# H·CUP
HEALTHCARE COST AND UTILIZATION PROJECT

## USER GUIDE:

## CHRONIC CONDITION INDICATOR FOR ICD-10-CM, v2021.1
## (BETA VERSION)

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## ACKNOWLEDGEMENTS

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**WHAT'S NEW IN v2021.1 OF THE CHRONIC CONDITION INDICATOR (CCI)
FOR ICD-10-CM (BETA VERSION)?**

- Expanded the Chronic Condition Indicator (CCI) from identifying chronic versus non-chronic diagnoses (values 1 and 0, respectively) to identifying diagnoses as one of the following:
  - Chronic (value C)
  - Acute (value A)
  - Both chronic and acute (value B)
  - Not applicable, code cannot be used to identify a chronic or acute condition (value N).

- Corrected the chronic identification of over 100 diagnosis codes.

- Added ICD-10-CM diagnosis codes valid starting in fiscal year 2021 so the tool now includes any code valid from October 2015 through September 2021.

# INTRODUCTION

This report provides technical documentation for the Healthcare Cost and Utilization Project (HCUP) Chronic Condition Indicators (CCI) for International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) (beta version). Starting on October 1, 2015, diagnoses for hospital inpatient stays and outpatient encounters in the United States are reported using the ICD-10-CM coding system. ICD-10-CM consists of more than 70,000 diagnosis codes.

The CCI for ICD-10-CM facilitates health services research by allowing the researcher to readily identify a diagnosis as indicating a chronic condition. Prior to v2021.1 (beta version), the CCI distinguished chronic from non-chronic conditions.  Starting in v2021.1 (beta version), the CCI tool was expanded to identify four types of conditions:

- Chronic
    - Examples include malignant cancer, diabetes, obesity, hypertension, and many mental health conditions
- Acute
    - Examples include aortic embolism, bacterial infection, pregnancy, and an initial encounter for an injury
- Both
    - Examples include persistent asthma with (acute) exacerbation, acute on chronic heart failure, and kidney transplant rejection
- Not applicable (code cannot be used to identify a chronic or acute condition)
    - Examples include external cause of morbidity codes, injury sequela codes, and codes starting with the letter Z for screening or observation.

Background on the development of the CCI for ICD-10-CM is provided in Appendix A. In 2021, AHRQ expects to conduct additional empirical analyses of the beta version of the tool and transition it out of beta status. User feedback on v2021.1 is appreciated and will be taken into consideration. Comments can be sent to hcup@ahrq.gov.

The CCI for ICD-10-CM (beta version) is updated annually to coincide with fiscal year updates to the ICD-10-CM coding system and retains diagnosis codes valid from the start of ICD-10-CM in October 2015. For this reason, it is advisable to always use the most recent version of the tool.

Files containing the mapping of ICD-10-CM codes to their CCI assignment can be downloaded from the HCUP User Support (HCUP-US) website.[1]

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[1] The HCUP User Support website can be found at www.hcup-us.ahrq.gov/.

**DESCRIPTION OF THE CHRONIC CONDITION INDICATOR FOR ICD-10-CM (BETA VERSION)**

Starting in v2021.1 (beta version), the CCI tool was expanded to identify four types of conditions:

- Chronic
- Acute
- Both chronic and acute
- Not applicable (code cannot be used to identify a chronic or acute condition).

The definition of a chronic condition is consistent with prior versions of the tool (including the ICD-9-CM version) and includes the following:

- A **chronic condition** is defined as a condition that lasts 12 months or longer and meets one or both of the following criteria:
    - It results in the need for ongoing intervention with medical products, services, and special equipment
    - It places limitations on self-care, independent living, and social interactions.[2]

**Acute conditions** are those that are expected to be resolved in less than 12 months or if lasting more than a year do not need ongoing medical attention or limit self-care and independent living. Diagnoses marked as **both** are chronic conditions for which there is an acute exacerbation of the condition. Some diagnoses cannot be used to identify a chronic or acute condition because the ICD-10-CM code does not provide sufficient information to make the distinction. Table 1 shows the distribution of the ICD-10-CM diagnosis codes by CCI assignment.

**Table 1. CCI Assignment by the Number of ICD-10-CM Diagnosis Codes, v2021.1**

| CCI Assignment | Number of ICD-10-CM Codes | Percent of All ICD-10-CM Codes |
|---|---|---|
| Diagnoses indicating a chronic condition (value C) | 11,735 | 16.0 |
| Diagnoses indicating an acute condition (value A) | 23,146 | 31.6 |
| Diagnoses indicating both a chronic and acute condition (value B) | 116 | 0.2 |
| Diagnoses that are not applicable to the assignment of chronic and acute conditions (value N) | 38,208 | 52.2 |
| Total number of ICD-10-CM diagnoses | 73,205 | 100.0 |

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[2] Perrin EC, Newacheck P, Pless IB, Drotar D, Gortmaker SL, Leventhal J, Perrin JM, Stein RE, Walker DK, Weitzman M. Issues involved in the definition and classification of chronic health conditions. Pediatrics. 1993 Apr;91(4):787-93.

