount. Do not include dollar sign. See Section 2.3 for the calculation method.
PROVIDER ID	Char	(varies by data)	This ID identifies the performing physician, such as the claim performing physician NPI number on a professional claim and the claim organization ID number on an outpatient facility claim.
SPECIALTY	Char	2	CMS specialty code used for pricing the line item service on the noninstitutional claim. Specialty Codes that will be used by the Prometheus program are listed below. 01 = General practice 08 = Family practice 11 = Internal medicine 16 = Obstetrics/gynecology 37 = Pediatric medicine 38 = Geriatric medicine 84 = Preventive medicine 06 = Cardiology 46 = Endocrinology 29 = Pulmonology 10 = Gastroenterology 13 = Neurology
FROM_DATE_s	Num	8	First Date of Service (SAS date).
THRU_DATE_s	Num	8	Last Date of Service (SAS date) – usually FROM_DATE and THRU_DATE is the same in PFO claims.
PLACE_OF_SVC_CODE	Char	2	Place of service. This field is used to identify emergency room service. '23' = Emergency Room Other place of service codes are allowed in this field, as

Table 5: Field Mapping and Format for Professional, Outpatient Facility, Ancillary and Other Claims file			
Variable	Type	Length	Label and/or Description
			long as emergency room is coded as indicated.
TYPE_OF_CLAIM	Char	1	Type of claim: this field should be generated by the user. ‘1’= Inpatient Facility Claims ‘2’= Outpatient Facility Claims ‘3’= Professional, Ancillary and Other Claims The professional, outpatient facility, ancillary and other claims file should only contain claims that have a ‘2’ and ‘3’ for this field.
HCPCS_PROC_CODE	Char	5	HCPCS CPT4 Procedure Code.
HCPCS_CPT_MOD	Char	2	Initial (functional) CPT modifier for HCPCS_PROC_CODE
CPTCODEX	Char	5	Additional HCPCS CPT4 Procedure Code <i>X (N1)</i>
CPTCODE_MODX	Char	2	Initial (functional) CPT modifier for CPTCODEX <i>(N1)</i>
PRINCIPAL_DIAG_CODE	Char	6	ICD-9 Principal Diagnosis code
SECONDARY_DIAGX_CODE	Char	6	ICD-9 Secondary Diagnosis code <i>X (N2)</i>
PRINCIPAL_PROC_CODE	Char	6	ICD-9 Principal Procedure code
PROC_ICD9_2NDX	Char	6	ICD-9 Secondary Procedure code <i>X (N3)</i>

Where *X* could be any of the values below:

- N1 represents a fixed number of multiple CPT Codes on claims.
- N2 represents a fixed number of multiple ICD-9 Diagnosis Codes on claims.
- N3 represents a fixed number of multiple ICD-9 Procedure Codes on claims.
- N1, N2, and N3 should be determined by the user during extract based on available data.

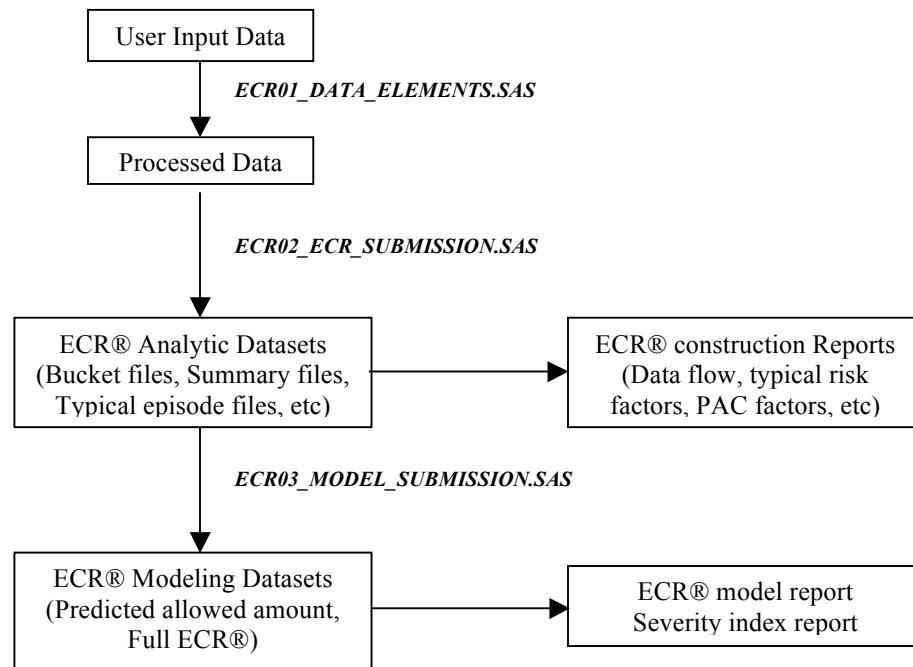
For reference, in the Prometheus developmental database N1=4; N2=5; and N3=4.

Table 6: Field Mapping and Format for Pharmacy file			
Variable	Type	Length	Label and/or Description
CONSISTENT_MEMBER_ID	Char	(varies by data)	Unique member ID.
ALLOWED_AMT	Num	8	Total Reimbursed Allowed Amount. Please do not include dollar sign. See Section 2.3 for the calculation of Total Reimbursed Allowed Amount.
NDC_CODE	Char	11	NDC Drug Code. NDC codes should be 11 characters. Hyphens should be removed. Leading and trailing zeros should be included. For example, 00000-1435-00 should be formatted as 00000143500.
SUPPLY_DAYS_NUM	Num	8	Number of days of prescription supply
PRESCRIPTION_FILLED_DATE_S	Num	8	Date of prescription filled (SAS date).

3 ECR® CONSTRUCTION

This section describes how to run the SAS programs to create the ECR® datasets. The overall process of constructing ECR® datasets is outlined in Figure 1.

Figure 1 Diagram of ECR® Construction Process



3.1 Instructions for Running SAS Programs to Create ECR® Datasets

3.1.1 Creating folders for storing SAS programs, data files, and reports

Create eight custom-named but separate folders within a working area on the hard drive or network drive according to the following bulleted list. These are the necessary folders needed to construct the ECR® datasets and manage program output. The user may name each folder any name to provide identifiable recognition of its purpose, however, avoid using special characters especially the ampersand (&) to not confuse SAS. Underscores () are fine. The user will later enter these folder pathnames into the SAS program.

- 1) A folder storing the required 5 user input datasets (a macro variable CLAIMDATA is referred to this folder).
- 2) A folder storing Prometheus Meta datasets (a macro variable METADATA is referred to this folder).
- 3) A folder storing all Prometheus standard SAS programs (a macro variable PROGRAM_LOC is referred to this folder).

- 4) A folder storing all SAS macro programs that will be called by Prometheus standard SAS programs (a macro variable MACROFILE is referred to this folder).
- 5) A folder storing all standard model coefficient data that will be used in ECR® modeling steps (a macro variable MODEL is referred to this folder).
- 6) A folder storing processed enrollment and claims data that will be further used for constructing each ECR® (a macro variable ECR® is referred to this folder). The Prometheus program reads the 5 original source data files (as constructed in Tables 2-6) and outputs processed data into this folder for further use in creating each ECR®.
- 7) A folder storing all SAS permanent datasets for each ECR® (a macro variable ANALYTIC is referred to this folder).
- 8) A folder storing all Excel reports for each ECR® (a macro variable FILELOC will refer to this folder).

After the folders are created, unzip and place the supplied Prometheus SAS program and data files to the appropriate folders.

Note:

If the users are running multiple health plans' data separately, make sure to create a new set of folders as described above for each health plan. If different health plan's data was pointed to the same folder for saving output dataset and reports, the results generated earlier will be over-written by the results generated later.

If the users have to rerun same ECRs on same data, we also recommend the users to remove or delete the SAS datasets and excel reports from the earlier runs, as the new output files may be named differently and may not always overwrite the old outputs.

3.1.2 Enter user settings in ECR00_COMMON_MACRO.sas

Before running the SAS programs, user-defined folder pathnames and parameters should be entered into ECR00_COMMON_MACRO.sas as instructed. This program sets values for global macro variables (e.g. location of input/output files, study periods, etc.) that will be used by other SAS programs. The program is divided into three main sections:

- 1) a section containing macro variables that the user is required to set;
- 2) a section containing macro variables with default values, which the user can change if desired;
- 3) a section containing macro variables with values that the user is not allowed to make any changes.

Open the program in the SAS Editor and read through the section of the program under

```
*****
**** USER SETTING SECTION ****
*****
```

Enter values where needed and stop at the end of this section. The required settings and descriptions have been summarized in the table 7.

Table 7: ECR00 COMMON_MACRO.sas Required User Settings

Required User Settings		Description
%LET USER=;		Enter user information. Example: %LET USER=XXX AT COMPANY;
Locations of datasets and reports		
%LET CLAIMDATA=;		Enter the location of source SAS datasets (including all 5 data files as constructed in Tables 2-6). Example: %LET CLAIMDATA=/SOURCE DATA;
%LET METADATA=;		Enter the location of meta data. Example: %LET METADATA=/ECR METADATA;
%LET MACROFILE=		Enter the location of SAS macro files. Example: %LET MACROFILE=/ECR MACRO;
%LET ECR=;		Enter the location for storing the intermediate SAS datasets. These datasets are generated from the source data files and are the common data that will be used to create each ECR®. Example: %LET ECR=/ECR DATASET;
%LET ANALYTIC=;		Enter the location for storing ECR® analytic SAS datasets. Example: %LET ANALYTIC=/ECR ANALYTIC;
%LET FILELOC=;		Enter the location for storing ECR® Excel reports. Example: %LET ECR=/MY REPORT;
%LET MODEL=		Enter the location for storing standard model coefficient data. Example: %LET MODEL=/MY MODEL COEFF;
Name of enrollment and claims datasets		
%LET CLM_MEMBER=;		Enter member file name. Example: %LET CLM_MEMBER=MEMBER;
%LET CLM_ELIG=;		Enter member enrollment file name. Example: %LET CLM_ELIG=MEM_ENROLL;
%LET CLM_IP=;		Enter inpatient/stay claims file name. Example: %LET CLM_IP=STAY;
%LET CLM_OP=;		Enter outpatient, professional, ancillary and other claims file name. Example: %LET CLM_OP=PROF;
%LET CLM_RX=;		Pharmacy claims file name. Example: %LET CLM_RX=PHARMACY;
Total number of diagnosis/procedure/revenue fields in claims datasets		
Inpatient	%LET IPDX=;	Enter total number of diagnosis fields including principal diagnosis in the inpatient stay file.

