Mapping three versions of the international classification of diseases to categories of chronic conditions

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Abstract

Introduction
Administrative health data capture diagnoses using the International Classification of Diseases (ICD), which has multiple versions over time. To facilitate longitudinal investigations using these data, we aimed to map diagnoses identified in three ICD versions – ICD-8 with adaptations (ICDA-8), ICD-9 with clinical modifications (ICD-9-CM), and ICD-10 with Canadian adaptations (ICD-10-CA) – to mutually exclusive chronic health condition categories adapted from the open source Clinical Classifications Software (CCS).

Methods
We adapted the CCS crosswalk to 3-digit ICD-9-CM codes for chronic conditions and resolved the one-to-many mappings in ICD-9-CM codes. Using this adapted CCS crosswalk as the reference and referring to existing crosswalks between ICD versions, we extended the mapping to ICDA-8 and ICD-10-CA. Each mapping step was conducted independently by two reviewers and discrepancies were resolved by consensus through deliberation and reference to prior research. We report the frequencies, agreement percentages and 95% confidence intervals (CI) from each step.

Results
We identified 354 3-digit ICD-9-CM codes for chronic conditions. Of those, 77 (22%) codes had one-to-many mappings; 36 (10%) codes were mapped to a single CCS category and 41 (12%) codes were mapped to combined CCS categories. In total, the codes were mapped to 130 adapted CCS categories with an agreement percentage of 92% (95% CI: 86%–98%). Then, 321 3-digit ICDA-8 codes were mapped to CCS categories with an agreement percentage of 92% (95% CI: 89%–95%). Finally, 3583 ICD-10-CA codes were mapped to CCS categories; 111 (3%) had a fair or poor mapping quality; these were reviewed to keep or move to another category (agreement percentage = 77% [95% CI: 69%–85%]).

Conclusions
We developed crosswalks for three ICD versions (ICDA-8, ICD-9-CM, and ICD-10-CA) to 130 clinically meaningful categories of chronic health conditions by adapting the CCS classification. These crosswalks will benefit chronic disease studies spanning multiple decades of administrative health data.

Keywords
international classification of diseases; ICDA-8; ICD-9-CM; ICD-10-CA; mapping; crosswalk; administrative data; chronic health conditions

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Introduction

Administrative health data include routinely-collected electronic healthcare records of encounters with the healthcare system such as physician office visits, hospitalizations, and drug dispensations [1, 2]. These data are collected for the purposes of managing and monitoring the healthcare system, but also offer a cost-effective and timely resource for population-based chronic disease research and surveillance investigations [1–4]. Rates of common chronic diseases are increasing worldwide. Chronic diseases account for over 70% of all deaths worldwide and are also a major driver of rising healthcare costs [5–7]. Therefore, there is a need to accurately and efficiently estimate the prevalence and incidence of chronic diseases; these goals can be achieved using administrative health data.

Administrative database content now extends over many decades in multiple countries. For example, Canada, Denmark, and Finland have over 40 years of administrative health data from physician visits and hospitalizations that are frequently used in longitudinal studies [8–12]. Many countries and regions across the world, such as the United States of America (US), the United Kingdom (UK), Germany, Sweden, Netherlands, Hungary, Italy, Hong Kong, Australia, and Taiwan, have electronic healthcare records [13]. Among these countries and regions, those that are members of the World Health Organization (WHO) collectively use the International Classification of Diseases (ICD), which was developed by the WHO and is subject to regular updates [14]. Many electronic healthcare records contain medical diagnoses recorded using multiple versions of the ICD system [8–10, 15, 16], and therefore researchers will benefit from mapping the ICD coding systems into a standard classification system to support research and collaboration opportunities amongst countries. In Canada, three ICD versions are captured in many of these databases: eighth revision (ICD-8), ninth revision (ICD-9), and tenth revision (ICD-10) [8, 9, 15, 16]. ICD-8 was first introduced in 1965, ICD-9 in 1975, and ICD-10 in 1993, with each version having a greater number of ICD codes. For example, the number of diagnosis codes increased fivefold from 14,000 in ICD-9 to over 70,000 in ICD-10 [17, 18]. An increase in the number and variety of diagnosis codes is attributable to knowledge advances in health and medical sciences, resulting in new diseases being added, recategorized, removed, or combined [19]. For example, autism, which is captured in ICD-9 and ICD-10 was not a recognized health condition in ICD-8. Intellectual disability in ICD-9 and ICD-10 was referred to as mental retardation in ICD-8; this term was replaced due to its negative connotations.

Though the increasing level of detail with each update of the ICD system is essential for diagnostic or administrative purposes, it presents a challenge in disease surveillance and health outcome studies that incorporate data for multiple ICD versions. Researchers typically focus on clinically-relevant conditions in order to achieve timely and clinically meaningful analyses and reports. For example, ICD-9 and ICD-10 with clinical modifications (i.e., ICD-9-CM and ICD-10-CM) have been mapped to the Abbreviated Injury Scale (AIS) in order to use hospitalization records to study a clinically meaningful construct, the severity of the injury [20]. Other crosswalks exist to map ICD codes in different nomenclature systems, such as crosswalks for ICD-9 and ICD-10 to the Systematized Nomenclature of Medicine – Clinical Terms (SNOMED CT) [21, 22]. Researchers who use electronic healthcare records must decide which mappings of ICD codes to adopt. Additionally, up until now, there were no available crosswalks, that is, lists of equivalent codes that mapped ICD-8, ICD-9, and ICD-10 codes into the same clinically meaningful categories of health conditions, which hinders chronic disease research spanning multiple decades. Historically, tracking chronic conditions can contribute to answering questions related to the heritability of chronic conditions and the individual and generational impacts experienced by those living with chronic conditions, including, health-outcomes, education attainment, employment, and socioeconomic status [23, 24].

Our research aimed to address this issue by developing crosswalks for all chronic diseases captured in ICD versions 8, 9 and 10 to map these diseases into clinically meaningful categories. Our proposed approach is to adapt the Clinical Classifications Software (CCS), developed for the US-based Agency for Healthcare Research and Quality [25]. The CCS provides validated crosswalks for categorizing diagnoses captured in ICD-9-CM and ICD-10-CM into mutually exclusive and broad classes of health conditions, which enables health outcome assessment and disease cohort development. The CCS has previously been used to report interpretable and clinically meaningful information about diseases, including their prevalence and associated medical expenditures [26, 27]. Extending such a crosswalk to other versions of the ICD (i.e. ICD-8) would open opportunities for longitudinal studies in chronic disease surveillance. Additionally, the CCS crosswalks are based on 5-digit ICD codes; however, in many administrative health databases, it is common for diagnoses to appear in truncated 3-digit versions [19]. This is the case with physician visit codes in the majority of provinces in Canada [28].

Therefore, our aim was to create mutually exclusive chronic health condition categories from three versions of the ICD system (ICD-8, ICD-9, and ICD-10). To achieve this aim, we adapted the CCS categorizations of the 5-digit ICD-9-CM codes to the subordinate 3-digit codes and extended the adapted CCS crosswalk to include ICD-8 with adaptations (ICDA-8) and ICD-10 with Canadian adaptation (ICD-10-CA). This will facilitate chronic disease research and surveillance that relies on electronic healthcare records from multiple decades of an individual’s life and across generations.

Methods

Setting and data sources

This study was conducted in the context of administrative databases from the Manitoba Population Research Data Repository [16, 29]. The Repository includes all encounters of Manitoba residents within the healthcare system, including inpatient hospitalizations and outpatient physician visits. The Medical Services database contained in the Repository includes claims for outpatient physician visits and captures diagnoses using 3-digit codes for ICDA-8 from 1970 to 1979, 3-digit codes for ICD-9-CM from 1979 to 2015, and 5-digit codes for ICD-9-CM since 2015. The Hospital Abstracts database includes hospitalization records with 25 diagnoses
fields captured using 4-digit codes for ICDA-8 from 1970 to 1979, 5-digit codes for ICD-9-CM from 1979 to 2004, and 5-digit codes for ICD-10-CA in subsequent years [16]. The study was approved by the Health Research Ethics Board of the University of Manitoba and the Manitoba Health Information Privacy Committee granted permission for data access.

The list of ICD-9-CM codes for this study, the Chronic Condition Indicator (CCI), and the CCS for ICD-9-CM crosswalk were all obtained from the Healthcare Cost and Utilization Project (HCUP) sponsored by the Agency for Healthcare Research and Quality [30]. The list of ICDA-8 codes was obtained from the US Department of Health, Education, and Welfare [31]. The list of ICD-10-CA codes was generated from the Manitoba Hospital Abstracts database from 2005 to 2018 (in the primary diagnosis position).

The CCI provides an enhancement of a previous classification system from Hwang et al. and categorizes 5-digit ICD-9-CM diagnosis codes into chronic or non-chronic conditions [32, 33]. The CCI defines a chronic condition as “a condition that lasts 12 months or longer and meets one or both of the following tests: (a) it places limitations on self-care, independent living, and social interactions; (b) it results in the need for ongoing intervention with medical products, services, and special equipment” [33]. It was used in this study to identify ICD codes of chronic health conditions.

The CCS was selected because it is an open source that provides validated crosswalks for categorizing the entire list of ICD-9-CM and ICD-10-CA codes into a smaller number of mutually exclusive and clinically relevant health condition categories [25]. The CCS includes 285 clusters of health conditions that are composed of mostly clinically homogeneous categories with a few heterogeneous categories of less common conditions within a body system.

Mapping process

The term “crosswalk” in this study refers to the complete list of equivalent matching codes and “mapping” refers to the processes of translating from source to target codes [34]. Because of the availability of a CCS crosswalk for ICD-9-CM as well as previous crosswalks that map ICD-10-CA and ICDA-8 to ICD-9-CM, we used ICD-9-CM as the reference coding system for mapping the three ICD versions. The mapping was conducted independently by two reviewers (AH & VV) with clinical and methodology expertise and included four steps: 1. Identifying ICD-9-CM codes for chronic conditions; 2. Creating a crosswalk between 3-digit ICD-9-CM and CCS categories; 3. Creating a crosswalk between ICDA-8 and CCS categories; and 4. Creating a crosswalk between ICD-10-CA and CCS categories (Figure 1). Discrepancies in mappings between the two reviewers were resolved through deliberation among the reviewers until consensus was reached. Deliberation included reviewing the detailed description of the codes for information on condition, symptomology, body systems, complications, and age of onset and referring to available crosswalks and published literature, which provided a peer-reviewed third-party decision. The two reviewers used independent resources to guide the mapping process, which were not shared until they met to discuss and resolve mapping discrepancies. Since ICD-9-CM and ICDA-8 diagnosis codes were captured as 3-digit codes during most data years in physician visit claims, our mappings were targeted to the 3-digit level code categories. Below we describe the four mapping steps in detail (See also in Figure 1).

**Step 1:** Identifying ICD-9-CM codes for chronic conditions

Starting with the entire list of ICD-9-CM codes, we excluded ICD-9-CM chapters (categories based on body system and health conditions) that did not capture specific chronic conditions, including 1. Infectious and Parasitic Diseases (001-139), 2. Symptoms, Signs, and Ill-Defined Conditions (780-799), 3. Injuries and Poisoning (800-999) and 4. Supplementary Codes of Factors Influencing Health Status (V01-V91). Then, we applied the CCI to exclude the remaining ICD-9-CM codes for acute conditions. Finally, we truncated the codes to three digits to match the form available in most data years in physician visit claims. The final list included 3-digit ICD-9-CM codes for chronic conditions only.

**Step 2:** Creating a crosswalk between 3-digit ICD-9-CM codes and CCS categories

The existing CCS crosswalk maps 5-digit ICD-9-CM to CCS categories in a many-to-one manner (i.e., several 5-digit ICD-9-CM codes map to one CCS category). Truncating the ICD-9-CM codes into their 3-digit form resulted in many instances where a single 3-digit ICD-9-CM code was mapped to multiple CCS categories (i.e., one-to-many mapping). This overlap would occur because some of the medical characteristics provided in the full 5-digit code of a condition (e.g., symptomology, complications, and body system) are lost at the 3-digit level. ICD-9-CM codes that mapped to multiple CCS categories were reviewed by two team members who made one of two decisions: 1. Assign the code to a modified CCS category that combines the overlapping CCS categories or 2. Assign the code to a single CCS category. CCS categories were combined if there was a significant overlap in the conditions, symptomology, body system, and/or age of onset between the categories. The choice to map the overlapping ICD-9-CM code into a single CCS category was made when the ICD-9-CM code description fit primarily with one CCS category and less with other categories.

Though the CCS includes a total of 285 mutually exclusive groups of health conditions, we expected to end with a smaller number, given that we limited our attention to chronic conditions and combined some CCS categories. The final list of CCS categories based on categorizing ICD-9-CM codes was the master reference list that was subsequently used to map ICDA-8 and ICD-10-CA codes to their respective CCS categories. The original CCS categories were numbered by the developers; we adopted these same numbers for each CCS category. When the original CCS categories were combined in our crosswalks, we combined the assigned numbers.

**Step 3:** Creating a crosswalk between 3-digit ICDA-8 codes and CCS categories

The objective of this step was to map truncated (i.e., 3-digit) ICDA-8 to the new list of modified CCS categories produced in Step 2 using existing crosswalks between ICDA-8 and ICD-9-CM from the Swedish National Board of Health and Welfare, the US Department of Health and Human Services, the Manitoba Centre for Health Policy (MCHP), and additional published literature [35–42]. The crosswalks were used to guide the choice of the CCS category that best fits the
ICD-9-CM: International Classification of Diseases 9th revision with clinical modifications; CCI: Chronic Condition Indicator; CCS: Clinical Classifications Software; ICDA-8: International Classification of Diseases 8th revision with adaptations; ICD-10-CA: The International Classification of Diseases 10th revision with Canadian adaptations.

ICDA-8 code based on reference of where the equivalent ICD-9-CM code had been already mapped. An ICDA-8 code was excluded if it did not capture a chronic condition, according to the CCI and its corresponding ICD-9-CM code.

**Step 4: Creating a crosswalk between ICD-10-CA and CCS categories**

To map ICD-10-CA codes to the modified CCS categories, the codes were first mapped to ICD-9-CM codes based on a crosswalk developed by the Canadian Institute for Health Information (CIHI), a national healthcare organization that enhanced ICD-10 to meet the morbidity coding needs of Canadian healthcare data [43, 44]. The mapping output included an assessment of the quality of fit of each ICD-10-CA code to its corresponding ICD-9-CM codes, with grades of good/excellent (1), fair (2), and poor (3) fit. The resulting ICD-10-CA codes were then mapped to CCS categories based on where their equivalent ICD-9-CM codes were placed. ICD-10-CA codes that had mapping grades of fair or poor were reviewed by the two team members independently for CCS category assignment based on the publically-available ICD-10-CM, an adaptation of ICD-10 intended for use in the US, to CCS crosswalk [18].

**Data analysis**

Results from these mapping steps include frequencies and percentages of the codes and categories used and produced at each mapping step. Additionally, to quantify the reliability of each mapping step, we calculated agreement percentages and 95% confidence intervals (CI; using the normal distribution approximation) between the two reviewers for each task where mapping decisions were made: assigning ICD-9-CM codes that mapped to multiple categories, mapping ICDA-8 codes to CCS categories, and assigning ICD-10-CA codes that mapped to a category different from the one suggested by the ICD-10-CM to CCS crosswalk. Agreement percentage was calculated as the frequency of reviewer agreements on mapping decisions divided by the total number of mapping decisions. Data analysis was conducted using SAS version 9.4 statistical software (SAS Institute; Cary, NC).

**Results**

**Identifying ICD-9-CM codes for chronic conditions**

There were 13,769 ICD-9-CM codes in the initial list. The number was reduced to 8231 codes after excluding chapters that mainly captured acute conditions. The number was further reduced to 4280 codes after applying the CCI criteria. After truncating the list of 5-digit ICD-9-CM codes into their superordinate 3-digit codes, 354 ICD-9-CM codes for chronic conditions were retained (See Supplementary Appendix 1).

**Creating a crosswalk between 3-digit ICD-9-CM codes and CCS categories**

The 354 ICD-9-CM codes produced in Step 1 were mapped to 151 of the original 285 CCS categories. Of the 354 ICD-9-CM codes, a total of 77 (22%) codes had a one-to-many relationship with 11 chapters. The highest conflict was observed for chapters corresponding to codes 320-389 Diseases of the Nervous System and Sense Organs with 15 codes; 390-459 Diseases of the Circulatory System with 13 codes; and 140-239 Neoplasms with 11 codes. 36 (10%) codes were mapped to a single CCS category and 41 (12%) codes were mapped to combined CCS categories (See Table 1 for examples). The two reviewers agreed on 71 out of the 77 mapping decisions, resulting in an agreement percentage of 92% (95% CI: 86%-98%) (See Supplementary Appendix 2). The overlapping codes resulted in combining 40 of the 151 CCS categories into 19 broader categories for a final tally of 130 CCS categories (See Supplementary Appendix 1).
Table 1: Example list of ICD-9-CM codes that mapped to multiple CCS categories

| ICD-9-CM code | ICD-9-CM code description | Overlapping CCS categories | Assigned CCS category | CCS category # |
|---------------|---------------------------|----------------------------|-----------------------|---------------|
| 203           | Multiple myeloma and immunoproliferative neoplasms | Leukemias | Multiple myeloma and leukemias | 39, 40 |
| 203           | Multiple myeloma and immunoproliferative neoplasms | Multiple myeloma | Multiple myeloma and leukemias | 39, 40 |
| 250           | Diabetes mellitus | Diabetes mellitus without complication | Diabetes mellitus | 49, 50 |
| 250           | Diabetes mellitus | Diabetes mellitus with complications | Diabetes mellitus | 49, 50 |

Table 2: Examples of discrepancies and final decisions in mapping ICDA-8 to CCS categories

| ICDA-8 | ICDA-8 code description | Reviewer chosen CCS categories | Assigned CCS category | CCS category # |
|--------|-------------------------|---------------------------------|-----------------------|---------------|
| 230    | Neoplasm of unspecified nature of digestive organs | Cancer of other GI organs; peritoneum | Neoplasms of unspecified nature | 44 |
| 230    | Neoplasm of unspecified nature of digestive organs | Neoplasms of unspecified nature | Neoplasms of unspecified nature | 44 |
| 209    | Myelofibrosis | Other hematologic conditions | Neoplasms of unspecified nature | 44 |
| 209    | Myelofibrosis | Neoplasms of unspecified nature | Neoplasms of unspecified nature | 44 |
| 307    | Transient situational disturbances | Adjustment disorders | Adjustment disorders | 650 |
| 307    | Transient situational disturbances | Mood and anxiety disorders | Adjustment disorders | 650 |
| 412    | Chronic ischaemic heart disease | Other and ill-defined heart disease | Coronary atherosclerosis and other heart diseases | 101 |
| 412    | Chronic ischaemic heart disease | Coronary atherosclerosis and other heart diseases | Coronary atherosclerosis and other heart diseases | 101 |

ICDA-8: International Classification of Diseases 8th revision with adaptations; CCS: Clinical Classifications Software.

Creating a crosswalk between ICDA-8 codes and CCS categories

A total of 321 3-digit ICDA-8 codes were mapped to CCS categories based on the ICD-9-CM equivalent codes (See Supplementary Appendix 3). The two reviewers mapped 296 of the 321 codes to the same CCS category, giving an agreement percentage of 92% (95% CI: 89%-95%) (See Supplementary Appendix 4). The majority of the mapping discrepancies involved ICDA-8 codes that mapped to multiple ICD-9-CM codes and those ICD-9-CM codes mapped to multiple CCS categories (See Table 2 for examples).

Creating a crosswalk between ICD-10-CA codes and CCS categories

3583 ICD-10-CA codes were identified in the Hospital Abstracts database over the study observation period. The
codes were converted to ICD-9-CM with 984 (27%) graded fair or poor. After independently reviewing the codes with these grades, 111 (3%) did not map to the correct CCS category according to the ICD-10-CM to CCS crosswalk [18]. The mapping suggestion from the crosswalk was voided for 74 (2%) codes and kept where originally mapped based on the equivalent ICD-9-CM code, and 37 (1%) were moved to the recommended CCS category (See Table 3 for examples). The two reviewers agreed on 86 of the 111 mapping decisions resulting in an agreement percentage of 77% (95% CI: 69%–85%) (See Supplementary Appendix 5). The majority of mapping discrepancies resulted from the trade-off between focusing on making the same decisions that were made in Step 2 to accommodate the loss of granularity of truncated ICD-9-CM codes and maintaining the details from the 4 and 5-digit ICD-10-CA codes (See Supplementary Appendix 6).