Information on the development of revised coding for the CCI for ICD-10-CM is provided in Appendix A.

A note about the use of the CCI tool.  The tool identifies ICD-10-CM codes that indicate a chronic condition but cannot by itself be used to count the number of chronic conditions. It is possible that more than one diagnosis on the hospital record indicates the same type of chronic condition.  For example, one diagnosis indicates *Type 1 diabetes mellitus with ketoacidosis without coma* and a second diagnosis specifies *Type 1 diabetes mellitus with other diabetic kidney complication.*  Both diagnoses signify the chronic condition of diabetes.

**USING THE DOWNLOADABLE CHRONIC CONDITION INDICATOR FOR ICD-10-CM (BETA VERSION) FILES**

**System Requirements**

Using the CCI for ICD-10-CM (beta version) requires a program to decompress or "unzip" files.[3] Approximately 5.0 megabytes of disk space available on one's hard drive also will be needed to accommodate all the CCI for ICD-10-CM (beta version)  files. Additional space is necessary for saving the CCI for ICD-10-CM (beta version) output files.

**Downloadable Files**

The CCI for ICD-10-CM (beta version) zip file contains the following:

1. One translation table in comma separated values (CSV) file format that assigns the CCI for data sets that contain ICD-10-CM diagnosis codes. The CCI returns the following values:
   - Chronic condition (value C)
   - Acute condition (value A)
   - Both a chronic and acute condition (value B)
   - Not applicable, code cannot be used to identify a chronic or acute condition (value N)
2. SAS program to apply the tool to the user's data
3. CCI for ICD-10-CM User Guide (PDF)
4. Change log detailing changes between v2021.1 and v2020.1.

Table 2 includes detail on the names and purposes of each file contained in the CCI for ICD-10-CM (beta version) zip file.

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[3] Third-party zip utilities are available from the following reputable vendors on their official websites: ZIP Reader (Windows) (free download offered by PKWARE, Inc.), SecureZIP® for Mac or Windows (free evaluation and licensed/fee software offered by PKWARE, Inc.), WinZip (Windows) (evaluation and fee versions offered by the Corel Corporation), Stuffit Expander® (Mac) (free evaluation and licensed/fee software offered by Smith Micro Software Inc.).

**Table 2. Contents of the Chronic Condition Indicator for ICD-10-CM Zip File**

| File Name | Purpose |
|---|---|
| CCI_ICD10CM_v*yyyy-r*.csv<br><br>where *yyyy* represents the fiscal year and *r* represents a release number within the fiscal year[a] | The CSV mapping file lists all ICD-10-CM diagnosis codes along with a description for each code, the CCI assignment (value A, B, C, or N).<br><br>This file can be converted to Excel, where a filter can be applied to examine individual ICD-10-CM codes and CCI assignment. |
| CCI_ICD10CM_Mapping_<br>Program_v*yyyy-r*.sas<br><br>where *yyyy* represents fiscal year and *r* represents a release number within fiscal year[a] | SAS mapping program applies the CCI for ICD-10-CM to the user's data. |
| CCI-ICD10CM-User-Guide-v*yyyy-r*.pdf<br><br>where *yyyy* represents fiscal year and *r* represents a release number within fiscal year[a] | This document (i.e., User Guide for the Chronic Condition Indicator for ICD-10-CM in PDF format). |
| CCI_ICD10CMChgLg_v*yyyy*-v*yyyy-r*.xlsx | A log (Microsoft® Excel) comparing two versions of the Chronic Condition Indicator for ICD-10-CM tool including a list of changes and assignment of ICD-10-CM codes to a CCI assignment. |

Abbreviations: CSV, comma separated values
[a]For example, the first mapping file release to include codes valid through fiscal year 2021 is named CCI_ICD10CM_v2021-1.csv.

**Running the SAS Program to Add the Chronic Condition Indicators to Data**

To download, modify, and run the software to apply the CCI for ICD-10-CM to an input dataset, follow these steps:

1. Users should download and extract the contents of the zip file containing the CCI for ICD-10-CM tool to a saved location on their computer. Files included in the zip file are described in Table 1 and referenced below.
2. Users must set up the SAS program (CCI_ICD10CM_Mapping_Program_v*yyyy-r*.sas) to run on their data. They must specify or modify where appropriate:
   a. Change the paths in the SAS program to point to the computer location(s) of
      i. The CSV mapping file (CCI_ICD10CM_v*yyyy-r*.csv)
      ii. The input dataset
      iii. The output dataset
   b. Set the macro variables in the SAS program to match the data element names and file structure of the input dataset (Table 3).