Table 7: ECR00_COMMON_MACRO.sas Required User Settings

Required User Settings		Description
		Example: %LET IPDX=4;
	%LET IPPX=;	Enter total number of procedure fields including principal procedure in the inpatient stay file. Example: %LET IPPX=3;
	%LET IPCPT=;	Enter total number of CPT fields including hcpcs_proc_code in the inpatient stay file. Example: %LET IPCPT=3;
	%LET REV_CPT=;	Enter total number of revenue fields in the inpatient stay file. Example: %LET REV_CPT=3;
Outpatient/professional claims	%LET OPDX=;	Enter total number of diagnosis fields including principal diagnosis in the PFO file. Example: %LET OPDX=4;
	%LET OPPX=;	Enter total number of procedure fields including principal procedure in the PFO file. Example: %LET OPPX=3;
	%LET OPCPT=;	Enter total number of CPT fields including hcpcs_proc_code in the PFO file. Example: %LET OPCPT=3;
%LET STUDY_START=MDY(,,); %LET STUDY_END=MDY(,,);		Enter the start and end dates of the study period - the study period should ideally be at least two years long to capture more complete ECRs®. For example, if the study period is from Jan 1, 2006 to Dec 31, 2007, then enter %LET STUDY_START=MDY(1,1,2006) %LET STUDY_END=MDY(12,31,2007);

Read through the next section under

```
*****
**** DEFAULT SETTING SECTION ****
*****
```

This section includes default settings that we strongly recommend users to use. This ensures consistency in outputs and will help comparisons across Prometheus SAS program users. However, users are allowed to change the default values to other values. The default settings and descriptions have been summarized in table 8.

Table 8: ECR00 COMMON_MACRO.sas Default Settings

Default Settings	Description
Chronic group %LET AGE_DM=18; %LET AGE_CHF=18; %LET AGE_COPD=18; %LET AGE_HTN=18; %LET AGE_CAD=18; %LET AGE_ASTHMA=2; %LET AGE_GERD=18; Inpatient Procedural (IPP) group %LET AGE_HIPR=18; %LET AGE_KNEE=18; %LET AGE_CABG=18; %LET AGE_COLON=18; %LET AGE_BARI=18; Inpatient Medical (IM) group %LET AGE_AMI=18; %LET AGE_PNE=18; %LET AGE_STR=18; Outpatient Procedural (OPP) group %LET AGE_PCI=18; %LET AGE_COLOS=18; %LET AGE_PREG=10; %LET AGE_GALL=18; %LET AGE_HYST=18; %LET AGE_KNRP=18;	Patient minimum age cut-Off. All reports will only include patients whose age at index trigger is equal to or above the minimum age.
%LET MAX_AGE=65;	Patient maximum age cut-off. All reports will only include patients whose age at index trigger is under the maximum age. If user does not wish to have a maximum age limit, they can put MAX_AGE=120;

Table 8: ECR00_COMMON_MACRO.sas Default Settings

Default Settings	Description
<p>Chronic group %LET ENROLLMENT_CH=365; %LET PRIOR_CH=0; %LET FOLLOWUP_CH=365;</p> <p>Inpatient Procedural (IPP) group; %LET PRIOR_IPP=30; %LET FOLLOWUP_IPP=180;</p> <p>Inpatient Medical (IM) group; %LET PRIOR_IM=0; %LET FOLLOWUP_IM=30;</p> <p>Outpatient Procedural (OPP) group; %LET PRIOR_PCI=60; %LET FOLLOWUP_PCI=180;</p> <p>%LET PRIOR_GALL=60; %LET FOLLOWUP_GALL=180;</p> <p>%LET PRIOR_KNRP=60; %LET FOLLOWUP_KNRP=180;</p> <p>%LET PRIOR_HYST=60; %LET FOLLOWUP_HYST=180;</p> <p>%LET PRIOR_COLOS=7; %LET FOLLOWUP_COLOS=30;</p> <p>%LET PRIOR_PREG=252; %LET PRIOR_MIN=90; %LET FOLLOWUP_PREG=56;</p>	<p>ENROLLMENT is the minimum required continuous enrollment from the start of the look-back duration. For chronic ECRs® the default minimum continuous enrollment 365 covers the default episode period, but users can reset the value. For other ECRs®, the minimum continuous enrollment automatically covers the duration from the start of the look-back to the end of the follow-up and is not allowed to be reset separately.</p> <p>PRIOR is the look-back duration (in days) from the start of the index trigger.</p> <p>FOLLOWUP is the duration of an episode (in days) from the end of the index trigger.</p> <p>For Chronic, IPP and IM, the look-back and follow up period are set at category level, so that ECRs® under the same category always use the same settings. For OPP, the settings are adjustable at the single ECR® level.</p>
<p>%LET BREAK_IPP=30; %LET BREAK_CH=30; %LET BREAK_OPP=30; %LET BREAK_IM=0;</p>	<p>Enrollment gap day allowance. A gap of no more than the default value is allowed in the continuous enrollment period. This gap can be changed based on user preference but we recommend for the sake of consistency to keep the default settings.</p>
<p>%LET GRACE=2;</p>	<p>Grace period in number of days for defining inpatient stay-associated outpatient/professional claims. Any outpatient/professional claims within +/- grace period of a stay are defined as stay associated claims.</p>

Table 8: ECR00_COMMON_MACRO.sas Default Settings

Default Settings	Description
<pre>%LET PFO_MIN_AMT=10; %LET STAY_MIN_AMT=50; %LET RX_MIN_AMT=1; %LET CLAIM_MAX_AMT=1000000; %LET SUM_MINIMUM=20; %LET SUM_MAX=1000000;</pre>	<p>Cut-off of valid allowed amt. Claims with allowed amount out of the ranges are dropped as invalid or outlier claims.</p> <p>Claim level: minimum \$10 for outpatient/professional claims (pfo_min_amt) \$50 for inpatient/stay claims (stay_min_amt) \$1 for pharmacy claims (rx_min_amt); maximum \$1 million for all types of claims</p> <p>Episode level: minimum \$20 for total medical costs (inpatient/outpatient/professional) in the episode maximum \$1 million for total medical costs (inpatient/outpatient/professional) in the episode maximum \$1 million for all pharmacy costs in the episode maximum \$2 million for all relevant costs in the episode</p>

The section after default settings

```

/*****\
      NO ANY CHANGES ALLOWED BELOW
\*****/

```

does not allow users to make any changes.

After values for all the macro variables have been set, save and close the program. There is no need to run (i.e. to submit) the ECR00 program, as it will be “included” in other s when needed using the SAS %include syntax.

3.1.3 Run ECR01_DATA_ELEMENTS.sas to create common data files.

After ECR00 user’s settings have been saved, user can run ECR01_DATA_ELEMENTS.sas. This program processes user’s source member and claims data to create a new set of data files that can be used to generate each ECR®. Major steps completed through this program include assigning CCS codes and Prometheus Drug ID codes, produce source data summary, etc. The data files produced from this program are stored in the location assigned by the user (%LET ECR=) .

Open the program in the SAS Editor and locate the section underneath the title

```

*****
**** USER SETTING SECTION ****
*****;

```

Enter the pathname to the folder which contains all of the Prometheus SAS program files at

```

** LOCATION OF SAS PROGRAMS;
** Example: %LET PROGRAM_LOC=/ECR PROGRAM;
%LET PROGRAM_LOC=;

```

After the program location is entered, save and run (i.e. submit) the ECR01 program, and close it when it is finished running.

Notes:

1. Program location is the only setting that requires user's input. No other changes are allowed in the ECR01 program.
2. Usually ECR01 only needs to be run once for all ECRs®. However, if any of the source data files are changed or any of the following settings in ECR00 are changed after ECR01 has been run, then the user has to rerun ECR01.

```
%LET CLAIMDATA=;
%LET METADATA=;
%LET ECR=;

%LET CLM_MEMBER=;
%LET CLM_ELIG=;
%LET CLM_IP=;
%LET CLM_OP=;
%LET CLM_RX=;

%LET IPDX=;
%LET IPPX=;
%LET IPCPT=;
%LET REV_CPT=;
%LET OPDX=;
%LET OPPX=;
%LET OPCPT=;

%LET STUDY_START=MDY(,,);
%LET STUDY_END=MDY(,,);
%LET EMERGENCY=;

%LET PFO_MIN_AMT=;
%LET STAY_MIN_AMT=;
%LET RX_MIN_AMT=;
%LET CLAIM_MAX_AMT=;
```

Changing ECR00 settings not listed above after running ECR01 does not require the rerun of ECR01.

3. The following steps are conducted in ECR01 steps for data cleaning.
 - i. All claims with ALLOWED_AMT lower than the minimum cut-off or higher than the maximum cut-off are excluded as invalid claims.
 - ii. For PFO claims:
 - a) If either "FROM_DATE_S" or "THRU_DATE_S" is missing – the missing date is imputed using the other date;
 - b) If the difference between "THRU_DATE_S" and "FROM_DATE_S" is >100 days, then the claim is excluded as an invalid claim.

3.1.4 Run ECR02_ECR_SUBMISSION.sas to create each ECR®.

After running ECR01 program is completed, user can run ECR02 SUBMISSION.sas to generate each ECR®. ECR02 program uses the data files created through ECR01 program and produce analytic data and reports for each ECR® separately.

Open the program in the SAS Editor and locate the section underneath the title

```
*****
**** USER SETTING SECTION ****
*****;
```

Enter the pathname to the folder which contains all of the Prometheus SAS program files at

```
** 1) LOCATION OF SAS PROGRAMS;
**   Example: %LET PROGRAM_LOC=/ECR PROGRAM;
```

```
%LET PROGRAM_LOC=;
```

Enter the names of ECRs® to be generated. User must use the standard ECR® names listed in table 1.

```
** 2) NAMES OF ECR;
**   Example: %LET ECR_NAME= CHF CAD HIPR;
```

```
%LET ECR_NAME=;
```

The title “NO CHANGES ALLOWED BELOW” marks the place below which no more changes are allowed. Save and run (i.e. submit) this program, and close it when it is finished running.