### Discussion

We mapped three ICD versions, ICDA-8, ICD-9-CM, and ICD-10-CA, into 130 clinically meaningful categories of chronic health conditions by adapting and extending the open-source CCS. Using ICD-9-CM as the reference, the mapping process included: 1. Identifying diagnosis codes of chronic conditions; 2. Adapting the CCS to classify 3-digit ICD-9-CM codes and resolving one-to-many mappings resulting in 130 clinically meaningful condition categories; 3. Translating ICDA-8 codes into those same categories aided by available crosswalks; and 4. Mapping ICD-10-CA codes to the CCS categories using the available crosswalk between ICD-10-CA and ICD-9-CM.

The developed crosswalks provide researchers with an efficient and convenient tool to aggregate thousands of diagnosis codes in different ICD versions into clinically meaningful categories of chronic health conditions while using the entire span of data years from administrative and other electronic healthcare records. Covering three ICD versions will, therefore, be especially valuable in chronic disease surveillance and longitudinal studies of disease risk that extend over decades at the population level. Furthermore, these crosswalks can aid in longitudinal studies that develop and apply prediction models to study the progression of conditions that would benefit from early detection. Such research has been previously done to identify trajectories of conditions such as gout and chronic obstructive pulmonary disease by analyzing the entire list of diagnostic codes present prior to the diagnosis of the target condition [45].

This study is unique because it translates all chronic condition diagnosis codes from multiple ICD versions to health condition categories. We included ICDA-8 in the mapping process, which has been a knowledge gap in previous mapping research. Such mapping resources are essential to advance health analytics but have been lacking. Most previous mappings have covered ICD-9 codes only [26, 27, 46–49], or focused on a single condition or category of conditions (e.g., respiratory diseases, cancer, and cardiovascular diseases) [35, 36, 50–55]. These prior classifications of ICD codes to clinically meaningful categories have highlighted the fact that each crosswalk is curated for a specific context, varying in the objectives, process, and results. Similar restrictions are met between different nomenclature systems. For example, providing a focus on medical terminology in SNOMED CT resulted in the inclusion of SNOMED CT as reference terminology in the Foundation Component of ICD-11 [56]. Moreover, future plans include further collaboration between WHO and SNOMED CT owners to provide more efficient and easier data entry using clinically meaningful terms from SNOMED CT. However, SNOMED CT includes extensive terminology about symptoms, signs, procedures, observations, some laboratory tests, drugs, and devices [57]. Further, SNOMED CT is currently identified for use as a reference tool for ICD coding, leaving electronic healthcare

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**Table 3: Examples of ICD-10-CA codes that were graded 2 or 3 and final mapping decisions**

| ICD-10-CA Code | ICD-10-CA code description | Original CCS category | New CCS category | CCS category # |
|----------------|----------------------------|-----------------------|----------------|----------------|
| N158           | Other specified renal tubulo-interstitial diseases | Urinary tract infections | Chronic kidney disease and related conditions | 156, 157, 158 |
| M8790          | Osteonecrosis, unspecified, multiple sites | Infective arthritis and osteomyelitis | Osteoporosis and other bone diseases | 206, 212 |
| K850           | Idiopathic acute pancreatitis | Pancreatic disorders (excluding diabetes) | Pancreatic disorders (excluding diabetes) | 152 |
| I088           | Other multiple valve diseases | Peri-; endo-; and myocarditis; cardiomyopathy | Heart valve disorders | 96 |
| N160           | Renal tubulo-interstitial disorders in infectious and parasitic diseases classified elsewhere | Urinary tract infections | Other diseases of kidney and ureters | 161 |
| K710           | Toxic liver disease with cholestasis | Hepatitis and other liver diseases | Hepatitis and other liver diseases | 6, 151 |

Grade 2 = fair; grade 3 = poor. ICD-10-CA: The International Classification of Diseases 10th revision with Canadian adaptations; CCS: Clinical Classifications Software.
records to use the ICD system [56]. Therefore, it remains necessary to refine each crosswalk to the particular user and research settings required. The crosswalks we have created provide a comprehensive categorization of multiple ICD versions and chronic health conditions, which can be incorporated to achieve a wide range of health research goals in a variety of settings. Further, these crosswalks can potentially be used by researchers in other countries, such as Australia, UK, and the US, where ICD-coded data are widely available.

This study has several strengths. We incorporated three different ICD versions spanning over 50 years of electronic healthcare records. Therefore, the produced crosswalks are generalizable to settings and jurisdictions where diagnoses are captured in one or more of the three mapped ICD versions, such as Canada, Sweden, Finland and Denmark, among many others. Second, the three crosswalks included all chronic conditions and were not limited to a subcategory or type of chronic condition. Third, each ICD version was mapped to the same 130 CCS categories, which provides an opportunity for longitudinal research covering multiple ICD versions. Furthermore, the mapping was completed by two reviewers and inter-reviewer agreement was calculated for each ICD version mapping. Additionally, we used available crosswalks to aid in the mapping decisions and provide a third-party peer reviewed decision when reviewers faced discrepancies.

Despite these strengths, we note a few limitations. The ICD-10-CA crosswalk was based on ICD codes that appeared in the Manitoba Hospital Abstracts database over a defined period of time; therefore, it may not include the entire list of ICD-10-CA codes. However, the codes were identified using 14 years of data for the entire population, and it is unlikely that the data are significantly different from those that would be captured in other jurisdictions. Additionally, the loss of granularity in the truncated 3-digit ICD codes may have resulted in the loss of details of the condition relating to various subcategories. This could affect the mapping decisions. For example, the 3-digit ICD-9-CM 250 captures diabetes mellitus. However, details on diabetes type and the presence of complications can only be identified using the 5 and 4-digit ICD-9-CM codes, respectively. This may not have been particularly disadvantageous to our objective of mapping three versions of ICD codes into clinically meaningful categories as that required us to focus on broader categories of conditions but would limit the crosswalks’ utility if more specific diagnoses are of interest. Mapping based on the broader 3-digit diagnosis level simplified the scope of the conditions between older ICD versions that included a smaller number of subcategories and newer ICD versions with growing subcategorization. Yet, developing crosswalks based on the full-length (e.g., 5-digit) ICD codes is recommended in data sources where these codes are available, such as in electronic healthcare records. The mappings were developed using ICD versions relevant to the province of Manitoba in Canada. There are some barriers associated with the application of our mappings to ICD versions used in other countries. However, these barriers would be minor and version-specific since the ICD system is universal to WHO member countries [58]. The crosswalks we have produced have not been independently validated. Future studies are recommended to evaluate the quality of the crosswalks within Manitoba, Canada, as well as in other jurisdictions.

Conclusion

This study described the development of crosswalks between three ICD versions: ICDA-8, ICD-9-CM, and ICD-10-CA into 130 clinically meaningful categories of chronic health conditions based on the open-source CCS classification. These crosswalks will benefit chronic disease research and surveillance that relies on electronic healthcare records spanning multiple decades. Future studies are recommended to independently validate the produced crosswalks.

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Conflicts of interest

All authors declare that they have no conflict of interest.

Ethics approval

The study was approved by the Health Research Ethics Board of the University of Manitoba; data access approval was provided by the Manitoba Health Information Privacy Committee.

Supplementary appendices

- Supplementary Appendix 1. Crosswalk of ICD-9-CM codes to CCS categories
- Supplementary Appendix 2. Discrepancies in ICD-9-CM mappings between the two reviewers
- Supplementary Appendix 3. Crosswalk of ICDA-8 codes to CCS categories
- Supplementary Appendix 4. Discrepancies in ICDA-8 mappings between the two reviewers
- Supplementary Appendix 5. Discrepancies in ICD-10-CA mappings between the two reviewers
- Supplementary Appendix 6. Crosswalk of ICD-10-CA codes to CCS categories
References

1. Gavrielov-Yusim N, Friger M. Use of administrative medical databases in population-based research. J Epidemiol Community Health 2014;68:283–7. https://doi.org/10.1136/jech-2013-202744

2. Cadarette SM, Wong L. An Introduction to Health Care Administrative Data. Can J Hosp Pharm 2015;68:232–7. http://doi.org/10.4212/cjhp.v68i3.1457

3. Jutte DP, Roos LL, Brownell MD. Administrative record linkage as a tool for public health research. Annu Rev Public Health 2011;32:91–108. https://doi.org/10.1146/annurev-publichealth-031210-100700

4. Roos LL, Nicol JP, Cageorge SM. Using administrative data for longitudinal research: comparisons with primary data collection. J Chronic Dis 1987;40:41–9. https://doi.org/10.1016/0021-9681(87)90095-6

5. Noncommunicable diseases progress monitor 2020. Geneva: World Health Organization; 2020.

6. Buttorff C, Ruder T, Bauman M. Multiple Chronic Conditions in the United States. Santa Monica, CA: RAND Corporation; 2017.

7. Health at a Glance: Europe 2018: State of Health in the EU Cycle. Paris: OECD Publishing; 2018.

8. Sund R. Quality of the Finnish Hospital Discharge Register: A systematic review. Scand J Public Health 2012;40:505–15. https://doi.org/10.1177/1403494812456637

9. Lyne E, Sandegaard JL, Rebolj M. The Danish National Patient Register. Scand J Public Health 2011;39:30–3. https://doi.org/10.1177/1403494811401482

10. Lucyk K, Lu M, Sajobi T, Quan H. Administrative health data in Canada: lessons from history. BMC Med Inform Decis Mak 2015;15:69. https://doi.org/10.1186/s12911-015-0196-9

11. Bernstein CN, Burchill C, Targownik LE, Singh H, Ghia JE, Roos LL. Maternal Infections That Would Warrant Antibiotic Use Antepartum or Peripartum Are Not a Risk Factor for the Development of IBD: A Population-Based Analysis. Inflamm Bowel Dis 2017;23:635–40. https://doi.org/10.1097/MIB.0000000000001042

12. Lix LM, Leslie WD, Yang S, Yan L, Walld R, Morin SN, et al. Accuracy of Offspring-Reported Parental Hip Fractures: A Novel Population-Based Parent-Offspring Record Linkage Study. Am J Epidemiol 2017;185:974–81. https://doi.org/10.1093/aje/kww197

13. Häyrinen K, Saranto K, Nykänen P. Definition, structure, content, use and impacts of electronic health records: a review of the research literature. Int J Med Inf 2008;77:291–304. https://doi.org/10.1016/j.ijmedinf.2007.09.001

14. World Health Organization. International Statistical Classification of Diseases and Related Health Problems (ICD) 2021. https://www.who.int/classifications/classification-of-diseases (accessed February 2, 2021).

15. Lindström U, Exarchou S, Sigurdardottir V, Sundström B, Asking J, Eriksson JK, et al. Validity of ankylosing spondylitis and undifferentiated spondyloarthritides diagnoses in the Swedish National Patient Register. Scand J Rheumatol 2015;44:369–76. https://doi.org/10.3109/03009742.2015.1010572

16. University of Manitoba - Faculty of Medicine - Community Health Sciences - Manitoba Centre for Health Policy - Concept Dictionary and Glossary for Population Based Research n.d. http://mchp-appserv.cpe.umanitoba.ca/viewConcept.php?conceptID=1028 (accessed August 5, 2020).

17. US Centers for Disease Control and Prevention; National Center for Health Statistics. International Classification of Diseases (ICD-10-CM/PCS) transition—background 2015. http://www.cdc.gov/nchs/icd/icd10cm_pcs_background.htm (accessed July 24, 2020).

18. Clinical Classifications Software (CCS) for ICD-10-PCS (beta version) n.d. https://hcup-us.ahrq.gov/toolssoftware/ccs10/ccs10.jsp (accessed July 23, 2020).

19. WHO International Classification of Diseases, 11th Revision (ICD-11). WHO n.d. http://www.who.int/classifications/icd/en/ (accessed July 29, 2020).

20. Glerum KM, Zonfrillo MR. Validation of an ICD-9-CM and ICD-10-CM map to AIS 2005 Update 2008. Inj Prev J Int Soc Child Adolesc Inj Prev 2019;25:90–2. https://doi.org/10.1136/injuryprev-2017-042519

21. Nadkarni PM, Darer JA. Migrating existing clinical content from ICD-9 to SNOMED. J Am Med Inform Assoc JAMIA 2010;17:602–7. https://doi.org/10.1136/jamia.2009.001057

22. Bowman SE. Coordinating SNOMED-CT and ICD-10: Getting the Most out of Electronic Health Record Systems. Am Health Inf Manag Assoc 2005;76:60–1.

23. Wehby GL, Domingue BW, Wolinsky FD. Genetic Risks for Chronic Conditions: Implications for Long-term Wellbeing. J Gerontol A Biol Sci Med Sci 2018;73:477–83. https://doi.org/10.1093/gerona/glx154

24. Rappaport SM. Genetic Factors Are Not the Major Causes of Chronic Diseases. PLOS ONE 2016;11:e0154387. https://doi.org/10.1371/journal.pone.0154387

25. Elixhauser A, Steiner C, Palmer L. Clinical Classifications Software (CCS). U.S. Agency for Healthcare Research and Quality; 2015.
26. Chi M, Lee C, Wu S. The prevalence of chronic conditions and medical expenditures of the elderly by chronic condition indicator (CCI). Arch Gerontol Geriatr 2011;52:284–9. https://doi.org/10.1016/j.archger.2010.04.017

27. Kannan VC, Andriamalala CN, Reynolds TA. The burden of acute disease in Mahajanga, Madagascar—a 21 month study. PloS One 2015;10:e0119029. https://doi.org/10.1371/journal.pone.0119029

28. Lix LM, Walker R, Quan H, Nesdole R, Yang J, Chen G, et al. Features of physician services databases in Canada. Chronic Dis Inj Can 2012;32:186–93.

29. Roos LL, Nicol JP. A Research Registry: Uses, Development, and Accuracy. J Clin Epidemiol 1999;52:39–47. https://doi.org/10.1016/S0895-4356(98)00126-7

30. HCUP-US Tools & Software Page n.d. https://hcup-us.ahrq.gov/tools_software.jsp (accessed July 14, 2020).

31. The US Department of health, Education and Welfare. Eighth Revision International Classification of Diseases. 1969.

32. Hwang W, Weller W, Ireys H, Anderson G. Out-of-pocket medical spending for care of chronic conditions. Health Aff Proj Hope 2001;20:267–78. https://doi.org/10.1377/hlthaff.20.6.267

33. Chronic Condition Indicator (CCI) for ICD-9-CM n.d. https://hcup-us.ahrq.gov/toolssoftware/chronic/chronic.jsp (accessed July 14, 2020).

34. De S. 8 steps to success in ICD-10-CM/PCS mapping: best practices to establish precise mapping between old and new ICD code sets. J AHIMA Am Health Inf Manag Assoc 2012;83.

35. Andersen MN, Olsen A-MS, Madsen JC, Faber J, Torp-Pedersen C, Gislason GH, et al. Liothyronine Substitution in Patients with Subclinical Hypothyroidism and the Risk of Myocardial Infarction and Mortality. PLOS ONE 2015;10:e0129793. https://doi.org/10.1371/journal.pone.0129793

36. Van Dyke M, Greer S, Odom E, Schieb L, Vaughan A, Kramer M, et al. Heart disease death rates among blacks and whites aged ≥35 years - United States, 1968-2015. MMWR Surveill Summ 2018;67:1–11. https://doi.org/10.15585/mmwr.s6705a1

37. Fazel SB, Grann M, Carlström E, Lichtenstein P, Långström N. Risk factors for violent crime in schizophrenia: A national cohort study of 13,806 patients. J Clin Psychiatry 2009;70:362–9. https://doi.org/10.4088/JCP.08m04274

38. Duggar BC, Lewis WF. Comparability of diagnostic data. Coded by the 8th and 9th Revisions of the International Classification of Diseases. Vital Health Stat 2 1987;1–31.
50. Lix L, Smith M, Pitz M, Ahmed R, Quon H, Griffith J, et al. Cancer Data Linkage in Manitoba: Expanding the Infrastructure for Research. Winnipeg, MB: Manitoba Centre for Health Policy; 2016.

51. Rück C, Larsson KJ, Lind K, Perez-Vigil A, Isomura K, Sarislan A, et al. Validity and reliability of chronic tic disorder and obsessive-compulsive disorder diagnoses in the Swedish National Patient Register. BMJ Open 2015;5:e007520. https://doi.org/10.1136/bmjopen-2014-007520

52. Sellgren C, Landén M, Lichtenstein P, Hultman NM, Långström N. Validity of bipolar disorder hospital discharge diagnoses: file review and multiple register linkage in Sweden. Acta Psychiatr Scand 2011;124:447–53. https://doi.org/10.1111/j.1600-0447.2011.01747.x

53. Tüchsen F, Hannerz H, Burr H. A 12 year prospective study of circulatory disease among Danish shift workers. Occup Environ Med 2006;63:451–5. https://doi.org/10.1136/oem.2006.026716

54. Harpsøe MC, Basit S, Andersson M, Nielsen NM, Frisch M, Wohlfahrt J, et al. Body mass index and risk of autoimmune diseases: a study within the Danish National Birth Cohort. Int J Epidemiol 2014;43:843–55. https://doi.org/10.1093/ije/dyu045

55. Nielsen EH, Lindholm J, Laurberg P. Use of combined search criteria improved validity of rare disease (craniopharyngioma) diagnosis in a national registry. J Clin Epidemiol 2011;64:1118–26. https://doi.org/10.1016/j.jclinepi.2010.12.016

56. Roberts R, Greenberg M, Richardson H. Report of ICD-11 Revision Review. Consultancy Interim Assessment of 11th ICD Revision. WHO; 2015.

57. Bodenreider O, Cornet R, Vreeman DJ. Recent Developments in Clinical Terminologies - SNOMED CT, LOINC, and RxNorm. Yearb Med Inform 2018;27:129–39. https://doi.org/10.1055/s-0038-1667077

58. World Health Organization. International Classification of Diseases, (ICD-10-CM/PCS) Transition – Background 2015. https://www.cdc.gov/nchs/icd/icd10cm_pcs_background.htm (accessed February 2, 2021).

