Final HHS-Developed Risk Adjustment Model Algorithm "Do It Yourself (DIY)" Software Instructions for the 2023 Benefit Year April 10, 2024 Update[1]

Section 1343 of the Patient Protection and Affordable Care Act (ACA) provides for a permanent risk adjustment program. To protect against potential effects of adverse selection and help stabilize premiums in the individual and small group (including merged) markets, the risk adjustment program transfers funds from plans with relatively low-risk enrollees to plans with relatively high-risk enrollees. It generally applies to non-grandfathered individual and small group (including merged market) plans inside and outside Exchanges.

The HHS risk adjustment methodology was first described in the HHS Notice of Benefit and Payment Parameters for 2014 final rule (78 FR 15410), which was published in the *Federal Register* on March 11, 2013. The HHS risk adjustment methodology for the 2023 benefit year is described in the HHS Notice of Benefit and Payment Parameters for 2023 final rule (87 FR 27208) (2023 Payment Notice final rule), which was published in the *Federal Register* on May 6, 2022.[2] Beginning with the 2023 benefit year, the Centers for Medicare & Medicaid Services (CMS) finalized removal of the current severity illness factors from the adult models and replaced them with new severity and transplant indicators interacted with hierarchical condition category (HCC) count factors in the adult and child models, as well as replaced the current enrollment duration factors in the adult models with HCC-contingent enrollment duration factors in the adult models. The 2023 benefit year risk adjustment models use the Version 07 (V07) HHS-HCC classification, first implemented in the 2021 benefit year, and are recalibrated using blended coefficients from the 2017, 2018, and 2019 enrollee-level External Data Gathering Environment (EDGE) data. The high-cost risk pool calculation incorporated into the HHS risk adjustment methodology since the 2018 benefit year continued with the same parameters for the 2023 benefit year.[3]

Consistent with 45 C.F.R. § 153.320(b)(1)(i), CMS released a document on May 6, 2022, that set forth the 2023 benefit year final risk adjustment model coefficients (or factors), which are used in this software.[4]

The risk adjustment methodology that HHS will use when operating a risk adjustment program on behalf of a State for the 2023 benefit year[5] will calculate a plan average risk score for each covered plan based upon the relative risk of the plan's enrollees, and apply a state payment transfer formula to determine risk adjustment payments and charges for plans within a State market risk pool. The methodology addresses three considerations: (1) adverse

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[1] This document provides instructions for the HHS risk adjustment models for the 2023 benefit year, with revisions from the previous 2023 benefit year software instructions posted on the CCIIO website on January 9, 2023, available at: https://www.cms.gov/files/document/cy2023-diy-instructions-192024.pdf.

[2] See the Patient Protection and Affordable Care Act; HHS Notice of Benefit and Payment Parameters for 2023; Final Rule; 87 FR 27208 (May 6, 2022) (2023 Payment Notice final rule), available at: https://www.govinfo.gov/content/pkg/FR-2022-05-06/pdf/2022-09438.pdf.

[3] HHS maintained the $1 million threshold and 60 percent coinsurance rate high-cost risk pool parameters for the 2023 benefit year. See the 2023 Payment Notice final rule, 87 FR at 27236.

[4] See "2023 Benefit Year Final HHS Risk Adjustment Model Coefficients ," May 6, 2022, available at: https://www.cms.gov/files/document/2023-benefit-year-final-hhs-risk-adjustment-model-coefficients.pdf.

[5] HHS will operate risk adjustment for the 2023 benefit year in all 50 states and the District of Columbia.

selection in the individual and small group (including merged) markets; (2) plan metal level differences and permissible rating variation; and (3) the need for risk adjustment transfers that net to zero. The federally-certified risk adjustment methodology developed by HHS applicable for the 2023 benefit year:

- Is developed on enrollee-level EDGE data, which directly reflects claims data for ACA individual and small group (including merged) market enrollees;
- Employs the HCC grouping logic used in the Medicare risk adjustment program, but with HCCs refined and selected to reflect the expected population in risk adjustment covered plans[6];
- Includes a selected number of Prescription Drug Categories (RXCs) and RXC interactions in the adult models;
- Establishes concurrent risk adjustment models, one for each combination of metal level (platinum, gold, silver, bronze, catastrophic) and age group (adult, child, infant);
- Pools catastrophically high-cost enrollees nationally with a portion of the costs funded by a percent of premium charge to issuers of risk adjustment covered plans in each national market[7];
- Results in state transfers that net to zero within a State market risk pool;
- Adjusts state transfers for plan metal level, geographic rating area, induced demand, premium assistance Medicaid alternative plans, and age rating, so that transfers reflect health risk and not other cost differences; and
- Transfers funds between plans within a State market risk pool based on differences in relative actuarial risk.[8]

Key Revisions for Benefit Year 2023:
- (August 2023 Revisions) Updated Table 1 to reflect additional and renamed CSR variants for 2023, and to describe use of the enrollment duration (ED) variable for HCC-contingent ED factors in the 2023 adult models.
- (August 2023 Revisions) Updated Table 2 to add 2023 CPT/HCPCS codes used for diagnosis filtering, as described in Section II. Table 2 includes review of 2023 quarterly updates with effective dates as of April 1, 2023. Replaced the 2021 column of code information with 2022 codes (used for historical data purposes).
- (August 2023 Revisions) Revised Table 3 ICD-10 to V07 HHS-Condition Categories (CC) Crosswalk to remove Fiscal Year (FY) 2022 and CY2022

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[6] See 45 CFR 153.20 for the definition of "Risk Adjustment Covered Plan".

[7] The high-cost risk pool calculations under the HHS risk adjustment methodology involve two national markets – one for the individual market (including catastrophic and non-catastrophic plans, and merged market plans), and another for the small group market. See, for example, the Patient Protection and Affordable Care Act; HHS Notice of Benefit and Payment Parameters for 2018; Amendments to Special Enrollment Periods and the Consumer Operated and Oriented Plan Program; Final Rule, 81 FR 94058 at 94080 – 94082 (Dec. 22, 2016) (2018 Payment Notice final rule).

[8] For the 2023 benefit year, statewide average premiums are reduced (i.e., adjusted) by 14 percent in the state payment transfer formula to account for the proportion of administrative costs that do not vary with claims. See the 2018 Payment Notice final rule, 81 FR at 94099 - 94100. Also see the 2023 Payment Notice final rule, 87 FR at 27223.

Medicare Code Editor (MCE) columns. Revised explanatory text in Sections II and V to clarify that FY2023 ICD-10 diagnosis codes and FY2023 MCE edits should be used in 2023 benefit year risk adjustment and that FY2022 code valid information is retained for historical purposes.

- (August 2023 Revisions) Revised Table 3 ICD-10 to V07 HHS-Condition Categories (CC) Crosswalk to add additional age restrictions in the CC Age Split column for codes in CCs excluded from one or more of the adult, child, or infant models. New age restrictions are for codes in CCs 22, 28, 87.1-94, 123, and 174, such that codes in all CCs with model exclusions are restricted from the respective age ranges by CC age splits or MCE age conditions. This revision does not alter the calculation of risk scores or introduce new model exclusions but only incorporates existing model exclusions into Table 3. CCs with model exclusions continue to be identified in Table 12 for reference.
- (August 2023 Revisions) Updated Table 6 to include additional and renamed CSR variants for the 2023 adult models. Updated Table 6 to remove the high severe illness interaction group and include new severe and transplant interaction variables that utilize enrollees' HCC counts in the 2023 adult models. Updated Table 6 to reflect new enrollment duration factors that are only applicable to enrollees with at least one HCC and with 6 months or less of enrollment in the 2023 adult models.
- (August 2023 Revisions) Updated Table 7 to include additional and renamed CSR variants for the 2023 child models. Updated Table 7 to include new severe and transplant interaction variables that utilize enrollees' HCC counts in the 2023 child models.
- (August 2023 Revisions) Updated Table 8 to include additional and renamed CSR variants for the 2023 infant models.
- (August 2023 Revisions) Updated Table 9 Model Factors for the 2023 benefit year (using 2017, 2018, and 2019 EDGE data).
- (August 2023 Revisions) Updated Tables 10a and 10b to contain NDCs and HCPCS codes in the National Library of Medicine's RxNorm dataset as of April 1, 2023.
- (January 2024 Revisions) Updated Tables 1, 6, 7, and 8 to simplify RA Software Person-level CSR Indicator to values of 1 through 4. Revised Section III to reflect the simplified CSR indicator values.
- (January 2024 Revisions) Updated Table 2 to include review of 2023 quarterly updates of CPT/HCPCS codes with effective dates as of October 1, 2023.[9]
- (January 2024 Revisions) Revised Table 3 to contain FY2023 and FY2024 ICD-10 diagnosis codes and FY2023 and FY2024 MCE age and sex conditions. Updated ICD-10 code labels to reflect changes in FY2024. Updated CC assignments to account for new FY2024 ICD-10 codes. Updated the combined

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[9] As a result of the Coronavirus (COVID-19) public health emergency (PHE), the CPT/HCPCS list in Table 2 was expanded in Calendar Year (CY) 2020 to include certain telehealth and telephonic service codes that were not previously accepted for the HHS-operated risk adjustment program. The allowable telehealth services on Table 2 will continue to be accepted for risk adjustment eligible diagnosis filtering for the HHS-operated risk adjustment program applicable for the individual and small group (including merged) markets for the entire 2023 benefit year, if the services are otherwise allowable under applicable state law. For more information on the telehealth and telephonic services that are valid for the HHS-operated risk adjustment program for the 2023 benefit year, please refer to the Risk Adjustment Telehealth and Telephone Services During COVID-19 FAQs (https://www.cms.gov/files/document/cciio-ra-telehealth-faq04112023.pdf), updated April 11, 2023.

set of MCE age and sex conditions to be used for Calendar Year (CY) 2023 that covers both fiscal years (FY2023 and FY2024). Revised explanatory text in Sections II and V to clarify the use of FY2023 and FY2024 ICD-10 diagnosis codes and MCE edits.