Notes:

- 1) Multiple ECRs® can be run together or individually. Enter the desired ECR® names separated by a space. If the size of the outpatient claims dataset is greater than 1 GB, submit 1 to 3 ECRs® at a time.
- 2) If user’s settings in ECR00 are changed, then ECR02 program has to be rerun. Depending on the fact that if the changed settings are applied to all ECRs®, an ECR® category, or a specific ECR® alone, the user can determine which ECRs® should be rerun.
- 3) If ECR01 program has been rerun for any reason, then ECR02 program should be rerun for all ECRs®.

3.2 Reports from ECR® Construction Programs

The ECR01 and ECR02 programs generate the following Excel reports:

Table 9: ECR® Reports	
Name of Report File	Contents
Common report (one set for all data)	
GENERAL_DATA_SUMMARY	This report shows the summary information for all original data submitted by the users and the valid data included in the study period for ECRs®. This includes the number of patients and their associated stay records, professional records, and pharmacy records as well as their associated costs.
CORE_PRICE_INFO	This report shows the average unit cost for core services, calculated using outpatient/professional claims. These services and their costs are used to determine the gaps in care and the care coordination (underuse) amount at the patient level for each chronic medical ECR®.
ECR®-specific report (one set Per ECR®. Numbers of reports vary by ECR® category. ECR® name in the file name is omitted)	
Chronic ECR® Reports	
DATA_FLOW	This table shows how patients with trigger claims are filtered through enrollment, eligibility, and exclusion criteria to generate final ECR® datasets with relevant claims. Number of unique patients and corresponding claims, total/average allowed amounts, standard deviations, and allowed amount distribution at each major filtering step are included. The final rows of the output table describe the counts and associated costs for 1) all relevant claims in an ECR®, 2) for “typical” services and 3) for potentially avoidable complications (PACs); each broken down by inpatient stay, outpatient facility, professional, and pharmacy claims. This output is a summary of the patient level intermediate SAS table that gets generated based on the actual number of patients, their claims experience, and how they were classified using the Prometheus ECR® process. The proportion of total dollars spent for care of PACs is calculated at the end of the report as the “PAC rate”.
DATA_FLOW_OVERVIEW	This is the overview of all relevant episodes in the final ECR® datasets. Total / average allowed amount, and standard deviations are calculated based on the total number of all episodes for the medical condition under study. This represents an actuarial analysis to study the proportion of costs contributed by each subgroup within the ECR®.
TYPICAL_STAY	This report shows the frequency and percentage of typical risk factors that are flagged among typical inpatient stay claims. All diagnoses, procedure, and revenue codes on these claims are searched for flagging typical risk factors. For chronic conditions, only GERD and CAD, which allow “typical” inpatient stays, have this report. For the other five chronic conditions (hypertension, diabetes, CHF, COPD and Asthma), all stays are regarded as PACs, therefore, they have no typical stays.
TYPICAL_PROF	This report shows the frequency and percentage of typical risk factors that are flagged among typical professional, outpatient facilities, other ancillary, and pharmacy claims. All diagnoses, procedure, and NDC codes on these claims

Table 9: ECR® Reports	
Name of Report File	Contents
	are searched for flagging risk factors.
PAC_STAY	For ECRs® including DM, Asthma, CHF, COPD, and HTN, this report shows the frequency and cost based on the principal diagnosis for PAC inpatient stays. Stays are counted only once and the principal diagnosis may belong to a typical or a PAC category, but identifies the reason a patient was admitted for the stay. For GERD and CAD, this report shows the frequency and cost of each type of PAC event that occurred in the PAC inpatient stay claims.
PAC_PROF	This report shows the frequency and cost of each type of PAC event that occurred in the professional, outpatient facilities, and other ancillary claims. All diagnoses and procedure codes on the claims are searched for PAC events and included in the PAC count, therefore counting the same patient for more than one PAC category is allowed.
CORE_PRICE	This report shows the user-specific cost of core services for the ECR®. It is calculated based on the average unit cost and the number of services recommended based on evidence informed guidelines during the episode period for each ECR®. This report is generated only for the chronic medical conditions and helps determine the underuse / care coordination amount for these ECRs®.
Inpatient Procedural/Inpatient Medical ECR® Reports	
DATA_FLOW	This table shows how patients with trigger claims are filtered through enrollment, eligibility, and exclusion criteria to generate final ECR® datasets with relevant claims. Number of unique patients and corresponding claims, total/average allowed amounts, standard deviations, and allowed amount distribution at each major filtering step are included. The final rows of the output table describe the counts and associated costs for 1) all relevant claims in an ECR®, 2) for “typical” services and 3) for potentially avoidable complications (PACs); each broken down by inpatient stay, outpatient facility/professional, and pharmacy claims. The last two rows in the report show data for typical and PAC inpatient readmissions. This output is a summary of the patient level intermediate SAS table that gets generated based on the actual number of patients, their claims experience, and how they were classified using the Prometheus ECR® process. The proportion of total dollars spent for care of PACs is calculated at the end of the report as the “PAC rate”.
DATA_FLOW_OVE RVIEW	This is the overview of all relevant episodes in the final ECR® datasets. Total / average allowed amount, and standard deviations are calculated based on the total number of all episodes for the medical condition under study. This represents an actuarial analysis to study the proportion of costs contributed by each subgroup within the ECR®.
TYPICAL_INDEX_ STAY	This report shows the frequency and percentage of typical risk factors that are flagged among typical index inpatient stay claims. All diagnoses, procedure, and revenue codes on these claims are searched for flagging typical risk factors.
TYPICAL_READMI	This report shows the frequency and cost based on the principal diagnosis for

Table 9: ECR® Reports	
Name of Report File	Contents
T_STAY	“typical” inpatient stay readmissions. Stays are counted only once. The principal diagnosis identifies the reason a patient was readmitted for the stay. Not all ECRs are allowed to have typical readmissions.
TYPICAL_PROF	This report shows the frequency and percentage of typical risk factors that are flagged among typical outpatient facility, professional, other ancillary, and pharmacy claims. All diagnoses, procedure, and pharmacy codes on these claims are searched for flagging typical risk factors.
PAC_INDEX_STAY	This report shows the frequency and cost of each type of PAC event that occurred in the PAC index inpatient stay claims.
PAC_READMIT_STAY	Not all readmissions are PACs. This report looks at the readmissions that were classified as PACs and shows the frequency and cost of each type of PAC event that occurred. If the stay did not have a pre-defined PAC event, the readmission is identified by the principal diagnosis code on the readmission.
PAC_PROF	This report shows the frequency and cost of each type of PAC event that occurred in the PAC outpatient facility and professional claims.
Outpatient Procedural ECR® Reports	
DATA_FLOW	This table shows how patients with trigger claims are filtered through enrollment, eligibility, and exclusion criteria to generate final ECR® datasets with relevant claims. Number of unique patients and corresponding claims, total/average allowed amounts, standard deviations, and allowed amount distribution at each major filtering step are included. The final rows of the output table describe the counts and associated costs for 1) all relevant claims in an ECR®, 2) for “typical” services and 3) for potentially avoidable complications (PACs); each broken down by inpatient stay, outpatient facility, professional, and pharmacy claims. This output is a summary of the patient level intermediate SAS table that gets generated based on the actual number of patients, their claims experience, and how they were classified using the Prometheus ECR® process. The proportion of total dollars spent for care of PACs is calculated at the end of the report as the “PAC rate” for the given ECR®.
DATA_FLOW_OVERVIEW	This is the overview of all relevant episodes in the final ECR® datasets. Total / average allowed amount, and standard deviations are calculated based on the total number of all episodes for the medical condition under study. This represents an actuarial analysis to study the proportion of costs contributed by each subgroup within the ECR®.
TYPICAL_INDEX_STAY	This report shows the frequency and percentage of typical risk factors that are flagged among typical index inpatient stay claims. All diagnoses, procedure, and revenue codes on these claims are searched for flagging typical risk factors.
TYPICAL_INDEX_FACI	This report shows the frequency and percentage of typical risk factors that are flagged among typical index outpatient facility claims. All diagnoses and procedure codes on these claims are searched for flagging typical risk factors.
TYPICAL_PROF	This report shows the frequency and percentage of typical risk factors that are flagged among professional, other ancillary, and pharmacy claims. All

Table 9: ECR® Reports	
Name of Report File	Contents
	diagnoses, procedure, and pharmacy codes on these claims are searched for flagging typical risk factors.
TYPICAL_ASSOC_ADMIT_STAY	This report shows the frequency and cost based on the principal diagnosis for “typical” inpatient stay claims that are associated with the index. Stays are counted only once. The principal diagnosis identifies the reason a patient was admitted for the stay. Not all ECRs are allowed to have typical IP readmissions.
TYPICAL_ASSOC_ADMIT_FACI	This report shows the frequency and cost based on the principal diagnosis for “typical” outpatient facility claims that are associated with the index. Claims are counted only once. The principal diagnosis identifies the reason a patient was admitted for the facility.
PAC_INDEX_STAY	This report shows the frequency and cost of each type of PAC event that occurred in the PAC index inpatient stay claims.
PAC_INDEX_FACI	This report shows the frequency and cost of each type of PAC event that occurred in the PAC index outpatient facility claims.
PAC_ASSOC_ADMIT_STAY	Admissions prior to the index admission as well as those after discharge are called associated admissions. This report shows the frequency and cost of each type of PAC event that occurred in the associated admissions that got classified as a PAC. If the stay did not have a pre-defined PAC event, the associated admission is identified by the principal diagnosis code on the stay.
PAC_ASSOC_ADMIT_FACI	This report shows the frequency and cost of each type of PAC event that occurred in the PAC outpatient facility claims that are associated with the index.
PAC_PROF	This report shows the frequency and cost of each type of PAC event that occurred in the PAC professional claims.

In all the reports above, the PAC events and their costs get double counted if the same claim has more than one PAC code. The unique patient count and the PAC costs associated with them are given at the end of the reports on a separate line defined as ACTUAL.

For all ECRs, there is also a CSV (Comma Separated Value) output for the DATA FLOW table to accommodate users’ need of the different output format.