Abbreviations

US: The United States of America
UK: The United Kingdom
WHO: The World Health Organization
ICD: The International Classification of Diseases
ICD-8: The International Classification of Diseases 8th revision
ICD-9: The International Classification of Diseases 9th revision
ICD-10: The International Classification of Diseases 10th revision
ICDA-8: The International Classification of Diseases 8th revision with adaptations
ICD-9-CM: The International Classification of Diseases 9th revision with clinical modifications
ICD-10-CM: The International Classification of Diseases 10th revision with clinical modifications
ICD-10-CA: The International Classification of Diseases 10th revision with Canadian adaptations
AIS: The Abbreviated Injury Scale
SNOMED CT: Systematized Nomenclature of Medicine – Clinical Terms
CCS: The Clinical Classifications Software
CCI: The Chronic Condition Indicator
HCUP: The Healthcare Cost and Utilization Project
MCHP: The Manitoba Centre for Health Policy
CIHI: The Canadian Institute of Health Information
CI: Confidence interval
### Supplementary Appendix 1: Crosswalk of ICD-9-CM codes to CCS categories

| CCS category # | CCS category description | ICD-9-CM code | ICD-9-CM code label |
|----------------|--------------------------|---------------|---------------------|
| 11             | Cancer of head and neck  | 140           | Malignant neoplasm of lip |
|                |                          | 141           | Malignant neoplasm of tongue |
|                |                          | 142           | Malignant neoplasm of major salivary glands |
|                |                          | 143           | Malignant neoplasm of gum |
|                |                          | 144           | Malignant neoplasm of floor of mouth |
|                |                          | 145           | Malignant neoplasm of other and unspecified parts of mouth |
|                |                          | 146           | Malignant neoplasm of oropharynx |
|                |                          | 147           | Malignant neoplasm of nasopharynx |
|                |                          | 148           | Malignant neoplasm of hypopharynx |
|                |                          | 149           | Malignant neoplasm of other and ill-defined sites within the lip oral cavity and pharynx |
|                |                          | 160           | Malignant neoplasm of nasal cavities middle ear and accessory sinuses |
|                |                          | 161           | Malignant neoplasm of larynx |
| 12             | Cancer of esophagus      | 150           | Malignant neoplasm of esophagus |
| 13             | Cancer of stomach        | 151           | Malignant neoplasm of stomach |
| 18             | Cancer of other GI organs; peritoneum | 152 | Malignant neoplasm of small intestine including duodenum |
|                |                          | 156           | Malignant neoplasm of gallbladder and extrahepatic bile ducts |
|                |                          | 158           | Malignant neoplasm of retroperitoneum and peritoneum |
|                |                          | 159           | Malignant neoplasm of other and ill-defined sites within the digestive organs and peritoneum |
|                |                          | 230           | Carcinoma in situ of digestive organs |
| 14             | Cancer of colon          | 153           | Malignant neoplasm of colon |
| 15             | Cancer of rectum and anus| 154           | Malignant neoplasm of rectum rectosigmoid junction and anus |
| 16             | Cancer of liver and intrahepatic bile duct | 155 | Malignant neoplasm of liver and intrahepatic bile ducts |
| 17             | Cancer of pancreas       | 157           | Malignant neoplasm of pancreas |
| 19, 20         | Cancer of bronchus, lung and other respiratory and intrathoracic organs | 162 | Malignant neoplasm of trachea bronchus and lung |
|                |                          | 163           | Malignant neoplasm of pleura |
|                |                          | 165           | Malignant neoplasm of other and ill-defined sites within the respiratory system and intrathoracic organs |
|                |                          | 231           | Carcinoma in situ of respiratory system |
| 41             | Other and unspecified cancers | 164 | Malignant neoplasm of thymus heart and mediastinum |
|                |                          | 176           | Kaposi’s sarcoma |
|                |                          | 190           | Malignant neoplasm of eye |
|                |                          | 194           | Malignant neoplasm of other endocrine glands and related structures |
|                |                          | 195           | Malignant neoplasm of other and ill-defined sites |
|                |                          | 209           | Neuroendocrine tumors |
|                |                          | 233           | Carcinoma in situ of breast and genitourinary system |
|                |                          | 234           | Carcinoma in situ of other and unspecified sites |
| 21             | Cancer of bone and connective tissue | 170 | Malignant neoplasm of bone and articular cartilage |
| 22             | Melanoma of skin         | 171           | Malignant neoplasm of connective and other soft tissue |
| 24             | Cancer of breast         | 174           | Malignant melanoma of skin |
| 24             | Cancer of breast         | 174           | Malignant neoplasm of female breast |
|                |                          | 175           | Malignant neoplasm of male breast |
| 25             | Cancer of uterus         | 179           | Malignant neoplasm of uterus, part unspecified |
| 26             | Cancer of cervix         | 180           | Malignant neoplasm of body of uterus |
| 27, 28         | Cancer of ovary and other female genital organs | 181 | Malignant neoplasm of placenta |

Continued
| CCS category # | CCS category description | ICD-9-CM code | ICD-9-CM code label |
|---------------|--------------------------|---------------|---------------------|
| 29            | Cancer of prostate       | 183, 185      | Malignant neoplasm of ovary and other uterine adnexa, Malignant neoplasm of prostate |
| 30            | Cancer of testis         | 183, 186      | Malignant neoplasm of testis |
| 31            | Cancer of other male genital organs | 183, 187 | Malignant neoplasm of penis and other male genital organs |
| 32            | Cancer of bladder        | 183, 188      | Malignant neoplasm of bladder |
| 33, 34        | Cancer of kidney and other urinary organs | 183, 189 | Malignant neoplasm of kidney and other and unspecified urinary organs |
| 35            | Cancer of brain and nervous system | 183, 191 | Malignant neoplasm of brain |
| 36            | Cancer of thyroid        | 183, 193      | Malignant neoplasm of thyroid gland |
| 42            | Secondary malignancies   | 183, 196      | Secondary and unspecified malignant neoplasm of lymph nodes |
| 43            | Malignant neoplasm without specification of site | 183, 199 | Malignant neoplasm without specification of site |
| 38            | Non-Hodgkin’s lymphoma   | 183, 200      | Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue |
| 37            | Hodgkin’s disease        | 183, 201      | Hodgkin’s disease |
| 39, 40        | Multiple myeloma and leukemias | 183, 203 | Multiple myeloma and immunoproliferative neoplasms |
| 44            | Neoplasms of unspecified nature or uncertain behavior | 183, 237 | Neoplasm of uncertain behavior of endocrine glands and nervous system |
| 47            | Other and unspecified benign neoplasm | 183, 225 | Benign neoplasm of brain and other parts of nervous system |
| 48            | Thyroid disorders        | 183, 238      | Neoplasm of uncertain behavior of other and unspecified sites and tissues |
| 49, 50        | Diabetes mellitus        | 183, 239      | Neoplasms of unspecified nature |
| 51            | Other endocrine disorders | 183, 240      | Other disorders of thyroid |
|               |                          |               | Simple and unspecified goiter |
|               |                          | 183, 241      | Nontoxic nodular goiter |
|               |                          | 183, 242      | Thyrotoxicosis with or without goiter |
|               |                          | 183, 243      | Congenital hypothyroidism |
|               |                          | 183, 244      | Acquired hypothyroidism |
|               |                          | 183, 245      | Thyroiditis |
|               |                          | 183, 246      | Other disorders of thyroid |
|               |                          | 183, 247      | Other disorders of pancreatic internal secretion |
|               |                          | 183, 248      | Disorders of parathyroid gland |
|               |                          | 183, 249      | Disorders of the pituitary gland and its hypothalamic control |
|               |                          | 183, 250      | Diseases of thymus gland |
|               |                          | 183, 251      | Disorders of adrenal glands |
|               |                          | 183, 252      | Ovarian dysfunction |
| CCS category # | CCS category description | ICD-9-CM code | ICD-9-CM code label |
|----------------|--------------------------|---------------|---------------------|
| 257 | Testicular dysfunction | 257 | Testicular dysfunction |
| 258 | Polyglandular dysfunction and related disorders | 258 | Polyglandular dysfunction and related disorders |
| 259 | Other endocrine disorders | 259 | Other endocrine disorders |
| 52 | Nutritional deficiencies | 260 | Kwashiorkor |
| 261 | Nutritional marasmus | 261 | Nutritional marasmus |
| 262 | Other severe protein-calorie malnutrition | 262 | Other severe protein-calorie malnutrition |
| 263 | Other and unspecified protein-calorie malnutrition | 263 | Other and unspecified protein-calorie malnutrition |
| 264 | Vitamin d deficiency | 264 | Vitamin d deficiency |
| 57, 58 | Other nutritional, endocrine, immunity, and metabolic disorders | 270 | Disorders of amino-acid transport and metabolism |
| 271 | Disorders of carbohydrate transport and metabolism | 271 | Disorders of carbohydrate transport and metabolism |
| 272 | Disorders of plasma protein metabolism | 272 | Disorders of plasma protein metabolism |
| 273 | Disorders of mineral metabolism | 273 | Disorders of mineral metabolism |
| 274 | Other and unspecified disorders of metabolism | 274 | Other and unspecified disorders of metabolism |
| 275 | Overweight, obesity and other hyperalimentation | 275 | Overweight, obesity and other hyperalimentation |
| 276 | Disorders involving the immune mechanism | 276 | Disorders involving the immune mechanism |
| 53 | Disorders of lipid metabolism | 277 | Disorders of lipid metabolism |
| 54 | Gout and other crystal arthropathies | 278 | Gout |
| 280 | Iron deficiency anemias | 280 | Iron deficiency anemias |
| 282 | Hereditary hemolytic anemias | 282 | Hereditary hemolytic anemias |
| 283 | Acquired hemolytic anemias | 283 | Acquired hemolytic anemias |
| 284 | Aplastic anemia and other bone marrow failure syndromes | 284 | Aplastic anemia and other bone marrow failure syndromes |
| 285 | Other and unspecified anemias | 285 | Other and unspecified anemias |
| 62, 63, 64, 247 | Other hematologic conditions | 286 | Coagulation defects |
| 287 | Purpura and other hemorrhagic conditions | 287 | Purpura and other hemorrhagic conditions |
| 288 | Diseases of white blood cells | 288 | Diseases of white blood cells |
| 289 | Other diseases of blood and blood-forming organs | 289 | Other diseases of blood and blood-forming organs |
| 653 | Delirium, dementia and other cognitive disorders | 290 | Dementias |
| 294 | Persistent mental disorders due to conditions classified elsewhere | 294 | Persistent mental disorders due to conditions classified elsewhere |
| 660, 661 | Alcohol and substance-related disorders | 299 | Alcohol-induced mental disorders |
| 292 | Drug-induced mental disorders | 292 | Drug-induced mental disorders |
| 303 | Alcohol dependence syndrome | 303 | Alcohol dependence syndrome |
| 304 | Drug dependence | 304 | Drug dependence |
| 305 | Nondependent abuse of drugs | 305 | Nondependent abuse of drugs |
| 659 | Schizophrenia and other psychotic disorders | 295 | Schizophrenic disorders |
| 297 | Delusional disorders | 297 | Delusional disorders |
| 298 | Other nonorganic psychoses | 298 | Other nonorganic psychoses |
| 651, 657 | Mood and anxiety disorders | 299 | Episodic mood disorders |
| 300 | Anxiety, dissociative and somatoform disorders | 300 | Anxiety, dissociative and somatoform disorders |
| 308 | Acute reaction to stress | 308 | Acute reaction to stress |
| 311 | Depressive disorder, not elsewhere classified | 311 | Depressive disorder, not elsewhere classified |
| 655 | Disorders usually diagnosed in infancy, childhood, or adolescence | 309 | Pervasive developmental disorders |
| 658 | Personality disorders | 309 | Personality disorders |
| 660 | Miscellaneous mental health disorders | 309 | Personality disorders |
| 670 | Special symptoms or syndromes not elsewhere classified | 309 | Personality disorders |
| 310 | Specific nonpsychotic mental disorders due to brain damage | 310 | Specific nonpsychotic mental disorders due to brain damage |
| 316 | Psychic factors associated with diseases classified elsewhere | 316 | Psychic factors associated with diseases classified elsewhere |
| CCS category # | CCS category description                      | ICD-9-CM code | ICD-9-CM code label                                      |
|----------------|-----------------------------------------------|---------------|--------------------------------------------------------|
| 652            | Attention-deficit, conduct, and disruptive behavior disorders | 312           | Disturbance of conduct not elsewhere classified         |
|                |                                               | 314           | Hyperkinetic syndrome of childhood                      |
| 654            | Developmental disorders                       | 315           | Specific delays in development                          |
|                |                                               | 317           | Mild intellectual disabilities                         |
|                |                                               | 318           | Other specified intellectual disabilities              |
|                |                                               | 319           | Unspecified intellectual disabilities                  |
| 81, 95         | Other nervous system conditions               | 327           | Organic sleep disorders                                |
|                |                                               | 330           | Cerebral degenerations usually manifest in childhood  |
|                |                                               | 333           | Other extrapyramidal disease and abnormal movement disorders |
|                |                                               | 334           | Spinocerebellar disease                               |
|                |                                               | 335           | Anterior horn cell disease                            |
|                |                                               | 336           | Other diseases of spinal cord                          |
|                |                                               | 337           | Disorders of the autonomic nervous system              |
|                |                                               | 338           | Pain, not elsewhere classified                         |
|                |                                               | 341           | Other demyelinating diseases of central nervous system |
|                |                                               | 347           | Cataplexy and narcolepsy                              |
|                |                                               | 348           | Other conditions of brain                             |
|                |                                               | 353           | Nerve root and plexus disorders                        |
|                |                                               | 354           | Mononeuritis of upper limb and mononeuritis multiplex  |
|                |                                               | 355           | Mononeuritis of lower limb and unspecified site        |
|                |                                               | 356           | Hereditary and idiopathic peripheral neuropathy        |
|                |                                               | 357           | Inflammatory and toxic neuropathy                      |
|                |                                               | 358           | Myoneural disorders                                   |
|                |                                               | 359           | Muscular dystrophies and other myopathies             |
| 79             | Parkinson’s disease                           | 332           | Parkinson’s disease                                   |
| 84             | Headache; including migraine                  | 339           | Other headache syndromes                              |
|                |                                               | 346           | Migraine                                              |
| 80             | Multiple sclerosis                            | 340           | Multiple sclerosis                                     |
| 82             | Paralysis                                     | 342           | Hemiplegia and hemiparesis                            |
|                |                                               | 343           | Infantile cerebral palsy                              |
|                |                                               | 344           | Other paralytic syndromes                             |
| 83             | Epilepsy, convulsions                         | 345           | Epilepsy and recurrent seizures                       |
| 90, 91         | Inflammation infection and other eye disorders | 360           | Disorders of the globe                                |
|                |                                               | 363           | Chorioretinal inflammations scars and other disorders of choroid |
|                |                                               | 364           | Disorders of iris and ciliary body                     |
|                |                                               | 370           | Keratitis                                             |
|                |                                               | 371           | Corneal opacity and other disorders of cornea          |
|                |                                               | 372           | Disorders of conjunctiva                              |
|                |                                               | 376           | Disorders of the orbit                                |
|                |                                               | 377           | Disorders of optic nerve and visual pathways           |
|                |                                               | 379           | Other disorders of eye                                |
| 87             | Retinal detachments, defects, vascular occlusion, and retinopathy | 361           | Retinal detachments and defects                       |
|                |                                               | 362           | Other retinal disorders                               |
| 88             | Glaucoma                                      | 365           | Glaucoma                                              |
| 86             | Cataract                                      | 366           | Cataract                                              |
| 89             | Blindness and vision defects                  | 369           | Blindness and low vision                              |
| 94             | Other ear and sense organ disorders           | 380           | Disorders of external ear                             |
|                |                                               | 384           | Other disorders of tympanic membrane                  |
|                |                                               | 389           | Hearing loss                                           |
| 92             | Otitis media and related conditions           | 381           | Nonsuppurative otitis media and eustachian tube disorders |
|                |                                               | 382           | Suppurative and unspecified otitis media              |
|                |                                               | 383           | Mastoiditis and related conditions                    |
| CCS category # | CCS category description | ICD-9-CM code | ICD-9-CM code label |
|---------------|--------------------------|---------------|---------------------|
| 93            | Conditions associated with dizziness or vertigo | 386           | Vertiginous syndromes and other disorders of vestibular system |
| 97            | Peri-; endo-; and myocarditis, cardiomyopathy | 393           | Chronic rheumatic pericarditis |
|               |                                         | 398           | Other rheumatic heart disease |
|               |                                         | 423           | Other diseases of pericardium |
|               |                                         | 425           | Cardiomyopathy |
| 96            | Heart valve disorders | 394           | Diseases of mitral valve |
|               |                                         | 395           | Diseases of aortic valve |
|               |                                         | 396           | Diseases of mitral and aortic valves |
|               |                                         | 397           | Diseases of other endocardial structures |
|               |                                         | 424           | Other diseases of endocardium |
| 98            | Essential hypertension | 401           | Essential hypertension |
| 99            | Hypertension with complications and secondary hypertension | 402           | Hypertensive heart disease |
|               |                                         | 403           | Hypertensive chronic kidney disease |
|               |                                         | 404           | Hypertensive heart and chronic kidney disease |
|               |                                         | 405           | Secondary hypertension |
| 100           | Acute myocardial infarction | 410           | Acute myocardial infarction |
| 101           | Coronary atherosclerosis and other heart disease | 411           | Other acute and subacute forms of ischemic heart disease |
|               |                                         | 412           | Old myocardial infarction |
|               |                                         | 413           | Angina pectoris |
|               |                                         | 414           | Other forms of chronic ischemic heart disease |
| 103           | Pulmonary heart disease | 415           | Acute pulmonary heart disease |
|               |                                         | 416           | Chronic pulmonary heart disease |
|               |                                         | 417           | Other diseases of pulmonary circulation |
| 105           | Conduction disorders | 426           | Conduction disorders |
| 106, 107, 108 | Cardiac dysrhythmias, arrest, ventricular fibrillation and congestive heart failure | 427           | Cardiac dysrhythmias |
|               |                                         | 428           | Heart failure |
| 104           | Other and ill-defined heart disease | 429           | Ill-defined descriptions and complications of heart disease |
| 109, 110      | Acute Cerebrovascular disease, occlusion or stenosis of precerebral arteries | 430           | Subarachnoid hemorrhage |
|               |                                         | 431           | Intracerebral hemorrhage |
|               |                                         | 432           | Other and unspecified intracranial hemorrhage |
|               |                                         | 433           | Occlusion and stenosis of precerebral arteries |
|               |                                         | 434           | Occlusion of cerebral arteries |
|               |                                         | 436           | Acute, but ill-defined, cerebrovascular disease |
| 112           | Transient cerebral ischemia | 435           | Transient cerebral ischemia |
| 111           | Other and ill-defined cerebrovascular disease | 437           | Other and ill-defined cerebrovascular disease |
|               |                                         | 438           | Late effects of cerebrovascular disease |
| 114, 115, 117 | Other circulatory disease | 440           | Atherosclerosis |
|               |                                         | 441           | Aortic aneurysm and dissection |
|               |                                         | 442           | Other aneurysm |
|               |                                         | 443           | Other peripheral vascular disease |
|               |                                         | 446           | Polyarteritis nodosa and allied conditions |
|               |                                         | 447           | Other disorders of arteries and arterioles |
|               |                                         | 448           | Disease of capillaries |
|               |                                         | 557           | Vascular insufficiency of intestine |
| 116           | Aortic and peripheral arterial embolism or thrombosis | 444           | Arterial embolism and thrombosis |
|               |                                         | 445           | Atheroembolism |
| 118           | Phlebitis, thrombophlebitis and thromboembolism | 453           | Other venous embolism and thrombosis |
| 121           | Other diseases of veins and lymphatics | 456           | Varicose veins of other sites |
|               |                                         | 457           | Noninfectious disorders of lymphatic channels |
|               |                                         | 459           | Other disorders of circulatory system |
| CCS category # | CCS category description | ICD-9-CM code | ICD-9-CM code label |
|----------------|--------------------------|---------------|---------------------|
| 134            | Other upper respiratory disease | 472 | Chronic pharyngitis and nasopharyngitis |
|                |                          | 476 | Chronic laryngitis and laryngotracheitis |
|                |                          | 477 | Allergic rhinitis |
|                |                          | 478 | Other diseases of upper respiratory tract |
| 126            | Other upper respiratory infections | 473 | Chronic sinusitis |
| 124            | Acute and chronic tonsillitis | 474 | Chronic disease of tonsils and adenoids |
| 127            | Chronic obstructive pulmonary disease and bronchiectasis | 491 | Chronic bronchitis |
|                |                          | 492 | Emphysema |
|                |                          | 494 | Bronchiectasis |
|                |                          | 496 | Chronic airway obstruction, not elsewhere classified |
| 128            | Asthma                   | 493 | Asthma |
| 132            | Lung disease due to external agents | 495 | Extrinsic allergic alveolitis |
|                |                          | 500 | Coal workers’ pneumoconiosis |
|                |                          | 501 | Asbestosis |
|                |                          | 502 | Pneumoconiosis due to other silica or silicates |
|                |                          | 503 | Pneumoconiosis due to other inorganic dust |
|                |                          | 504 | Pneumonopathy due to inhalation of other dust |
|                |                          | 505 | Pneumoconiosis, unspecified |
|                |                          | 506 | Respiratory conditions due to chemical fumes and vapors |
|                |                          | 508 | Respiratory conditions due to other and unspecified external agents |
| 133            | Other lower respiratory disease | 512 | Pneumothorax and air leak |
|                |                          | 514 | Pulmonary congestion and hypostasis |
|                |                          | 515 | Postinflammatory pulmonary fibrosis |
|                |                          | 516 | Other alveolar and parietoalveolar pneumonopathy |
|                |                          | 517 | Lung involvement in conditions classified elsewhere |
| 131            | Respiratory failure, insufficiency or arrest | 518 | Other diseases of lung |
| 136            | Disorders of teeth and jaw | 523 | Gingival and periodontal diseases |
|                |                          | 525 | Other diseases and conditions of the teeth and supporting structures |
| 138            | Esophageal disorders | 530 | Diseases of esophagus |
| 139, 153       | Gastroduodenal ulcer, gastrointestinal hemorrhage | 531 | Gastric ulcer |
|                |                          | 532 | Duodenal ulcer |
|                |                          | 533 | Peptic ulcer, site unspecified |
|                |                          | 534 | Gastrojejunal ulcer |
| 140            | Gastritis and duodenitis | 535 | Gastritis and duodenitis |
| 141            | Other disorders of stomach and duodenum | 537 | Other diseases of stomach and duodenum |
| 144            | Regional enteritis and ulcerative colitis | 555 | Regional enteritis |
| 154            | Noninfectious gastroenteritis | 556 | Ulcerative colitis |
|                |                          | 558 | Other and unspecified noninfectious gastroenteritis and colitis |
| 146            | Diverticulosis and diverticulitis | 562 | Diverticula of intestine |
| 155            | Other gastrointestinal disorders | 564 | Functional digestive disorders not elsewhere classified |
|                |                          | 579 | Intestinal malabsorption |
| 6, 151         | Hepatitis and Other liver diseases | 571 | Chronic liver disease and cirrhosis |
|                |                          | 572 | Liver abscess and sequelae of chronic liver disease |
|                |                          | 573 | Other diseases of liver |
| 149            | Biliary tract disease | 575 | Other disorders of gallbladder |
| 152            | Pancreatic disorders (excluding diabetes) | 576 | Other disorders of biliary tract |
|                |                          | 577 | Diseases of pancreas |