- (January 2024 Revisions) Revised Table 4 to update the label for HCC 122 to "Nontraumatic Coma, Except Diabetic, Hepatic, or Hypoglycemic; Nontraumatic Brain Compression/Anoxic Damage" to better reflect its CY2023 (FY2023/FY2024) code content.[10]
- (January 2024 Revisions) Updated Tables 10a and 10b to contain NDCs and HCPCS codes in the National Library of Medicine's RxNorm dataset as of October 1, 2023. (Tables 10a and 10b will be updated again in April 2024 to reflect monthly RxNorm updates of NDCs and HCPCS codes through December 1, 2023.)
- (April 2024 Revisions) Updated Tables 10a and 10b to contain NDCs and HCPCS codes in the National Library of Medicine's RxNorm dataset as of December 1, 2023 to be used as the final set of NDCs and HCPCS codes for the 2023 benefit year.

The state payment transfer formula that is part of the HHS risk adjustment methodology consists of concurrent risk adjustment models, one for each combination of metal level (platinum, gold, silver, bronze, and catastrophic) and age group (adult, child, infant). This document provides the detailed information needed to simulate the calculation of risk scores given individual diagnoses.

CMS has created two versions of software (SAS software and HHS-developed risk adjustment model algorithm "Do It Yourself [DIY]" software) and software instructions for issuers to use with their enrollment data to simulate their enrollee populations' 2023 benefit year risk scores within the HHS-HCC risk adjustment models. **This software is being issued only as a supplemental tool for issuers of risk adjustment covered plans to better understand and simulate the calculation of plan liability risk scores for their enrollees.**

This software is not a required prerequisite to submitting claims data to the EDGE server for risk adjustment, nor is it a requirement of the HHS-operated risk adjustment program. Furthermore, issuers should not use this software to filter their own claims prior to submitting claims data to the EDGE server. The EDGE server software may have several additional layers of operational rules. The algorithm software merely provides a simulation tool for issuers to calculate enrollees' risk scores. Because risk adjustment transfers under the state payment transfer formula are dependent on the data submitted by other issuers within the State market risk pool, an issuer that wishes to use this information to assist with estimating its 2023 benefit year state transfer(s) should do so with caution and in combination with other data.

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[10] Consistent with fiscal year 2024 updates to ICD-10 codes that were effective October 1, 2023, the label for HCC 122 was updated from "Coma, Brain Compression/Anoxic Damage" to "Nontraumatic Coma, Except Diabetic, Hepatic, or Hypoglycemic; Nontraumatic Brain Compression/ Anoxic Damage." See *https://www.cms.gov/medicare/coding-billing/icd-10-codes/2024-icd-10-cm*. See also, the Patient Protection and Affordable Care Act; HHS Notice of Benefit and Payment Parameters for 2025; Updating Section 1332 Waiver Public Notice Procedures; Medicaid; Consumer Operated and Oriented Plan (CO–OP) Program; and Basic Health Program; Proposed Rule, 88 FR 82510 at 82535 (Nov. 24, 2023) (2025 Payment Notice proposed rule).

Questions: Please direct questions regarding these instructions to CMS at RARIPaymentOperations@cms.hhs.gov.

Terminology: The abbreviations ICD-10 and ICD-10-CM are used interchangeably in this document to refer to the International Classification of Diseases, 10th Revision, Clinical Modification. The abbreviations CC and HCC used in these instructions refer to the HHS-HCC risk adjustment models. These are different HCCs from those used in the CMS-HCC risk adjustment model for Medicare Part C.

I.   Introduction

The HHS risk adjustment methodology generally includes risk adjustment models, a determination of plan average actuarial risk, and a calculation of payments and charges.[12] The calculation of payments and charges at the State market risk pool level is referred to by HHS as the state payment transfer formula. This document provides a detailed description of the HHS risk adjustment models and enables interested parties to develop software to determine risk scores given individual diagnoses.

This document should be viewed as a supplemental tool to the 2023 benefit year HHS risk adjustment methodology finalized in the 2023 Payment Notice final rule. Please note that the models described herein were finalized in the 2023 Payment Notice final rule and the final 2023 benefit year model coefficients were set forth by CMS in a document released on May 6, 2022.[13]

The following is a description of the HHS risk adjustment models for the 2023 benefit

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[11] HCCs described in the tables that have splits, such as HCC035_1 and HCC035_2, are identified in the EDGE reference data as 351 and 352.

[12] The HHS-operated risk adjustment program also includes a high-cost risk pool, data collection approach, data validation procedures, and a schedule for program operation. These elements are not discussed in this document.

[13] See supra note 4.

year. This description includes a narrative and accompanying tables for calculating the risk scores from diagnoses in the HHS risk adjustment models. The HHS risk adjustment models calculate risk scores by summing an enrollee's factors (age/sex, HCCs, RXCs, enrollment duration, and interaction terms).[14] This description shows, in detail, how individual diagnoses are assigned to HCCs and NDCs/HCPCS codes are assigned to RXCs, and then allows the user to build individual risk scores from those inputs.

These instructions outline the steps needed to produce individual risk scores from the HHS risk adjustment models.

The state payment transfer formula that is part of the HHS risk adjustment methodology includes risk adjustment models based on age, as detailed in Table 1 Model Membership. Adult scores are calculated for enrollees whose age is equal to or greater than 21 using the adult model set. Child scores are calculated for enrollees age 2 – 20 using the child model set. Infant scores are calculated for enrollees age 0 – 1 using the infant model set. Because HHS models predict plan liability, there are 5 models within each age group model set – one each for platinum, gold, silver, bronze, and for the individual market only, catastrophic plans.

The following five sections describe the algorithm for creating risk scores. Any algorithm developed to calculate risk scores should prepare the diagnosis-level file and use it to assign HCCs for each person. This is described in Section II and includes the list of acceptable CPT/HCPCS codes listed in Table 2.[15] Additionally, Section II describes how to prepare NDC-level and HCPCS-level files for use in creating RXCs. Section III and Section IV, respectively, identify data inputted to and outputted from the applicable risk adjustment model. Finally, Section V describes the algorithm to produce risk scores (i.e., outputs). First, the algorithm should crosswalk acceptable diagnoses to Condition Categories (CCs). Then the algorithm should create HCCs by imposing hierarchies on the CCs. The algorithm should also crosswalk acceptable NDCs and HCPCS codes to RXCs. For persons without claims or encounter records, zeros are assigned to all CCs, HCCs, and RXCs. After HCCs and RXCs are created, the algorithm should compute predicted scores using the factors from the adult, child, and infant HHS risk adjustment regression models. This information is referenced in Tables 3-11. Information provided in Table 12 is not required to compute predicted risk scores and does not impact the algorithm; this table is included for reference purposes only.

The factors from the following regression models are used to produce risk scores:
- Adult regressions
    - Adult platinum
    - Adult gold
    - Adult silver
    - Adult bronze
    - Adult catastrophic
- Child regressions
    - Child platinum

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[14] The RXC and enrollment duration factors only apply to the adult models.
[15] Definitions taken directly from the Current Procedural Terminology (CPT®) codes and the Healthcare Common Procedure Coding System (HCPCS) code set.

- o Child gold
- o Child silver
- o Child bronze
- o Child catastrophic
- Infant regressions
  - o Infant platinum
  - o Infant gold
  - o Infant silver
  - o Infant bronze
  - o Infant catastrophic

II.   Creation of diagnosis-level file, NDC-level file, and HCPCS-level file

A. <u>Diagnosis-level file.</u> The diagnosis-level input file (Section III) should include ICD-10-CM diagnosis codes used for risk adjustment, listed in Table 3, ICD-10 to Condition Categories (CC) Crosswalk. The user must evaluate each claim or encounter record to determine whether the claim or record's diagnoses are included in the diagnosis file to be inputted to the algorithm or software. Encounter records normally report dates, provider or bill types, diagnoses and procedures, and other information, though they may not have payment information.

This section on the diagnosis file preparation explains how each record is evaluated to determine whether the record's diagnoses are to be used for CC/HCC creation. It is the user's responsibility to create the diagnosis-level file according to the filtering logic below. This document provides filtering instructions and a list of the CY2022 (for historical data purposes) and CY2023 CPT/HCPCS codes that define service or procedure types that identify acceptable sources of diagnoses for risk adjustment. However, the user must create the diagnosis-level file for input to the risk adjustment algorithm; the data set is <u>not</u> created by the algorithm.

