



Canadian Primary Care Sentinel Surveillance Network
Réseau canadien de surveillance sentinelle en soins primaires

CPCSSN Case Definitions

2020-Q2

Created: 2020-08-14

Last updated: 2020-08-17

Reviewed & approved by:

CPCSSN Case Definition Working Group: 2019-05-09

CPCSSN Dev Team: 2020-05-15

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CPCSSN Team, **Case Definitions: Canadian Primary Care Sentinel Surveillance Network (CPCSSN), Version 2020-Q2**. May 15, 2020. URL: <http://cpcssn.ca/research-resources/cpcssn-case-definitions-v2>

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Acknowledgments: [CPCSSN Case Definitions Working Group, CPCSSN Dev Team and other contributors]

Funding for this publication was provided by the Public Health Agency of Canada. The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

Purpose

This document is intended to be the simplest unambiguous representation of CPCSSN's current case definitions, consistent with the original documented intent. It defines the criteria, in terms of CPCSSN data, that CPCSSN's case detection algorithms use to classify a patient as being a case.

This document is intended for use by:

- researchers needing to understand or use CPCSSN's case definitions,
- those wanting to propose modifications or create new case definitions,
- CPCSSN's developers to implement CPCSSN's case definitions

This document is not intended to include suggested changes or improvements to the case definitions. Proposed changes to existing case definitions or new case definitions should be submitted to CPCSSN's Case Definition Working Group, where they will be reviewed, possibly approved, and prioritised for implementation by CPCSSN's development team.

Updates

There has been a major change to the database schema for 2020-Q2. Instead of a descriptive name (e.g., Diabetes Mellitus (ml)), diseases are now given an unqualified name (e.g., Diabetes Mellitus), a version number, and whether or not they are the CPCSSN default definition. The designation as the CPCSSN default means that if there are multiple case definition versions for a specific disease, the default is the one that CPCSSN believes is most accurate at classifying patients who have (and do not have) the disease. The default definition also indicates which case definition version is to be used when one case definition depends on another (e.g., Dyslipidemia requires Diabetes Mellitus, Version 3).

The following table describes the mapping between the 2019-Q4 and 2020-Q2 case definition naming conventions:

<i>Disease (2019-Q4)</i>	<i>Disease (2020-Q2)</i>	<i>Version (2020-Q2)</i>	<i>IsDefaultDefinition (2020-Q2)*</i>
CKD	CKD	1	1
COPD	COPD	1	1
Dementia	Dementia	1	1
Depression	Depression	1	1
Diabetes Mellitus	Diabetes Mellitus	1	0
Diabetes Mellitus (ml)	Diabetes Mellitus	2	0
-	Diabetes Mellitus	3	1
Dyslipidemia	Dyslipidemia	1	1
Epilepsy	Epilepsy	1	1
Herpes Zoster	Herpes Zoster	1	1
Hypertension	Hypertension	1	1
Hypertension (ml)	Hypertension	2	0
Osteoarthritis	Osteoarthritis	1	1
Osteoarthritis (ml)	Osteoarthritis	2	0
Parkinsons Disease	Parkinsons Disease	1	1
Pediatric Asthma	Pediatric Asthma	1	1
Pediatric Diabetes Mellitus	Pediatric Diabetes Mellitus	1	1