Continued
| CCS category # | CCS category description                                      | ICD-9-CM code | ICD-9-CM code label                                      |
|----------------|---------------------------------------------------------------|--------------|---------------------------------------------------------|
| 156, 157, 158  | Chronic kidney disease and related conditions                 | 581          | Nephrotic syndrome                                      |
|                |                                                               | 582          | Chronic glomerulonephritis                              |
|                |                                                               | 583          | Nephritis and nephropathy not specified as acute or     |
|                |                                                               | 585          | Chronic kidney disease                                  |
|                |                                                               | 586          | Renal failure, unspecified                              |
|                |                                                               | 587          | Renal sclerosis, unspecified                            |
| 161            | Other diseases of kidney and ureters                          | 588          | Disorders resulting from impaired renal function        |
| 159            | Urinary tract infections                                      | 590          | Infections of kidney                                    |
|                |                                                               | 595          | Cystitis                                                |
| 162            | Other diseases of bladder and urethra                         | 596          | Other disorders of bladder                               |
|                |                                                               | 599          | Other disorders of urethra and urinary tract            |
| 164            | Hyperplasia of prostate                                       | 600          | Hyperplasia of prostate                                 |
| 165, 166       | Inflammatory and other male genital disorders                 | 601          | Inflammatory diseases of prostate                       |
|                |                                                               | 607          | Disorders of penis                                       |
| 167            | Nonmalignant breast conditions                                 | 610          | Benign mammary dysplasias                               |
| 175            | Other female genital disorders                                 | 614          | Inflammatory disease of ovary fallopian tube pelvic    |
|                |                                                               | 615          | cellular tissue and peritoneum                          |
|                |                                                               | 617          | Endometriosis                                           |
|                |                                                               | 619          | Fistula involving female genital tract                   |
|                |                                                               | 621          | Disorders of uterus not elsewhere classified            |
|                |                                                               | 625          | Pain and other symptoms associated with female genital |
|                |                                                               | 629          | organs                                                  |
| 171            | Menstrual disorders                                           | 626          | Disorders of menstruation and other abnormal bleeding  |
|                |                                                               | 618          | Genital prolapse                                         |
| 170            | Prolapse of female genital organs                             | 627          | Menopausal and postmenopausal disorders                  |
| 173            | Menopausal disorders                                          | 628          | Female infertility                                       |
| 253            | Allergic reactions                                            | 691          | Atopic dermatitis and related conditions                |
| 198            | Other inflammatory condition of skin                          | 694          | Bullous dermatoses                                      |
|                |                                                               | 695          | Erythematous conditions                                 |
|                |                                                               | 696          | Psoriasis and similar disorders                         |
| 200            | Other skin disorders                                          | 701          | Other hypertrophic and atrophic conditions of skin      |
|                |                                                               | 705          | Diseases of sweat glands                                |
| 199            | Chronic ulcer of skin                                         | 707          | Chronic ulcer of skin                                   |
| 210            | Systemic lupus erythematous and connective tissue disorders   | 710          | Diffuse diseases of connective tissue                   |
| 204, 225       | Joint disorders                                               | 713          | Arthopathy associated with other disorders classified    |
|                |                                                               | 716          | Other and unspecified arthopathies                      |
|                |                                                               | 717          | Internal derangement of knee                            |
|                |                                                               | 718          | Other derangement of joint                              |
| 202            | Rheumatoid arthritis and related disease                      | 714          | Rheumatoid arthritis and other inflammatory polyarthropathies |
| 203            | Osteoarthritis                                                | 715          | Osteoarthritis and allied disorders                      |
| 205            | Spondylosis, intervertebral disc disorders and other back    | 720          | Ankylosing spondylitis and other inflammatory           |
|                |                                                               |              | spondylopathies                                         |

Continued
Supplementary Appendix 1: Continued

| CCS category # | CCS category description | ICD-9-CM code | ICD-9-CM code label                                      |
|----------------|--------------------------|---------------|--------------------------------------------------------|
| 201            | Infective arthritis and osteomyelitis | 721, 730      | Spondylosis and allied disorders, Osteomyelitis periostitis and other infections involving bone |
| 206, 212       | Osteoporosis and other bone disease | 731           | Osteitis deformans and osteopathies associated with other disorders classified elsewhere |
| 208            | Acquired foot deformities | 735           | Acquired deformities of toe                            |
| 209            | Other acquired deformities | 737           | Curvature of spine                                     |
| 216            | Nervous system congenital anomalies | 740, 741     | Anencephalus and similar anomalies, Spina bifida       |
| 217            | Other congenital anomalies | 742           | Other congenital anomalies of nervous system           |
| 213            | Cardiac and circulatory congenital anomalies | 745           | Bulbus cordis anomalies and anomalies of cardiac septal closure |
| 214            | Digestive congenital anomalies | 750           | Other congenital anomalies of upper alimentary tract |
| 215            | Genitourinary congenital anomalies | 752, 753     | Congenital anomalies of genital organs, Congenital anomalies of urinary system |

Supplementary Appendix 2: Discrepancies in ICD-9-CM mappings between the two reviewers

| ICD-9-CM code | ICD-9-CM code label                                      | Assigned CCS category description |
|---------------|--------------------------------------------------------|-----------------------------------|
| 310           | Specific nonpsychotic mental disorders due to brain damage | Delirium, dementia, and amnestic and other cognitive disorders, Miscellaneous mental health disorders |
| 312           | Disturbance of conduct not elsewhere classified         | Attention-deficit, conduct, and disruptive behavior disorders, Impulse control disorders, NEC |
| 440           | Atherosclerosis                                         | Acute cerebrovascular disease     |
| 477           | Allergic rhinitis                                       | Other upper respiratory disease, Allergic reactions |
| 626           | Disorders of menstruation and other abnormal bleeding from female genital tract | Other female genital disorders, Menstrual disorders |
| 710           | Diffuse diseases of connective tissue                   | Systemic lupus erythematosus and connective tissue disorders, Other connective tissue disease |
## Supplementary Appendix 3: Crosswalk of ICDA-8 codes to CCS categories

| CCS category # | CCS category description | ICDA-8-code | ICDA-8-CM code label |
|----------------|--------------------------|-------------|---------------------|
| 11             | Cancer of head and neck  | 140         | Malignant neoplasm of lip |
|                |                          | 141         | Malignant neoplasm of tongue |
|                |                          | 142         | Malignant neoplasm of salivary gland |
|                |                          | 143         | Malignant neoplasm of gum |
|                |                          | 144         | Malignant neoplasm of floor of mouth |
|                |                          | 145         | Malignant neoplasm of other and unspecified parts of mouth |
|                |                          | 146         | Malignant neoplasm of oropharynx |
|                |                          | 147         | Malignant neoplasm of nasopharynx |
|                |                          | 148         | Malignant neoplasm of hypopharynx |
|                |                          | 149         | Malignant neoplasm of pharynx, unspecified |
|                |                          | 150         | Malignant neoplasm of nose, nasal cavities, middle ear and accessory sinuses |
|                |                          | 151         | Malignant neoplasm of esophagus |
|                |                          | 152         | Malignant neoplasm of small intestine, including duodenum |
|                |                          | 153         | Malignant neoplasm of large intestine, except rectum |
|                |                          | 154         | Malignant neoplasm of rectum and rectosigmoid junction |
|                |                          | 155         | Malignant neoplasm of liver and intrahepatic bile ducts, specified as primary |
|                |                          | 156         | Malignant neoplasm of gallbladder and bile ducts |
|                |                          | 157         | Malignant neoplasm of pancreas |
|                |                          | 158         | Malignant neoplasm of peritoneum and retroperitoneal tissue |
|                |                          | 159         | Malignant neoplasm of unspecified digestive organs |
| 12             | Cancer of esophagus      | 160         | Malignant neoplasm of nose, nasal cavities, middle ear and accessory sinuses |
| 13             | Cancer of stomach        | 161         | Malignant neoplasm of esophagus |
| 14             | Cancer of colon          | 162         | Malignant neoplasm of liver and intrahepatic bile ducts, specified as primary |
|                | Cancer of rectum and anus| 163         | Malignant neoplasm of rectum and rectosigmoid junction |
| 15             | Cancer of liver and intrahepatic bile duct | 164         | Malignant neoplasm of liver and intrahepatic bile ducts, specified as primary |
|                | Cancer of pancreas       | 165         | Malignant neoplasm of pancreas |
| 16             | Cancer of pancreas       | 166         | Malignant neoplasm of pancreas |
| 17             | Cancer of pancreas       | 167         | Malignant neoplasm of pancreas |
| 18             | Cancer of other GI organs; peritoneum | 168         | Malignant neoplasm of pancreas |
|                | Cancer of other GI organs; peritoneum | 169         | Malignant neoplasm of pancreas |
|                | Malignant neoplasm of small intestine, including duodenum | 170         | Malignant neoplasm of pancreas |
|                | Malignant neoplasm of large intestine, except rectum | 171         | Malignant neoplasm of pancreas |
| 19, 20         | Cancer of bronchus, lung | 172         | Malignant neoplasm of pancreas |
|                | and other respiratory and intrathoracic organs | 173         | Malignant neoplasm of pancreas |
|                | Other and unspecified cancers | 174         | Malignant neoplasm of pancreas |
| 21             | Cancer of bone and connective tissue | 175         | Malignant neoplasm of pancreas |
|                | Melanoma of skin         | 176         | Malignant neoplasm of pancreas |
| 22             | Cancer of breast         | 177         | Malignant neoplasm of pancreas |
| 23             | Cancer of breast         | 178         | Malignant neoplasm of pancreas |
| 24             | Cancer of breast         | 179         | Malignant neoplasm of pancreas |
| 25             | Cancer of uterus         | 180         | Malignant neoplasm of pancreas |
| 26             | Cancer of cervix         | 181         | Malignant neoplasm of pancreas |
| 27, 28         | Cancer of ovary and other female genital organs | 182         | Malignant neoplasm of pancreas |
|                | Cancer of ovary and other female genital organs | 183         | Malignant neoplasm of pancreas |
|                | Malignant neoplasm of pancreas, Fallopian tube and broad ligament | 184         | Malignant neoplasm of pancreas |
| 29             | Cancer of prostate       | 185         | Malignant neoplasm of pancreas |
| 30             | Cancer of testis         | 186         | Malignant neoplasm of pancreas |
| 31             | Cancer of other male genital organs | 187         | Malignant neoplasm of pancreas |
| 32             | Cancer of bladder        | 188         | Malignant neoplasm of pancreas |
| 33, 34         | Cancer of kidney and other urinary organs | 189         | Malignant neoplasm of pancreas |
| 35             | Cancer of brain and nervous system | 190         | Malignant neoplasm of pancreas |
| 36             | Cancer of thyroid        | 191         | Malignant neoplasm of pancreas |
| 42             | Secondary malignancies   | 192         | Malignant neoplasm of pancreas |
|                | Secondary and unspecified malignant neoplasm of lymph nodes | 193         | Malignant neoplasm of pancreas |

Continued
| CCS category # | CCS category description | ICDA-8-code | ICDA-8-CM code label |
|----------------|--------------------------|-------------|---------------------|
| 197            | Secondary malignant neoplasm of respiratory and digestive systems | 197         |                     |
| 199            | Other secondary malignant neoplasm | 199         |                     |
| 200            | Lymphosarcoma and reticulum-cell sarcoma | 200         |                     |
| 202            | Other neoplasms of lymphoid tissue | 202         |                     |
| 201            | Hodgkin’s disease | 201         |                     |
| 203            | Multiple myeloma | 203         |                     |
| 204            | Lymphatic leukemia | 204         |                     |
| 205            | Myeloid leukemia | 205         |                     |
| 206            | Monocytic leukemia | 206         |                     |
| 207            | Other and unspecified leukemia | 207         |                     |
| 225            | Benign neoplasm of brain and other parts of nervous system | 225         |                     |
| 208            | Polycythemia vera | 208         |                     |
| 209            | Myelofibrosis | 209         |                     |
| 230            | Neoplasm of unspecified nature of digestive organs | 230         |                     |
| 231            | Neoplasm of unspecified nature of respiratory organs | 231         |                     |
| 232            | Neoplasm of unspecified nature of skin and musculoskeletal system | 232         |                     |
| 233            | Neoplasm of unspecified nature of breast | 233         |                     |
| 234            | Neoplasm of unspecified nature of uterus | 234         |                     |
| 235            | Neoplasm of unspecified nature of ovary | 235         |                     |
| 236            | Neoplasm of unspecified nature of other female genital organs | 236         |                     |
| 237            | Neoplasm of unspecified nature of other genito-urinary organs | 237         |                     |
| 238            | Neoplasm of unspecified nature of eye, brain and other parts of nervous system | 238         |                     |
| 239            | Neoplasm of unspecified nature of other and unspecified organs | 239         |                     |
| 240            | Simple goiter | 240         |                     |
| 241            | Non-toxic nodular goiter | 241         |                     |
| 242            | Thyrotoxicosis with or without goitre | 242         |                     |
| 243            | Cretinism of congenital origin | 243         |                     |
| 244            | Myxoedema | 244         |                     |
| 245            | Thyroiditis | 245         |                     |
| 246            | Other diseases of thyroid gland | 246         |                     |
| 250            | Diabetes mellitus | 250         |                     |
| 251            | Disorders of pancreatic internal secretion other than diabetes mellitus | 251         |                     |
| 252            | Diseases of parathyroid gland | 252         |                     |
| 253            | Diseases of pituitary gland | 253         |                     |
| 254            | Diseases of thymus gland | 254         |                     |
| 255            | Disorders of adrenal glands | 255         |                     |
| 256            | Ovarian dysfunction | 256         |                     |
| 257            | Testicular dysfunction | 257         |                     |
| 258            | Polyglandular dysfunction and other diseases of endocrine glands | 258         |                     |
| 265            | Vitamin D deficiency | 265         |                     |
| 267            | Protein malnutrition | 267         |                     |
| 268            | Nutritional marasmus | 268         |                     |

Continued
| CCS category # | CCS category description                       | ICDA-8-code | ICDA-8-CM code label                                      |
|----------------|-----------------------------------------------|-------------|---------------------------------------------------------|
| 57, 58         | Other nutritional, endocrine, immunity, and metabolic disorders | 270         | Congenital disorders of amino-acid metabolism            |
|                |                                               | 271         | Congenital disorders of carbohydrate metabolism          |
|                |                                               | 273         | Other and unspecified congenital disorders of metabolism |
|                |                                               | 275         | Plasma protein abnormalities                             |
|                |                                               | 276         | Amyloidosis                                              |
|                |                                               | 277         | Obesity not specified as of endocrine origin             |
|                |                                               | 278         | Other hyperalimentation                                  |
|                |                                               | 279         | Other and unspecified metabolic diseases                 |
| 53             | Disorders of lipid metabolism                 | 272         | Congenital disorders of lipid metabolism                 |
| 54             | Gout and other crystal arthropathies          | 274         | Gout                                                    |
| 59, 61         | Deficiency, sickle cell and other anemia      | 280         | Iron deficiency anemias                                 |
|                |                                               | 282         | Hereditary hemolytic anemias                            |
|                |                                               | 283         | Acquired hemolytic anemias                              |
|                |                                               | 284         | Aplastic anemia                                          |
|                |                                               | 285         | Other and unspecified anemias                           |
| 62, 63, 64, 247| Other hematologic conditions                  | 286         | Coagulation defects                                     |
|                |                                               | 287         | Purpura and other hemorrhagic conditions                 |
|                |                                               | 288         | Agranulcytosis                                           |
|                |                                               | 289         | Other diseases of blood and blood-forming organs        |
| 653            | Delirium, dementia and other cognitive disorders | 290         | Senile and presenile dementia                            |
| 660, 661       | Alcohol and substance-related disorders       | 291         | Alcoholic psychosis                                      |
|                |                                               | 303         | Alcoholism                                               |
|                |                                               | 304         | Drug dependence                                          |
| 659            | Schizophrenia and other psychotic disorders   | 293         | Psychosis associated with other cerebral condition      |
|                |                                               | 294         | Psychosis associated with other physical conditions     |
|                |                                               | 295         | Schizophrenic disorders                                 |
|                |                                               | 297         | Paranoid states                                          |
|                |                                               | 298         | Other psychosis                                          |
|                |                                               | 299         | Unspecified psychosis                                    |
| 651, 657       | Mood and anxiety disorders                    | 296         | Affective psychosis                                      |
|                |                                               | 300         | Neuroses                                                 |
| 655            | Disorders usually diagnosed in infancy, childhood, or adolescence | NA         |                                                         |
| 658            | Personality disorders                         | 301         | Personality disorders                                    |
| 670            | Miscellaneous mental health disorders         | 305         | Physical disorders of presumably psychogenic origin     |
|                |                                               | 306         | Special symptoms not elsewhere classified               |
|                |                                               | 309         | Mental disorders not specified as psychotic associated with physical conditions |
| 650            | Adjustment disorders                          | 307         | Transient situational disturbances                      |
| 652            | Attention-deficit, conduct, and disruptive behavior disorders | 308         | Behaviour disorders of childhood                        |
| 654            | Developmental disorders                       | 310         | Borderline mental retardation                           |
|                |                                               | 311         | Mild mental retardation                                 |
|                |                                               | 312         | Moderate mental retardation                             |
|                |                                               | 313         | Severe mental retardation                               |
|                |                                               | 314         | Profound mental retardation                             |
|                |                                               | 315         | Unspecified mental retardiation                         |
| 81, 95         | Other nervous system conditions               | 330         | Hereditary neuromuscular disorders                      |
|                |                                               | 331         | Hereditary diseases of the striatopallidal system       |
|                |                                               | 332         | Hereditary ataxia                                        |
| CCS category # | CCS category description | ICDA-8-code | ICDA-8-CM code label |
|----------------|--------------------------|-------------|---------------------|
| 333 | Other hereditary and familial diseases of nervous system | 341 | Other demyelinating diseases of central nervous system |
| 347 | Other diseases of brain | 348 | Motor Neuron Disease |
| 349 | Other diseases of spinal cord | 354 | Polynuertis and polyradiculitis |
| 355 | Other and unspecified forms of neuralgia and neuritis | 357 | Other diseases of peripheral nerves except autonomic |
| 358 | Diseases of peripheral autonomic nervous system | 733 | Other diseases of muscle, tendon and fascia |
| 79 | Parkinson’s disease | 342 | Paralysis agitans |
| 84 | Headache; including migraine | 346 | Migraine |
| 80 | Multiple sclerosis | 340 | Multiple sclerosis |
| 82 | Paralysis | 343 | Cerebral spastic infantile paralysis |
| 83 | Epilepsy, convulsions | 345 | Epilepsy |
| 79 | Headache | 791 | Headache |
| 346 | Migraine | 79 | Headache |
| 349 | Other diseases of spinal cord | 354 | Polynuertis and polyradiculitis |
| 355 | Other and unspecified forms of neuralgia and neuritis | 357 | Other diseases of peripheral nerves except autonomic |
| 358 | Diseases of peripheral autonomic nervous system | 733 | Other diseases of muscle, tendon and fascia |
| 87 | Retinal detachments, defects, vascular occlusion, and retinopathy | 376 | Detachment of retina |
| 88 | Glaucoma | 375 | Glaucoma |
| 86 | Cataract | 374 | Cataract |
| 90, 91 | Inflammation infection and other eye disorders | 363 | Keratitis |
| 89 | Blindness and vision defects | 364 | Iritis |
| 365 | Choroiditis | 366 | Other inflammation of uveal tract |
| 367 | Inflammation of optic nerve and retina | 369 | Other inflammatory diseases of eye |
| 369 | Inflammation of optic nerve and retina | 371 | Corneal opacity |
| 378 | Other diseases of eye | 377 | Other diseases of retina and optic nerve |
| 82 | Paralysis | 343 | Cerebral spastic infantile paralysis |
| 83 | Epilepsy, convulsions | 345 | Epilepsy |
| 87 | Retinal detachments, defects, vascular occlusion, and retinopathy | 376 | Detachment of retina |
| 92 | Otitis media and related conditions | 381 | Otitis media without mention of mastoiditis |
| 93 | Conditions associated with dizziness or vertigo | 382 | Otitis media with mastoiditis |
| 97 | Peri-; endo-; and myocarditis, cardiomyopathy | 383 | Mastoiditis without mention of otitis media |
| 423 | Chronic disease of pericardium, non-rheumatic | 425 | Cardiomyopathy |
| 96 | Heart valve disorders | 393 | Diseases of pericardium |
| 394 | Diseases of mitral valve | 395 | Diseases of aortic valve |
| 396 | Diseases of mitral and aortic valves | 397 | Diseases of other endocardial structures |
| 424 | Chronic disease of endocardium | 400 | Malignant hypertension |
| 98 | Essential hypertension | 401 | Essential benign hypertension |
| 99 | Hypertension with complications and secondary hypertension | 402 | Hypertensive heart disease |
| 99 | Hypertension with complications and secondary hypertension | 403 | Hypertensive renal disease |
| 404 | Hypertensive heart and renal disease | 410 | Acute myocardial infarction |
| 100 | Acute myocardial infarction | 410 | Acute myocardial infarction |
| CCS category # | CCS category description | ICDA-8-code | ICDA-8-CM code label |
|----------------|--------------------------|-------------|----------------------|
| 101            | Coronary atherosclerosis and other heart disease | 411         | Other acute and subacute forms of ischemic heart disease |
|                | 412                      |             | Chronic ischemic heart disease |
|                | 413                      |             | Angina pectoris |
|                | 414                      |             | Asymptomatic ischemic heart disease |
| 103            | Pulmonary heart disease  | 426         | Pulmonary heart disease |
|                | 450                      |             | Pulmonary embolism and infarction |
| 105            | Conduction disorders     | NA          | NA |
| 106, 107, 108  | Cardiac dysrhythmias, arrest, ventricular fibrillation and congestive heart failure | 427         | Symptomatic heart disease |
|                | 428                      |             | Other myocardial insufficiency |
| 104            | Other and ill-defined heart disease | 429         | Ill-defined heart disease |
| 109, 110       | Acute cerebrovascular disease, occlusion or stenosis of precerebral arteries | 430         | Subarachnoid hemorrhage |
|                | 431                      |             | Cerebral Hemorrhage |
|                | 432                      |             | Occlusion of precerebral arteries |
|                | 433                      |             | Cerebral Thrombosis |
|                | 434                      |             | Cerebral embolism |
|                | 435                      |             | Acute, but ill-defined, cerebrovascular disease |
| 112            | Transient cerebral ischemia | 435         | Transient cerebral ischemia |
| 111            | Other and ill-defined cerebrovascular disease | 437         | Generalized ischemic cerebrovascular disease |
|                | 438                      |             | Other and ill-defined cerebrovascular disease |
| 114, 115, 117  | Other circulatory disease | 440         | Arteriosclerosis |
|                | 441                      |             | Aortic aneurysm (nonsyphilitic) |
|                | 442                      |             | Other aneurysm |
|                | 443                      |             | Other peripheral vascular disease |
|                | 444                      |             | Gangrene |
|                | 445                      |             | Polyarteritis nodosa and allied conditions |
|                | 446                      |             | Other diseases of arteries and arterioles |
|                | 447                      |             | Diseases of capillaries |
| 116            | Aortic and peripheral arterial embolism or thrombosis | 444         | Arterial embolism and thrombosis |
| 118            | Phlebitis, thrombophlebitis and thromboembolism | 453         | Other venous embolism and thrombosis |
| 121            | Other diseases of veins and lymphatics | 456         | Varicose veins of other sites |
|                | 457                      |             | Noninfective disease of lymphatic channels |
|                | 458                      |             | Other diseases of circulatory system |
| 134            | Other upper respiratory disease | 502         | Chronic pharyngitis and nasopharyngitis |
|                | 506                      |             | Chronic laryngitis |
|                | 507                      |             | Hay fever |
|                | 508                      |             | Other diseases of upper respiratory tract |
| 126            | Other upper respiratory infections | 503         | Chronic sinusitis |
| 124            | Acute and chronic tonsillitis | 500         | Hypertrophy of tonsils and adenoids |
| 127            | Chronic obstructive pulmonary disease and bronchiectasis | 491         | Chronic bronchitis |
|                | 492                      |             | Emphysema |
|                | 518                      |             | Bronchiectasis |
| 128            | Asthma                   | 493         | Asthma |
| 132            | Lung disease due to external agents | 515         | Pneumoconiosis due to other silica or silicates |
|                | 516                      |             | Other pneumoconioses and related diseases |
| 133            | Other lower respiratory disease | 512         | Spontaneous pneumothorax |
|                | 514                      |             | Pulmonary congestion and hypostasis |
|                | 517                      |             | Other chronic interstitial pneumonia |
| 131            | Respiratory failure, insufficiency or arrest | 519         | Other diseases of respiratory system |