NOTE: Supplemental diagnosis codes may be submitted in certain circumstances. These instructions and the software do not address the addition of supplemental diagnosis codes. Therefore, risk score output from this software will not account for inclusion of supplemental diagnoses.

Only ICD-10 diagnosis codes from sources allowable for risk adjustment should be included in the diagnosis-level file. ICD-10 codes that are not listed in Table 3 may be included in the diagnosis-level file but are ignored by the algorithm.[16] The steps below provide logic to determine which diagnoses are allowable. Note that Steps 1 and 3 refer to Table 2, CPT/HCPCS Included List for Diagnosis Code Filtering, which provides the 2022 (for historical data purposes) and 2023 CPT/HCPCS codes used to define service or procedure types that are acceptable sources of diagnoses for risk adjustment.
- The CPT/HCPCS codes marking services with diagnoses allowable for risk adjustment are listed in column A of Table 2.

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[16] If the user conducts fiscal year code validity checks described later in this section, only codes valid for risk adjustment will be included in the final diagnosis-level file.

- Column B lists the short description of the CPT/HCPCS codes.
- Columns C and D, respectively, indicate whether a CPT/HCPCS code is acceptable in 2022 or 2023.
- Notes begin on row 6,272 of the Excel table with the line "Notes:" and should not be imported by any program.

The diagnosis-level input file should include diagnoses from claims/encounter records with **discharge dates or through dates** within the benefit year. Though the term "claim" is used in the steps below, the steps apply equally to encounter records. For the EDGE server, only claims with discharge diagnoses are used for HHS risk adjustment.

1. Professional source of diagnosis
    a. For professional records, use diagnoses from records that have at least one line item with an acceptable CPT/HCPCS code (Table 2). If there is at least one acceptable line on the record, use all the header diagnoses. There are three possible values for CPT/HCPCS codes in columns C and D:
        i. yes = code is acceptable in that calendar year
        ii. no = code is not acceptable in that calendar year
        iii. N/A = code is not in existence in that calendar year
    b. For professional records, if a line item has an acceptable CPT/HCPCS code, use all diagnoses from the line item.
    c. If there are no acceptable service lines on the record, do not use any of the diagnoses for risk adjustment.
2. Inpatient facility source of diagnosis
    a. Use all header diagnoses from records where facility bill type code equals one of the following:
        i. 111 (inpatient admit through discharge); or
        ii. 117 (inpatient replacement of prior claim).
    b. There is no procedure screen for inpatient facility record types.
3. Outpatient facility source of diagnosis
    a. Restrict records to those with facility bill type code equal to:
        i. 131 (hospital outpatient admit through discharge); or
        ii. 137 (hospital outpatient replacement of prior claim); or
        iii. 711 (rural health clinic admit through discharge); or
        iv. 717 (rural health clinic replacement of prior claim); or
        v. 731 (clinic – freestanding admit through discharge); or
        vi. 737 (clinic – freestanding replacement of prior claim); or
        vii. 761 (community mental health center admit through discharge); or
        viii. 767 (community mental health center replacement of prior claim); or
        ix. 771 (federally qualified health center admit through discharge); or
        x. 777 (federally qualified health center replacement of prior claim); or
        xi. 851 (critical access hospital admit through discharge); or
        xii. 857 (critical access hospital replacement of prior claim); or
        xiii. 871 (freestanding non-residential opioid treatment programs [OTPs]); or
        xiv. 877 (OTPs replacement of prior claim).
    b. For records with at least one acceptable CPT/HCPCS code (Table 2) on a

service line, use all header diagnoses. Otherwise, do not use the diagnoses for risk adjustment.

Fiscal year code validity: Section III further describes the diagnosis-level input data file. After creating that file, the user will have the variables needed to conduct fiscal year validity checks. Table 3 identifies the fiscal year(s) in which the diagnosis codes used for risk adjustment are valid. The user should check that for a given diagnosis (variable DIAG) and service date (variable DIAGNOSIS_SERVICE_DATE), the diagnosis code has a Y in the corresponding Table 3 Code Valid column. ICD-10 diagnosis codes with service dates of January 1, 2023 – September 30, 2023 should have a Y in the Code Valid in FY2023 column; otherwise, the user should exclude them. ICD-10 diagnosis codes with service dates of October 1, 2023 – December 31, 2023 should have a Y in the Code Valid in FY2024 column; otherwise, the user should exclude them.

Note on bundled claims for mother and newborn infant: In practice, some hospital claims for childbirth include both the mother's record and the newborn infant's record on the same claim (diagnoses and procedure codes). Because there are separate adult, child, and infant risk adjustment models and some of the diagnosis codes may not be distinguishable between mother and infant on bundled claims, **any bundled claims should be redefined as two separate records whenever possible (mother and infant, <u>each with a separate ID, sex, and age</u>) in order for the diagnoses to be appropriately included in the input dataset and used for appropriately calculating risk scores.**

The user will need to independently create a program to detect any bundled claims and redefine them (i.e., it is not part of these instructions). For example, a bundled claim detection program would need to identify enrollees with a claim containing the following elements:

Mother is the enrollee:
- AGE_LAST >= 2 (an age corresponding to the child or adult models; more specifically age should be appropriate for a maternity diagnosis [i.e., 9-64])[17] and
- ICD-10 diagnoses corresponding to a completed pregnancy HCC (HCC 207 or 208 or 209) and
- ICD-10 diagnoses corresponding to a newborn HCC (HCC 242 or 243 or 244 or 245 or 246 or 247 or 248 or 249).

Infant is the enrollee:
- AGE_LAST = 0 (an age corresponding to the infant model; more specifically age is appropriate for a newborn diagnosis at birth) and
- ICD-10 diagnoses corresponding to a completed pregnancy HCC (HCC 207 or 208 or 209) and
- ICD-10 diagnoses corresponding to a newborn HCC (HCC 242 or 243 or 244 or 245 or 246 or 247 or 248 or 249).

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[17] Section III of this document identifies the two age variables used in the software and specifies when each is used. Section V includes the detailed algorithm for creation of HCCs. MCE edits specifying appropriate age for maternity diagnoses are included in Table 3.

See Table 3, ICD-10 to Condition Categories (CC) Crosswalk, for diagnosis codes corresponding to the completed pregnancy and newborn HCCs.

For purposes of creating the diagnosis-level input file (refer to Section III), if bundled claims will not be detected and redefined, enrollees with bundled claims should be included. If the enrollee is a female with an age appropriate for a maternity diagnosis, then the diagnoses on the bundled claim are assumed to correspond to the mother's enrollee ID. If the enrollee is age 0, then the diagnoses on the bundled claim are assumed to correspond to the infant's enrollee ID. All diagnoses on a bundled claim that could apply to either the mother or the infant (i.e., diagnoses that do not require passing an age/sex edit) are assumed to apply to the enrollee's ID. All HCCs that are valid for the mother or infant (based on diagnoses that pass or do not require age/sex edits) will be used to compute the enrollee's risk score; and all diagnoses that do not pass age/sex edits (i.e., newborn diagnosis codes for the mother; pregnancy diagnosis codes for the infant) will be ignored.[18] Table 1, rows 11-20, provides an algorithm for including these enrollees.

Infants with a record in the person-level file (refer to Section III) that cannot be matched with a claim or who do not have claims will have no diagnoses in the diagnosis-level file. Infants without diagnoses will be assigned to the lowest severity category and the Age 1 maturity category for infants as detailed in Table 8, rows 130, 132, and 137. Age 0 infants with diagnoses but who lack a newborn HCC will be reassigned to Age 1, and receive the corresponding severity category and the Age 1 maturity category for infants as detailed in Table 8, rows 5-130 and 137. Male infants also have the male demographic factor assigned. Age 0 male infants who lack a newborn HCC will have their demographic factor reassigned from Age 0 to Age 1, as detailed in Table 8, row 142.

B. <u>NDC-level file</u>. The National Drug Code (NDC)-level input file (Section III) should include NDCs used for risk adjustment, listed in Table 10a RXC to NDC Crosswalk. Only pharmacy claims (not medical claims) are the acceptable source for NDCs. The user must evaluate each claim to determine whether the claim's NDCs are included in the NDC file to be inputted to the algorithm or software.

The NDCs are to be used for RXC creation. It is the user's responsibility to create the NDC-level file for input to the risk adjustment algorithm; the data set is <u>not</u> created by the algorithm.

The NDC-level input file should include NDCs from pharmacy claims with **prescription filled dates** within the benefit year. NDC codes should be in the 11 digit, no dashes, HIPAA format to match the format required for EDGE submission.[19] (Note: Table 10a in

the Excel file contains the NDC codes formatted as text, not numbers, to retain any leading zeroes needed for 11-digit codes.) NDC codes that are not listed in Table 10a may be included in the NDC-level file but are ignored by the algorithm and are not included in RXCs for the adult risk adjustment models' risk score calculations.