**IsDefaultDefinition* = 1 if the case definition is the default (CPCSSN standard), and = 0 if it is not.

List of CPCSSN Case Definitions

<i>Case Definition</i>	<i>Version</i>	<i>Method of Creation</i>	<i>Current Standard?</i>	<i>Quarter Last Updated</i>	<i>Page</i>
CKD	1	Expert panel	Yes	2018-Q4	6
COPD	1	Expert panel	Yes	2018-Q4	7
Dementia	1	Expert panel	Yes	2018-Q4	8
Depression	1	Expert panel	Yes	2018-Q4	9
Diabetes Mellitus	1	Expert panel	No	2018-Q4	10
Diabetes Mellitus	2	Machine learning	No	2018-Q2	11
Diabetes Mellitus	3	Expert panel	Yes	2020-Q2	12
Dyslipidemia	1	Expert panel	Yes	2019-Q4	13
Epilepsy	1	Expert panel	Yes	2018-Q4	14
Herpes Zoster	1	Expert panel	Yes	2018-Q2	15
Hypertension	1	Expert panel	Yes	2018-Q4	16
Hypertension	2	Machine learning	No	2018-Q4	18
Osteoarthritis	1	Expert panel	Yes	2010-Q1	19
Osteoarthritis	2	Machine learning	No	2018-Q4	20
Parkinson's Disease	1	Expert panel	Yes	2018-Q4	21
Pediatric Asthma'	1	Expert panel	Yes	2018-Q2	22
Pediatric Diabetes Mellitus	1	Expert panel	Yes	2019-Q4	23

Where multiple versions of a case definition exist, we recommend using those that are indicated with a 'Yes' under 'Current Standard?'.

Interpretation

The following pages contain the logic used to classify each CPCSSN patient's disease status for a host of disease case definitions. There are three naming conventions used in the headings for each disease:

1. For diseases with only a single version, neither the version number nor the IsDefaultDefinition flag are included in the heading.
2. For diseases with multiple versions, the version number is included in the name.
 - a. If the disease definition is not the CPCSSN default (i.e., IsDefaultDefinition = 0), no extra information is included.
 - b. If the disease definition is the CPCSSN default (i.e., IsDefaultDefinition = 1), the words "CPCSSN Standard" follow the case definition version number.

For each disease Case Definition, any single **Scenario** is sufficient to warrant classification as a case. Within a **Scenario**, all criteria joined by "AND" must be satisfied to warrant classification as a case. Conditions followed by "EXCEPT" define exceptions to the disease case definitions. That is, these conditions negate other criteria within the **Scenario**, so any other criteria in the **Scenario** alone are insufficient to define a disease case.

The text 'including [all] sub-codes' indicates a wildcard match is to be applied to the listed codes.

The **date of case detection** for a case is defined to be the earliest of the individual (qualifying) criteria dates for the case.

CKD

Scenario A

Two **Plasma Creatinine Clearance (eGFR)** tests (LOINC = 12195-4) in the **Lab** table having results < 60 ml/min/1.73 m² separated by between 3 months and 18 months, inclusive.

COPD

Note: For all scenarios, patient age at onset must be ≥ 35 years.

Scenario A

Any of the following ICD-9 codes (including all sub-codes) in the **Billing** or **Health Condition** table:

491.2: OBSTRUCTIVE CHRONIC BRONCHITIS
492: EMPHYSEMA
496: CHRONIC AIRWAY OBSTRUCTION, NOT ELSEWHERE CLASSIFIED

Scenario B

Any of the following ATC codes (including all sub-codes) in the **Medication** table:

R03BB: ANTICHOLINERGICS
R03AK04: SALBUTAMOL AND SODIUM CROMOGLICATE
R03AL: ADRENERGICS IN COMBINATION WITH ANTICHOLINERGICS INCLUDING TRIPLE COMBINATIONS WITH CORTICOSTEROIDS

EXCEPT

If the **HealthCondition** table contains the following ICD-9 code (including all sub-codes), the medications are insufficient for defining a disease case:

493: ASTHMA

Dementia

Scenario A

Any of the following ICD-9 codes (including sub-codes) in the **Billing, Encounter Diagnosis, or Health Condition** table:

290: DEMENTIAS
294.1: DEMENTIA IN CONDITIONS CLASSIFIED ELSEWHERE
294.8: OTHER PERSISTENT MENTAL DISORDERS DUE TO
CONDITIONS CLASSIFIED ELSEWHERE
331: OTHER CEREBRAL DEGENERATIONS

excluding sub-codes:

290.8: OTHER SPECIFIED SENILE PSYCHOTIC CONDITIONS
290.9: UNSPECIFIED SENILE PSYCHOTIC CONDITION
331.3: COMMUNICATING HYDROCEPHALUS
331.4: OBSTRUCTIVE HYDROCEPHALUS
331.5: IDIOPATHIC NORMAL PRESSURE HYDROCEPHALUS (INPH)
331.81: REYE'S SYNDROME

Scenario B

Any of the following ATC codes (including all sub-codes) in the **Medication** table:

N06DA: ANTICHOLINESTERASES
N06DX01: MEMANTINE

Depression

Scenario A

Any of the following ICD-9 codes (including all sub-codes) in the **Billing** or **Health Condition** table:

296: EPISODIC MOOD DISORDERS
311: DEPRESSIVE DISORDER, NOT ELSEWHERE CLASSIFIED

Scenario B

Any of the following ATC codes (including all sub-codes) in the **Medication** table:

N06AB: SELECTIVE SEROTONIN REUPTAKE
INHIBITORS
N06AF04: TRANYLCYPROMINE
N06AG02: MOCLOBEMIDE
N06AX11: MIRTAZAPINE
N06CA01: AMITRIPTYLINE AND PSYCHOLEPTICS

EXCEPT

If the **HealthCondition** table contains the following ICD-9 code (including all sub-codes), the medications are insufficient for defining a disease case:

300: ANXIETY DISORDER

Diabetes Mellitus, Version 1

Scenario A

The following ICD-9 code (including all sub-codes) in the **Health Condition** table
OR
at least two (identical or different) of the following ICD-9 code (including all sub-codes) in the **Billing** table that are recorded on different dates that are ≤ 2 years apart:

250: DIABETES MELLITUS

Scenario B

The following ATC code (including all sub-codes) in the Medication table: A10: DRUGS USED IN DIABETES	EXCEPT	If the HealthCondition table contains any of the following ICD-9 codes (including all sub-codes), the medications are insufficient for defining a disease case: 249: SECONDARY DIABETES MELLITUS 256.4: POLYCYSTIC OVARIES 648.8: ABNORMAL GLUCOSE TOLERANCE OF MOTHER, COMPLICATING PREGNANCY, CHILDBIRTH, OR THE PUERPERIUM 775.1: NEONATAL DIABETES MELLITUS 790.29: OTHER ABNORMAL GLUCOSE
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Scenario C

Any **Hemoglobin A1c (HbA1c)** test (LOINC = 17856-6) in the **Lab** table with a result ≥ 7
AND
at least two **Fasting Blood Glucose (FBG)** tests (LOINC = 14771-0) in the **Lab** table having results strictly > 7 that are recorded on different dates that are ≤ 1 year apart.

Diabetes Mellitus, Version 2

Scenario A

The following ICD-9 code (including all sub-codes) in the **Health Condition** table

OR

at least two (identical or different) of the following ICD-9 code (including all sub-codes) in the **Encounter Diagnosis** table that are recorded on different dates that are ≤ 2 years apart:

250: DIABETES MELLITUS

Diabetes Mellitus, Version 3 (CPCSSN Standard)

Scenario A

The following ICD-9 code (including all sub-codes) in the **Health Condition** table
OR
at least two (identical or different) of the following ICD-9 code (including all sub-codes) in the **Billing** table that are recorded on different dates that are ≤ 2 years apart:

250: DIABETES MELLITUS

Scenario B

The following ATC code (including all sub-codes) in the Medication table: A10: DRUGS USED IN DIABETES	EXCEPT	If the HealthCondition table contains any of the following ICD-9 codes (including all sub-codes), the medications are insufficient for defining a disease case: 249: SECONDARY DIABETES MELLITUS 256.4: POLYCYSTIC OVARIES 648.8: ABNORMAL GLUCOSE TOLERANCE OF MOTHER, COMPLICATING PREGNANCY, CHILDBIRTH, OR THE PUERPERIUM 775.1: NEONATAL DIABETES MELLITUS 790.29: OTHER ABNORMAL GLUCOSE
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Scenario C

Any **Hemoglobin A1c (HbA1c)** test (LOINC = 17856-6) in the **Lab** table with a result ≥ 6.5
AND
at least two **Fasting Blood Glucose (FBG)** tests (LOINC = 14771-0) in the **Lab** table having results strictly > 7 that are recorded on different dates that are ≤ 1 year apart.