Continued
| CCS category # | CCS category description | ICDA-8-code | ICDA-8-CM code label |
|----------------|--------------------------|-------------|----------------------|
| 136            | Disorders of teeth and jaw | 523         | Gingival and periodontal diseases |
|                |                          | 525         | Other diseases and conditions of the teeth and supporting structures |
| 138            | Esophageal disorders      | 530         | Diseases of esophagus |
| 139, 153       | Gastroduodenal ulcer, gastrointestinal hemorrhage | 531         | Ulcer of stomach |
|                |                          | 532         | Ulcer of duodenum |
|                |                          | 533         | Peptic ulcer, site unspecified |
|                |                          | 534         | Gastrojejunal ulcer |
| 140            | Gastritis and duodenitis  | 535         | Gastritis and duodenitis |
| 141            | Other disorders of stomach and duodenum | 537         | Other diseases of stomach and duodenum |
| 144            | Regional enteritis and ulcerative colitis | 563         | Chronic enteritis and ulcerative colitis |
| 154            | Noninfectious gastroenteritis | 561         | Gastro-enteritis and colitis, except ulcerative, of noninfectious origin |
| 146            | Diverticulosis and diverticulitis | 562         | Diverticula of intestine |
| 155            | Other gastrointestinal disorders | 564         | Functional disorders of intestines |
|                |                          | 269         | Other nutritional deficiency |
| 6, 151         | Hepatitis and Other liver diseases | 571         | Cirrhosis of liver |
|                |                          | 572         | Suppurative hepatitis and liver abscess |
|                |                          | 573         | Other diseases of liver |
| 149            | Biliary tract disease     | 575         | Cholecystitis and cholangitis, without mention of calculus |
|                |                          | 576         | Other diseases of gallbladder and biliary ducts |
| 152            | Pancreatic disorders (excluding diabetes) | 577         | Diseases of pancreas |
| 156, 157, 158  | Chronic kidney disease and related conditions | 581         | Nephrotic syndrome |
|                |                          | 582         | Chronic nephritis |
|                |                          | 583         | Nephritis, unqualified |
|                |                          | 584         | Renal sclerosis, unqualified |
| 161            | Other diseases of kidney and ureters | NA         | NA |
| 159            | Urinary tract infections  | 590         | Infections of kidney |
|                |                          | 595         | Cystitis |
| 162            | Other diseases of bladder and urethra | 596         | Other disorders of bladder |
|                |                          | 599         | Other diseases of urinary tract |
| 164            | Hyperplasia of prostate   | 600         | Hyperplasia of prostate |
| 165, 166       | Inflammatory and other male genital disorders | 601         | Prostatitis |
|                |                          | 607         | Other diseases of male genital organs |
| 167            | Nonmalignant breast conditions | 610         | Chronic cystic disease of breast |
| 175            | Other female genital disorders | 612         | Acute salpingitis and oophoritis |
|                |                          | 613         | Chronic salpingitis and oophoritis |
|                |                          | 614         | Salpingitis and oophoritis, unqualified |
|                |                          | 616         | Diseases of parametrium and pelvic peritoneum (female) |
|                |                          | 625         | Other diseases of uterus |
|                |                          | 629         | Other disorders of female genital organs |
| 171            | Menstrual disorders       | 626         | Disorders of menstruation |
| 170            | Prolapse of female genital organs | 623         | Uterovaginal prolapse |
| 173            | Menopausal disorders      | 627         | Menopausal symptoms |
| 174            | Female infertility        | 628         | Sterility, female |
| 253            | Allergic reactions        | 691         | Infantile eczema and related conditions |
| 198            | Other inflammatory condition of skin | 693         | Dermatitis herpetiformis |
|                |                          | 694         | Pemphigus |

Continued
| CCS category # | CCS category description | ICDA-8-code | ICDA-8-CM code label |
|----------------|--------------------------|-------------|---------------------|
| 200            | Other skin disorders     | 695         | Erythematous conditions |
|                |                          | 696         | Psoriasis and similar disorders |
| 199            | Chronic ulcer of skin    | 701         | Other hypertrophic and atrophic conditions of skin |
|                |                          | 705         | Diseases of sweat glands |
| 210            | Systemic lupus erythematosus and connective tissue disorders | 716 | Polymyositis and dermatomyositis |
| 204, 225       | Joint disorders          | 714         | Other specified forms of arthritis |
|                |                          | 715         | Arthritis, unspecified |
|                |                          | 724         | Internal derangement of joint |
|                |                          | 727         | Ankylosis of joint |
|                |                          | 729         | Other diseases of joint |
| 202            | Rheumatoid arthritis and related disease | 712 | Rheumatoid arthritis and allied conditions |
| 203            | Osteoarthritis           | 713         | Osteoarthritis and allied conditions |
| 205            | Spondylosis, intervertebral disc disorders and other back problems | 725 | Displacement of intervertebral disk |
| 201            | Infective arthritis and osteomyelitis | 720 | Osteomyelitis and periostitis |
| 206, 212       | Osteoporosis and other bone disease | 721 | Osteitis deformans |
|                |                          | 722         | Osteochondrosis |
|                |                          | 723         | Other diseases of bone |
| 208            | Acquired foot deformities | 737 | Hallux valgus and varus |
| 209            | Other acquired deformities | 735 | Curvature of spine |
| 216            | Nervous system congenital anomalies | 740 | Anencephalus |
|                |                          | 741         | Spina bifida |
|                |                          | 742         | Congenital hydrocephalus |
|                |                          | 743         | Other congenital anomalies of nervous system |
| 217            | Other congenital anomalies | 738 | Other deformities |
|                |                          | 744         | Congenital anomalies of eye |
|                |                          | 745         | Congenital anomalies of ear, face and neck |
|                |                          | 748         | Congenital anomalies of respiratory system |
|                |                          | 749         | Cleft palate and cleft lip |
|                |                          | 755         | Other congenital anomalies of limbs |
|                |                          | 756         | Other congenital anomalies of musculoskeletal system |
|                |                          | 757         | Congenital anomalies of skin, hair and nails |
|                |                          | 758         | Other and unspecified congenital anomalies |
|                |                          | 759         | Congenital syndromes affecting multiple systems |
| 213            | Cardiac and circulatory congenital anomalies | 746 | Congenital anomalies of heart |
|                |                          | 747         | Other congenital anomalies of circulatory system |
| 214            | Digestive congenital anomalies | 750 | Congenital anomalies of upper alimentary tract |
|                |                          | 751         | Other congenital anomalies of digestive system |
| 215            | Genitourinary congenital anomalies | 752 | Congenital anomalies of genital organs |
|                |                          | 753         | Congenital anomalies of urinary system |
## Supplementary Appendix 4: Discrepancies in ICDA-8 mappings between the two reviewers

| ICDA-8 code | ICDA-8 code label | Assigned CCS category description | Reviewer 1 | Reviewer 2 |
|-------------|-------------------|-----------------------------------|------------|------------|
| 209         | Myelofibrosis     | Neoplasms of unspecified nature   | Other hematologic conditions |
| 230         | Neoplasm of unspecified nature of digestive organs | Neoplasms of unspecified nature | Cancer of other GI organs; peritoneum |
| 231         | Neoplasm of unspecified nature of respiratory organs | Neoplasms of unspecified nature | Lung and other respiratory cancer |
| 232         | Neoplasm of unspecified nature of skin and musculoskeletal system | Neoplasms of unspecified nature | Not mapped |
| 233         | Neoplasm of unspecified nature of breast | Neoplasms of unspecified nature | Other cancers |
| 234         | Neoplasm of unspecified nature of uterus | Neoplasms of unspecified nature | Other cancers |
| 235         | Neoplasm of unspecified nature of ovary | Neoplasms of unspecified nature | Other cancers |
| 236         | Neoplasm of unspecified nature of other female genital organs | Neoplasms of unspecified nature | Other cancers |
| 237         | Neoplasm of unspecified nature of other genito-urinary organs | Neoplasms of unspecified nature | Other cancers |
| 269         | Other nutritional deficiency | Not mapped | Other gastrointestinal disorders |
| 275         | Plasma protein abnormalities | Other nutritional; endocrine; and metabolic disorders | Immunity disorders |
| 293         | Psychosis associated with other cerebral condition | Schizophrenia and other psychotic disorders | Delirium, dementia and other cognitive disorders |
| 294         | Psychosis associated with other physical conditions | Schizophrenia and other psychotic disorders | Delirium, dementia and other cognitive disorders |
| 307         | Transient situational disturbances | Mood and anxiety disorders | Adjustment disorders |
| 309         | Mental disorders not specified as psychotic associated with physical conditions | Miscellaneous mental health disorders | Delirium, dementia and other cognitive disorders |
| 355         | Other and unspecified forms of neuralgia and neuritis | Not mapped | Other nervous system conditions |
| 382         | Otitis media with mastoiditis | Otitis media and related conditions | Not mapped |
| 412         | Chronic ischaemic heart disease | Coronary atherosclerosis and other heart disease | Other and ill-defined heart disease |
| 445         | Gangrene | Peripheral and visceral atherosclerosis | Not mapped |
| 450         | Pulmonary embolism and infarction | Pulmonary heart disease | Not mapped |
| 575         | Cholecystitis and cholangitis, without mention of calculus | Not mapped | Biliary tract disease |
| 616         | Diseases of parametrium and pelvic peritoneum (female) | Not mapped | Other female genital disorders |
| 733         | Other diseases of muscle, tendon and fascia | Other nervous system conditions | Not mapped |
| 738         | Other deformities | Not mapped | Acquired foot deformities |
| 791         | Headache | Headache; including migraine | Not mapped |

Note: Some codes were not mapped by a reviewer because they do not capture a chronic condition. A consensus decision was made to include these codes because they present conditions that were mapped in the developed ICD-9-CM crosswalk.
### Supplementary Appendix 5: Discrepancies in ICD-10-CA mappings between the two reviewers

| ICD-10-CA code | ICD-10-CA code label | Assigned CCS category description | Reviewer 1 | Reviewer 2 |
|----------------|----------------------|-----------------------------------|------------|------------|
| F842           | Rett’s syndrome      | Disorders usually diagnosed in infancy, childhood, or adolescence | Other nervous system conditions | Other nervous system conditions |
| G319           | Degenerative disease of nervous system, unspecified | Delirium, dementia and other cognitive disorders | Other nervous system conditions | Other nervous system conditions |
| G453           | Amaurosis fugax      | Retinal detachments; defects; vascular occlusion; and retinopathy | Transient cerebral ischemia | Other nervous system conditions |
| G912           | Normal-pressure hydrocephalus | Delirium, dementia and other cognitive disorders | Other nervous system conditions | Other nervous system conditions |
| G913           | Post-traumatic hydrocephalus, unspecified | Delirium, dementia and other cognitive disorders | Other nervous system conditions | Other nervous system conditions |
| G918           | Other hydrocephalus | Delirium, dementia and other cognitive disorders | Other nervous system conditions | Other nervous system conditions |
| I088           | Other multiple valve diseases | Heart valve disorders | Peri-; endo-; and myocarditis; cardiomyopathy | Other nervous system conditions |
| I253           | Aneurysm of heart    | Other circulatory disease | Coronary atherosclerosis and other heart disease | Other nervous system conditions |
| I254           | Coronary artery aneurysm and dissection | Other circulatory disease | Coronary atherosclerosis and other heart disease | Other nervous system conditions |
| I99            | Other and unspecified disorders of circulatory system | Other diseases of veins and lymphatic | Other circulatory disease | Other circulatory disease |
| K292           | Gastrointestinal haemorrhage, unspecified | Gastritis and duodenitis | Alcohol and substance-related disorders | Other nervous system conditions |
| K702           | Alcoholic fibrosis and sclerosis of liver | Hepatitis and Other liver diseases | Alcohol and substance-related disorders | Other nervous system conditions |
| M081           | Juvenile ankylosing spondylitis | Spondylodisc; intervertebral disc; other back problems | Rheumatoid arthritis and related disease | Other nervous system conditions |
| M308           | Other conditions related to polyarteritis nodosa | Other circulatory disease | Systemic lupus erythematosus and connective tissue disorders | Other nervous system conditions |
| M317           | Microscopic polyangiitis | Other circulatory disease | Systemic lupus erythematosus and connective tissue disorders | Other nervous system conditions |
| M318           | Other specified necrotizing vasculopathies | Other circulatory disease | Systemic lupus erythematosus and connective tissue disorders | Other nervous system conditions |
| N020           | Recurrent and persistent hematuria with minor glomerular abnormality | Other diseases of bladder and urethra | Chronic Kidney disease and related conditions | Other nervous system conditions |
| N021           | Recurrent and persistent hematuria with focal and segmental glomerular lesions | Other diseases of bladder and urethra | Chronic Kidney disease and related conditions | Other nervous system conditions |
| N022           | Recurrent and persistent hematuria with diffuse membranous glomerulonephritis | Other diseases of bladder and urethra | Chronic Kidney disease and related conditions | Other nervous system conditions |
| N023           | Recurrent and persistent hematuria with diffuse mesangial proliferative glomerulonephritis | Other diseases of bladder and urethra | Chronic Kidney disease and related conditions | Other nervous system conditions |
| N025           | Recurrent and persistent hematuria with diffuse mesangiocapillary glomerulonephritis | Other diseases of bladder and urethra | Chronic Kidney disease and related conditions | Other nervous system conditions |
| N027           | Recurrent and persistent hematuria with diffuse crescentic glomerulonephritis | Other diseases of bladder and urethra | Chronic Kidney disease and related conditions | Other nervous system conditions |
| N028           | Recurrent and persistent hematuria with other morphologic changes | Other diseases of bladder and urethra | Chronic Kidney disease and related conditions | Other nervous system conditions |
| N029           | Recurrent and persistent hematuria with unspecified morphologic changes | Other diseases of bladder and urethra | Chronic Kidney disease and related conditions | Other nervous system conditions |
| N160           | Renal tubulo-interstitial disorders in infectious and parasitic diseases classified elsewhere | Other diseases of kidney and ureters | Urinary tract infections | Other nervous system conditions |
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|---------------|--------------------------|----------------|---------------------|
| 11            | Cancer of head and neck  | C00(0,1,2,4,5,9)| Malignant neoplasm of lip |
|               |                          | C01            | Malignant neoplasm of base of tongue |
|               |                          | C02(0,1,2,3,4,8,9)| Malignant neoplasm of other and unspecified parts of tongue |
|               |                          | C07            | Malignant neoplasm of parotid gland |
|               |                          | C08(0,1,9)      | Malignant neoplasm of other and unspecified major salivary glands |
|               |                          | C03(0.1)        | Malignant neoplasm of gum |
|               |                          | C04(0,1,8,9)    | Malignant neoplasm of floor of mouth |
|               |                          | C05(0.1)        | Malignant neoplasm of palate |
|               |                          | C06(0,1,2,8,9)  | Malignant neoplasm of other and unspecified parts of mouth |
|               |                          | C09(0,1,8,9)    | Malignant neoplasm of tonsil |
|               |                          | C10(0,3,4,8,9)  | Malignant neoplasm of oropharynx |
|               |                          | C11(1,2,3,8,9)  | Malignant neoplasm of nasopharynx |
|               |                          | C12             | Malignant neoplasm of piriform sinus |
|               |                          | C13(0,1,2,8,9)  | Malignant neoplasm of hypopharynx |
|               |                          | C14(0,8)        | Malignant neoplasm of other and ill-defined sites in the lip, oral cavity and pharynx |
|               |                          | C30(00,01)      | Malignant neoplasm of nasal cavity and middle ear |
|               |                          | C31(0,2,8,9)    | Malignant neoplasm of accessory sinuses |
|               |                          | C32(0,1,3,8,9)  | Malignant neoplasm of larynx |
| 12            | Cancer of esophagus      | C15(0,3,4,5,8,9)| Malignant neoplasm of esophagus |
| 13            | Cancer of stomach        | C16(0,1,2,3,4,5,6,8,9)| Malignant neoplasm of stomach |
| 18            | Cancer of other GI organs; peritoneum | C17(0,1,2,3,8,9) | Malignant neoplasm of small intestine |
|               |                          | C23             | Malignant neoplasm of gallbladder |
|               |                          | C24(0,1,9)      | Malignant neoplasm of other and unspecified parts of biliary tract |
|               |                          | C45(1)          | Malignant neoplasm of retroperitoneum and peritoneum |
|               |                          | C48(0,1,2)      | Mesothelioma |
| 14            | Cancer of colon          | C18(0,1,2,3,4,5,6,7,8,9)| Malignant neoplasm of colon |
| 15            | Cancer of rectum and anus| C19             | Malignant neoplasm of rectosigmoid junction |
|               |                          | C20             | Malignant neoplasm of rectum |
|               |                          | C21(0,1,2,8)    | Malignant neoplasm of anus and anal canal |
|               |                          | D01(3)          | Carcinoma in situ of other and unspecified digestive organs |
| 16            | Cancer of liver and intrahepatic bile duct | C22(0,1,2,4,7,9) | Malignant neoplasm of liver and intrahepatic bile ducts |
| 17            | Cancer of pancreas       | C25(0,1,2,3,4,7,8,9)| Malignant neoplasm of pancreas |
| 19, 20        | Cancer of bronchus, lung and other respiratory and intrathoracic organs | C33 | Malignant neoplasm of trachea |
|               |                          | C34(00,01,09,10,11,19,2,30,31, 39,80,81,89,90,91,99) | Malignant neoplasm of bronchus and lung |
|               |                          | C38(4)          | Malignant neoplasm of heart, mediastinum and pleura |
|               |                          | C39(0)          | Malignant neoplasm of other and ill-defined sites in the respiratory system and intrathoracic organs |
|               |                          | C45(0)          | Mesothelioma |
|               |                          | C46(71)         | Kaposi sarcoma |
|               |                          | D02(0,2,3)      | Carcinoma in situ of middle ear and respiratory system |
| 41            | Other and unspecified cancers | C05(8,9)       | Malignant neoplasm of palate |
|               |                          | C37             | Malignant neoplasm of thymus |
|               |                          | C38(0,1,2,3)    | Malignant neoplasm of heart, mediastinum and pleura |