C. <u>HCPCS-level file.</u> The Healthcare Common Procedure Coding System (HCPCS)-level input file (Section III) should include HCPCS codes used for risk adjustment RXCs, listed in Table 10b RXC to HCPCS Crosswalk. Inpatient, outpatient, and professional medical claims are acceptable sources for HCPCS codes. Inpatient and outpatient claims should be restricted to the same facility bill type codes used for the diagnosis-level file (see Part II.A.2.a. and 3.a). HCPCS should only be used for medications when an NDC is not available from a pharmacy claim. The user must evaluate each claim to determine whether the claim's HCPCS codes are included in the HCPCS file to be inputted in the algorithm or software.

The HCPCS codes in the HCPCS-level input file are to be used for RXC creation. It is the user's responsibility to create the HCPCS-level file for input to the risk adjustment algorithm; the data set is <u>not</u> created by the algorithm.

The HCPCS-level input file should include HCPCS codes from inpatient, outpatient, and professional medical claims with **<u>discharge dates or through dates</u>** within the benefit year. HCPCS codes that are not listed in Table 10b may be included in the HCPCS-level file but are ignored by the algorithm and are not included in RXCs for the adult risk adjustment models' risk score calculations.

III. Input data files for CC/HCC and RXC variable creation
This section describes the four input data files needed to create CC and HCC grouping and regression variables, RXC and RXC*HCC interaction variables, and all other regression variables: a person-level file, a diagnosis-level file, an NDC-level file, and a HCPCS-level file. It is the responsibility of the user to create these input data files with the variables listed in this section.

Note on CSR_INDICATOR
In operations, cost-sharing reduction (CSR) plan variations will be identified by the Health Insurance Oversight System (HIOS) variant ID or a new variant ID created specifically for EDGE to ensure that premium assistance Medicaid Alternative plans (i.e., private options) or other types of state subsidy plans have the correct CSR RA factor applied.[20] Listed below and described in Table 1, rows 29-46, are the codes that will be

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the user can access to normalize NDC codes to the 11 digit, no dashes, HIPAA format. The source for the NDC start dates is the U.S. Food and Drug Administration's Orange Book:
https://www.accessdata.fda.gov/scripts/cder/ob/index.cfm.

[20] In the 2023 benefit year, Arkansas, Colorado, Connecticut, Massachusetts, and New Mexico have premium assistance Medicaid Alternative plans or other types of state subsidy plans.

used to identify the plan variation.[21] Please note that unlike the risk adjustment software person-level CSR indicator, the HIOS variant ID is a plan-level indicator.

HIOS Variant ID	Cost-Sharing Reduction (CSR) Level	RA Software Person-level CSR Indicator		CSR RA Factor
		August 2023 and Prior (For Reference Only)	This Version	
00	Non-CSR/unknown CSR	0	1	1.00
01	Non-CSR/unknown CSR	0	1	1.00
02	CSR: Zero Cost Sharing – Platinum	4	1	1.00
03	CSR: Limited Cost Sharing – Platinum	8	1	1.00
04	CSR: 73% Actuarial Value (AV) Silver Plan Variation	3	1	1.00
41	CSR: State Subsidy – Gold	17	1	1.00
02	CSR: Zero Cost Sharing – Gold	5	2	1.07
03	CSR: Limited Cost Sharing – Gold	9	2	1.07
42	CSR: State Subsidy – Gold	16	2	1.07
02	CSR: Zero Cost Sharing – Silver	6	3	1.12
03	CSR: Limited Cost Sharing – Silver	10	3	1.12
05	CSR: 87% AV Silver Plan Variation	2	3	1.12
06	CSR: 94% AV Silver Plan Variation	1	3	1.12
30	CSR: State Subsidy Off-Exchange Plan – Silver	15	3	1.12
32	CSR: State Subsidy – Silver	14	3	1.12
35	CSR: State Subsidy – Silver	13	3	1.12
36	CSR: State Subsidy – Silver	12	3	1.12
02	CSR: Zero Cost Sharing – Bronze	7	4	1.15
03	CSR: Limited Cost Sharing – Bronze	11	4	1.15

Note on Enrollment Duration
Beginning with the 2023 benefit year, the adult models include a series of partial-year enrollment indicators for enrollees with at least one HCC whose enrollment period in an issuer's plans is 6 months or less. There are two steps involved in creating the enrollment duration indicator variables:

STEP 1: For the PERSON file, the user should create an ENROLDURATION variable for each enrollee with 12 possible values corresponding to 1-12 months based on an enrollee's total number of days enrolled in the plan in the benefit year as described

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[21] We note that when we identify unique State-specific plans that have higher plan liability than the standard plan variants, we utilize the corresponding CSR adjustment factor in the plan liability risk score calculation that maps to the plan's AV. For example, we use a CSR adjustment factor of 1.12 for all Massachusetts CSR wrap-around plans with AVs above 94 percent, as discussed in the 2023 Payment Notice final rule, 87 FR at 27235. See also, the 2025 Payment Notice proposed rule, 88 FR at 82548.

below and in Table 1, rows 22-23. Although ENROLDURATION will only be used to create variables needed for the adult models, we recommend it be constructed for *all* enrollees to maintain consistency in the variables present in the PERSON file. The created ENROLDURATION variable can be ignored for enrollees in the child or infant models.

STEP 2: The monthly enrollment duration interaction variables for enrollees with at least one HCC (HCC_ED1–HCC_ED6) will be created only for adult enrollees by the algorithm as described in Section V and in Table 6, rows 115-120.

1. PERSON file – a person-level file of demographic and enrollment information
    a. ENROLID (or another person identification variable)
        i. character or numeric type and unique to an individual
    b. SEX
        i. one character, 1 = male; 2 = female
    c. DOB
        i. 8-character numeric field, provides the enrollee's date of birth
        ii. Used to calculate AGE_AT_DIAGNOSIS for MCE diagnosis code age edits
    d. AGE_LAST
        i. Age as of last day of enrollment in benefit year
        ii. Used for all risk adjustment purposes except MCE diagnosis code age edits
        iii. For infants born in the previous year but not discharged until the benefit year, users should substitute Age 0 for Age 1 in AGE_LAST.
    e. METAL
        i. Enrollee's metal level
        ii. Allowable values: platinum, gold, silver, bronze, catastrophic (only 1 of these values)
    f. CSR_INDICATOR
        i. Person-level indicator. Enrollees who qualify for cost-sharing reductions or those enrolled in premium assistance Medicaid alternative plans will be assigned CSR_INDICATOR = 1-4. Non-CSR recipients will be assigned CSR_INDICATOR = 1, which is associated with a factor of 1.00 (no adjustment to risk score).
            • 1 = Non-CSR recipient, and enrollees with unknown CSR (HIOS Variant ID = 00, 01).
            • 1 = Enrollees in Zero Cost Sharing Plan Variation of Platinum Level QHP (HIOS Variant ID = 02).
            • 1 = Enrollees in Limited Cost Sharing Plan Variation of Platinum Level QHP (HIOS Variant ID = 03).
            • 1 = Enrollees in 73% AV Silver Plan Variation (HIOS Variant ID = 04).

- 1 = Enrollees in a State Subsidy Plan of Gold Level QHP (HIOS Variant ID = 41).
- 2 = Enrollees in Zero Cost Sharing Plan Variation of Gold Level QHP (HIOS Variant ID = 02).
- 2 = Enrollees in Limited Cost Sharing Plan Variation of Gold Level QHP (HIOS Variant ID = 03).
- 2 = Enrollees in a State Subsidy Plan of Gold Level QHP (HIOS Variant ID = 42).
- 3 = Enrollees in Zero Cost Sharing Plan Variation of Silver Level QHP (HIOS Variant ID = 02).
- 3 = Enrollees in Limited Cost Sharing Plan Variation of Silver Level QHP (HIOS Variant ID = 03).
- 3 = Enrollees in 87% AV Silver Plan Variation (HIOS Variant ID = 05).
- 3 = Enrollees in 94% AV Silver Plan Variation (HIOS Variant ID = 06).
- 3 = Enrollees in a State Subsidy Off-Exchange Plan of Silver Level QHP (HIOS Variant ID = 30).
- 3 = Enrollees in a State Subsidy Plan of Silver Level QHP (HIOS Variant ID = 32).
- 3 = Enrollees in a State Subsidy Plan of Silver Level QHP (HIOS Variant ID = 35).
- 3 = Enrollees in a State Subsidy Plan of Silver Level QHP (HIOS Variant ID = 36).
- 4 = Enrollees in Zero Cost Sharing Plan Variation of Bronze Level QHP (HIOS Variant ID = 02).
- 4 = Enrollees in Limited Cost Sharing Plan Variation of Bronze Level QHP (HIOS Variant ID = 03).

g. ENROLDURATION
  i. Person-level enrollment duration variable. Although it is for use in adult models only, it is recommended the user create it for all enrollees for consistency in PERSON file preparation. Values will be ignored for enrollees in child or infant models.
  ii. Allowable values are 1-12 based on months enrolled in plan in benefit year as defined by days:
     1 = 1–31 days enrolled
     2 = 32–62 days enrolled
     3 = 63–92 days enrolled
     4 = 93–123 days enrolled
     5 = 124–153 days enrolled
     6 = 154–184 days enrolled
     7 = 185–214 days enrolled
     8 = 215–245 days enrolled
     9 = 246–275 days enrolled
     10 = 276–306 days enrolled
     11 = 307–335 days enrolled