3.3 Important ECR® Analytical Data Files from ECR® Datasets Construction Programs

The ECR® dataset construction programs generate a set of permanent SAS data files (intermediate output files) that are saved in the directory referred by a macro variable ANALYTIC. Among these data files, the following are most useful for users. Be aware that although the ECR® reports only include patients within the study age range, the ECR® SAS datasets always include patients of all ages so that it is more flexible for the user to conduct additional analysis. The variable AGE_GROUP=1 flags patients within the study range.

1. Bucket file (named as *<ECR name>_bucket*, *<ECR name>_ip_bucket*, *<ECR name>_op_bucket*): This file is at the claims level. For chronic ECRs®, inpatient stay and PFO (professional, outpatient facility, ancillary) claims are combined into a single bucket file (*<ECR name>_bucket*), whereas for all other ECRs®, two bucket files are created to contain inpatient stays (*<ECR name>_ip_bucket*) and PFO claims (*<ECR name>_op_bucket*) separately.

The bucket file contains all relevant medical claims that have been used to build up the ECR® episodes. It keeps all data fields in the original claim data file. In addition, each diagnosis and procedure code in the claim has been assigned with the corresponding CCS code. Each claim has been flagged for a typical or PAC assignment as well as the reason of the assignment (See Appendix Table A.1-A.7 for file contents).

2. Summary file (named as *<ECR name>_summary*): This file is at the patient level. It contains all relevant episodes and their associated allowed amounts. The allowed amount is broken down by typical and PAC and by professional, stay and pharmacy claims. This is the dataset that is used to create the ECR® data flow tables (See Appendix Table A.8-A.11 for file contents).
3. Sum Model Typical file: (named as *<ECR name>_sum_model_typical_<claim type>*): This file is at the patient level and is based on typical claims that went into the models. Each patient in this file is flagged with typical risk factors.
 - For chronic ECRs®, there is only one sum model typical professional file that includes all relevant patients that have any typical professional or outpatient facility allowed amounts. For GERD and CAD the typical stay claims are included in this single file. Typical risk factor flags are identified from patient's typical professional, outpatient facility and pharmacy claims (and also from typical stay claims for CAD and GERD). The sum of all typical allowed amounts is used for creating the risk-adjustment professional models.
 - For IPP and IM ECRs®, there are up to two (stay and prof) sum model typical files for each ECR®. The sum model typical stay file includes stay claims of all patients whose index inpatient stay is typical. The typical index stay claims help identify and flag risk factors that serve as independent variables in the risk-adjustment stay models. The allowed amount for the index stays is the dependent variable and is used for creating the risk-adjustment models for inpatient stays. The sum model typical prof file includes typical professional, outpatient facility and pharmacy claims for all patients whose index inpatient stay is typical. These claims help identify and flag typical risk factors that serve as independent variables in the risk-adjustment professional models. The sum of allowed amounts for the typical professional, outpatient facility and pharmacy claims is the dependent variable and is used for creating the risk-adjustment typical professional models.
 - For OPP ECRs®, there are up to three (stay, faci, prof) sum model typical files for each ECR®. The sum model typical stay file includes stay claims of all patients who have a typical index inpatient stay. Typical stay risk factor flags are identified from

these patients' index stay claims. The index stay allowed amount is used for creating the risk-adjustment model for typical inpatient stays. The sum model typical faci file includes outpatient facility claims of all patients who have a typical index outpatient facility. Typical outpatient facility risk factor flags are identified from these patients' index outpatient facility claims. The index facility allowed amount is used for creating the risk-adjustment models for typical outpatient facility. The sum model typical prof file includes all patients whose have either a typical inpatient stay index or a typical outpatient facility index. Typical prof risk factor flags are identified from these patients' typical professional and pharmacy claims. The sum of typical professional and pharmacy allowed amounts is used for creating the risk-adjustment typical professional models.

(See Appendix Table A.12 for the contents of sum model typical files).

4 ECR® MODELING

Prometheus modeling program uses the typical episode ECR® data generated through section 3 to build risk-adjustment payment models and produce risk-adjusted full ECR® payment for each typical patient episode. In addition, a severity index is calculated for each ECR® with reference to the standard CIP model.

4.1 Benchmark (Reference) Database: Commercially Insured Population (CIP)

Our benchmark database is a two-year national database of 4.7 million covered lives and over 95 million dollars in allowed amounts. It is called the CIP (commercially insured population) database and was used to create reference PAC rates as well as benchmark coefficients for the risk-adjustment models.

4.2 ECR® risk-adjustment modeling

Separate risk-adjustment models are created for each of the components of the episode (stay, outpatient facility and professional & pharmacy) where applicable. Chronic care ECRs® have only one risk-adjustment model (PFO: professional, pharmacy and other claims model); inpatient procedural (IPP) and inpatient medical (IM) ECRs®, will each potentially have a stay model and a PFO model; and outpatient procedural (OPP) ECRs® will each potentially have three models (inpatient stay, outpatient facility and PFO models). While the ECR® dataset always include patients of all ages, the risk-adjustment modeling procedure is conducted only among, and the results only applied to, patients within the study age range. Depending on the sample size and the availability of the corresponding standard CIP models, the modeling program will automatically choose one procedure from the following 4 options to create each of the risk-adjustment ECR® models:

1. Scoring 3: Builds a user-specific model based on their own fee schedules and practice patterns, selects predictor variables that are specific to the user's database, and calculates the risk-adjusted typical predicted allowed amount. The statistical processes applied behind the scenes include stepwise linear regression analysis using log-transformed typical allowed amount as dependent variable and typical risk factor flags as the predictors and 200 runs of boot-strap processes for model selection and validation. This logic is used when the user's sample size is at least 150. If the final model generated through this procedure contains at least 3 predictors and the adjusted R-square is at least 0.1, then the user-specific model is reported as the final model. Otherwise, one of the Scoring 0, 1, or 2 logics is used to select the final model, depending on the sample size and the availability of the CIP standard models.
2. Scoring 2: Uses the standard CIP model "predictor" list but generates normalized coefficients based on user-specific fee schedules and practice patterns. This model is used to calculate the risk-adjusted typical predicted allowed amount. This logic is used when the sample size is at least 500 and the user's data has failed to build a user-specific model.
3. Scoring 1: Uses the standard CIP model "predictors" as well as "coefficients" to calculate the risk-adjusted typical predicted allowed amount. The model intercept is adjusted using a bias

correction factor to make the total predicted typical allowed amount equal to the total actual typical amount in the user's database (after trimming for outliers). This logic is used when the user's sample size is between 15 and 150 and there is a CIP standard model available, or the user's sample size is between 150 and 500 but the user's data has failed to build a user-specific model.

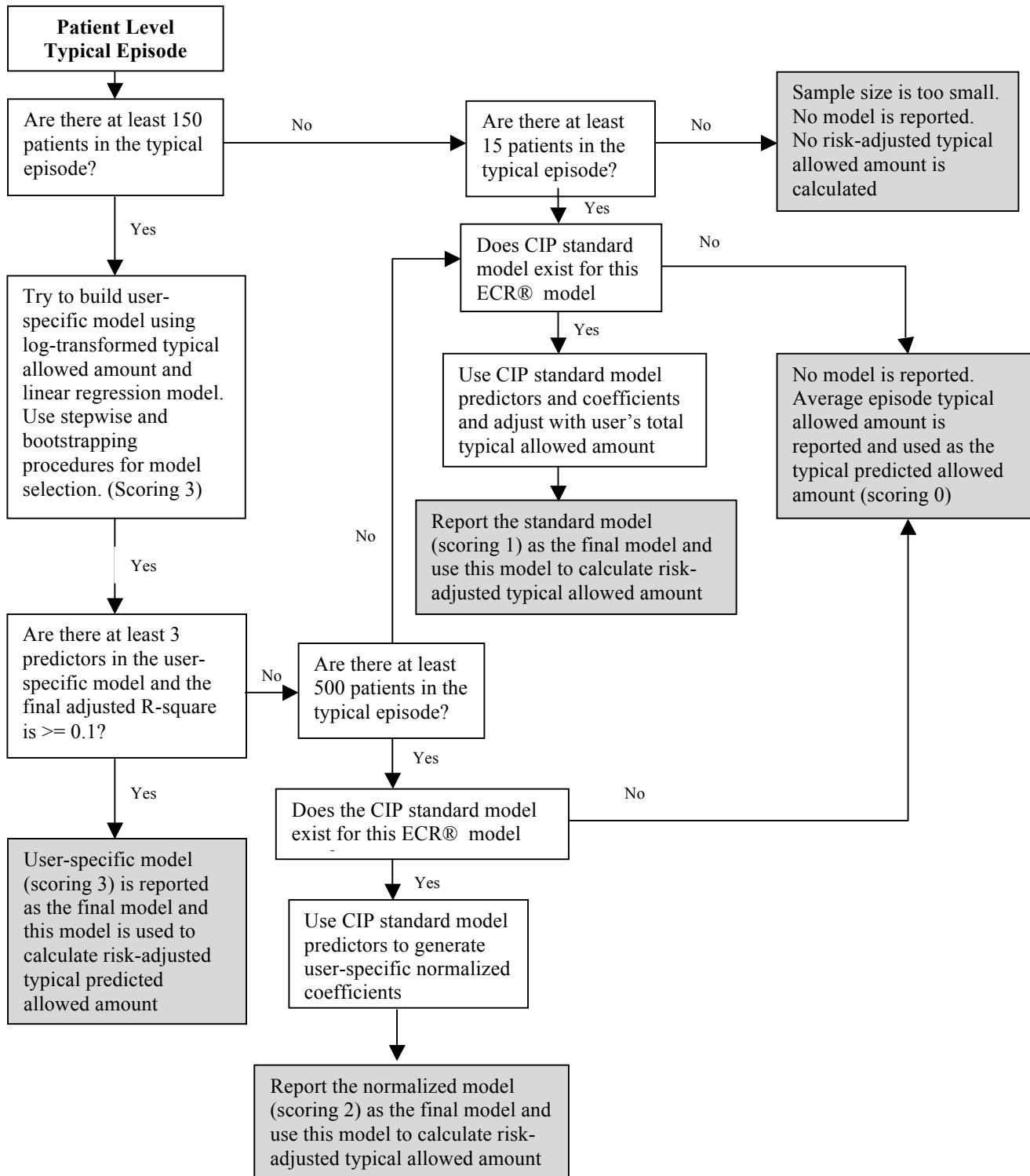
4. Scoring 0: Reports user's average allowed amount using typical allowed amount values trimmed at 1st and 99th percentiles values for costs. This logic is used when there is no existing standard CIP model; and the user's sample size is between 15 and 150, or the user's sample size \geq 150 but the data has failed to build a user-specific model.