Continued
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|----------------|--------------------------|----------------|---------------------|
| 21             | Cancer of bone and connective tissue | C45(7)          | Mesothelioma        |
|                |                          | C69(0,2,3,4,5,6,8,9) | Malignant neoplasm of eye and adnexa |
|                |                          | C74(0,1,9)       | Malignant neoplasm of adrenal gland |
|                |                          | C75(0,1,3,9)     | Malignant neoplasm of other endocrine glands and related structures |
|                |                          | C76(0,1,2,3,4,5,7,8) | Malignant neoplasm of other and ill-defined sites |
|                |                          | D05(0,1,7,9)     | Carcinoma in situ of breast |
|                |                          | D06(0,1,7,9)     | Carcinoma in situ of cervix uteri |
|                |                          | D07(0,1,2,3,4,5,6) | Carcinoma in situ of other and unspecified genital organs |
|                |                          | D09(0,1,2,3,7)   | Carcinoma in situ of other and unspecified sites |
|                |                          | C40(0,1,2,3,9)   | Malignant neoplasm of bone and articular cartilage of limbs |
|                |                          | C41(00,01,1,2,3,4,8,9) | Malignant neoplasm of bone and articular cartilage of other and unspecified sites |
|                |                          | C47(0,2,3,4,5,6,8,9) | Malignant neoplasm of peripheral nerves and autonomic nervous system |
|                |                          | C49(0,1,2,3,4,5,6,8,9) | Malignant neoplasm of other connective and soft tissue |
| 22             | Melanoma of skin         | C43(1,2,3,4,5,6,7,8,9) | Malignant melanoma of skin |
| 24             | Cancer of breast         | C50(00,01,09,10,11,20,21,30,31,40,41,49,50,51,60,61,80,81,89,90,91,99) | Malignant neoplasm of breast |
| 25             | Cancer of uterus         | C54(0,1,2,3,8,9)  | Malignant neoplasm of corpus uteri |
|                |                          | C55              | Malignant neoplasm of uterus, part unspecified |
| 26             | Cancer of cervix         | C53(0,1,8,9)     | Malignant neoplasm of cervix uteri |
| 27, 28         | Cancer of ovary and other female genital organs | C51(0,1,8,9) | Malignant neoplasm of vulva |
|                |                          | C52              | Malignant neoplasm of vagina |
|                |                          | C56(0,1,9)       | Malignant neoplasm of ovary |
|                |                          | C57(00,01,09,1,3,4,8,9) | Malignant neoplasm of other and unspecified female genital organs |
| 29             | Cancer of prostate       | C58              | Malignant neoplasm of placenta |
| 30             | Cancer of testis         | C61              | Malignant neoplasm of prostate |
| 31             | Cancer of other male genital organs | C60(0,1,2,8,9) | Malignant neoplasm of penis |
|                |                          | C63(1,7,8)       | Malignant neoplasm of other and unspecified male genital organs |
| 32             | Cancer of bladder        | C67(0,1,2,3,4,5,6,7,8,9) | Malignant neoplasm of bladder |
| 33, 34         | Cancer of kidney and other urinary organs | C64              | Malignant neoplasm of kidney, except renal pelvis |
|                |                          | C65              | Malignant neoplasm of renal pelvis |
|                |                          | C66              | Malignant neoplasm of ureter |
|                |                          | C68(0,1,8,9)     | Malignant neoplasm of other and unspecified urinary organs |
| 35             | Cancer of brain and nervous system | C70(0,1)        | Malignant neoplasm of meninges |
|                |                          | C71(0,1,2,3,4,5,6,7,8,9) | Malignant neoplasm of brain |
|                |                          | C72(0,3,5,8,9)   | Malignant neoplasm of spinal cord, cranial nerves and other parts of central nervous system |
| 36             | Cancer of thyroid        | C73              | Malignant neoplasm of thyroid gland |
| 42             | Secondary malignancies   | C77(0,1,2,3,4,5,8) | Secondary and unspecified malignant neoplasm of lymph nodes |

Continued
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|---------------|--------------------------|----------------|---------------------|
| 43            | Malignant neoplasm without specification of site | C45(9) | Mesothelioma |
|               |                          | C80 | Malignant neoplasm, without specification of site |
| 38            | Non-Hodgkin’s lymphoma   | C82(0,1,2,7,9) | Follicular lymphoma |
|               |                          | C83(0,1,2,3,5,7,8,9) | Non-follicular lymphoma |
|               |                          | C84(0,4,5) | Mature T/NK-cell lymphomas |
|               |                          | C85(1,7,9) | Other and unspecified types of non-Hodgkin lymphoma |
|               |                          | C91(4) | Lymphoid leukaemia |
|               |                          | C96(3,7,9) | Other and unspecified malignant neoplasms of lymphoid, haematopoietic and related tissue |
| 37            | Hodgkin’s disease        | C81(0,1,2,3,7,9) | Hodgkin lymphoma |
| 39, 40        | Multiple myeloma and Leukemias | C90(0,1,20,21) | Multiple myeloma and malignant plasma cell neoplasms |
|               |                          | C91(0,1,3,5,7,9) | Lymphoid leukaemia |
|               |                          | C92(0,1,3,4,5,7,9) | Myeloid leukaemia |
|               |                          | C93(0) | Monocytic leukaemia |
|               |                          | C94(0,2) | Other leukaemias of specified cell type |
|               |                          | C95(0,1,9) | Leukaemia of unspecified cell type |
| 47            | Other and unspecified benign neoplasm | D32(0,1,9) | Benign neoplasm of meninges |
|               |                          | D33(0,1,2,3,4,9) | Benign neoplasm of brain and other parts of central nervous system |
| 44            | Neoplasms of unspecified nature or uncertain behavior | D42(0,1,9) | Neoplasm of uncertain or unknown behaviour of meninges |
|               |                          | D43(0,1,2,3,4,7,9) | Neoplasm of uncertain or unknown behaviour of brain and central nervous system |
|               |                          | D44(0,1,2,3,4,5,6,7,8,9) | Neoplasm of uncertain or unknown behaviour of endocrine glands |
|               |                          | D45 | Polycythemia vera |
|               |                          | D46(7,9) | Myelodysplastic syndromes |
|               |                          | D47(0,1,7,9) | Other neoplasms of uncertain or unknown behaviour of lymphoid, haematopoietic and related tissue |
|               |                          | D48(0,1,2,5,6,7,9) | Neoplasm of uncertain or unknown behaviour of other and unspecified sites |
| 48            | Thyroid disorders        | Q85(0) | Phakomatoses, not elsewhere classified |
|               |                          | E03(0,1,2,4,5,8,9) | Other hypothyroidism |
|               |                          | E04(0,1,2,8,9) | Other nontoxic goitre |
|               |                          | E05(0,1,2,5,8,9) | Thyrotoxicosis [hyperthyroidism] |
|               |                          | E06(0,1,3,5,9) | Thyroiditis |
|               |                          | E07(0,1,8,8,9) | Other disorders of thyroid |
|               |                          | E89(0) | Postprocedural endocrine and metabolic disorders, not elsewhere classified |
| 49, 50        | Diabetes mellitus        | E10(0,10,11,12,20,21,22,28,32, 33,35,38,40,41,42,50,51,52,60, 61,62,63,68,70,71,78,9) | Type 1 diabetes mellitus |
|               |                          | E11(0,10,11,12,2021,22,28,30,31, 32,33,35,38,40,41,42,50,51,52,60, 61,62,63,68,70,71,78,9) | Type 2 diabetes mellitus |
|               |                          | E13(0,10,20,22,28,40,41,42,50, 51,63,70,71,78,9) | Other specified diabetes mellitus |
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|---------------|--------------------------|----------------|---------------------|
| 51            | Other endocrine disorders | E14(0,10,11,12,20,21,22,28,33, 40,41,42,50,51,52,60,62,63,68, 70,71,78,9) | Unspecified diabetes mellitus |
|               |                          | E15            | Nondiabetic hypoglycaemic coma |
|               |                          | E16(0,1,2,4,8) | Other disorders of pancreatic internal secretion |
|               |                          | E20(8,9)       | Hypoparathyroidism |
|               |                          | E21(0,1,2,3,4) | Hyperparathyroidism and other disorders of parathyroid gland |
|               |                          | E22(0,2,9)     | Hyperfunction of pituitary gland |
|               |                          | E23(0,1,2,6,7) | Hypofunction and other disorders of pituitary gland |
|               |                          | E24(0,8,9)     | Cushing syndrome |
|               |                          | E25(0,8,9)     | Adrenogenital disorders |
|               |                          | E26(0,8,9)     | Hyperaldosteronism |
|               |                          | E27(0,1,2,3,4,8,9) | Other disorders of adrenal gland |
|               |                          | E28(2,3,9)     | Ovarian dysfunction |
|               |                          | E29(0,1,8,9)   | Testicular dysfunction |
|               |                          | E30(1)         | Disorders of puberty, not elsewhere classified |
|               |                          | E31(0,9)       | Polyglandular dysfunction |
|               |                          | E32(0,8,9)     | Diseases of thymus |
|               |                          | E34(0,2,5,8,9) | Other endocrine disorders |
|               |                          | E89(1,2,3)     | Postprocedural endocrine and metabolic disorders, not elsewhere classified |
| 52            | Nutritional deficiencies | E41            | Nutritional marasmus |
|               |                          | E42            | Marasmic kwashiorkor |
|               |                          | E43            | Unspecified severe protein-energy malnutrition |
|               |                          | E46            | Unspecified protein-energy malnutrition |
|               |                          | E55(0,9)       | Vitamin D deficiency |
|               |                          | M83(8,9)       | Adult osteomalacia |
| 57, 58        | Other nutritional, endocrine, immunity, and metabolic disorders | C88(00)        | Malignant immunoproliferative diseases |
|               |                          | D47(2)         | Other neoplasms of uncertain or unknown behaviour of lymphoid, haematopoietic and related tissue |
|               |                          | D76(0)         | Other specified diseases with participation of lymphoreticular and reticuloendothelial tissue |
|               |                          | D80(1,2,3,4)   | Immunodeficiency with predominantly antibody defects |
|               |                          | D81(1,2,3,8,9) | Combined immunodeficiencies |
|               |                          | D82(1,3,9)     | Immunodeficiency associated with other major defects |
|               |                          | D83(1,9)       | Common variable immunodeficiency |
|               |                          | D84(1,8,9)     | Other immunodeficiencies |
|               |                          | D89(1,9)       | Other disorders involving the immune mechanism, not elsewhere classified |
|               |                          | E65            | Localized adiposity |
|               |                          | E66(0,2,8,9)   | Obesity |
|               |                          | E67(3)         | Other hyperalimentation |
|               |                          | E70(1,2,3)     | Disorders of aromatic amino-acid metabolism |
|               |                          | E71(0,3)       | Disorders of branched-chain amino-acid metabolism and fatty-acid metabolism |
|               |                          | E72(0,1,2,3,4,5,8) | Other disorders of amino-acid metabolism |
|               |                          | E73(0,9)       | Lactose intolerance |
|               |                          | E74(0,2,3,4,8) | Other disorders of carbohydrate metabolism |
|               |                          | E76(0)         | Disorders of glycosaminoglycan metabolism |
|               |                          | E77(1,8)       | Disorders of glycoprotein metabolism |

Continued
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|---------------|--------------------------|----------------|---------------------|
| E80(0,1,2,4,6,7) | Disorders of porphyrin and bilirubin metabolism |
| E83(0,10,18,3,4,5) | Disorders of mineral metabolism |
| E84(0,1,8,9) | Cystic fibrosis |
| E85(0,1,3,4,8,9) | Amyloidosis |
| E88(0,8,9) | Other metabolic disorders |
| E89(8) | Postprocedural endocrine and metabolic disorders, not elsewhere classified |
| R73(802,812) | Elevated blood glucose level |
| E75(2,5) | Disorders of sphingolipid metabolism and other lipid storage disorders |
| E88(0,1,3,6,8) | Disorders of lipoprotein metabolism and other lipidaemias |

53 Disorders of lipid metabolism

| R73(802,812) | Elevated blood glucose level |

54 Gout and other crystal arthropathies

| M10(00,01,02,03,04,05,06,07, 08,09,39,44,90,92,93,94,95, 96,97,98,99) | Other crystal arthropathies |
| D46(1,2,4) | Myelodysplastic syndromes |
| D50(0,8,9) | Iron deficiency anaemia |
| D55(0,9) | Anaemia due to enzyme disorders |
| D60(0,1,9) | Acquired haemolytic anaemia |

59, 61 Deficiency, sickle cell and other anemia

| D61(0,1,2,3,8,9) | Acute posthaemorrhagic anaemia |
| D62 | Other anaemias |
| D64(0,1,2,3,4,8,9) | Other anaemias |

62, 63, 64, 247 Other hematologic conditions

| D65 | Disseminated intravascular coagulation [fibrinolysis syndrome] |
| D66 | Hereditary factor VIII deficiency |
| D67 | Hereditary factor IX deficiency |
| D68(0,2,3,4,80,81,88,9) | Other coagulation defects |
| D69(0,1,2,30,38,4,5,6,8,9) | Purpura and other haemorrhagic conditions |
| D70(0,8) | Agranulocytosis |
| D71 | Functional disorders of polymorphonuclear neutrophils |
| D72(1,8,9) | Other disorders of white blood cells |
| D73(0,1,2,3,4,5,8,9) | Diseases of spleen |
| D74(8,9) | Methaemoglobinemia |
| D75(1,9) | Other diseases of blood and blood-forming organs |
| D76(1,2,3) | Other specified diseases with participation of lymphoreticular and reticuloendothelial tissue |
| D89(2) | Other disorders involving the immune mechanism, not elsewhere classified |
| I88(0,1,8,9) | Non-specific lymphadenitis |
| R72 | Abnormality of white blood cells, not elsewhere classified |

653 Delirium, dementia and other cognitive disorders

| F01(1,9) | Vascular dementia |
| F03 | Unspecified dementia |
| F04 | Organic amnesic syndrome, not induced by alcohol and other psychoactive substances |
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|----------------|--------------------------|----------------|---------------------|
| F05(1)         | Delirium, not induced by alcohol and other psychoactive substances |
| F06(5,6,8,9)   | Other mental disorders due to brain damage and dysfunction and to physical disease |
| F09            | Unspecified organic or symptomatic mental disorder |
| G30(0,8,9)     | Alzheimer disease |
| G31(0,8,9)     | Other degenerative diseases of nervous system, not elsewhere classified |
| G91(0,1,2,3,8,9) | Hydrocephalus |
| F10(0,1,2,3,4,5,6,7,8,9) | Mental and behavioural disorders due to use of alcohol |
| F11(0,1,2,3,4,5,6,7,8,9) | Mental and behavioural disorders due to use of opioids |
| F12(0,1,2,3,4,5,6,7,8,9) | Mental and behavioural disorders due to use of cannabinoids |
| F13(0,1,2,3,4,5,6,7,8,9) | Mental and behavioural disorders due to use of sedatives or hypnotics |
| F14(0,1,2,3,4,5,6,7,8,9) | Mental and behavioural disorders due to use of cocaine |
| F15(0,1,2,3,4,5,6,7,8,9) | Mental and behavioural disorders due to use of other stimulants, including caffeine |
| F16(0,1,2,3,4,5,7,8) | Mental and behavioural disorders due to use of hallucinogens |
| F17(2,3)       | Mental and behavioural disorders due to use of tobacco |
| F18(0,1,2,5,7) | Mental and behavioural disorders due to use of volatile solvents |
| F19(0,1,2,3,4,5,6,7,8,9) | Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances |
| F55            | Abuse of non-dependence-producing substances |
| G31(2)         | Other degenerative diseases of nervous system, not elsewhere classified |
| F20(0,1,2,3,4,5,6,8,9) | Schizophrenia |
| F21            | Schizotypal disorder |
| F22(0,8,9)     | Persistent delusional disorders |
| F23(0,1,2,3,8,9) | Acute and transient psychotic disorders |
| F24            | Induced delusional disorder |
| F25(0,1,2,8,9) | Schizoaffective disorders |
| F28            | Other nonorganic psychotic disorders |
| F29            | Unspecified nonorganic psychosis |
| F32(1)         | Depressive episode |
| F30(0,1,2,8,9) | Manic episode |
| F31(0,1,2,3,4,5,6,7,8,9) | Bipolar affective disorder |
| F32(0,2,3,8,9) | Depressive episode |
| F33(0,1,2,3,4,8,9) | Recurrent depressive disorder |
| F34(1,8,9)     | Persistent mood [affective] disorders |
| F38(0,1,8)     | Other mood [affective] disorders |
| F39            | Unspecified mood [affective] disorder |
| F40(0,1,2,8,9) | Phobic anxiety disorders |
| F41(0,1,2,3,8,9) | Other anxiety disorders |
| F42(0,1,2,8,9) | Obsessive-compulsive disorder |
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|---------------|--------------------------|----------------|----------------------|
| F43(0,9)      | Reaction to severe stress, and adjustment disorders | | |
| F44(0,1,2,4,5,6,7,8,9) | Dissociative [conversion] disorders | | |
| F45(0,1,2) | Somatoform disorders | | |
| F48(0,1,8,9) | Other neurotic disorders | | |
| F53(0)       | Mental and behavioural disorders associated with the puerperium, not elsewhere classified | | |
| F99          | Mental disorder, not otherwise specified | | |
| F84(0,1,2,5,8,9) | Pervasive developmental disorders | | |
| F93(2,8,9) | Emotional disorders with onset specific to childhood | | |
| F94(1,2,8) | Disorders of social functioning with onset specific to childhood and adolescence | | |
| F98(2,8,9) | Other behavioural and emotional disorders with onset usually occurring in childhood and adolescence | | |
| F34(0)       | Persistent mood [affective] disorders | | |
| F60(0,1,2,3,4,5,6,7,8,9) | Specific personality disorders | | |
| F61          | Mixed and other personality disorders | | |
| F62(0,8,9) | Enduring personality changes, not attributable to brain damage and disease | | |
| F68(1,8) | Other disorders of adult personality and behaviour | | |
| F69()        | Unspecified disorder of adult personality and behaviour | | |
| F64(7)       | Other mental disorders due to brain damage and dysfunction and to physical disease | | |
| F07(0,1,2,8,9) | Personality and behavioural disorders due to brain disease, damage and dysfunction | | |
| F45(3,4,8,9) | Somatoform disorders | | |
| F50(0,1,2,3,5,8,9) | Eating disorders | | |
| F51(0,3,4,9) | Nonorganic sleep disorders | | |
| F52(2,8,9) | Sexual dysfunction, not caused by organic disorder or disease | | |
| F54          | Psychological and behavioural factors associated with disorders or diseases classified elsewhere | | |
| F59          | Unspecified behavioural syndromes associated with physiological disturbances and physical factors | | |
| F66(9)       | Psychological and behavioural disorders associated with sexual development and orientation | | |
| F95(2,8,9) | Tic disorders | | |
| F98(1,4,5) | Other behavioural and emotional disorders with onset usually occurring in childhood and adolescence | | |
| G44(2)       | Other headache syndromes | | |
| F43(1,2,8) | Reaction to severe stress, and adjustment disorders | | |
| F93(0)       | Emotional disorders with onset specific to childhood | | |
| F63(0,8,9) | Habit and impulse disorders | | |
| F91(0,1,3,8,9) | Conduct disorders | | |
| F92(0,8,9) | Mixed disorders of conduct and emotions | | |