<div align="center">12 = 336–366 days enrolled</div>

2. DIAG file – a diagnosis-level input file of diagnoses
   a. ENROLID (or another person identification variable that must be the same as in PERSON file).[22]
      i. person identifier of character or numeric type and unique to an individual
   b. DIAG
      i. ICD-10-CM diagnosis code, 7-character field, no periods, left justified. Codes should be to the greatest level of available specificity. (Age and sex edits for diagnoses are applied in Part V, step 1 to ensure CCs are assigned appropriately for the age and sex of the enrollee.) Only diagnoses from allowable sources (Part II) should be included in the diagnosis-level file.
   c. DIAGNOSIS_SERVICE_DATE
      i. 8-character numeric field, provides the date of the diagnosis
      ii. As described in Part II, this variable can be used with DIAG and Table 3 to check that a diagnosis code is valid for a given fiscal year.
   d. AGE_AT_DIAGNOSIS
      i. Age as of the diagnosis service date, calculated using DOB from PERSON file and DIAGNOSIS_SERVICE_DATE
      ii. Used only for MCE diagnosis code age edits

3. NDC file – an NDC-level input file of drug codes
   a. ENROLID (or another person identification variable that must be the same as in PERSON file)
      i. person identifier of character or numeric type and unique to an individual
   b. NDC
      i. NDC normalized drug code (11-digit, no dashes, HIPAA standard format), 11-character field, left justified. This format matches the format required for submission to the EDGE server. Only NDCs from pharmacy claims filled in the benefit year (Part II) should be included in the NDC-level file.

4. HCPCS file – a HCPCS-level input file of drug codes
   a. ENROLID (or another person identification variable that must be the same as in PERSON file)
      i. Person identifier of character or numeric type and unique to an individual
   b. HCPCS
      i. HCPCS drug code, 5-character field, left justified. Only HCPCS drug codes from inpatient, outpatient, or professional medical claims from allowable sources (Part II) and with discharge or

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[22] Please note that in operation, this information cannot include personally identifiable information.

through dates in the benefit year (Part II) should be included in the HCPCS-level file.

IV.   Variables output by the algorithm

This section describes the variables that are outputted by the HHS risk adjustment models. Any software or algorithms developed from the tables output a person-level file and need to be capable of adding any person-level variables that the user wants to keep.

The following variables can be specified:
1. Any person-level variables from the original person-level file
2. Demographic age/sex variables created by the algorithm
3. HCCs created by the algorithm
4. CCs (condition categories assigned before hierarchies are applied)
5. HCC groups and HCC interactions created by the algorithm
6. RXCs and RXC interactions created by the algorithm
7. Infant model maturity categories, reassigned age/sex variables, severity level categories, and maturity by severity level interactions created by the algorithm
8. Adult model enrollment duration variables created by the algorithm
9. Score variables:
    a. Adult Models
        i. SCORE_ADULT_PLATINUM
        ii. SCORE_ADULT_GOLD
        iii. SCORE_ADULT_SILVER
        iv. SCORE_ADULT_BRONZE
        v. SCORE_ADULT_CATASTROPHIC
    b. Child Models
        i. SCORE_CHILD_PLATINUM
        ii. SCORE_CHILD_GOLD
        iii. SCORE_CHILD_SILVER
        iv. SCORE_CHILD_BRONZE
        v. SCORE_CHILD_CATASTROPHIC
    c. Infant Models
        i. SCORE_INFANT_PLATINUM
        ii. SCORE_INFANT_GOLD
        iii. SCORE_INFANT_SILVER
        iv. SCORE_INFANT_BRONZE
        v. SCORE_INFANT_CATASTROPHIC
10. CSR-adjusted score variables:
    a. Adult Models
        i. CSR_ADJUSTED_SCORE_ADULT_PLATINUM
        ii. CSR_ADJUSTED_SCORE_ADULT_GOLD
        iii. CSR_ADJUSTED_SCORE_ADULT_SILVER
        iv. CSR_ADJUSTED_SCORE_ADULT_BRONZE
        v. CSR_ADJUSTED_SCORE_ADULT_CATASTROPHIC
    b. Child Models
        i. CSR_ADJUSTED_SCORE_CHILD_PLATINUM

        ii.   CSR_ADJUSTED_SCORE_CHILD_GOLD

       iii.   CSR_ADJUSTED_SCORE_CHILD_SILVER

       iv.   CSR_ADJUSTED_SCORE_CHILD_BRONZE

        v.   CSR_ADJUSTED_SCORE_CHILD_CATASTROPHIC

   c. Infant Models

        i.   CSR_ADJUSTED_SCORE_INFANT_PLATINUM

       ii.   CSR_ADJUSTED_SCORE_INFANT_GOLD

       iii.   CSR_ADJUSTED_SCORE_INFANT_SILVER

       iv.   CSR_ADJUSTED_SCORE_INFANT_BRONZE

        v.   CSR_ADJUSTED_SCORE_INFANT_CATASTROPHIC

11. Final unadjusted and CSR-adjusted score variables depending on the enrollee's metal level and CSR indicator, including enrollment in premium assistance Medicaid alternative plans.

   a. Adult scores

        i.   SCORE_ADULT

       ii.   CSR_ADJUSTED_SCORE_ADULT

   b. Child scores

        i.   SCORE_CHILD

       ii.   CSR_ADJUSTED_SCORE_CHILD

   c. Infant scores

        i.   SCORE_INFANT

       ii.   CSR_ADJUSTED_SCORE_INFANT

The user should determine which of the scores is appropriate for the enrollee depending upon the age and plan benefit design of that enrollee.

V.   Algorithm to produce output

This section describes the process by which the outputs identified in Section IV are created. The algorithm to produce risk scores can be segmented into five parts—CC, HCC, and RXC creation model; variable creation; access factors table; unadjusted score calculation; and CSR-adjusted score calculation.

Step 1A: CC and HCC creation. This first step should use Table 3 for CC creation and Table 4 for HCC creation.

    Table 3 crosswalks ICD-10 codes to the Condition Categories (CCs) in the risk adjustment models. This table incorporates the ICD-10 Medicare Code Edits (MCEs) for age and sex, the further specified CC age and sex splits, and the creation of CCs and additional CCs.[23] Explanations of the fields in Table 3 are provided below:
- Obs (column A): Observations, numeric count from 1 to 11,233 of the code list.
- ICD10 (column B): Only ICD-10 codes assigned to HCCs in the risk adjustment models are included in this crosswalk. All other ICD-10 codes correspond to HCCs not included in the risk adjustment models and are not

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[23] The CC age and sex splits relate to how specific conditions are reclassified by age or sex within the full HCC classification. These reassignments are not related to age or sex coding guidelines.

used to calculate risk scores.

- ICD10 Label (column C): Full ICD-10 code labels.
- Code Valid column (columns D and E): Identifies the fiscal year(s) (column D FY2023; column E FY2024) in which the ICD-10 codes are valid. There are two possible values in columns D and E:
  - Y = Yes, code is valid ICD-10 code in that fiscal year
  - N = No, code is not valid ICD-10 code in that fiscal year; code may not yet be in existence or code was deleted in that fiscal year; the code should not be used for risk adjustment in that fiscal year period
- FY2023 MCE Age Condition [use AGE_AT_DIAGNOSIS] (column F), FY2024 MCE Age Condition [use AGE_AT_DIAGNOSIS] (column H), and CY2023 (FY23/FY24) MCE Age Condition [use AGE_AT_DIAGNOSIS] (column J): Checks that a person with a diagnosis code has the appropriate age for the diagnosis. The specific FY versions are presented for informational purposes. The user should use the CY2023 version which covers both FYs (column J) to match the MCE Age Condition version being used in Operations. Conditions listed in this column are required for the CC to be assigned.
  - Newborn diagnosis: Age of 0 years
  - Pediatric diagnosis: Age range is 0-17 years inclusive
  - Maternity diagnosis: Age range is 9-64 years inclusive
  - Adult diagnosis: Age range is 15 years or older
- FY2023 MCE Sex Condition (column G), FY2024 MCE Sex Condition (column I), and CY2023 (FY23/FY24) MCE Sex Condition (column K): Checks that a person with a diagnosis code has the appropriate sex for the diagnosis. The specific FY versions are presented for informational purposes. The user should use the CY2023 version which covers both FYs (column K) to match the MCE Sex Condition version being used in Operations. Conditions listed in this column are required for the CC to be assigned.
  - Female indicates the diagnosis is only appropriate for females.
  - Male indicates the diagnosis is only appropriate for males.
- CC Age Split [use AGE_LAST] (column L): Identifies diagnosis codes whose assignments to CCs in the risk adjustment models change depending on the age of the enrollee. ICD-10 codes assigned by age to more than one CC in the risk adjustment models are listed more than once. In those cases, the age splits are mutually exclusive and enrollees are assigned to only the CC(s) for the respective age range.
- CC Sex Split (column M): Identifies diagnosis codes whose assignments to CCs in the risk adjustment models change depending on the sex of the enrollee. ICD-10 codes assigned by sex to more than one CC in the risk adjustment models are listed more than once. Enrollees are assigned to only the CC(s) for the appropriate sex.
- CC (column N), Second CC (column O), and Third CC (column P): CC (column N) identifies the CC in the risk adjustment models to which a person with the ICD-10 code who meets the MCE conditions and CC splits is assigned. Additional CCs (columns O and P) are assigned when the ICD-10 code is assigned to more than one HCC in the risk adjustment models because it contains more than one clinical concept (such as an ICD-10 diagnosis code that

encompasses both diabetes and a complication of diabetic peripheral angiopathy with gangrene). Second CC (column O) identifies the second CC, and Third CC (column P) identifies the third CC in the risk adjustment model to which a person with the ICD-10 code who meets the MCE conditions and CC Age or Sex splits is assigned.