**Table 3. Modifiable Macro Variables and Directory Paths**

| Description of Macro Variables and Directory Paths | SAS Program Syntax |
|---|---|
| **File Location** | |
| Specify the location of the CSV mapping file | FILENAME INRAW1 |
| Specify the location of the input dataset | LIBNAME IN1 |
| Specify the location of the output dataset | LIBNAME OUT1 |
| **File Names** | |
| Specify the file name of the input dataset | %LET CORE=YOUR_SAS_FILE |
| Specify the file name of the output dataset | %LET OUT1=OUTPUT_SAS_FILE |
| **Input Data Characteristics** | |
| Specify the prefix used to name the ICD-10-CM diagnosis data element array in the input dataset. In this example the diagnosis data elements would be named I10_DX1, I10_DX2, etc., similar to the naming of ICD-10-CM data elements in HCUP databases. | %LET DXPREFIX=I10_DX; |
| Specify the maximum number of diagnosis codes on any record in the input file. In this example the maximum number of diagnosis codes on any record is 30. The value of NUMDX must be numeric and greater than or equal to 1; otherwise, the program will not read in any diagnosis codes for CCI assignment. | %LET NUMDX=30; |
| Specify the number of observations to use from the input dataset. Use MAX to use all observations; use a smaller value for testing the program. | %LET OBS = MAX |

Abbreviation: CSV, comma-separate values

**Chronic Condition Indicator Data Elements in the Output File**

This SAS program assumes the input file includes one or more ICD-10-CM diagnosis codes in an array. The output file includes all data elements from the input file, in addition to an array of CCI data elements (CCIn) with a one-to-one correspondence to the array of ICD-10-CM codes. For example, CCS1 includes the CCI assignment for the ICD-10-CM code in the first position of the ICD-10-CM diagnosis code array. The values of the data elements CCIn indicate whether the corresponding ICD-10-CM code is one of the following:

- Chronic condition (value C)
- Acute condition (value A)
- Both chronic and acute (value B)
- Not applicable, code cannot be used to identify a chronic or acute condition (value N).

In v2021.1, codes that are not valid ICD-10-CM diagnosis codes from October 1, 2015 through September 30, 2021 are assigned a blank value (" ") for the CCI.

## APPENDIX A: BACKGROUND ON THE DEVELOPMENT OF THE CHRONIC CONDITION INDICATOR FOR ICD-10-CM

The [Chronic Condition Indicator (CCI) for ICD-9-CM](#) was used as the starting point for the CCI for ICD-10-CM. In preparation for the October 2015 implementation of ICD-10-CM/PCS, the Healthcare Cost and Utilization Project (HCUP) tools were converted to the new coding system. The initial mapping was completed in 2014 (prior to ICD-10-CM-coded data being available) by linking the CCI assignment of ICD-9-CM codes to ICD-10-CM codes via the General Equivalence Mappings (GEMs) available from the Centers for Medicare & Medicaid Services (CMS) website.[4] The resultant first iteration of the ICD-10-CM CCI classification was considered a beta version.

The beta version of the tool stayed consistent with the definition of a chronic condition used for the ICD-9-CM version. A chronic condition is defined as a condition that lasts 12 months or longer and meets one or both of the following criteria: (1) it results in the need for ongoing intervention with medical products, services, and special equipment or (2) it places limitations on self-care, independent living, and social interactions.[5] It should be noted that looking for the word "chronic" in the ICD-10-CM code description is not sufficient to identifying chronic conditions for the CCI because ICD-10-CM coding instructions may have use a different criteria for the use of ICD-10-CM code that specifies a chronic condition and the criteria can vary by the type of disease.

For v2021.1 of the beta version, AHRQ decided to expand the tool to distinguish diagnoses that simultaneously identify chronic and acute condition as "both" and to distinguish acute conditions from those marked as non-chronic in earlier versions of the tool. This change necessitated the identification of diagnosis codes that could not be used to identify acute and chronic conditions. The following steps were followed to convert the coding of chronic vs non-chronic (values 1 and 0, respectively) to the values (C)hronic, (A)cute, (B)oth, and (N)ot applicable.

The first step in the conversion process was to identify codes marked as non-chronic in v2020.1 (beta version) that were not applicable to the identification of a chronic or acute condition. The following type of diagnosis codes were included in this category (CCI value N):

- Codes for external causes of morbidity (all ICD-10-CM codes in the range of V00-Y99)
- Codes indicating a subsequent or sequela encounter for an injury (all ICD-10-CM codes starting with S or T and not ending in A, B, or C)[6]

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[4] Information on the GEMS is available at [http://www.cms.gov/Medicare/Coding/ICD10/2014-ICD-10-CM-and-GEMs.html](http://www.cms.gov/Medicare/Coding/ICD10/2014-ICD-10-CM-and-GEMs.html). Accessed 10/25/2020.