Continued
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|----------------|-------------------------|----------------|---------------------|
| 654            | Developmental disorders | F70(0,1,8,9)   | Mild mental retardation |
|                |                         | F72(1,8,9)     | Severe mental retardation |
|                |                         | F73(9)         | Profound mental retardation |
|                |                         | F78(1,8)       | Other mental retardation |
|                |                         | F79(0,1)       | Unspecified mental retardation |
|                |                         | F80(1,2,9)     | Specific developmental disorders of speech and language |
|                |                         | F81(9)         | Specific developmental disorders of scholastic skills |
|                |                         | F82            | Specific developmental disorder of motor function |
|                |                         | F88            | Other disorders of psychological development |
|                |                         | F89            | Unspecified disorder of psychological development |

| 81, 95 Other nervous system conditions | E75(4) | Disorders of sphingolipid metabolism and other lipid storage disorders |
|                                       | G10 | Huntington disease |
|                                       | G11(0,1,2,3,4,8,9) | Hereditary ataxia |
|                                       | G12(0,1,2,9) | Spinal muscular atrophy and related syndromes |
|                                       | G21(0) | Secondary parkinsonism |
|                                       | G23(1) | Other degenerative diseases of basal ganglia |
|                                       | G24(0,3,8,9) | Dystonia |
|                                       | G25(0,1,2,3,4,5,6,8,9) | Other extrapyramidal and movement disorders |
|                                       | G36(0,9) | Other acute disseminated demyelination |
|                                       | G37(1,2,5,8,9) | Other demyelinating diseases of central nervous system |
|                                       | G47(4) | Sleep disorders |
|                                       | G54(0,1,2,4,6,8,9) | Nerve root and plexus disorders |
|                                       | G56(0,1,2,3,4,8,9) | Mononeuropathies of upper limb |
|                                       | G57(0,1,3,4,5,6,7,8,9) | Mononeuropathies of lower limb |
|                                       | G68(0,7,8,9) | Other mononeuropathies |
|                                       | G60(0,1,9) | Hereditary and idiopathic neuropathy |
|                                       | G61(0,1,8,9) | Inflammatory polyneuropathy |
|                                       | G62(0,1,2,8,9) | Other polyneuropathies |
|                                       | G70(0,8,9) | Myasthenia gravis and other myoneural disorders |
|                                       | G71(0,1,2,3,9) | Primary disorders of muscles |
|                                       | G72(0,1,2,3,4,8,9) | Other myopathies |
|                                       | G80(3) | Cerebral palsy |
|                                       | G90(0,2,3,4,8) | Disorders of autonomic nervous system |
|                                       | G93(0,1,2,4,5,6,81,88,9) | Other disorders of brain |
|                                       | G95(0,1,2,8,9) | Other diseases of spinal cord |

| 79 | Parkinson’s disease | G20 | Parkinson disease |
|    |                     | G21(1,2,9) | Secondary parkinsonism |

| 84 | Headache; including migraine | G43(0,1,2,3,8,9) | Migraine |

| 80 | Multiple sclerosis | G35 | Multiple sclerosis |

| 82 | Paralysis | G80(0,1,2,4,8,9) | Cerebral palsy |
|    |           | G81(01,09,10,19,90,91,99) | Hemiplegia |
|    |           | G82(092,191,193,222,223,291,293,390,391,490,491,510,511,591) | Paraplegia and tetraplegia |
|    |           | G83(0,1,22,3,4,5,8,9) | Other paralytic syndromes |

| 83 | Epilepsy, convulsions | F80(3) | Specific developmental disorders of speech and language |

Continued
| CCS category # | CCS category description                                      | ICD-10-CA code | ICD-10-CA code label                             |
|----------------|---------------------------------------------------------------|----------------|-----------------------------------------------|
| 90, 91         | Inflammation infection and other eye disorders                | G40(0,1,2,3,4,5,6,7,8,9) | Epilepsy                                    |
|                |                                                                | G41(0,1,2,8,9) | Status epilepticus                           |
|                |                                                                | H05(0,1,2,3,4,5,8,9) | Disorders of orbit                           |
|                |                                                                | H10(1,2,3,4,5,8,9) | Conjunctivitis                               |
|                |                                                                | H11(0,1,3,4,8,9) | Other disorders of conjunctiva               |
|                |                                                                | H15(8) | Disorders of sclera                           |
|                |                                                                | H16(0,1,2,3,8,9) | Keratitis                                    |
|                |                                                                | H17(0,8,9) | Corneal scars and opacities                   |
|                |                                                                | H18(1,2,3,4,5,6,7,8,9) | Other disorders of cornea                    |
|                |                                                                | H20(0,1,8,9) | Iridocyclitis                                 |
|                |                                                                | H21(0,3,4,5,8,9) | Other disorders of iris and ciliary body      |
|                |                                                                | H27(0,1,8,9) | Other disorders of lens                       |
|                |                                                                | H30(2,8,9) | Chorioretinal inflammation                   |
|                |                                                                | H31(3,4,8) | Other disorders of choroid                    |
|                |                                                                | H43(0,1,2,3,8,9) | Disorders of vitreous body                   |
|                |                                                                | H44(0,1,2,4,5,6,7,8) | Disorders of globe                           |
|                |                                                                | H46 | Optic neuritis                               |
|                |                                                                | H47(0,1,28,3,4,7) | Other disorders of optic [2nd] nerve and visual pathways |
|                |                                                                | H55 | Nystagmus and other irregular eye movements  |
|                |                                                                | H57(0,1,8) | Other disorders of eye and adnexa            |
| 87             | Retinal detachments, defects, vascular occlusion, and retinopathy | G45(3) | Transient cerebral ischaemic attacks and related syndromes |
|                |                                                                | H33(0,1,2,3,4,5) | Retinal detachments and breaks               |
|                |                                                                | H34(1,2,8) | Retinal vascular occlusions                  |
|                |                                                                | H35(0,1,2,3,4,5,6,8) | Other retinal disorders                      |
|                |                                                                | H59(81) | Postprocedural disorders of eye and adnexa, not elsewhere classified |
| 88             | Glaucoma                                                       | H40(0,1,2,3,4,5,6,8,9) | Glaucoma                                    |
|                |                                                                | Q15(0) | Other congenital malformations of eye         |
| 86             | Cataract                                                        | H25(0,1,2,8,9) | Senile cataract                              |
|                |                                                                | H26(0,1,2,3,4,8,9) | Other cataract                               |
| 89             | Blindness and vision defects                                   | H54(0,1,2,4,5,7) | Visual impairment including blindness (binocular or monocular) |
| 94             | Other ear and sense organ disorders                             | H60(0,1,2,3,4,5,8,9) | Otitis externa                               |
|                |                                                                | H61(0,1,2,3,8,9) | Other disorders of external ear              |
|                |                                                                | H72(0,1,2,8,9) | Perforation of tympanic membrane             |
|                |                                                                | H73(1,8,9) | Other disorders of tympanic membrane         |
|                |                                                                | H90(0,1,2,3,4,5,6,7,8) | Conductive and sensorineural hearing loss   |
|                |                                                                | H91(3,8,9) | Other hearing loss                           |
| 92             | Otitis media and related conditions                             | H65(0,1,2,3,4,9) | Nonsuppurative otitis media                  |
|                |                                                                | H66(0,1,2,3,4,9) | Suppurative and unspecified otitis media     |
|                |                                                                | H68(0,1) | Eustachian salpingitis and obstruction        |
|                |                                                                | H69(8,9) | Other disorders of Eustachian tube           |
|                |                                                                | H70(0,1,2,8,9) | Mastoiditis and related conditions           |
|                |                                                                | H95(0,1) | Postprocedural disorders of ear and mastoid process, not elsewhere classified |
| 93             | Conditions associated with dizziness or vertigo                 | H81(0,1,2,3,4,8,9) | Disorders of vestibular function             |
|                |                                                                | H83(0,1,2) | Other diseases of inner ear                  |
| 97             | Peri-; endo-; and myocarditis, cardiomyopathy                   | I09(2,8,9) | Other rheumatic heart diseases               |
|                |                                                                | I23(0) | Certain current complications following acute myocardial infarction |
|                |                                                                | I31(1,2,3,8,9) | Other diseases of pericardium                |
|                |                                                                | I42(0,1,2,3,4,5,6,7,8,9) | Cardiomyopathy                              |

Continued
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|---------------|--------------------------|----------------|---------------------|
| 96            | Heart valve disorders    | I05(0,1,2,8,9) | Rheumatic mitral valve diseases |
|               |                          | I06(0,1,2)     | Rheumatic aortic valve diseases |
|               |                          | I07(1,2,8,9)   | Rheumatic tricuspid valve diseases |
|               |                          | I08(0,1,2,3,8) | Multiple valve diseases |
|               |                          | I34(0,1,2,8,9) | Nonrheumatic mitral valve disorders |
|               |                          | I35(0,1,2,8,9) | Nonrheumatic aortic valve disorders |
|               |                          | I36(1,8)       | Nonrheumatic tricuspid valve disorders |
|               |                          | I37(0,1,2)     | Pulmonary valve disorders |
|               |                          | I38            | Endocarditis, valve unspecified |
|               |                          | I39(1)         | Endocarditis and heart valve disorders in diseases classified elsewhere |
| 98            | Essential hypertension   | I10(0,1)       | Essential (primary) hypertension |
| 99            | Hypertension with        | I11            | Hypertensive heart disease |
|               | complications and        | I12            | Hypertensive renal disease |
|               | secondary hypertension   | I13            | Hypertensive heart and renal disease |
|               |                          | I15(00,10,11,20,21,80,90) | Secondary hypertension |
| 100           | Acute myocardial infarction | I21(0,1,2,3,40,41,42,49,9) | Acute myocardial infarction |
|               |                          | I22(0,1,8,9)   | Subsequent myocardial infarction |
| 101           | Coronary atherosclerosis and other heart disease | I20(0,1,80,88,9) | Angina pectoris |
|               |                          | I24(0,1,8,9)   | Other acute ischaemic heart diseases |
|               |                          | I25(10,11,12,13,14,15,19,5,6,8,9) | Chronic ischaemic heart disease |
| 103           | Pulmonary heart disease  | I26(0,9)       | Pulmonary embolism |
|               |                          | I27(0,1,2,8,9) | Other pulmonary heart diseases |
|               |                          | I28(0,1,8,9)   | Other diseases of pulmonary vessels |
| 105           | Conduction disorders     | I44(0,1,2,3,4,6,7) | Atrioventricular and left bundle-branch block |
|               |                          | I45(0,1,2,5,6,8,9) | Other conduction disorders |
| 106, 107, 108 | Cardiac dysrhythmias, arrest, ventricular fibrillation and congestive heart failure | I46(0,1,9) | Cardiac arrest |
|               |                          | I47(0,1,2,9)   | Paroxysmal tachycardia |
|               |                          | I48(0,1)       | Atrial fibrillation and flutter |
|               |                          | I49(00,1,2,3,4,5,8,9) | Other cardiac arrhythmias |
|               |                          | I50(0,1,9)     | Heart failure |
|               |                          | R00(1)         | Abnormalities of heart beat |
| 104           | Other and ill-defined heart disease | I23(2,3,6,81,82,88) | Certain current complications following acute myocardial infarction |
|               |                          | I25(0,3,4)     | Chronic ischaemic heart disease |
|               |                          | I51(0,3,4,6,7,8,9) | Complications and ill-defined descriptions of heart disease |
|               |                          | I97(0,1)       | Postprocedural disorders of circulatory system, not elsewhere classified |
| 109, 110      | Acute cerebrovascular disease, occlusion or stenosis of precerebral arteries | I60(0,1,2,3,4,5,6,7,8,9) | Subarachnoid haemorrhage |
|               |                          | I61(0,1,2,3,4,5,6,8,9) | Intracerebral haemorrhage |
|               |                          | I62(0,1,9)     | Other nontraumatic intracranial haemorrhage |
|               |                          | I63(0,1,2,3,4,5,6,8,9) | Cerebral infarction |
|               |                          | I64            | Stroke, not specified as haemorrhage or infarction |
|               |                          | I65(0,1,2,3,8) | Occlusion and stenosis of precerebral arteries, not resulting in cerebral infarction |
|               |                          | I66(0,1,2,3,4,8,9) | Occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction |
| 112           | Transient cerebral ischemia | G45(0,1,8,9) | Transient cerebral ischaemic attacks and related syndromes |
| 111           | Other and ill-defined cerebrovascular disease | G45(4) | Transient cerebral ischaemic attacks and related syndromes |
| 114, 115, 117 | Other circulatory disease | I67(0,1,2,3,4,5,6,7,8,9) | Other cerebrovascular diseases |
|               |                          | I70(0,1,2,8,9) | Atherosclerosis |
|               |                          | I71(0,1,2,3,4,6,8,9) | Aortic aneurysm and dissection |

Continued
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|----------------|--------------------------|----------------|----------------------|
| I72(0,1,2,3,4,8,9) | Other aneurysm and dissection |
| I73(0,1,8,9) | Other peripheral vascular diseases |
| I77(0,1,2,3,6,8,9) | Other disorders of arteries and arterioles |
| I78(0,1,8) | Diseases of capillaries |
| K55(0,1,9) | Vascular disorders of intestine |
| M30(0,1,3,8) | Polyanarteritis nodosa and related conditions |
| M31(0,1,3,4,5,6,7,8) | Other necrotizing vasculopathies |
| I74(0,1,2,3,4,5,8,9) | Arterial embolism and thrombosis |
| I73(0,1,8,9) | Other peripheral arterial embolism or thrombosis |
| I82(0,1,2,3,8,9) | Other venous embolism and thrombosis |
| I85(0,9) | Oesophageal varices |
| I86(0,1,2,3,4,8) | Varicose veins of other sites |
| I87(0,2,0,1,2,8,9) | Other disorders of veins |
| I89(0,1,8,9) | Other noninfective disorders of lymphatic vessels and lymph nodes |
| I97(2) | Postprocedural disorders of circulatory system, not elsewhere classified |
| I99 | Other and unspecified disorders of circulatory system |
| R58 | Haemorrhage, not elsewhere classified |
| J30(0,1,3,4) | Vasomotor and allergic rhinitis |
| J31(0,1,2) | Chronic rhinitis, nasopharyngitis and pharyngitis |
| J34(0,1,3,8) | Other disorders of nose and nasal sinuses |
| J37(0) | Chronic laryngitis and laryngotracheitis |
| J38(0,1,0,2,0,9,1,2,3,4,5,6,7) | Diseases of vocal cords and larynx, not elsewhere classified |
| J39(0,1,2,3,8) | Other diseases of upper respiratory tract |
| J32(0,1,2,3,4,8,9) | Chronic sinitis |
| J35(0,1,2,3,8,9) | Chronic diseases of tonsils and adenoids |
| J41(0,1,3,4) | Simple and mucopurulent chronic bronchitis |
| J42 | Unspecified chronic bronchitis |
| J43(1,8,9) | Emphysema |
| J44(1) | Other chronic obstructive pulmonary disease |
| J47 | Bronchiectasis |
| J45(0,0,0,1,0,1,10,8,9,0,9,1) | Asthma |
| J60 | Coalworker pneumoconiosis |
| J61 | Pneumoconiosis due to asbestos and other mineral fibres |
| J62(0,8) | Pneumoconiosis due to dust containing silica |
| J63(2) | Pneumoconiosis due to other inorganic dusts |
| J66(8) | Airway disease due to specific organic dust |
| J67(0,2,8,99) | Hypersensitivity pneumonitis due to organic dust |
| J68(0,1,3,4,8,9) | Respiratory conditions due to inhalation of chemicals, gases, fumes and vapours |
| J70(0,1,2,3,4,8,9) | Respiratory conditions due to other external agents |
| J18(2) | Pneumonia, organism unspecified |
| J84(0,1,8,9) | Other interstitial pulmonary diseases |
| J93(0,1) | Pneumothorax |
| J95(80) | Postprocedural respiratory disorders, not elsewhere classified |