If the sample size is less than 15, no model or average allowed amount will be reported. No risk-adjusted allowed amount will be calculated. The summary of above logic is outlined in the Figure 2 diagram. Availability of the CIP models is summarized in table 10.

Table 10: Availability of CIP Standard Model

ECR® Category	ECR® Description	ECR® Name	Model Availability		
			STAY	FACI	PROF
Chronic Medical ECR® (CH)	Chronic Obstructive Pulmonary Disease	COPD			Yes
	Congestive Heart Failure	CHF			Yes
	Coronary Artery Disease	CAD			Yes
	Diabetes	DM			Yes
	Hypertension	HTN			Yes
	Asthma	ASTHMA			Yes
	Gastroesophageal Reflux Disease	GERD			Yes
Inpatient Procedural ECR® (IPP)	Hip Replacement	HIPR	No		Yes
	Knee Replacement	KNEE	No		Yes
	Coronary Artery Bypass Graft	CABG	Yes		Yes
	Bariatric Surgery	BARI	No		Yes
	Colon Resection	COLON	No		Yes
Inpatient Medical ECR® (IM)	Acute Myocardial Infarction	AMI	Yes		Yes
	Pneumonia	PNE	Yes		Yes
	Stroke	STR	Yes		Yes
Outpatient Procedural ECR® (OPP)	Coronary Angioplasty	PCI	Yes	Yes	Yes
	Colonoscopy	COLOS	No	Yes	Yes
	Pregnancy and Delivery	PREG	No	No	Yes
	Cholecystectomy	GALL	Yes	No	Yes
	Hysterectomy	HYST	No	Yes	Yes
	Knee Arthroscopy	KNRP	No	Yes	Yes

Figure 2: Diagram of Prometheus ECR® Modeling Procedure



4.3 Full ECR® Price

Based on the final ECR® model, the full ECR® price is calculated for each patient with typical episodes. The full ECR® price is the sum of the following 5 portions:

1. Risk-adjusted predicted typical allowed amount;
2. Adjustment for under-use of core services (for Chronic medical ECRs® only).
3. PAC Allowance:
 - a. Flat-rate PAC allowance;
 - b. Risk-adjusted (proportional) PAC allowance;
4. Typical readmission/associated admission allowance (for IPP and OPP ECR® that have readmissions / associated admissions classified as typical)
5. Margin allowance;

For patients with chronic care ECRs®, a single calculation is done. However, for patients with inpatient procedural (IPP), inpatient medical (IM) or outpatient procedural (OPP) ECRs®, separate calculations are done for each component (stay, professional and outpatient facility, where applicable). The full ECR® price is then determined as the sum of the components relevant to the patient. The calculations are done automatically within the program with default settings as noted below. However, if the user wishes to change the PAC allowance rates or the margin, then the programs have the flexibility to do that.

Details of the Full ECR® price calculations:

1. **Risk-adjusted predicted typical allowed amount:** This is calculated from the risk-adjustment models as described in section 4.2.
2. **Adjustment for under-use of core services (for chronic medical ECRs® only):** For each chronic care ECR®, we calculate the user-specific cost of core services. This is calculated based on the average unit cost and the number of services recommended based on evidence informed guidelines during the episode period for each ECR®. Gaps in care are calculated on a patient-by-patient basis and an allowance given upfront for the underuse. The allowance for under-use is obtained from the PAC dollars in the user's database. If all the PAC dollars are used in paying for care coordination / under-use, no further PAC Allowance is given. If dollars are left behind in the PAC pool, they are used to determine the PAC Allowance.
3. **PAC Allowance:** The PAC dollars in a user's database are determined by the ECR® analytic process and generated as a report under the DATA FLOW tab in section 3.2. For chronic care ECRs®, the total care-coordination / underuse amount is subtracted from the PAC pool to determine the balance of the PAC dollars that go towards development of the PAC Allowance. Fifty percent of the PAC dollars are re-distributed to each patient irrespective of the occurrence of PACs and is called the PAC allowance.
 - a. **Flat-rate PAC allowance:** 25% of the PAC allowance dollars are distributed equally to all patients with relevant episode costs.

- b. Risk-adjusted (proportional) PAC allowance:** 75% of the PAC allowance dollars are made available to all patients with relevant episode costs. However, the amount is calculated based on their risk-adjusted predicted costs and is proportional to the base predicted costs.
- 4. **Typical Readmission allowance** (for IP stay and OP facility components of the ECR® only): For some IPP, IM and OPP ECRs®, typical readmissions or associated admissions are included in the full ECR® price. This amount is calculated as the average typical readmission/associated admission amount for the typical index episode.
- 5. **Margin allowance:** A 10% margin (or any other number that the user considered best) could be added towards the full ECR® price. However, in the current Prometheus model, we have set the margin at 0%.

4.4 Severity Index

User's Severity Index: User's Severity Index helps determine if the user's population is sicker than the benchmark population in the developmental CIP (commercially insured population, section 4.1) database. A user-specific severity index is calculated for each ECR® using an indirect standardization technique. The procedure uses the standard CIP professional model coefficients as weights to score the severity of patients in the user's database. The ratio of user's average patient severity to CIP average patient severity for a given ECR is the user's severity index.

Patient Severity Index: Patient Severity Index helps determine the relative severity of individual patients within the user's population for each ECR®. To calculate patient's severity index, the user-specific professional model coefficients are used as weights to score the severity of individual patients. The ratio of individual patient's severity to the average severity of all patients within the health plan for a given ECR is patient's severity index.

4.5 Run ECR03_MODEL_SUBMISSION.sas

After ECR02 program run is completed, a SAS data file is generated that contains typical episodes and typical risk factor flags for each ECR® and each claim type (i.e. inpatient stay, outpatient facility, professional etc.). Users may continue to run ECR03_MODEL_SUBMISSION.sas to generate risk-adjustment models, full ECR® prices, and severity index for each ECR®. This section describes how to run the SAS programs for this purpose.

Open the program ECR03_MODEL_SUBMISSION.sas in the SAS Editor and locate the section underneath the title

```
*****
**** USER SETTING SECTION ****
*****;
```

Enter the pathname to the folder which contains all of the Prometheus SAS program files at

```
** 1) LOCATION OF SAS PROGRAMS;
**      Example: %LET PROGRAM_LOC=/ECR PROGRAM;

%LET PROGRAM_LOC=;
```

Enter the names of ECRs® to be generated. User must use the standard ECR® names listed in table 1.

```
** 2) NAMES OF ECR;
**      Example: %LET ECR_NAME= CHF CAD HIPR;

%LET ECR_NAME=;
```

Read through the next section under

```
*****
**** DEFAULT SETTING SECTION ****
*****
```

This section includes default settings that we recommend users to use. However, users are allowed to change the default values to other values. The default settings and descriptions have been summarized in table 11.

Table 11: ECR03_MODEL_SUBMISSION.sas Default Settings	
Default Settings	Description
Settings for Modeling	
%LET SAMPLE_MIN=15;	The minimum sample size that the program will produce risk-adjusted typical predicted allowed amount using Scoring 0-3. If the sample size is less than this number, the program will not calculate risk-adjusted allowed amount, full ECR® price, or severity index.
%LET SAMPLE_SCORE3=150;	The minimum sample size that the program will try to build user-specific models using Scoring 3 logic. If the sample size is less than this number, the program will use Scoring 1 or 0 to calculate risk-adjusted allowed amount and full ECR® price.
%LET SAMPLE_SCORE2=500;	The minimum sample size that the program will use Scoring 2 logic to normalize the model coefficients based on the CIP standard model and user-specific fee schedule, when user-specific modeling (Scoring 3) procedure has failed. If the sample size is less than this number, the program will use Scoring 1 or 0 to calculate risk-adjusted allowed amount and full ECR® price.
%LET PRED_N=3;	The minimum number of predictors for a model to be valid using Scoring 3 logic. If the number of predictors in the final model is less than this number, the user-specific model has failed and the program will use other logic (Scoring 1, 2 or 0) to calculate risk-adjusted allowed amount and full ECR® price.
%LET R2=0.1;	The minimum adjusted R square for a model to be valid using Scoring 3 logic. If the adjusted R square in the final model is less than this number, the user-specific model has failed and the program will use other logic (Scoring 1, 2 or 0) to calculate risk-adjusted allowed amount and full ECR® price.
Settings for Full ECR® Calculation	

Table 11: ECR03_MODEL_SUBMISSION.sas Default Settings

Default Settings	Description
Settings for Modeling	
%LET PRF=0.5;	PAC redistribution factor, i.e. the proportion of total added PAC amount that is allowed for re-distribution.
%LET FFPF=0.25;	Flat fee portion factor, i.e. the proportion of total redistributable PAC that is evenly assigned to each patient. Rest of the redistributable PAC is assigned to patients in proportion of each patient's risk-adjusted typical allowed amount.
%LET UAF=1;	Core service underuse adjustment factor, i.e. the proportion of the underuse of core service that will be compensated in full ECR® price (used for Chronic medical ECR® only).
%LET MF=0;	Margin factor, i.e. the proportion of total typical allowed amount that is added to the full ECR® as a margin cost.

The title “NO CHANGES ALLOWED BELOW” marks the place below which no more changes are allowed. Save and run (i.e. submit) this program, and close it when it is finished running.

4.6 Output and Report Tables from ECR® Models

The ECR03 programs generate the following Excel reports. For each ECR® and each claim type, there will be one of Scoring0-3 or no model report, depending on which modeling procedure has been selected by the program based on the sample size and the availability of the corresponding standard CIP models.

