**Charlson Co-morbidity Index (CCI) Programs Documentation**

This system is for Truven data stored in the AWS Lilly designed database.

The Charlson Comorbidity Index uses health care claims data to assign a numeric value to indicate the patient’s health care severity. Diagnosis and procedure codes are assigned a health care condition and associated severity weight number. Each patient’s claims are identified, grouped into conditions, and those associated severity numbers are summed to calculate the patients CCI value. The following documentation describes the folders, files, and programs for this calculation

1. CCI\_Codes

* The spreadsheet, Copy of ICD9 to ICD10 Crosswalk NSCLC.xlsx, assigns diagnosis and procedure codes to a health care CONDITION in tab ICD\_Codes. The diagnosis codes have column, CODE\_TYPE, equal to ICD-9-CM DX or ICD-10-CM DX. The procedure codes have values ICD-9-PCS or ICD-10-PCS.
* For this system, the above spreadsheet was copied and a new tab, Weights, was added to create Copy of ICD9 to ICD10 Crosswalk NSCLC.xlsx. The weight tab assigns severity WEIGHT and CONDITION\_NBR to each health care condition. This was previously hard coded in the program. By surfacing this in the spreadsheet, this allows the scientist to alter the WEIGHT for a specific project. If this is done, it is recommended that a new tab be added with the tab name Weight and the current one be retained but the tab renamed.

1. Pgm/MY\_CCI\_pgm.SAS

The following is a starter program for the user to alter to meet the specifications for their project. Copy this program and make changes to the libname projlib to point to your project and SAS macro variables in step 2 below to meet your project specifications.

The incoming project SAS data set (macro variable &inds) must have one row per enrolid and include a variable index.

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/\* 1. Set operational options \*/

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*libname projlib '/YOURLOCATIONHERE/ProjectX/sasout';*

filename inclsas '/YOURLOCATIONHERE/CCI';

libname RWE\_TF YOURINCOMINGDATAHERE;

libname RWE\_WRK YOURTEMPLOCATIONHERE;

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

/\* 2. Set macro variables \*/

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\* Truven Tables;

%let paytype=1, 2; /\* 1 = Commercial Claims, 2 = Medicare, 3 = Medicaid \*/

%let recsrc=2, 4, 6; /\* 2=Facility Header 4=Inpatient Service, 6=Outpatient Service \*/

%let dataver=AFS\_DLVRY\_PERIOD='A' and year in(2015,2016,2017,2018) ;

\* Project Cohort;

%let inds = projlib.ProjectX; /\* cohort enrolids with index \*/

%let indexvar = index; /\* index variable on inds data set \*/

\* CCI related;

%let cci\_codein = /YOURLOCATIONHERE/CCI/NONTA\_STANDARD\_DX\_Charlson\_V3\_Wght.xlsx;

/\* CCI spreadsheet \*/

%let cond\_count = 1; /\* 1=count only most severe (diabetes, liver, tumor) 0=count all \*/

%let premths = 6; /\* months pre index for claim extract \*/

%let postmths = 0; /\* months post index for claim extract \*/

%let weightvar = weight; /\* weight variable on cci\_codein data set \*/

%let primary = 1; /\* 1=use primary (pdx, pproc), 0=do not use primary \*/

%let delflag = 1; /\* 1=use following delcond, 0=no delete condition \*/

%let delcond = if condition\_Nbr=14 then delete /\* specify condition or list of conditions to remove from cci calculation \*/

%let outds = projlib.YOUROUTPUT; /\* output sas data set \*/

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/\* 3. Call CCI module \*/

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%include inclsas (CCI.sas);

proc print data = &outds (obs=10);

title "&outds sample";

run;

proc datasets library = work kill;

run;

quit;

run;

1. Include/CCI.SAS

This is the program for the calculation of the CCI and is called by your program as shown in the sample above, pgm/my\_cci\_pgm. This program:

* reads the spreadsheet NONTA\_STANDARD\_DX\_Charlson\_V3\_Wght.xlsx, tabs ICD\_Codes and Weights.
* reads your project data set for the enrolids and index.
* queries the AWS Lilly designed Truven tables for those enrolids claim diagnosis and procedure codes within the user defined date range.
* outputs a SAS data set of enrolids and their associated CCI values.

The outgoing project SAS data set (macro variable &outds) will contain variables:

enrolid w1 w2 w3 w4 w5 w6 w7 w8 w9 w10 w11 w12 w13 w14 w15 w16 w17 weight\_tot &indexvar

where

* w1-w17 corresponds to the CONDITON\_NBR and contains the value of the WEIGHT from the weight tab of the file Copy of ICD9 to ICD10 Crosswalk NSCLC.xlsx.
* Weight\_tot is the sum of w1-w17
* &indexvar is the index variable as defined by that macro variable