Continued
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|----------------|--------------------------|----------------|---------------------|
| 131            | Respiratory failure, insufficiency or arrest | J80 | Adult respiratory distress syndrome |
|                |                          | J81 | Pulmonary oedema |
|                |                          | J82 | Pulmonary eosinophilia, not elsewhere classified |
|                |                          | J95(1,2,3) | Postprocedural respiratory disorders, not elsewhere classified |
|                |                          | J96(0,1,9) | Respiratory failure, not elsewhere classified |
|                |                          | J98(10,18,2,4) | Other respiratory disorders |
| 136            | Disorders of teeth and jaw | K03(6) | Other diseases of hard tissues of teeth |
|                |                          | K05(0,1,2,3,4,5,6) | Gingivitis and periodontal diseases |
|                |                          | K06(0,1,2,8,9) | Other disorders of gingiva and edentulous alveolar ridge |
|                |                          | K08(1,2,3,80,81,82,83,87,88,9) | Other disorders of teeth and supporting structures |
| 138            | Esophageal disorders | K20 | Oesophagitis |
|                |                          | K21(0,9) | Gastro-oesophageal reflux disease |
|                |                          | K22(0,10,11,12,13,14,15,16,17, 19,2,3,4,5,6,7,8,9) | Other diseases of oesophagus |
| 139, 153       | Gastroduodenal ulcer, gastrointestinal hemorrhage | K25(0,1,2,3,4,5,6,7,9) | Gastric ulcer |
|                |                          | K26(0,1,2,3,4,5,6,7,9) | Duodenal ulcer |
|                |                          | K27(0,1,2,3,4,5,7,9) | Peptic ulcer, site unspecified |
|                |                          | K28(0,1,3,4,5,6,7,9) | Gastrojejunal ulcer |
| 140            | Gastritis and duodenitis | K29(0,1,2,3,4,5,6,7,8,9) | Gastritis and duodenitis |
| 141            | Other disorders of stomach and duodenum | K31(1,2,3,4,5,6,8,0,81,88,9) | Other diseases of stomach and duodenum |
| 144            | Regional enteritis and ulcerative colitis | K50(0,1,8,9) | Crohn disease [regional enteritis] |
|                |                          | K51(0,1,2,3,4,5,8,9) | Ulcerative colitis |
| 154            | Noninfectious gastroenteritis | K52(0,1,2,8,9) | Other noninfective gastroenteritis and colitis |
| 146            | Diverticulosis and diverticulitis | K57(0,1,2,3,4,5,8,9) | Diverticular disease of intestine |
| 155            | Other gastrointestinal disorders | K58(0,9) | Irritable bowel syndrome |
|                |                          | K59(0,1,2,3,4,8,9) | Other functional intestinal disorders |
|                |                          | K90(0,1,4,8,9) | Intestinal malabsorption |
|                |                          | K91(0,1,2) | Postprocedural disorders of digestive system, not elsewhere classified |
| 6, 151         | Hepatitis and Other liver diseases | K70(0,1,2,3,4,9) | Alcoholic liver disease |
|                |                          | K71(0,1,2,6,8,9) | Toxic liver disease |
|                |                          | K72(1,9) | Hepatic failure, not elsewhere classified |
|                |                          | K73(0,1,2,8,9) | Chronic hepatitis, not elsewhere classified |
|                |                          | K74(0,1,3,4,5,6) | Fibrosis and cirrhosis of liver |
|                |                          | K75(0,1,2,3,4,8,9) | Other inflammatory liver diseases |
|                |                          | K76(0,1,3,5,6,7,8,9) | Other diseases of liver |
| 149            | Biliary tract disease | K81(0,1,8,9) | Cholecystitis |
|                |                          | K82(0,1,2,3,4,8,9) | Other diseases of gallbladder |
|                |                          | K83(0,1,2,3,4,5,8,9) | Other diseases of biliary tract |
|                |                          | K91(5) | Postprocedural disorders of digestive system, not elsewhere classified |
| 152            | Pancreatic disorders (excluding diabetes) | K85(0,1,2,3,8,9) | Acute pancreatitis |
|                |                          | K86(0,1,2,3,8,9) | Other diseases of pancreas |
| 156, 157, 158  | Chronic kidney disease and related conditions | N01(7,8,9) | Rapidly progressive nephritic syndrome |
|                |                          | N03(1,2,3,5,7,8,9) | Chronic nephritic syndrome |
|                |                          | N04(0,1,2,3,4,5,7,8,9) | Nephrotic syndrome |
|                |                          | N05(0,1,2,3,5,6,7,8,9) | Unspecified nephritic syndrome |
|                |                          | N07(1,8,9) | Hereditary nephropathy, not elsewhere classified |
| CCS category # | CCS category description                  | ICD-10-CA code       | ICD-10-CA code label                                                                 |
|----------------|-------------------------------------------|----------------------|-------------------------------------------------------------------------------------|
| 161            | Other diseases of kidney and ureters      | N14(0,1,2)           | Drug- and heavy-metal-induced tubulo-interstitial and tubular conditions             |
|                |                                            | N15(8)               | Other renal tubulo-interstitial diseases                                              |
|                |                                            | N18(0,8,9)           | Chronic kidney disease                                                               |
|                |                                            | N19                  | Unspecified kidney failure                                                            |
|                |                                            | N26                  | Unspecified contracted kidney                                                         |
| 159            | Urinary tract infections                  | N25(0,1,8,9)         | Disorders resulting from impaired renal tubular function                              |
|                |                                            | N16(0)               | Renal tubulo-interstitial disorders in diseases classified elsewhere                   |
| 162            | Other diseases of bladder and urethra     | N10                  | Acute tubulo-interstitial nephritis                                                   |
|                |                                            | N11(0,1,8,9)         | Chronic tubulo-interstitial nephritis                                                 |
|                |                                            | N12                  | Tubulo-interstitial nephritis, not specified as acute or chronic                     |
|                |                                            | N13(6)               | Obstructive and reflux uropathy                                                       |
|                |                                            | N15(1,9)             | Other renal tubulo-interstitial diseases                                              |
|                |                                            | N28(84,85)           | Other disorders of kidney and ureter, not elsewhere classified                        |
|                |                                            | N30(0,1,2,3,4,8,9)   | Cystitis                                                                             |
|                |                                            | N02(0,1,2,3,5,7,8,9) | Recurrent and persistent haematuria                                                   |
|                |                                            | N13(8,9)             | Obstructive and reflux uropathy                                                       |
|                |                                            | N31(2,8,9)           | Neuromuscular dysfunction of bladder, not elsewhere classified                        |
|                |                                            | N32(0,1,2,3,4,8,9)   | Other disorders of bladder                                                            |
|                |                                            | N36(0,1,2,3,8,9)     | Other disorders of urethra                                                            |
|                |                                            | N39(8,8,9)           | Other disorders of urinary system                                                     |
|                |                                            | R31(0,1,8)           | Unspecified haematuria                                                                |
|                |                                            | N30(0,1,2,3,4,8,9)   | Recurrent and persistent haematuria                                                   |
|                |                                            | N02(0,1,2,3,5,7,8,9) | Obstructive and reflux uropathy                                                       |
|                |                                            | N13(8,9)             | Neuromuscular dysfunction of bladder, not elsewhere classified                        |
|                |                                            | N31(2,8,9)           | Other disorders of bladder                                                            |
|                |                                            | N36(0,1,2,3,8,9)     | Other disorders of urethra                                                            |
|                |                                            | N39(8,8,9)           | Other disorders of urinary system                                                     |
|                |                                            | R31(0,1,8)           | Unspecified haematuria                                                                |
| 164            | Hyperplasia of prostate                   | N40                  | Hyperplasia of prostate                                                              |
| 165, 166       | Inflammatory and other male genital disorders | N41(0,1,2,3,8,9)   | Inflammatory diseases of prostate                                                     |
| 167            | Nonmalignant breast conditions            | N48(0,1,2,3,5,7,8,9) | Other disorders of penis                                                              |
| 175            | Other female genital disorders            | N60(0,1,2,3,4,8,9)   | Benign mammary dysplasia                                                              |
| 175            | Other female genital disorders            | N39(39)              | Other disorders of urinary system                                                     |
|                |                                            | N70(0,1,9)           | Salpingitis and oophoritis                                                            |
|                |                                            | N71(0,1,9)           | Inflammatory disease of uterus, except cervix                                         |
|                |                                            | N73(0,1,2,3,4,5,6,8,9) | Other female pelvic inflammatory diseases                                             |
|                |                                            | N80(0,1,2,3,4,5,6,8,9) | Endometriosis                                                                         |
|                |                                            | N82(0,1,2,3,4,5,8,9) | Fistulae involving female genital tract                                               |
|                |                                            | N84(0,8,9)           | Polyp of female genital tract                                                         |
|                |                                            | N85(0,1,2,4,5,6,7,8,9) | Other noninflammatory disorders of uterus, except cervix                             |
|                |                                            | N94(0,1,2,3,4,5,6,8,9) | Pain and other conditions associated with female genital organs and menstrual cycle |
|                |                                            | N96                  | Habitual aborter                                                                     |
|                |                                            | N99(4)               | Postprocedural disorders of genitourinary system, not elsewhere classified            |
| 171            | Menstrual disorders                       | N89(7)               | Other noninflammatory disorders of vagina                                              |
|                |                                            | N91(0,1,2,5)         | Absent, scanty and rare menstruation                                                  |
|                |                                            | N92(0,1,2,3,5,6)     | Excessive, frequent and irregular menstruation                                        |
|                |                                            | N93(0,8,9)           | Other abnormal uterine and vaginal bleeding                                           |
| 170            | Prolapse of female genital organs         | N81(0,1,2,3,4,5,6,8,9) | Female genital prolapse                                                               |
|                |                                            | N99(3)               | Postprocedural disorders of genitourinary system, not elsewhere classified            |
| 173            | Menopausal disorders                      | N92(4)               | Excessive, frequent and irregular menstruation                                        |
|                |                                            | N95(0,1,2,8,9)       | Menopausal and other perimenopausal disorders                                          |
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|----------------|--------------------------|----------------|---------------------|
| 174            | Female infertility       | N97(0,1,2,3,4,8,9) | Female infertility |
|                |                          | L20(8,9)        | Atopic dermatitis   |
|                |                          | L2               | Diaper [napkin] dermatitis |
| 253            | Allergic reactions      | L00             | Staphylococcal scalded skin syndrome |
|                |                          | L10(0,4,9)      | Pemphigus           |
|                |                          | L12(0,2,3,9)    | Pemphigoid          |
|                |                          | L13(0,8,9)      | Other bullous disorders |
|                |                          | L26             | Exfoliative dermatitis |
|                |                          | L30(4)          | Other dermatitis    |
| 198            | Other inflammatory condition of skin | L40(1,3,5,8,9) | Psoriasis |
|                |                          | L41(0)          | Parapsoriasis       |
|                |                          | L42             | Pityriasis rosea    |
|                |                          | L51(1,2,8,9)    | Erythema multiforme |
|                |                          | L52             | Erythema nodosum    |
|                |                          | L53(0,8,9)      | Other erythematous conditions |
|                |                          | L71(1,9)        | Rosacea             |
|                |                          | L92(0)          | Granulomatous disorders of skin and subcutaneous tissue |
|                |                          | L93(0,2)        | Lupus erythematosus |
|                |                          | L95(1)          | Vasculitis limited to skin, not elsewhere classified |
|                |                          | L98(2)          | Other disorders of skin and subcutaneous tissue, not elsewhere classified |
| 200            | Other skin disorders    | L11(0)          | Other acantholytic disorders |
|                |                          | L30(1)          | Other dermatitis    |
|                |                          | L57(4)          | Skin changes due to chronic exposure to nonionizing radiation |
|                |                          | L73(2)          | Other follicular disorders |
|                |                          | L74(4,9)        | Eccrine sweat disorders |
|                |                          | L83             | Acanthosis nigricans |
|                |                          | L85(9)          | Other epidermal thickening |
|                |                          | L87(2)          | Transepidermal elimination disorders |
|                |                          | L90(0,2,6,9)    | Atrophic disorders of skin |
|                |                          | L91(0,8,9)      | Hypertrophic disorders of skin |
|                |                          | L94(0,1)        | Other localized connective tissue disorders |
| 199            | Chronic ulcer of skin   | L89(0,1,2,3,4,5,8,9) | Decubitus ulcer and pressure area |
|                |                          | L97(0,1,2,4,8,9) | Ulcer of lower limb, not elsewhere classified |
|                |                          | L98(4)          | Other disorders of skin and subcutaneous tissue, not elsewhere classified |
| 210            | Systemic lupus erythematosus and connective tissue disorders | M32(0,1,8,9) | Systemic lupus erythematosus |
|                |                          | M33(0,1,2,9)    | Dermatopolymyositis |
|                |                          | M34(1,2,8,9)    | Systemic sclerosis |
|                |                          | M35(0,1,8,9)    | Other systemic involvement of connective tissue |
| 204, 225      | Joint disorders         | M02(80,81,83,84,86,89,90,96,97,99) | Reactive arthropathies |
|                |                          | M12(21,22,24,25,26,27,49,51,52,53,54,55,56,57,80,89) | Other specific arthropathies |
|                |                          | M13(00,06,07,08,09,13,14,16,17,19,80,81,83,84,85,86,87,89,90,91,92,93,94,95,96,97,98,99) | Other arthritis |
|                |                          | M15(3,8,9)      | Polyrhthrosis |
|                |                          | M22(0,1,2,3,4,8,9) | Disorders of patella |
|                |                          | M23(00,01,02,03,05,06,10,12,14,15,16,20,21,22,23,24,25,26,29,30,31,32,33,34,35,36,39,4,5,60,61,62,63,64,8,9) | Internal derangement of knee |
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|----------------|--------------------------|----------------|---------------------|
| M24(01,02,03,04,05,07,08,10,11,12,13,14,15,17,18,31,33,34,35,37,38,40,41,42,43,44,45,46,47,48,50,51,52,53,54,55,56,57,58,61,62,63,64,66,67,7,81,82,83,84,85,86,87,91,93,94,95,97) | Other specific joint derangements |
| M25(02,05,06,13,16,17,21,23,27,28,31,32,33,34,35,36,37,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,66,67,81,82,83,84,85,86,87,88,91,93,95,96,97,99) | Other joint disorders, not elsewhere classified |
| R26(2) | Abnormalities of gait and mobility |
| R29(4) | Other symptoms and signs involving the nervous and musculoskeletal systems |
| M05(1,2,3,8,9) | Seropositive rheumatoid arthritis |
| M06(0,1,2,3,4,8,9) | Other rheumatoid arthritis |
| M08(0,2,3,4,8,9) | Juvenile arthritis |
| M10(07,09) | Other specific arthropathies |
| M15(0,1,2,4) | Polyarthrosis |
| M16(0,1,2,3,4,5,6,7,9) | Coxarthrosis [arthrosis of hip] |
| M17(0,1,2,3,4,5,9) | Gonarthrosis [arthrosis of knee] |
| M18(0,1,2,3,5,9) | Arthrosis of first carpometacarpal joint |
| M19(0,1,2,8,9) | Other arthrosis |
| M08(1) | Juvenile arthritis |
| M45 | Ankylosing spondylitis |
| M46(04,08,1,32,34,35,36,37,40,43,44,45,46,47,49,52,53,54,56,57,59,90,96,97,98,99) | Other inflammatory spondylopathies |
| M47(02,04,10,12,13,14,16,17,20,22,23,25,26,27,80,82,83,85,86,87,88,89,90,92,96,97,99) | Spondylosis |
| M48(38,82,85,86,92,96,97,99) | Other spondylopathies |
| M50(0,1,2,3,8,9) | Cervical disc disorders |
| M51(0,1,2,3,8,9) | Other intervertebral disc disorders |
| M56(1) | Postprocedural musculoskeletal disorders, not elsewhere classified |
| M08(1) | Other inflammatory spondylopathies |
| M46(20,22,25,28,29) | Osteomyelitis |
| M86(07,10,11,12,13,14,15,16,17,18,19,20,21,24,25,26,27,28,30,35,36,38,42,43,44,45,46,47,48,60,61,62,63,64,65,66,67,68,80,81,82,84,85,86,87,88,90,91,92,93,94,95,96,97,98,99) | Osteoporosis with pathological fracture |
| M87(11,15,16,18,22,24,25,27,35,37,38,83,85,87) | Osteonecrosis |
| M42(05,09) | Spinal osteochondrosis |
| M48(40,45,46,48,54,55,56) | Other spondylopathies |
| M80(08,10,25,48,82,86,90,95,96,98) | Osteoporosis with pathological fracture |
| M81(9) | Osteoporosis without pathological fracture |
| M84(00,01,02,03,04,05,06,07,08,11,12,13,14,15,16,17,18,21,22,23,24,25,26,27,28,35,36,37,38,40,41,42,43,44,45,46,47,48,84,86,87,95,97) | Disorders of continuity of bone |
| CCS category # | CCS category | ICD-10-CA code | ICD-10-CA code label |
|---------------|--------------|----------------|---------------------|
| M85(01,04,05,06,08,41,42,43,45,46,54,55,56,57,58,61,62,63,64,65,66,67,68,81,85,86,87,88,93) | Other disorders of bone density and structure |
| M87(02,03,04,05,06,07,90,91,92,93,94,95,96,97,98) | Osteonecrosis |
| M89(00,01,02,09,15,23,25,26,28,31,33,34,36,37,38,51,54,55,58,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98) | Other disorders of bone |
| M91(0,1) | Juvenile osteochondrosis of hip and pelvis |
| M92(0,2,4,5,6,7,8) | Other juvenile osteochondrosis |
| M93(0,1,21,22,25,26,27,8,9) | Other osteochondropathies |
| M94(0,1,20,21,22,23,24,25,27,28,29,31,35,36,81,82,84,85,86,87,88,89,95,96) | Other disorders of cartilage |
| M96(0) | Postprocedural musculoskeletal disorders, not elsewhere classified |

### Acquired foot deformities

- **M20(1,2,3,4,5,6)**
- **M40(13,22,23,24,25,29)**
- **M41(04,05,14,15,19,20,25,34,40,44,45,46,47,49,54,55,58,80,84,85,86,89,90,93,94,95,96,99)**
- **M43(88)**
- **M96(2,3)**

### Other acquired deformities

- **Q10(0,3,4,5,6,7)**
- **Q11(1,2)**
- **Q12(0,1,3,4)**
- **Q13(0,1,2,3,4,8)**
- **Q14(0,1,2,8,9)**
- **Q15(0,1,4,5,9)**
- **Q17(0,1,2,3,4,5,8,9)**
- **Q18(0,1,2,5,6,8,9)**
- **Q30(0,2,8,9)**
- **Q31(1,3,5,8)**
- **Q32(0,10,12,18,2,4)**
- **Q33(0,2,3,4,6,8,9)**
- **Q34(8,9)**
- **Q35(1,3,5,9)**

### Nervous system congenital anomalies

- **Q00(0)**
- **Q01(0,2,8,9)**
- **Q02**
- **Q03(0,1,8,9)**
- **Q04(0,2,3,4,6,8,9)**
- **Q05(1,2,3,4,6,7,8,9)**
- **Q06(1,2,4,8,9)**
- **Q07(0,8,9)**

### Other congenital anomalies

- **Q10(0,3,4,5,6,7)**
- **Q11(1,2)**
- **Q12(0,1,3,4)**
- **Q13(0,1,2,3,4,8)**
- **Q14(0,1,2,8,9)**
- **Q16(0,1,4,5,9)**
- **Q17(0,1,2,3,4,5,8,9)**
- **Q18(0,1,2,5,6,8,9)**
- **Q30(0,2,8,9)**
- **Q31(1,3,5,8)**
- **Q32(0,10,12,18,2,4)**
- **Q33(0,2,3,4,6,8,9)**
- **Q34(8,9)**
- **Q35(1,3,5,9)**

### Other congenital malformations

- **Q10(0,3,4,5,6,7)**
- **Q11(1,2)**
- **Q12(0,1,3,4)**
- **Q13(0,1,2,3,4,8)**
- **Q14(0,1,2,8,9)**
- **Q16(0,1,4,5,9)**
- **Q17(0,1,2,3,4,5,8,9)**
- **Q18(0,1,2,5,6,8,9)**
- **Q30(0,2,8,9)**
- **Q31(1,3,5,8)**
- **Q32(0,10,12,18,2,4)**
- **Q33(0,2,3,4,6,8,9)**
- **Q34(8,9)**
- **Q35(1,3,5,9)**
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|----------------|--------------------------|----------------|---------------------|
| Q36            | Cleft lip                |                |                     |
| Q37            | Cleft palate with cleft lip |                |                     |
| Q65            | Congenital deformities of hip | (0,1,2,3,4,5,6,8,9) |                     |
| Q66            | Congenital deformities of feet | (0,1,2,3,4,5,6,7,8,9) |                     |
| Q67            | Congenital musculoskeletal deformities of head, face, spine and chest | (0,2,3,4,5,6,7,8) |                     |
| Q68            | Other congenital musculoskeletal deformities | (0,1,2,4,8) |                     |
| Q69            | Polydactyly              | (0,1,2,9)      |                     |
| Q70            | Syndactyly               | (0,1,2,3,4,9)  |                     |
| Q71            | Reduction defects of upper limb | (0,1,2,3,4,8) |                     |
| Q72            | Reduction defects of lower limb | (0,1,2,3,4,6,8,9) |                     |
| Q74            | Other congenital malformations of limb(s) | (0,1,2,3,8,9) |                     |
| Q75            | Other congenital malformations of skull and face bones | (0,1,2,3,4,8,9) |                     |
| Q76            | Congenital malformations of spine and bony thorax | (0,1,2,3,4,7) |                     |
| Q77            | Osteochondrodysplasia with defects of growth of tubular bones and spine | (1,2,3,4) |                     |
| Q78            | Other osteochondrodysplasias | (0,1,2,4,6,8) |                     |
| Q79            | Congenital malformations of the musculoskeletal system, not elsewhere classified | (0,1,2,3,4,5,6,8,9) |                     |
| Q80            | Congenital ichthyosis | (1,2,8) |                     |
| Q81            | Epidermolysis bullosa | (0,8,9) |                     |
| Q82            | Other congenital malformations of skin | (2,3,4,5,8,9) |                     |
| Q83            | Congenital malformations of breast | (1,3,8,9) |                     |
| Q84            | Other congenital malformations of integument | (2,3,4,6,8) |                     |
| Q85            | Phakomatoses, not elsewhere classified | (1,8,9) |                     |
| Q86            | Congenital malformation syndromes due to known exogenous causes, not elsewhere classified | (2,8) |                     |
| Q87            | Other specified congenital malformation syndromes affecting multiple systems | (0,1,2,3,4,5,8) |                     |
| Q89            | Other congenital malformations, not elsewhere classified | (0,1,2,3,7,8,9) |                     |
| Q90            | Down syndrome | (1,2,9) |                     |
| Q91            | Edwards syndrome and Patau syndrome | (0,2,3,6,7) |                     |
| Q92            | Other trisomies and partial trisomies of the autosomes, not elsewhere classified | (5,8,9) |                     |
| Q93            | Monosomies and deletions from the autosomes, not elsewhere classified | (3,4,5) |                     |
| Q96            | Turner syndrome | (3,9) |                     |
| Q97            | Other sex chromosome abnormalities, female phenotype, not elsewhere classified | (0,8) |                     |
| Q98            | Other sex chromosome abnormalities, male phenotype, not elsewhere classified | (0,4) |                     |
| Q99            | Other chromosome abnormalities, not elsewhere classified | (0,1,2,8,9) |                     |

| 213              | Cardiac and circulatory congenital anomalies | P29 | Cardiovascular disorders originating in the perinatal period |
|------------------|---------------------------------------------|-----|------------------------------------------------------------|
|                  |                                             | Q20 | Congenital malformations of cardiac chambers and connections |
|                  |                                             | Q21 | Congenital malformations of cardiac septa |
|                  |                                             | Q22 | Congenital malformations of pulmonary and tricuspid valves |

Continued
| CCS category # | CCS category description | ICD-10-CA code | ICD-10-CA code label |
|---------------|--------------------------|----------------|----------------------|
| Q23(0,1,2,3,4,8,9) | Congenital malformations of aortic and mitral valves |
| Q24(0,1,2,4,5,6,8,9) | Other congenital malformations of heart |
| Q25(0,1,2,3,4,5,6,7,8) | Congenital malformations of great arteries |
| Q26(2,3,4,6,8,9) | Congenital malformations of great veins |
| Q27(0,30,31,32,33,38,8,9) | Other congenital malformations of peripheral vascular system |
| Q28(0,2,3,8,9) | Other congenital malformations of circulatory system |
| 214 Digestive congenital anomalies | | |
| Q38(0,1,2,3,4,5,6,8) | Other congenital malformations of tongue, mouth and pharynx |
| Q39(0,1,2,3,4,5,8,9) | Congenital malformations of oesophagus |
| Q40(0,1,2,8) | Other congenital malformations of upper alimentary tract |
| Q41(0,1,2,8,9) | Congenital absence, atresia and stenosis of small intestine |
| Q42(0,2,3,8,9) | Congenital absence, atresia and stenosis of large intestine |
| Q43(0,1,3,4,5,6,7,8,9) | Other congenital malformations of intestine |
| Q44(1,2,4,5,6,7) | Congenital malformations of gallbladder, bile ducts and liver |
| Q45(0,2,3,8,9) | Other congenital malformations of digestive system |
| 215 Genitourinary congenital anomalies | | |
| Q50(1,2,3,38,4,5,6) | Congenital malformations of ovaries, fallopian tubes and broad ligaments |
| Q51(1,2,3,4,8,9) | Congenital malformations of uterus and cervix |
| Q52(0,1,2,3,4,5,6,7,8,9) | Other congenital malformations of female genitalia |
| Q53(0,1,2,9) | Undescended testicle |
| Q54(0,1,2,3,4,8,9) | Hypospadias |
| Q55(0,1,2,4,60,68,8,9) | Other congenital malformations of male genital organs |
| Q56(0,4) | Indeterminate sex and pseudohermaphroditism |
| Q60(0,1,3,6) | Renal agenesis and other reduction defects of kidney |
| Q61(0,1,2,3,4,5,9) | Cystic kidney disease |
| Q62(0,10,11,18,2,3,5,6,7,8) | Congenital obstructive defects of renal pelvis and congenital malformations of ureter |
| Q63(0,1,2,3,8,9) | Other congenital malformations of kidney |
| Q64(0,10,18,2,30,31,32,38,4,6,78) | Other congenital malformations of urinary system |