Table 12: ECR® Modeling Reports

Name of Report Files	Contents
Scoring0	This report showed the summary data, including number of patients, average allowed amount, allowed amount in quartiles, etc., using typical episodes trimmed at 1 st and 99 th percentiles.
Scoring1	This report shows the risk-adjustment model using the standard CIP model coefficients. The intercept has been adjusted to neutralize the aggregated actual total amount and model predicted amount. Risk factor frequency and multiplier factors are reported.
Scoring2	This report shows the risk-adjustment model using the standard CIP model predictors and normalized to user-specific coefficients. The intercept has been adjusted to incorporate the log transformation bias. Risk factor frequency and multiplier factors are reported.
Scoring3	This report shows the user-specific risk-adjustment model built completely with user's data. The intercept has been adjusted to incorporate the log transformation bias. Risk factor frequency and multiplier factors are reported.
No model	This report shows that there is no model or predicted allowed amount being created due to small sample size. The minimum required sample size and the actual sample size are given in this report.
Full ECR Summary	This report shows the summary of all components, such as PAC allowance,

	predicted typical allowed amount, core service underuse adjustment, etc, for the full ECR calculations.
Severity Index	This report shows the average severity index in the user's database for each ECR® with reference to the CIP population.
RF severity adjustment	This report shows the frequency of patients with 1, 2, 3, .. typical risk factors and for each risk factor category, the frequency and proportion of patients without PACs, as well as the total and average PAC costs. In addition, the report provides average severity-adjusted typical costs, average severity-adjusted PAC% as well as average severity-adjusted relevant costs for each risk factor category. User can use this report to analyze the relationship between patient's severity (in terms of risk factor counts) and the PAC costs, severity-adjusted typical costs as well as severity-adjusted PAC costs for each ECR.

4.7 Important SAS Data Files generated from ECR® modeling procedures

For each ECR® and each data type (i.e. inpatient stay, outpatient facility, or professional) the modeling program will create two important patient-level SAS datasets.

1. Risk-adjusted typical predicted allowed amount file (named as *<ECR name>_typical_<claim type>_pred*). This data file is generated if the minimum sample size for modeling is reached (default is 15). This data file carries over all patients and data fields from the corresponding sum typical model file. A new variable PRED_ALLOW, which is the predicted ECR® allowed amount calculated from the risk-adjustment model, is added to this file for patients within the study age range (see Appendix Table B.1 for file contents)..
2. Full ECR® price (named as *<ECR name>_fullECR*). This data file includes all patients with typical episodes. Full ECR® price and severity-adjusted typical cost are calculated for all patients within the study age range (see Appendix Table B.2-4 for file contents).

5 ADDITIONAL FEATURES AND CAPABILITIES WITH THE OUTPUTS

With appropriate data, the user can conduct additional analysis using ECR® outputs. The following sections show a few analyses that the user may be interested in.

5.1 Regional variation analysis

If the user has patients' residential data, such as zip code, it is easy to link this information to the patients' ECR® data (the Summary file) for regional variation analysis. The user can stratify the patients from the Summary file by zip code and then aggregate patients' ECR® information (such as relevant, typical, PAC allowed amount) within each zip code to generate zip code level data flow. Similar regional analysis can be conducted at county level or state level, if data is available. A regional variation analysis of care-coordination / underuse amount for Chronic care ECRs® can also be done by linking CORE_GAP from the Core_costs file to the members' zip code. A separate module has been created called V3.5.2 R to allow the users to run this analysis.

5.2 Provider level (Attribution) analysis

Similar to the regional variation analysis, the user can conduct provider level analysis, if a member-provider attribution logic has been developed. First, the health plan should attribute each member to the providers that should hold responsibility for the member's episode. The user then can stratify the patients from the Summary file by provider, and aggregate patients' ECR® information (such as relevant, typical, PAC allowed amount) within each provider to generate provider level data flow. Similarly gaps in care by provider for chronic ECRs® can be determined by linking CORE_GAP from the Core_costs file to the attributed provider file. A separate module has been created called V3.5.2 A to allow the users to run this analysis.

APPENDIX: CONTENTS OF IMPORTANT SAS DATA FILES**Appendix A. SAS data files from ECR® construction procedures**

A.1 Chronic Medical ECR® Bucket File <i>(includes IP stay, OP facility, professional, and other ancillary claims)</i>	
Variable name	Description
.....	<i>All data fields from original STAY and PFO files</i>
MERGE_KEY	Unique claim record identifier
CCS_*	CCS code conversion corresponding to each diagnosis and procedure code
PRCD_*	Expanded trigger protection flags
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient Gender (M=Male F=Female)
ADMIT_EMERG	Emergency room flag
EPSD_START	Episode start date
EPSD_END	Episode end date
TRIG_START	First Date of Service of trigger
TRIG_END	Last Date of Service of trigger
EXPAND_CLM	Expanded trigger flag
EPI_LEVEL	Type of claim ('STAY'= IP stay claim 'PROF'=OP facility or professional claims)
TYPICAL_BY_EXPAND	Typical flagged by expanded triggers
HAC_BY_EXPAND	HAC STAY claims flagged by expanded triggers
PAC_BY_EXPAND	PAC flagged by expanded triggers
PAC_BY_CCSDX	PAC flagged by CCS diagnosis code
PAC_BY_CCSPX	PAC flagged by CCS procedure code
PAC_BY_EMERG	PAC flagged by emergency service
PAC_BY_WITHIN_STAY	PAC PFO claims flagged by within PAC IP stay period
FINAL_PAC	Final PAC flag
FINAL_TYPICAL	Final typical flag
BUCKET	Claim bucket ('TYPICAL'=typical claims 'PAC'=PAC claims)

A.2 Inpatient Procedural ECR® OP Bucket File <i>(includes OP facility, professional, and other ancillary claims)</i>	
Variable name	Description
.....	All data fields from original PFO files
MERGE_KEY	Unique claim record identifier
CCS_*	CCS code conversion corresponding to each diagnosis and procedure code
PRCD_*	Expanded trigger protection flags
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient Gender (M=Male F=Female)
ADMIT_EMERG	Emergency room flag
EPSD_START	Episode start date
EPSD_END	Episode end date
TRIG_START	First Date of Service of trigger
TRIG_END	Last Date of Service of trigger
PACB_MOD_IP	PAC by modifier from STAY claims
PACB_MOD_OP	PAC by modifier from PFO claims
READMISSION	Readmission flag
EXPAND_CLM	Expanded trigger flag
TYPICAL_BY_EXPAND	Typical flagged by expanded triggers
HAC_BY_EXPAND	HAC flagged by expanded triggers
PAC_BY_EXPAND	PAC flagged by expanded triggers
PAC_BY_CCSDX	PAC flagged by CCS diagnosis code
PAC_BY_CCSPX	PAC flagged by CCS procedure code
PAC_BY_EMERG	PAC flagged by emergency service
PAC_BY_F_STAY_PAC	PAC flagged by within PAC IP stay period
FINAL_PAC	Final PAC flag
FINAL_TYPICAL	Final typical flag
BUCKET	Claim bucket ('TYPICAL'=typical claims 'PAC'=PAC claims)

A.3 Inpatient Procedural ECR® IP Bucket File <i>(includes IP facility stay claims)</i>	
Variable name	Description
.....	All data fields from original STAY files
MERGE_KEY	Unique claim record identifier
CCS_*	CCS code conversion corresponding to each diagnosis and procedure code
PRCD_*	Expanded trigger protection flags
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient Gender (M=Male F=Female)
ADMIT_EMERG	Emergency room flag
EPSD_START	Episode start date
EPSD_END	Episode end date
TRIG_START	First Date of Service of trigger
TRIG_END	Last Date of Service of trigger
PACB_MOD_OP	PAC by modifier from PFO claims
PACB_MOD_IP	PAC by modifier from STAY claims
READMISSION	Readmission flag
EXPAND_CLM	Expanded trigger flag
TYPICAL_BY_EXPAND	Typical flagged by expanded triggers
HAC_BY_EXPAND	HAC flagged by expanded triggers
PAC_BY_EXPAND	PAC flagged by expanded triggers
PAC_BY_CCSDX	PAC flagged by CCS diagnosis code
PAC_BY_CCSPX	PAC flagged by CCS procedure code
PAC_BY_EMERG	PAC flagged by emergency service
PAC_BY_TRIG_PAC	PAC readmission flagged by trigger PAC IP stay
INDEX_STAY	Index stay flag
FINAL_PAC	Final PAC flag
FINAL_TYPICAL	Final typical flag
BUCKET	Claim bucket ('TYPICAL'=typical claims 'PAC'=PAC claims)

A.4 Inpatient Medical ECR® OP Bucket File <i>(includes OP facility, professional, and other ancillary claims)</i>	
Variable name	Description
.....	All data fields from original PFO files
MERGE_KEY	Unique claim record identifier
CCS_*	CCS code conversion corresponding to each diagnosis and procedure code
PRCD_*	Expanded trigger protection flags
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient Gender (M=Male F=Female)
ADMIT_EMERG	Emergency room flag
EPSD_START	Episode start date
EPSD_END	Episode end date
TRIG_START	First Date of Service of trigger
TRIG_END	Last Date of Service of trigger
READMISSION	Readmission flag
EXPAND_CLM	Expanded trigger flag
TYPICAL_BY_EXPAND	Typical flagged by expanded triggers
HAC_BY_EXPAND	HAC flagged by expanded triggers
PAC_BY_EXPAND	PAC flagged by expanded triggers
PAC_BY_CCSDX	PAC flagged by CCS diagnosis code
PAC_BY_CCSPX	PAC flagged by CCS procedure code
PAC_BY_EMERG	PAC flagged by emergency service
PAC_BY_F_STAY_PAC	PAC PFO flagged by within PAC IP stay period
FINAL_PAC	Final PAC flag
FINAL_TYPICAL	Final typical flag
BUCKET	Claim bucket ('TYPICAL'=typical claims 'PAC'=PAC claims)