Dyslipidemia

Scenario A

The following ICD-9 code (including sub-codes) in the **Billing, Encounter Diagnosis, or Health Condition** table:

272: DISORDERS OF LIPOID METABOLISM

Scenario B

<p>Any of the following ATC codes (including all sub-codes) in the Medication table:</p> <p>C10: LIPID MODIFYING AGENTS</p> <p>excluding any of the following ATC codes (including all sub-codes) in the Medication table:</p> <p>C10AC: BILE ACID SEQUESTRANTS</p>	<p>EXCEPT</p>	<p>If the DiseaseCase table contains the following disease, the medications are insufficient for defining a disease case:</p> <p>Diabetes Mellitus, Version 3</p>
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Scenario 3

Any **Cholesterol in LDL (LDLc)** test (LOINC = 22748-8) in the **Lab** table with a result ≥ 3.5 mmol/L

OR

Any **Cholesterol Total/Cholesterol in HDL Ratio (TCh/HDL)** test (LOINC = 9830-1) in the **Lab** table with a result ≥ 4.3 mmol/L

Epilepsy

Scenario A

The following ICD-9 code (including sub-codes) in the **Billing, Encounter Diagnosis, or Health Condition** table:

345: EPILEPSY AND RECURRENT SEIZURES

excluding sub-codes:

345.2: PETIT MAL STATUS, EPILEPTIC

345.3: GRAND MAL STATUS, EPILEPTIC

Scenario B

Any of the following ICD-9 codes (including all sub-codes) in the **Billing, Encounter Diagnosis, or Health Condition** table:

345.2: PETIT MAL STATUS, EPILEPTIC

345.3: GRAND MAL STATUS, EPILEPTIC

780.3: CONVULSIONS

AND

Any of the following ATC codes (including sub-codes) in the **Medication** table:

N03A: ANTIEPILEPTICS

N05BA06: LORAZEPAM

N05BA09: CLOBAZAM

excluding sub-codes:

N03AE01: CLONAZEPAM

N03AX12: GABAPENTIN

Herpes Zoster

Scenario A

The following ICD-9 code (including all sub-codes) in the **Billing, Encounter Diagnosis, or Health Condition** table:

053: HERPES ZOSTER

Hypertension, Version 1 (CPCSSN Standard)

Scenario A

Any of the following ICD-9 codes (including all sub-codes) in the **Health Condition** table

OR

at least two (identical or different) of the following ICD-9 codes (including all sub-codes) in the **Billing** table that are recorded on different dates that are ≤ 2 years apart:

401: ESSENTIAL HYPERTENSION

402: HYPERTENSIVE HEART DISEASE

403: HYPERTENSIVE CHRONIC KIDNEY DISEASE

404: HYPERTENSIVE HEART AND CHRONIC KIDNEY DISEASE

405: SECONDARY HYPERTENSION

Scenario B

<p>Any of the following ATC codes (including all sub-codes) in the Medication table:</p> <p>C02: ANTIHYPERTENSIVES C03AA03: HYDROCHLOROTHIAZIDE C03BA04: CHLORTALIDONE C03BA08: METOLAZONE C03BA11: INDAPAMIDE C03DB01: AMILORIDE C03DB02: TRIAMTERENE C03EA01: HYDROCHLOROTHIAZIDE AND POTASSIUM-SPARING AGENTS C07AA06: TIMOLOL C07AB03: ATENOLOL C07AB04: ACEBUTOLOL C07AG02: CARVEDILOL C07CB03: ATENOLOL AND OTHER DIURETICS C08CA01: AMLODIPINE C08CA02: FELODIPINE C08DA01: VERAPAMIL C09AA01: CAPTOPRIL C09AA02: ENALAPRIL C09AA03: LISINOPRIL C09AA07: BENAZEPRIL C09AA08: CILAZAPRIL C09AA09: FOSINOPRIL C09AA10: TRANDOLAPRIL C09BA02: ENALAPRIL AND DIURETICS C09BA03: LISINOPRIL AND DIURETICS C09CA02: EPROSARTAN C09CA03: VALSARTAN C09CA04: IRBESARTAN C09CA07: TELMISARTAN C09DA01: LOSARTAN AND DIURETICS C09DA02: EPROSARTAN AND DIURETICS C09DA04: IRBESARTAN AND DIURETICS C09XA02: ALISKIREN</p>	<p>EXCEPT</p>	<p>If the HealthCondition table contains any of the following ICD-9 codes (including all sub-codes), the medications are insufficient for defining a disease case:</p> <p>250: DIABETES MELLITUS 333.1: ESSENTIAL AND OTHER SPECIFIED FORMS OF TREMOR 346: MIGRAINE 410: ACUTE MYOCARDIAL INFARCTION 412: OLD MYOCARDIAL INFARCTION 413: ANGINA PECTORIS 427: CARDIAC DYSRHYTHMIAS 428: HEART FAILURE 456.0: ESOPHAGEAL VARICES WITH BLEEDING 456.1: ESOPHAGEAL VARICES WITHOUT MENTION OF BLEEDING 572.3: PORTAL HYPERTENSION 592: CALCULUS OF KIDNEY AND URETER</p>
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Hypertension, Version 2

Scenario A

The following ICD-9 code (including all sub-codes) in the **Encounter Diagnosis** or **Health Condition** table:

401: ESSENTIAL HYPERTENSION

Scenario B

The following ATC code in the **Medication** table:

C08CA01: AMLODIPINE

Osteoarthritis, Version 1 (CPCSSN Standard)

Scenario A

Any of the following ICD-9 codes (including all sub-codes) in the **Billing** or **Health Condition** table:

715: OSTEOARTHROSIS AND ALLIED DISORDERS
721: SPONDYLOSIS AND ALLIED DISORDERS

Osteoarthritis, Version 2

Scenario A

The following ICD-9 code (including all sub-codes) in the **Encounter Diagnosis** or **Health Condition** table:

715: OSTEOARTHROSIS AND ALLIED DISORDERS

Parkinsons Disease

Scenario A

The following ICD-9 code (including all sub-codes) in the **Billing, Encounter Diagnosis, or Health Condition** table:

332: PARKINSON'S DISEASE

Pediatric Asthma

Note: For all scenarios, patient age must be between 1 and 17 years, inclusive.

Scenario A

The following ICD-9 code (including all sub-codes) in the **Billing, Encounter Diagnosis, or Health Condition** table:

493: ASTHMA

Scenario B

At least two (identical or different) of the following ATC codes in the **Medication** table:

H02AB02: DEXAMETHASONE
H02AB06: PREDNISOLONE
H02AB07: PREDNISON
R03AC02: SALBUTAMOL
R03AC03: TERBUTALINE
R03AC04: FENOTEROL
R03AC12: SALMETEROL
R03AC13: FORMOTEROL
R03AC18: INDACATEROL
R03AK06: SALMETEROL AND FLUTICASONE
R03AK07: FORMOTEROL AND BUDESONIDE
R03AK08: FORMOTEROL AND BECLOMETASONE
R03AK09: FORMOTEROL AND MOMETASONE
R03BA01: BECLOMETHASONE
R03BA02: BUDESONIDE
R03BA05: FLUTICASONE
R03BA06: TRIAMCINOLONE
R03BA07: MOMETASONE
R03BA08: CICLESONIDE
R03BB01: IPRATROPIUM BROMIDE
R03DC01: ZAFIRLUKAST
R03DC03: MONTELUKAST

Pediatric Diabetes Mellitus

Note: For all scenarios, patient age at onset must be < 18 years.

Scenario A

The following ICD-9 code (including all sub-codes) in the **Health Condition** table

OR

at least two (identical or different) of the following ICD-9 code (including all sub-codes) in the **Billing** table that are recorded on different dates that are ≤ 2 years apart:

250: DIABETES MELLITUS

Scenario B

The following ATC code (including all sub-codes) in the **Medication** table:

A10: DRUGS USED IN DIABETES

Scenario C

Two or more **Hemoglobin A1c (HbA1c)** test (LOINC = 17856-6) in the **Lab** table with a result ≥ 6.5

Appendix A - Validation Results and References

Case Definition	Version	Method of Creation	Sensitivity % (95% CI)	Specificity % (95% CI)	PPV % (95% CI)	NPV % (95% CI)	Page
CKD*	1	Expert panel	-	-	-	-	6
COPD¹	1	Expert panel	82.1 (76.0-88.2)	97.3 (96.5-98.0)	72.1 (65.4-78.8)	98.4 (97.9-99.0)	7
Dementia¹	1	Expert panel	96.8 (93.3-100.0)	98.1 (97.5-98.7)	72.8 (65.0-80.6)	99.8 (99.6-100.0)	8
Depression¹	1	Expert panel	81.1 (77.2-85.0)	94.8 (93.7-95.9)	79.6 (75.7-83.6)	95.2 (94.1-96.3)	9
Diabetes Mellitus¹	1	Expert panel	95.6 (93.4-97.9)	97.1 (96.3-97.9)	87.0 (83.5-90.5)	87.0 (83.5-90.5)	10
Diabetes Mellitus²	2	Machine Learning	93.5 (90.0-95.8)	99.0 (98.3-99.4)	94.9 (91.7-97.0)	98.7 (98.0-99.2)	11
Diabetes Mellitus**	3	Expert panel	-	-	-	-	12
Dyslipidemia***	1	Expert panel	94.8 (87.2, 98.6)	100.0 (-)	100.0 (-)	97.3 (93.3, 99.3)	13
Epilepsy¹	1	Expert panel	98.6 (96.6-100.0)	98.7 (98.2-99.2)	85.6 (80.2-91.1)	99.9 (99.7-100.0)	14
Herpes Zoster^{3, 4}	1	Expert panel	100.0 (97.8-100.0)	73.77 (65.0- 81.3)	83.9 (79.5-87.5)	100 (-)	15
Hypertension¹	1	Expert panel	84.9 (82.6-87.1)	93.5 (92.0-95.1)	92.9 (91.2-94.6)	86.0 (83.9-88.2)	16
Hypertension²	2	Machine Learning	93.1 (91.3-94.6)	93.2 (91.4-94.7)	93.2 (91.4-94.7)	93.1 (91.3-94.6)	18
Osteoarthritis¹	1	Expert panel	77.8 (74.5-81.1)	94.9 (93.8-96.1)	87.7 (84.9-90.5)	90.2 (88.7-91.8)	19
Osteoarthritis²	2	Machine Learning	82.0 (78.7-85.0)	93.8 (92.3-95.0)	86.0 (82.9-88.7)	91.8 (90.2-93.2)	20
Parkinsons Disease¹	1	Expert panel	98.8 (96.4-100.0)	99.0 (98.6-99.5)	82.0 (74.5-89.5)	99.9 (99.8-100.0)	21
Pediatric Asthma⁵	1	Expert panel	96.9 (91.3-99.4)	Not reported	100.0 (-)	Not reported	22
Pediatric Diabetes Mellitus	1	Expert panel	94.9 (88.4-98.3)	100.0 (-)	100.0 (-)	100.0 (-)	23

*Definition is based solely on laboratory results, thus reference standard validation cannot be completed.

**Updated HbA1C cut-off from greater than equal to 7.0 to greater than equal to 6.5. No revalidation completed.

***Unpublished results.

Note: Where there are multiple versions of a case definition (e.g., versions 1, 2, and 3 for Diabetes Mellitus), the choice of version will depend on the goal of an individual study. In general, high sensitivity is preferred for prevalence studies whereas high PPV is preferred for study recruitment or Quality Improvement studies.

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