[5] Perrin EC, Newacheck P, Pless IB, Drotar D, Gortmaker SL, Leventhal J, Perrin JM, Stein RE, Walker DK, Weitzman M. Issues involved in the definition and classification of chronic health conditions. Pediatrics. 1993 Apr;91(4):787-93.

[6] Codes for subsequent and sequela encounters cannot be used to identify chronic or acute conditions because ICD-10-CM Coding Guidelines do not specify the amount of time that has elapsed from the initial encounter.

- Codes indicating a subsequent or sequela encounter for a fracture (all ICD-10-CM codes starting with M and not ending in A)[6]
- Codes indicating an initial, subsequent, or sequela encounter for underdosing of a drug (select ICD-10-CM codes starting with T)
- Codes indicating drug abuse or dependence in remission (select ICD-10-CM codes starting with F)
- Codes used for scoring the level of a condition (select ICD-10-CM symptoms and signs codes in the range of R00-R69)
  - Examples include codes indicating the National Institute of Health Stroke Scale (NIHSS) or Glasgow coma scale
- Codes used to report abnormal findings without diagnosis (ICD-10-CM codes in the range of R70-R97) with two exceptions:
  - Two diagnosis codes (R85614 and R87624) that indicate cytologic evidence of malignancy on a smear that marked as chronic (CCI value C), consistent with the ICD-9-CM rule that malignant cancers are considered chronic
- Codes for factors influencing health status and contact with health services (ICD-10-CM codes starting with Z) that were not designated as chronic in prior versions of the CCI tool.  This includes the following types of codes:
  - Codes identifying encounters for medical examinations, observation, evaluation, aftercare, screening, testing, and immunization
  - Codes identifying personal history, family history, or carrier of disease
  - Codes indicating a resistance to antimicrobial drugs
  - Codes indicating socioeconomic and psychosocial factors
  - Codes related to lifestyle and life management factors.

In CCI v2021.1 (beta version), 52.2 percent of the 73,205 ICD-10-CM diagnosis codes were classified as not applicable (CCI value N).

The second step in the process was to determine ICD-10-CM diagnosis codes that indicated both chronic and acute conditions. A list of possible codes was compiled using the following approach:

- Codes that were marked as chronic in v2020.1 (beta version) but included the word "acute" or "brief" in the code description
- Codes that included both the words "acute" and "chronic" in the code description
- Codes that included both the words "subacute" and "chronic" in the code description
- Codes that included the phrase "acute on chronic"
- Codes that described transplant complications, rejections, failures, or infections.

Clinical coding experts reviewed the list of codes and decided if any of these codes should be designated as indicating both chronic and acute conditions.  In CCI v2021.1 (beta version), 0.2 percent of the 73,205 ICD-10-CM diagnosis codes were classified as both (CCI value B).  This approach to identifying diagnoses that indicated chronic and acute conditions was limited to looking for key terms in the code descriptions. Before the CCI tool is moved out of the beta version, more work needs to be done to identify these combination codes.

The next step in the process of converting to the new CCI coding system was to assign the remaining codes that were marked as chronic in v2020.1 (beta version) to chronic (new value C). The ICD-10-CM version of the tool adhered to the following rules implemented under ICD-9-CM:

- All cancers were considered chronic except basal cell carcinomas, benign neoplasms (except benign neoplasms of the brain, cranial nerves, and cerebral meninges), skin and cervix carcinomas *in situ,* and neoplasms of uncertain behavior (except neurofibromatosis).
- All congenital anomalies were designated as chronic conditions.
- All codes indicting an amputated limb were considered as indicating a chronic condition.

In addition, under ICD-10-CM all codes indicating drug abuse or dependence (not in remission) were considered chronic. In CCI v2021.1 (beta version), 16.0 percent of the 73,205 ICD-10-CM diagnosis codes were classified as chronic (CCI value C).

The remaining ICD-10-CM diagnosis codes were designated as acute. This includes, but is not limited to, infections, initial encounters for injuries and fractures, births, pregnancy, drug or alcohol use, and postprocedural or postoperative complications. In CCI v2021.1 (beta version), 31.6 percent of the 73,205 ICD-10-CM diagnosis codes were classified as acute (CCI value A).

Additional empirical analysis of the updated coding in v2021.1 of the tool is needed before the tool is moved out of beta status. User feedback on v2021.1 is appreciated and will be taken into consideration. Comments can be sent to hcup@ahrq.gov.