- Footnote (column Q): Identifies applicable footnotes for the ICD-10 code. Notes begin on row 11,239 of the Excel table with the line "Notes:" and should not be imported by any program.

Table 4 provides the hierarchy rules to apply to the CCs to create HCCs. Explanations of the fields in Table 4 are provided below:

- Obs (column A): Observations, numeric count from 1 to 141 of HCCs in the HHS risk adjustment models.
- V07 HCC (column B): Only HCCs in the risk adjustment models are identified. HCCs are created when hierarchies are applied to CCs.
- Set to 0 HCCs (column C): Hierarchy exclusions for each HCC are listed. Users should set the HCCs in this column to 0 when a person has the HCC listed in column B.
- HCC Label (column D): Full HCC labels.

Use Table 3 and Table 4 to create CCs and HCCs:[24]

1. Create CC and HCC 0/1 indicator variables for each HCC in the risk adjustment models listed in Table 4 (Example: CC001, CC002, CC003, CC004, CC006, CC008 ... CC254; HHS_HCC001, HHS_HCC002 ... HHS_HCC254). Initially, set CCs and HCCs to 0 for each person.
2. If there are any acceptable diagnoses for a person, then:
   a. Perform ICD-10 Medicare Code Edits (MCEs) for age and sex (use CY2023 MCE Age Condition and MCE Sex Condition columns in Table 3). Use AGE_AT_DIAGNOSIS for applying MCE age edits.
   b. If a person meets the MCE conditions, apply CC Age Split and CC Sex Split to create CC (set to 1) using crosswalk of ICD-10 to CCs (use CC Age Split, CC Sex Split, and CC columns in Table 3). Use AGE_LAST for CC age splits.
   c. Create additional CCs (set to 1) using Second CC and Third CC columns.
3. Create HCCs after all diagnoses for a person are processed and CC variables are created using hierarchies provided in Table 4.
   a. Set HCC to 1 when corresponding CC is set to 1.
   b. Set the HCCs in column C to 0 when a person has the HCC listed in column B set to 1.

Step 1B: RXC creation. This step should use Tables 10a/10b and Table 11 for RXC creation.

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[24] The V07 HHS-HCC classification includes *HCC 22 Type 1 Diabetes Mellitus, add-on to Diabetes HCCs 19-21* in the adult models. *HCC Group 1* includes *HCC 19*, *HCC 20*, and *HCC 21*. *HCC 22* is an additive HCC to *HCC Group 1* and distinguishes the additional costs for Type 1 diabetes. See the Patient Protection and Affordable Care Act; HHS Notice of Benefit and Payment Parameters for 2021; Notice Requirement for Non-Federal Governmental Plans; Final Rule, 85 FR 29164 at 29175 – 29185 (May 14, 2020). Type 1 diabetes continues to appear in HCC Group 1 but has separate additive incremental costs with HCC 22.

Table 10a crosswalks National Drug Codes (NDCs) to the Prescription Drug Categories (RXCs) in the adult risk adjustment models. This table identifies the subset of NDCs used in the creation of RXCs. Explanations of the fields in Table 10a are provided below:

- RXC (column A): Identifies the RXC number in the risk adjustment models that a person with the NDC is assigned.
  - o RXCs 1-10 are included in the adult risk adjustment models as stand-alone variables and as interactions, each with risk factors included in a person's risk score.
- RXC_Label (column B): Provides the label of each RXC.
- NDC (column C): Only NDCs assigned to RXCs in the adult risk adjustment models are included in this crosswalk. All other NDCs do not map to an RXC and are not used to calculate risk scores. NDCs are stored in string (character) to avoid dropping of leading zeroes.

Table 10b crosswalks Healthcare Common Procedure Coding System (HCPCS) codes to the Prescription Drug Categories (RXCs) in the adult risk adjustment models. This table identifies the subset of HCPCS codes used in the creation of RXCs. Explanations of the fields in Table 10b are provided below:

- RXC (column A): Identifies the RXC number in the risk adjustment models that a person with the NDC is assigned. (See Table 10a description above for information about RXCs 1-10.)
- RXC_Label (column B): Provides the label of each RXC.
- HCPCS (column C): Only HCPCS codes assigned to RXCs in the adult risk adjustment models are included in this crosswalk. All other HCPCS drug codes do not map to an RXC and are not used to calculate risk scores.

Table 11 provides the hierarchy rules to apply to the RXCs. Explanations of the fields in Table 11 are provided below:

- RXC (column A): RXCs in the risk adjustment models are identified.
- Set to 0 RXC (column B): Hierarchy exclusions for each RXC are listed. Users should set the RXCs in column B to 0 when a person has the RXC listed in column A.
- RXC_Label (column C): Provides the label of each RXC in column A.

Use Tables 10a/10b and Table 11 to create RXCs:

1. Create 10 RXC 0/1 indicator variables for each RXC in the risk adjustment models listed in Table 10a (Example: RXC_01, RXC_02, RXC_03 ... RXC_09, RXC_10). Initially, set RXCs to 0 for each person.
2. Using Table 10a, if there are any acceptable NDCs for a person, then set to 1 the corresponding RXC(s) using the RXC and NDC columns in the crosswalk.
3. Using Table 10b, if there are any acceptable HCPCS codes for a person, then set to 1 the corresponding RXC(s) using the RXC and HCPCS columns in the crosswalk.
4. Using hierarchies provided in Table 11, set the RXCs in column B to 0 when a

person has the RXC listed in column A set to 1.

The RXC interactions will be created in a later step.

Step 2: Model variable creation.
This step should use Table 5 for demographic variable creation, Table 6 for additional adult model variables including enrollment duration, Table 7 for additional child model variables, and Table 8 for additional infant model variables.

Explanations of the fields in Tables 5-8 are provided below:
- Column A identifies the model set in which the variable is used (adult, child or infant).
- Column B identifies the variable name.
- Column C gives a variable description.
- Column D indicates if the variable is used in the model.
- Column E defines the variable creation.

Variables must be assigned values in the same order as defined in Tables 5, 6, 7, and 8. For example, in Table 6, assign a value to the HCC group variables first, then the variable HCC_CNT, then the variable SEVERE, then the severe illness interaction terms.

Variable creation:
1. Create demographic variables needed for score calculation using Table 5.
   a. A person's age and sex are used to create 1 of 28 mutually exclusive age-sex variables (18 for adult models, 8 for child models, 2 for infant models). Use AGE_LAST.
   b. Because the infant model is computed with females as the reference group for the age-sex demographic variables, there are no separate age-sex demographic variables for females age 0 or 1. Note that if male age 0 infants are assigned to Age 1 because they lack a newborn HCC, their age/sex demographic variable will be reassigned to Age 1 using Table 8.
   c. Adult age-sex variables are listed in rows 8-25.
   d. Child age-sex variables are listed in rows 27-34.
   e. Infant age-sex variables are listed in rows 36 and 37.
2. For the adult and child models – create HCC groups using Tables 6 and 7.
   a. HCC groups are effectively treated as single HCCs in the models. The HCC groups are assigned variables GXX, where XX is the group number.
   b. For the adult models:
      i. There are 18 adult HCC groups. The group variable names are listed in rows 5-60 of column B of Table 6.
      ii. Initially create the 18 HCC groups for adults and set to 0 for each person.
      iii. The HCCs in an HCC group are listed in column E of Table 6 starting in row 5.
      iv. A variable for an HCC group is set to equal 1 if an adult has at least one of the HCCs in a given adult HCC group.
   c. For the child models:

21

> i. There are 21 child HCC groups. The HCC group variable names are listed in rows 5-67 of column B of Table 7.
> ii. Initially create the 21 HCC groups for children and set to 0 for each person.
> iii. The HCCs in an HCC group are found in column E of Table 7 starting in row 5.
> iv. A variable for an HCC group is set to equal 1 if a child has at least one of the HCCs in a given child HCC group.

3. For the adult and child models – create variable for count of HCCs using Tables 6 and 7.
   a. The variable HCC_CNT is the count of unique HCCs or HCC groups assigned to the enrollee. HCC groups are effectively treated as single HCCs in the count.
   b. HCC 22 *Type 1 Diabetes Mellitus, add-on to Diabetes HCCs 19-21* is additive to *HCC Group 1* so HCC 22 is not included in the count of HCCs for adult enrollees. HCC 22 is not included in the child models.[25]
   c. The adult model count variable, HCC_CNT, is listed on row 63 of Table 6. Its values range from 0 to 108 total unique HCCs or HCC groups in the adult models.
   d. The child model count variable, HCC_CNT, is listed on row 70 of Tables 7. Its values range from 0 to 107 total unique HCCs in the child models.

4. For the adult and child models – create the severe illness indicator variable using Tables 6 and 7.
   a. The severe illness indicator variable (0/1), SEVERE, is created when an adult or child has at least 1 of 24 HCCs or HCC groups that indicate a severe illness. SEVERE is initially set to 0 for each adult and child enrollee and is set equal to 1 if the enrollee has at least 1 of the 24 HCCs or HCC groups.
   b. For the adult models, rows 65-88 of column E in Table 6 identify these 24 HCCs or HCC groups.
   c. For the child models, rows 72-95 of column E in Table 7 identify these 24 HCCs or HCC groups.

5. For the adult and child models – create the transplant severe illness indicator variable using Tables 6 and 7.
   a. The transplant severe illness indicator variable (0/1), TRANSPLANT, is created when an adult or child has at least 1 of 7 HCCs or HCC groups that indicate a transplant. TRANSPLANT is initially set to 0 for each adult and child enrollee and is set equal to 1 if the enrollee has at least 1 of the 7 HCCs or HCC groups.
   b. For the adult models, rows 90-96 of column E in Table 6 identify these 7 HCCs or HCC groups.
   c. For the child models, rows 97-103 of column E in Table 7 identify these 7 HCCs or HCC groups.

6. For the adult and child models – create variables for severe illness interacted with HCC counts, SEVERE_HCC_COUNTX, where X is the count of HCCs or HCC groups, using Tables 6 and 7.
   a. For the adult models:

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[25] See supra note 24.

      i.   The variables SEVERE and HCC_CNT are used to create 10 mutually exclusive interaction variables (0/1) identified in rows 98-107 of Table 6.

      ii.   Interaction variables SEVERE_HCC_COUNT1–SEVERE_HCC_COUNT10PLUS are initially set to 0 for each adult.

      iii.   Adult enrollees with SEVERE = 1 are assigned one of the SEVERE_HCC_COUNTX variables, determined by the corresponding count of HCCs or HCC groups (X). Values for HCC_CNT of 10 or higher correspond to the interaction variable SEVERE_HCC_COUNT10PLUS. The respective interaction variable is set to 1. For example, SEVERE_HCC_COUNT1 = 1 if SEVERE = 1 and HCC_CNT = 1, SEVERE_HCC_COUNT2 = 1 if SEVERE = 1 and HCC_CNT = 2, and so on.

      iv.   Adult enrollees who have SEVERE = 0 will have all 10 severe illness interaction variables set to 0. All other enrollees will have exactly 1 severe illness interaction variable set to 1.

  b. For the child models:

      i.   The variable SEVERE and HCC_CNT are used to create 7 mutually exclusive interaction variables (0/1) identified in rows 105-111 of Table 7.

      ii.   Interaction variables SEVERE_HCC_COUNT1–SEVERE_HCC_COUNT8PLUS are initially set to 0 for each child.

      iii.   Child enrollees with SEVERE = 1 are assigned one of the SEVERE_HCC_COUNTX variables, determined by the corresponding count of HCCs or HCC groups (X). Values for HCC_CNT of 6 or 7 correspond to the interaction variable SEVERE_HCC_COUNT6_7. Values for HCC_CNT of 8 or higher correspond to the interaction variable SEVERE_HCC_COUNT8PLUS. The respective interaction variable is set to 1. For example, SEVERE_HCC_COUNT1 = 1 if SEVERE = 1 and HCC_CNT = 1, SEVERE_HCC_COUNT2 = 1 if SEVERE = 1 and HCC_CNT = 2, and so on.

      iv.   Child enrollees who have SEVERE = 0 will have all 7 severe illness interaction variables set to 0. All other enrollees will have exactly 1 severe illness interaction variable set to 1.

7. For the adult and child models – create variables for transplant severe illness interacted with HCC counts, TRANSPLANT_HCC_COUNTX, where X is the count of HCCs or HCC groups, using Tables 6 and 7.

  a. For the adult models:

      i.   The variables TRANSPLANT and HCC_CNT are used to create 5 mutually exclusive interaction variables (0/1) identified in rows 109-113 of Table 6.

      ii.   Interaction variables TRANSPLANT_HCC_COUNT4–SEVERE_HCC_COUNT8PLUS are initially set to 0 for each adult.

      iii.   Adult enrollees with TRANSPLANT = 1 and a count of 4 or more HCCs (HCC_CNT >= 4) are assigned one of the TRANSPLANT_HCC_COUNTX variables, determined by the

corresponding count of HCCs or HCC groups (X). Values for HCC_CNT of 8 or higher correspond to the interaction variable TRANSPLANT_HCC_COUNT8PLUS. The respective interaction variable is set to 1. For example, TRANSPLANT_HCC_COUNT4 = 1 if TRANSPLANT = 1 and HCC_CNT = 4, TRANSPLANT_HCC_COUNT5 = 1 if TRANSPLANT = 1 and HCC_CNT = 5, and so on.

      iv.   Adult enrollees who have TRANSPLANT = 0 will have all 5 transplant severe illness interaction variables set to 0. Enrollees who have TRANSPLANT = 1 but are assigned less than 4 HCCs (HCC_CNT < 4) will have all 5 transplant severe illness interaction variables set to 0. All other enrollees will have exactly 1 transplant severe interaction variable set to 1.

   b. For the child models:

      i.   The variables TRANSPLANT and HCC_CNT are used to create 1 interaction variable (0/1) identified in row 113 of Table 7.

      ii.   The interaction variable TRANSPLANT_HCC_COUNT4PLUS is initially set to 0 for each child.

      iii.   Child enrollees with TRANSPLANT = 1 and a count of 4 or more HCCs (HCC_CNT >= 4) are assigned the TRANSPLANT_HCC_COUNT4PLUS variable. The interaction variable is set to 1.

8. For the adult models – create enrollment duration interaction variables using Table 6.

   a. The variables ENROLDURATION and HCC_CNT are used to create the 6 mutually exclusive (0/1) enrollment duration interaction variables for adult enrollees who have partial year enrollment of 6 months or less. The interaction variables are identified in rows 115-120 of Table 6.

      i.   The enrollment duration interaction variables HCC_ED1–HCC_ED6 are initially set to 0 for each adult.

      ii.   An enrollment duration interaction variable (HCC_EDX) is set to 1 if an adult has ENROLDURATION equal to the corresponding number (X) and a count of at least one HCC or HCC group. For example, HCC_ED1 = 1 if ENROLDURATION = 1 and HCC_CNT > 0, HCC_ED2 = 1 if ENROLDURATION = 2 and HCC_CNT > 0, and so on.

      iii.   Enrollees who have ENROLDURATION > 6 (indicating more than 6 months of enrollment) will have all 6 ED interaction variables set to 0. Enrollees who have ENROLDURATION <= 6 but have no HCCs (HCC_CNT = 0) will have all 6 ED interaction variables set to 0. All other adult enrollees will have exactly 1 ED interaction variable set to 1.

9. For the adult models – create RXC interaction variables using Table 6.

   a. The HCCs and the RXC variables (RXC_01-RXC_10) created earlier in Step 1B are used to create the 13 (0/1) RXC interaction variables. The RXC interaction variables are identified in rows 133-145 of Table 6.

      i.   Create the 13 RXC interaction variables listed in rows 133-145 in column B (e.g., RXC_01_X_HCC001) and initially set to 0 for each

adult. These interactions are based on RXCs listed in rows 122-131 of Table 6.

  ii. An RXC interaction variable (e.g., RXC_01_X_ HCC001) is set to 1 if an adult has both the corresponding RXC set to 1 and the HCC(s) set to 1 as listed in column E of Table 6 starting in row 133.

  iii. There are 5 RXC interactions that include a single HCC (rows 133, 135, 140, 142-143).

  iv. There are 7 RXC interactions that include a set of HCCs in which only 1 HCC of the set must be set to 1 (rows 134, 136-139, 144-145).

  v. There is 1 RXC interaction (RXC_09_X_HCC056_057_AND_048_041 in row 141) that includes two sets of HCCs in which at least 1 HCC in each set must be set to 1.