A.5 Inpatient Medical ECR® IP Bucket File <i>(includes IP facility stay claims)</i>	
Variable name	Description
.....	All data fields from original STAY files
MERGE_KEY	Unique claim record identifier
CCS_*	CCS code conversion corresponding to each diagnosis and procedure code
PRCD_*	Expanded trigger protection flags
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient Gender (M=Male F=Female)
ADMIT_EMERG	Emergency room flag
EPSD_START	Episode start date
EPSD_END	Episode end date
TRIG_START	First Date of Service of trigger
TRIG_END	Last Date of Service of trigger
READMISSION	Readmission flag
EXPAND_CLM	Expanded trigger flag
TYPICAL_BY_EXPAND	Typical flagged by expanded triggers
HAC_BY_EXPAND	HAC flagged by expanded triggers
PAC_BY_EXPAND	PAC flagged by expanded triggers
PAC_BY_CCSDX	PAC flagged by CCS diagnosis code
PAC_BY_CCSPX	PAC flagged by CCS procedure code
PAC_BY_EMERG	PAC flagged by emergency service
PAC_BY_TRIG_PAC	PAC readmission flagged by trigger PAC IP stay
INDEX_STAY	Index stay flag
FINAL_PAC	Final PAC flag
FINAL_TYPICAL	Final typical flag
BUCKET	Claim bucket ('TYPICAL'=typical claims 'PAC'=PAC claims)

A.6 Outpatient Procedural ECR® OP Bucket File <i>(includes OP facility, professional, and other ancillary claims)</i>	
Variable name	Description
.....	All data fields from original PFO files
MERGE_KEY	Unique claim record identifier
CCS_*	CCS code conversion corresponding to each diagnosis and procedure code
PRCD_*	Expanded trigger protection flags
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient Gender (M=Male F=Female)
ADMIT_EMERG	Emergency room flag
TRIG_FROM	Claim source of trigger
EPSD_START	Episode start date
EPSD_END	Episode end date
TRIG_START	First Date of Service of trigger
TRIG_END	Last Date of Service of trigger
EXPAND_CLM	Expanded trigger flag
TYPICAL_BY_EXPAND	Typical flagged by expanded triggers
HAC_BY_EXPAND	HAC flagged by expanded triggers
PAC_BY_EXPAND	PAC flagged by expanded triggers
PAC_BY_CCSDX	PAC flagged by CCS diagnosis code
PAC_BY_CCSPX	PAC flagged by CCS procedure code
PAC_BY_MOD	PAC flagged by CPT modifier code
PAC_BY_F_STAY_PAC	PAC professional claims flagged by within PAC IP stay or PAC OP facility period
INDEX_STAY	Index stay flag
INDEX_PAC	Index PAC flag
FINAL_PAC	Final PAC flag
FINAL_TYPICAL	Final typical flag
BUCKET	Claim bucket ('TYPICAL'=typical claims 'PAC'=PAC claims)

A.7 Outpatient Procedural ECR® IP Bucket File <i>(includes IP facility stay claims)</i>	
Variable name	Description
.....	All data fields from original STAY files
MERGE_KEY	Unique claim record identifier
CCS_*	CCS code conversion corresponding to each diagnosis and procedure code
PRCD_*	Expanded trigger protection flags
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient Gender (M=Male F=Female)
ADMIT_EMERG	Emergency room flag
TRIG_FROM	Claim source of trigger
EPSD_START	Episode start date
EPSD_END	Episode end date
TRIG_START	First Date of Service of trigger
TRIG_END	Last Date of Service of trigger
EXPAND_CLM	Expanded trigger flag
TYPICAL_BY_EXPAND	Typical flagged by expanded triggers
HAC_BY_EXPAND	HAC flagged by expanded triggers
PAC_BY_EXPAND	PAC flagged by expanded triggers
PAC_BY_CCSDX	PAC flagged by CCS diagnosis code
PAC_BY_CCSPX	PAC flagged by CCS procedure code
PAC_BY_MOD	PAC flagged by CPT modifier
INDEX_STAY	Index stay flag
FINAL_PAC	Final PAC flag
FINAL_TYPICAL	Final typical flag
BUCKET	Claim bucket ('TYPICAL'=typical claims 'PAC'=PAC claims)

A.8 Chronic Medical ECR® Summary File	
Variable name	Description
CONSISTENT_MEMBER_ID	Unique member ID
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient gender (M=male F=female)
GENDER	Patient gender (1=male 0=female)
TYPICAL_STAY_AMT	Typical IP stay amount
TYPICAL_PROF_AMT	Typical OP facility/professional amount
PAC_STAY_AMT	PAC IP stay amount
PAC_PROF_AMT	PAC OP facility/professional amount
RX_ALLOW_AMT_TYPICAL	Typical Rx amount
RX_ALLOW_AMT_PAC	PAC Rx amount
RLVNT_STAY_AMT	Relevant IP stay amount (=TYPICAL_STAY_AMT + PAC_STAY_AMT)
RLVNT_PROF_AMT	Relevant OP facility/professional amount (=TYPICAL_PROF_AMT + PAC_PROF_AMT)
RLVNT_RX_ALLOWED	Relevant Rx amount (=RX_ALLOW_AMT_PAC + RX_ALLOW_AMT_TYPICAL)
ALL_TYPICAL_AMT	All typical amount (=TYPICAL_STAY_AMT + TYPICAL_PROF_AMT + RX_ALLOW_AMT_TYPICAL)
ALL_PAC_AMT	All PAC amount (=PAC_STAY_AMT + PAC_PROF_AMT + RX_ALLOW_AMT_PAC)
ALL_RELEVANT_AMT	All relevant amount (=RLVNT_PROF_AMT + RLVNT_PROF_AMT)
PAC_PCNT	PAC % (All_PAC_AMT / ALL_RELEVANT_AMT)

A.9 Inpatient Procedural ECR® Summary File	
Variable name	Description
CONSISTENT_MEMBER_ID	Unique member ID
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient gender (M=male F=female)
GENDER	Patient gender (1=male 0=female)
TYP_AMT_IP_INDEX	Typical index IP stay amount
TYP_AMT_IP_READ	Typical IP stay readmission amount
TYP_AMT_OP	Typical OP facility and professional amount
TYP_AMT_RX	Typical Rx amount
PAC_AMT_IP_INDEX	PAC index IP stay amount
IP_ADD_FAC_COSTS_DUE_TO_PAC	Additional IP facility costs due to PAC (=PAC_AMT_IP_INDEX minus health plan average TYP_AMT_IP_INDEX), if negative, made equal to zero
PAC_AMT_IP_READ	PAC IP stay readmission amount
PAC_AMT_OP	PAC OP facility and professional amount
PAC_AMT_RX	PAC Rx amount
TYP_SUM_AMT	Sum of TYP_AMT_IP_INDEX + TYP_AMT_OP + TYP_AMT_RX
PAC_SUM_AMT	Sum of PAC_AMT_IP_INDEX + PAC_AMT_OP + PAC_AMT_RX
RLVNT_STAY_AMT	Relevant IP stay amount (=TYP_AMT_IP_INDEX + TYP_AMT_IP_READ + PAC_AMT_IP_INDEX + PAC_AMT_IP_READ)
RLVNT_PROF_AMT	Relevant OP facility/professional amount (=TYP_AMT_OP + PAC_AMT_OP)
RLVNT_RX_ALLOWED	Relevant Rx amount (=TYP_AMT_RX + PAC_AMT_RX)
ALL_RELEVANT_AMT	All relevant amount (=RLVNT_STAY_AMT+ RLVNT_PROF_AMT+ RLVNT_RX_ALLOWED)
ALL_PAC_AMT	All PAC amount (=IP_ADD_FAC_COSTS_DUE_TO_PAC + PAC_AMT_IP_READ + PAC_AMT_OP + PAC_AMT_RX)
ALL_TYPICAL_AMT	All Typical amount (ALL_RELEVANT_AMT- ALL_PAC_AMT)
PAC_PCNT	PAC % (ALL_PAC_AMT / ALL_RELEVANT_AMT)

A.10 Inpatient Medical ECR® Summary File	
Same as Inpatient Procedural ECR® Summary file	

A.11 Outpatient Procedural ECR® Summary File	
Variable name	Description
CONSISTENT_MEMBER_ID	Unique member ID
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient gender (M=male F=female)
GENDER	Patient gender (1=male 0=female)
TYP_AMT_IP_INDEX	Typical index IP stay amount
TYP_AMT_OP_INDEX	Typical index OP facility amount
TYP_AMT_IP_READ	Typical IP stay associated admission amount
TYP_AMT_OP_READ	Typical OP facility associated admission amount
TYP_AMT_PROF	Typical professional amount
TYP_AMT_RX	Typical Rx amount
PAC_AMT_IP_INDEX	PAC index IP stay amount
IP_ADD_FAC_COSTS_DUE_TO_PAC	Additional IP facility costs due to PAC (=PAC_AMT_IP_INDEX minus health plan average TYP_AMT_IP_INDEX), if negative, made equal to zero
PAC_AMT_OP_INDEX	PAC index OP facility amount
OP_ADD_FAC_COSTS_DUE_TO_PAC	Additional OP facility costs due to PAC (=PAC_AMT_OP_INDEX minus health plan average TYP_AMT_OP_INDEX), if negative, made equal to zero
PAC_AMT_IP_READ	PAC IP stay associated admission amount
PAC_AMT_OP_READ	PAC OP facility associated admission amount
PAC_AMT_PROF	PAC professional amount
PAC_AMT_RX	PAC Rx amount
TYP_SUM_AMT	Sum of TYP_AMT_IP_INDEX + TYP_AMT_OP_INDEX + TYP_AMT_PROF + TYP_AMT_RX
PAC_SUM_AMT	Sum of PAC_AMT_IP_INDEX + PAC_AMT_OP_INDEX + PAC_AMT_PROF + PAC_AMT_RX
RLVNT_STAY_AMT	Relevant IP stay amount (=TYP_AMT_IP_INDEX + TYP_AMT_IP_READ + PAC_AMT_IP_INDEX + PAC_AMT_IP_READ)
RLVNT_FACI_AMT	Relevant OP facility amount (=TYP_AMT_OP_INDEX + TYP_AMT_OP_READ + PAC_AMT_OP_INDEX + PAC_AMT_OP_READ)
RLVNT_PROF_AMT	Relevant OP professional amount (=TYP_AMT_PROF + PAC_AMT_PROF)
RLVNT_RX_ALLOWED	Relevant Rx amount (=TYP_AMT_RX + PAC_AMT_RX)
ALL_RELEVANT_AMT	All relevant amount (=RLVNT_STAY_AMT + RLVNT_FACI_AMT + RLVNT_PROF_AMT + RLVNT_RX_ALLOWED)
ALL_PAC_AMT	All PAC amount (=IP_ADD_FAC_COSTS_DUE_TO_PAC + PAC_AMT_IP_READ + OP_ADD_FAC_COSTS_DUE_TO_PAC + PAC_AMT_OP_READ + PAC_AMT_PROF + PAC_AMT_RX)
ALL_TYPICAL_AMT	All Typical amount (ALL_RELEVANT_AMT- ALL_PAC_AMT)
PAC_PCNT	PAC % (All_PAC_AMT / ALL_RELEVANT_AMT)

A.12 Sum_Model_Typical File (for all ECRs)	
Variable name	Description
.....	<i>All data fields from SUMMARY files</i>
<Typical risk factor name>	Flags for all typical risk factors related to this ECR
TYP_MODEL_AMT_(PROF/FACI/STAY)	Total typical cost for the ECR component that will be used to build risk-adjustment model.
RF_COUNT	Number of all typical risk factors (excluding age and gender)

This file only carries members that have typical claims.