10. For the infant models – create maturity and severity categories, reassign age-sex variable if needed, and create maturity by severity level interaction variables using Table 8.

 a. Table notation: Severity category and maturity category variables (which are not included in the regression, but are used to create regression interaction variables) use the "IHCC_" prefix designating them as Infant variables. Examples: IHCC_Severity5; IHCC_Extremely_Immature.

 b. Create 5 severity level category 0/1 indicator variables based on HCC flags (See Table 8, rows 5-124). Set to 1 if any of the corresponding HCC variables is set to 1.

  i. Severity Level 5 (Highest)

  ii. Severity Level 4

  iii. Severity Level 3

  iv. Severity Level 2

  v. Severity level 1 (Lowest)

 c. Apply hierarchies so that each age 0 or age 1 infant has only a single severity level variable, the highest qualifying level, set to 1 (see Table 8, rows 126-130). Note that infants lacking any of the HCCs corresponding to severity levels are assigned to Severity Level 1 (Lowest).

 d. Create 5 maturity category 0/1 indicator variables set to 1 based on age only if age 1, and on age as well as newborn HCC flags if age 0 (see Table 8, rows 132-137). Note that age 0 infants lacking a newborn HCC (242-249) are assigned to Age 1.

  i. Age 1

  ii. Extremely Immature

  iii. Immature

  iv. Premature/Multiples

  v. Term

 e. Apply hierarchies so that each age 0 or age 1 infant has only a single maturity variable set to 1 (see Table 8, rows 138-140).

 f. Reassign male age 0 infants lacking a newborn HCC to the Age 1 age-sex variable (see Table 8, row 142).

 g. Create 25 maturity by severity level interactions (0/1) using the 5 maturity category variables and 5 severity level category variables (see Table 8, rows 144-168). These are mutually exclusive interactions—each infant will have

only one maturity by severity level interaction set to 1.
- i. Extremely_Immature_x_Severity5
- ii. Extremely_Immature_x_Severity4
- iii. Extremely_Immature_x_Severity3
- iv. Extremely_Immature_x_Severity2
- v. Extremely_Immature_x_Severity1
- vi. Immature_x_Severity5
- vii. Immature_x_Severity4
- viii. Immature_x_Severity3
- ix. Immature_x_Severity2
- x. Immature_x_Severity1
- xi. Premature_Multiples_x_Severity5
- xii. Premature_Multiples_x_Severity4
- xiii. Premature_Multiples_x_Severity3
- xiv. Premature_Multiples_x_Severity2
- xv. Premature_Multiples_x_Severity1
- xvi. Term_x_Severity5
- xvii. Term_x_Severity4
- xviii. Term_x_Severity3
- xix. Term_x_Severity2
- xx. Term_x_Severity1
- xxi. Age1_x_Severity5
- xxii. Age1_x_Severity4
- xxiii. Age1_x_Severity3
- xxiv. Age1_x_Severity2
- xxv. Age1_x_Severity1

Step 3: Access factors in Table 9.
1. For the adult models, use adult factors in rows 4-214 for each of the metal levels (columns D-H).
2. For the child models, use child factors in rows 216-382 for each of the metal levels (columns D-H)
3. For the infant models, use infant factors in rows 384-410 for each of the metal levels (columns D-H)

Step 4: Unadjusted score calculation (using directions in Tables 6-8, variables created in Tables 5-8, and factors from Table 9).

1. For each adult, create an adult model score for the metal level in which that adult is enrolled (corresponding to scores in Part IV).
   a. Create scores for each metal level using directions in rows 147-155 in Table 6.
      - i. SCORE_ADULT_PLATINUM
      - ii. SCORE_ADULT_GOLD
      - iii. SCORE_ADULT_SILVER
      - iv. SCORE_ADULT_BRONZE
      - v. SCORE_ADULT_CATASTROPHIC

26

b. The score for each of the above variables is the sum of the factors of the corresponding metal level in Table 9 for all variables set to 1 for that adult: demographic variable, any HCCs, any HCC groups, a severe illness interaction group if applicable, an enrollment duration variable if applicable, RXCs 1-10, and RXC interactions.
   i. SCORE_ADULT_PLATINUM uses factors from column D
   ii. SCORE_ADULT_GOLD uses factors from column E
   iii. SCORE_ADULT_SILVER uses factors from column F
   iv. SCORE_ADULT_BRONZE uses factors from column G
   v. SCORE_ADULT_CATASTROPHIC uses factors from column H
c. Identify the metal level in which the adult is enrolled (Table 1 row 27).
d. Create an adult model score SCORE_ADULT for the metal level in which the adult is enrolled using directions in rows 168-169 in Table 6.

2. For each child create a child model score for the metal level in which that child is enrolled (corresponding to scores in Part IV).
   a. Create scores for each metal level using directions in rows 115-119 in Table 7.
      i. SCORE_CHILD_PLATINUM
      ii. SCORE_CHILD_GOLD
      iii. SCORE_CHILD_SILVER
      iv. SCORE_CHILD_BRONZE
      v. SCORE_CHILD_CATASTROPHIC
   b. The score for each of the above variables is the sum of the factors of the corresponding metal level in Table 9 for all variables set to 1 for that child: demographic variable, any HCCs, and any HCC groups.
      i. SCORE_CHILD_PLATINUM uses factors from column D
      ii. SCORE_CHILD_GOLD uses factors from column E
      iii. SCORE_CHILD_SILVER uses factors from column F
      iv. SCORE_CHILD_BRONZE uses factors from column G
      v. SCORE_CHILD_CATASTROPHIC uses factors from column H
   c. Identify the metal level in which the child is enrolled (Table 1 row 27).
   d. Create a child model score SCORE_CHILD for the metal level in which the child is enrolled using directions in rows 132-133 in Table 7.

3. For each infant create an infant model score for the metal level in which that infant is enrolled (corresponding to scores in Part IV) using directions starting at row 170 of Table 8, infant variables created in Tables 5 and 8, and factors from Table 9.
   a. Unadjusted infant risk score is the sum of (0/1 variable x factor) over all the following:
      i. 0/1 age-sex categories for INFANT models
      ii. 0/1 maturity x severity level interactions for INFANT models
   b. The unadjusted score is the sum of the factors of the corresponding metal level in Table 9 for all variables set to 1 for that infant.
      i. SCORE_INFANT_PLATINUM uses factors from column D
      ii. SCORE_INFANT_GOLD uses factors from column E
      iii. SCORE_INFANT_SILVER uses factors from column F
      iv. SCORE_INFANT_BRONZE uses factors from column G

    v. SCORE_INFANT_CATASTROPHIC uses factors from column H

  c. Females will have a single maturity level x severity level interaction set to 1 and that factor will be their score. Males will a have a single maturity level x severity level interaction set to 1 and a single age-sex variable set to 1; the sum of the factors for those two variables will be their score.

  d. Identify the metal level in which the infant is enrolled (Table 1 row 27).

  e. Create an infant model score SCORE_INFANT for the metal level in which the infant is enrolled using directions in rows 187-188 in Table 8.

Step 5: CSR-adjusted score calculation (using instructions in Tables 6-8).

1. For each adult, create an adult model CSR-adjusted score for the metal level in which that adult is enrolled (corresponding to CSR-adjusted scores in Part IV).

  a. Each adult will have one of the following CSR-adjusted risk scores that corresponds to his/her metal level. CSR-adjusted scores are created using directions in rows 157-166 in Table 6.

    i. CSR_ADJUSTED_SCORE_ADULT_PLATINUM

    ii. CSR_ADJUSTED_SCORE_ADULT_GOLD

    iii. CSR_ADJUSTED_SCORE_ADULT_SILVER

    iv. CSR_ADJUSTED_SCORE_ADULT_BRONZE

    v. CSR_ADJUSTED_SCORE_ADULT_CATASTROPHIC

  b. Identify the metal level in which the adult is enrolled (Table 1 row 27).

  c. Create an adult model score CSR_ADJUSTED_SCORE_ADULT for the metal level in which the adult is enrolled using directions in rows 171-173 in Table 6.

2. For each child, create a child model CSR-adjusted score for the metal level in which that child is enrolled (corresponding to CSR-adjusted scores in Part IV).

  a. Each child will have one of the following CSR-adjusted risk scores that corresponds to his/her metal level. CSR-adjusted scores are created using directions in rows 121-130 in Table 7.

    i. CSR_ADJUSTED_SCORE_CHILD_PLATINUM

    ii. CSR_ADJUSTED_SCORE_CHILD_GOLD

    iii. CSR_ADJUSTED_SCORE_CHILD_SILVER

    iv. CSR_ADJUSTED_SCORE_CHILD_BRONZE

    v. CSR_ADJUSTED_SCORE_CHILD_CATASTROPHIC

  b. Identify the metal level in which the child is enrolled (Table 1 row 27).

  c. Create a child model score CSR_ADJUSTED_SCORE_CHILD for the metal level in which the child is enrolled using directions in rows 135-137 in Table 7.

3. For each infant, create an infant model CSR-adjusted score for the metal level in which that infant is enrolled (corresponding to CSR-adjusted scores in Part IV).

  a. Each infant will have one of the following CSR-adjusted risk scores that corresponds to his/her metal level. CSR-adjusted scores are created using directions in rows 176-185 in Table 8.

    i. CSR_ADJUSTED_SCORE_INFANT_PLATINUM

    ii. CSR_ADJUSTED_SCORE_INFANT_GOLD

       iii. CSR_ADJUSTED_SCORE_INFANT_SILVER
       iv. CSR_ADJUSTED_SCORE_INFANT_BRONZE
       v. CSR_ADJUSTED_SCORE_INFANT_CATASTROPHIC

b. Identify the metal level in which the infant is enrolled (Table 1 row 27).
c. Create an infant model score CSR_ADJUSTED_SCORE_INFANT for the metal level in which the infant is enrolled using directions in rows 190-192 in Table 8.

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