Each ECR and ECR component (i.e. stay, prof, OP faci) has a separate file.

Appendix B. SAS data files from ECR® modeling procedures

B.1 Typical Pred File (for all ECRs)	
Variable name	Description
.....	<i>All data fields from SUM MODEL TYPICAL files</i>
PRED_ALLOW	Model predicted typical allowed amount
MODEL_RF_COUNT	Number of typical risk factors in the final model
PT_SEV (for prof component only)	Patient-specific severity score (Exponential of the sum product of RF and their coefficients using only typical prof model)

This file only carries members that have typical claims.

Each ECR and ECR component (i.e. stay, prof, OP faci) has a separate file.

B.2 Chronic Medical Full ECR® Price File	
Variable name	Description
CONSISTENT_MEMBER_ID	Unique member ID
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient gender (M=male F=female)
ALL_TYP_AMT	Actual typical cost
ALL_PAC_AMT	Actual PAC cost
PRED_ALLOW	Predicted typical cost
UNDERUSE_ALLOW	Core services underuse adjustment
PAC_ALLOW	PAC allowance amount
PAC_FF_ALLOW	PAC allowance fixed amount
PAC_PAF	PAC allowance proportional factor
PAC_PROP_ALLOW	PAC allowance proportional amount
MARGIN	Margin allowance
ALL_RELEVANT_AMT	Actual total relevant cost
PRED_FULLECR	Predicted total full ECR® price
PAC_PCNT	PAC % (ALL_PAC_AMT / ALL_RELEVANT_AMT)
RF_COUNT	Number of all typical risk factors
PT_SEV	Patient-specific severity score (Exponential of the sum product of RF and their coefficients using only typical prof model)
PT_SEV_INDEX	Ratio of patient-specific severity score to the plan-average severity score
SEV_ADJ_TYP_AMT	Severity-adjusted typical amount (ALL_TYP_AMT/PT_SEV_INDEX)
SEV_ADJ_RLVNT_AMT	Severity-adjusted relevant amount (SEV_ADJ_TYP_AMT + ALL_PAC_AMT)
SEV_ADJ_PAC_PCNT	Severity-adjusted PAC % (ALL_PAC_AMT / SEV_ADJ_RLVNT_AMT)

B.3 Inpatient Procedural and Inpatient Medical Full ECR® Price File	
Variable name	Description
CONSISTENT_MEMBER_ID	Unique member ID
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient gender (M=male F=female)
TYP_MODEL_AMT_STAY	Actual typical index IP stay cost
TYP_AMT_IP_READ	Actual typical IP readmission cost
PAC_AMT_IP_READ	Actual PAC IP readmission cost
TYP_MODEL_AMT_PROF	Actual typical professional, OP facility, and Rx cost
PAC_PROF_AMT	Actual PAC professional, OP facility, and Rx cost
PRED_ALLOW_STAY	Predicted typical index IP stay cost
PAC_ALLOW_STAY	PAC IP stay allowance amount
PAC_FF_ALLOW_STAY	PAC IP stay allowance fixed amount
PAC_PAF_STAY	PAC IP stay allowance proportional factor
PAC_PROP_ALLOW_STAY	PAC IP stay allowance proportional amount
TYP_READMIT_ALLOW_STAY	Typical IP stay readmission allowance amount
MARGIN_STAY	Margin Allowance for IP stay
PRED_ECR_STAY	Total ECR price for IP stay
PRED_ALLOW_PROF	Predicted typical professional, OP facility, and Rx cost
PAC_ALLOW_PROF	PAC allowance amount for professional, OP facility, and Rx cost
PAC_FF_ALLOW_PROF	PAC allowance fixed amount for professional, OP facility, and Rx cost
PAC_PAF_PROF	PAC allowance proportional factor for professional, OP facility, and Rx cost
PAC_PROP_ALLOW_PROF	PAC allowance proportional amount for professional, OP facility, and Rx cost
MARGIN_PROF	Margin allowance for professional, OP facility, and Rx cost
PRED_ECR_PROF	Total ECR price for professional, OP facility, and Rx cost
ALL_RELEVANT_AMT	Actual total relevant cost
PRED_FULLECR	Predicted total full ECR price
ALL_PAC_AMT	Actual total PAC costs
ALL_TYP_AMT	Actual total typical costs
PAC_PCNT	PAC % (ALL_PAC_AMT / ALL_RELEVANT_AMT)
RF_COUNT	Number of all typical risk factors
PT_SEV	Patient-specific severity score (Exponential of the sum product of RF and their coefficients using only typical prof model)
PT_SEV_INDEX	Ratio of patient-specific severity score to the plan-average severity score
SEV_ADJ_TYP_AMT	Severity-adjusted typical amount (ALL_TYP_AMT/PT_SEV_INDEX)
SEV_ADJ_RLVNT_AMT	Severity-adjusted relevant amount (SEV_ADJ_TYP_AMT + ALL_PAC_AMT)
SEV_ADJ_PAC_PCNT	Severity-adjusted PAC % (ALL_PAC_AMT / SEV_ADJ_RLVNT_AMT)

B.4 Outpatient Procedural Full ECR® Price File	
Variable name	Description
CONSISTENT_MEMBER_ID	Unique member ID
PT_AGE	Patient age at trigger (YEAR OF TRIGGER DATE-YOB)
AGE_GROUP	Patient age group. 1= (min age <= age <max age) 0=(age<min age or >= max age)
SEX	Patient gender (M=male F=female)
TYP_MODEL_AMT_STAY	Actual typical index IP stay cost
TYP_AMT_IP_READ	Actual typical IP readmission cost
PAC_AMT_IP_READ	Actual PAC IP readmission cost
TYP_MODEL_AMT_FACI	Actual typical index OP facility cost
TYP_AMT_OP_READ	Actual typical OP facility readmission cost
PAC_AMT_OP_READ	Actual PAC OP facility readmission cost
TYP_MODEL_AMT_PROF	Actual typical professional and Rx cost
PAC_PROF_AMT	Actual PAC professional and Rx cost
PRED_ALLOW_STAY	Predicted typical index IP stay cost
PAC_ALLOW_STAY	PAC IP stay allowance amount
PAC_FF_ALLOW_STAY	PAC IP stay allowance fixed amount
PAC_PAF_STAY	PAC IP stay allowance proportional factor
PAC_PROP_ALLOW_STAY	PAC IP stay allowance proportional amount
TYP_READMIT_ALLOW_STAY	Typical IP stay readmission allowance amount
MARGIN_STAY	Margin Allowance for IP stay
PRED_ECR_STAY	Total ECR price for IP stay
PRED_ALLOW_FACI	Predicted typical index OP facility cost
PAC_ALLOW_FACI	PAC OP facility allowance amount
PAC_FF_ALLOW_FACI	PAC OP facility allowance fixed amount
PAC_PAF_FACI	PAC OP facility allowance proportional factor
PAC_PROP_ALLOW_FACI	PAC OP facility allowance proportional amount
TYP_READMIT_ALLOW_FACI	Typical OP facility readmission allowance amount
MARGIN_FACI	Margin Allowance for OP facility
PRED_ECR_FACI	Total ECR price for OP facility
PRED_ALLOW_PROF	Predicted typical professional and Rx cost
PAC_ALLOW_PROF	PAC allowance amount for professional and Rx cost
PAC_FF_ALLOW_PROF	PAC allowance fixed amount for professional and Rx cost
PAC_PAF_PROF	PAC allowance proportional factor for professional and Rx cost
PAC_PROP_ALLOW_PROF	PAC allowance proportional amount for professional and Rx cost
MARGIN_PROF	Margin allowance for professional and Rx cost
PRED_ECR_PROF	Total ECR price for professional and Rx cost
ALLL_RELEVANT_AMT	Actual total relevant cost
PRED_FULLECR	Predicted total full ECR price

ALL_PAC_AMT	Actual total PAC costs
ALL_TYP_AMT	Actual total typical costs
PAC_PCNT	PAC % ($ALL_PAC_AMT / ALL_RELEVANT_AMT$)
RF_COUNT	Number of all typical risk factors
PT_SEV	Patient-specific severity score (Exponential of the sum product of RF and their coefficients using only typical prof model)
PT_SEV_INDEX	Ratio of patient-specific severity score to the plan-average severity score
SEV_ADJ_TYP_AMT	Severity-adjusted typical amount ($ALL_TYP_AMT / PT_SEV_INDEX$)
SEV_ADJ_RLVNT_AMT	Severity-adjusted relevant amount ($SEV_ADJ_TYP_AMT + ALL_PAC_AMT$)
SEV_ADJ_PAC_PCNT	Severity-adjusted PAC % ($ALL_PAC_AMT / SEV_ADJ_RLVNT_AMT$)

HELP DESK ASSISTANCE REQUEST FORM

Please attach a completed copy of this sheet and your log to all help desk requests so that we have the necessary information to assist you. Please E-mail this form to the Prometheus Help Desk at Jenna.Costley@hci3.org. Please use the form in the document “Help Desk Assistance Request Form” for this request.

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Operating System:

ECR® Information V3.5.2 UNIX

ECR® Type:Select ECR Type

Disease Name:Select Disease Type

Program Version:Select Version

Program Name:
