# Implementation Guide
# for COVID-19 Data Collection
# using SNOMED CT

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As part of the global effort to manage and contain the COVID-19 public health emergency, SNOMED International is doing their part to support care teams and researchers in their efforts to address its containment. SNOMED International has published a set of coronavirus related concepts in its January 2020 SNOMED CT International Edition, with updated descriptions and SNOMED CT to ICD-10 maps in the interim March 2020 International Edition release. SNOMED International will also be making this SNOMED CT Coronavirus Content available as part of the Global Patient Set (GPS) in the next release in September 2020. In the meantime, this content is available and can be used under the same open license as the GPS, the Creative Commons Attribution 4.0 International License.

This implementation guide shows how SNOMED CT can be used to record, communicate and integrate clinical data related to COVID-19, for the purposes of healthcare service delivery, pandemic surveillance, international collaboration and retrospective data analysis. This guide provides practical examples of SNOMED CT subsets that can be used to code a variety of COVID-19 related data elements, such as symptoms, risk factors and medications. A set of computable SNOMED CT subset artefacts also accompanies this guide.

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# 1. Introduction

## Background

On March 11, 2020, the World Health Organization formally characterized coronavirus, COVID-19, as a global pandemic and health systems globally are continuing their efforts to manage the outbreak. Coronavirus disease COVID-19 is an infectious disease caused by a newly discovered coronavirus.

As part of the global effort to manage and contain this global public health emergency, SNOMED International is doing their part to support care teams and researchers in their efforts to address its containment. SNOMED International took swift action by publishing a set of coronavirus related concepts in the January 31st 2020 International Edition of SNOMED CT, with updated descriptions and SNOMED CT to ICD-10 maps in the interim March 2020 International Edition release. This SNOMED CT COVID-19 Related Content will appear as part of the Global Patient Set (GPS) in the next release in September 2020. In the meantime, this content is available and can be used under the same open license as the GPS, the Creative Commons Attribution 4.0 International License.

## Purpose

As the global terminology for health, SNOMED CT can serve as a common language for recording, sharing, integrating and analyzing COVID-19 related data. This implementation guide shows how SNOMED CT can be used for these data purposes. It provides practical examples of SNOMED CT subsets that can be used to code a variety of COVID-19 related data elements. A set of computable SNOMED CT subset artefacts also accompanies this guide.
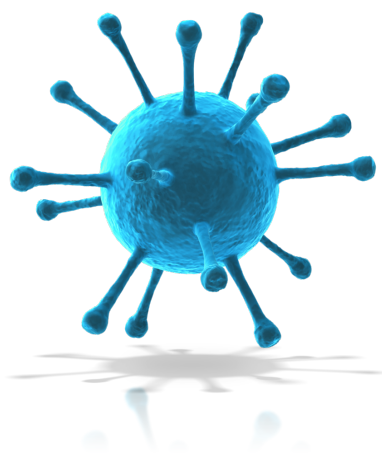


## Scope

The scope of this document has been guided by the collective needs and experiences of our SNOMED International Members.

The primary focus of the guide is to provide example SNOMED CT subsets for data elements covering the following key areas:

- Provider and facility details - e.g. healthcare profession, site of care, personal protective equipment
- Patient demographics - e.g. biological sex, foreign travel history, living arrangements
- Clinical assessment - e.g. symptoms, diagnosis, complications
- Tests and procedures - e.g. specimen, laboratory test results
- Treatment and education - e.g. vaccination, therapy

The example subsets included in this guide use concepts that are in, or are planned to be added to, the SNOMED CT International Edition. This provides a foundation for international collaboration and research on COVID-19. Some

examples of SNOMED CT extension concepts, added in National Editions of SNOMED CT, are also provided for a number of data elements. Please note that these extension concepts should only be used in implementations where the relevant Edition is deployed.

## Audience

The primary audience of this guide is the SNOMED National Release Centers (NRCs), who themselves may be required to provide national or regional guidance to their local implementations during or after the COVID-19 pandemic.

## Acknowledgments

This guide has been developed in collaboration with our SNOMED National Release Centers (NRCs) and other Member representatives. We would like to thank you all for sharing your knowledge and experience to collectively help in the development of this COVID-19 guide.

## References

The following references were used in the development of this guide.

- Caution on Kidney Dysfunctions of COVID-19 Patients
- Coronavirus Disease 2019 (COVID-19), *Centers for Disease Control and Prevention, U.S.*
- Coronavirus Disease (COVID-19) Pandemic, *World Health Organization*
- Coronavirus: what are asymptomatic and mild COVID-19?, *Patient.info*
- Coronavirus: what are moderate, severe and critical COVID-19?, *Patient.info*
- COVID-19 and the Cardiovascular System
- COVID-19: Gastrointestinal Manifestations and Potential Fecal-Oral Transmission
- COVID-19 Hospitalisation in England Surveillance System (CHESS) Daily Reporting, *NHS, UK*
- COVID-19 Response Home, *HL7 International*
- Dysregulation of Immune Response in Patients with COVID-19 in Wuhan, China
- Emergency use ICD codes for COVID-19 disease outbreak, World Health Organization
- Global Research on Coronavirus Disease (COVID-19), World Health Organization
- HISO 10082:2020 *Community Based Assessment Data Standard*, Wellington: Ministry of Health 2020, New Zealand
- Interoperability for COVID-19 Novel Coronavirus Pandemic, The Office of the National Coordinator for Health Information Technology, U.S.
- Logica Implementation Guide: Covid-19 - Terminology Value Sets, U.S.
- Neurological Manifestations of Hospitalized Patients with COVID-19 in Wuhan, China: A Retrospective Case Series Study
- Rhabdomyolysis as Potential Late Complication Associated with COVID-19
- SARS Coronavirus 2, Regenstrief Institute
- SNOMED CT Coronavirus Content, SNOMED International
- Solidarity Clinical Trials for COVID-19 Treatment, World Health Organization

## 1.1 How to Use this Guide

### Overview

Any SNOMED CT subset used to code COVID-19 data should be designed based on its purpose and the context in which it will be used.

To make the process of planning and designing your SNOMED CT subsets more efficient and internationally consistent, we recommend the following three steps.

| Identify data elements and existing subsets | Download subsets | Review and adapt subsets |
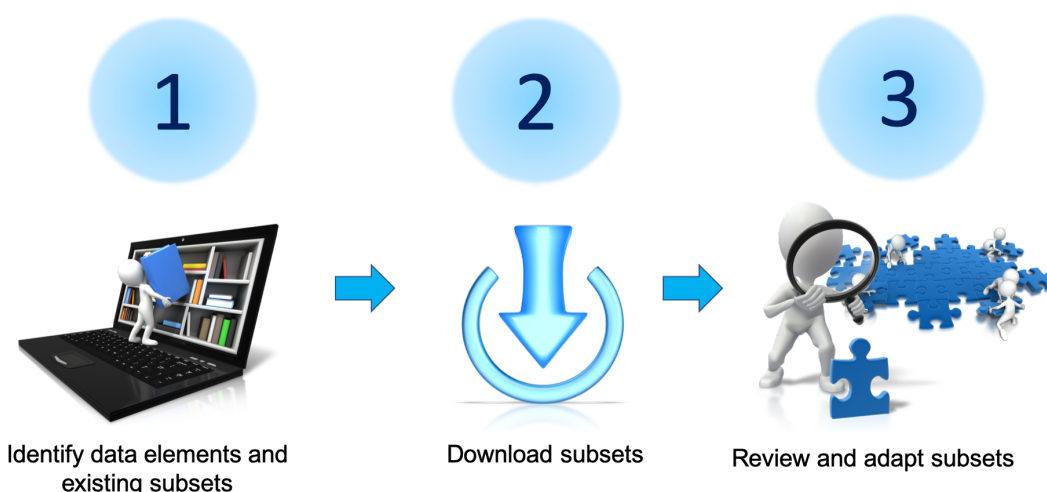
These three steps are explained in more detail below.

## Step 1 - Identify Data Elements

The first step is to identify the data elements that may require SNOMED CT coding. These data elements may already be defined in national reporting requirements [1] [2], or you may be developing a new information model (or data set) for a new purpose. Your requirements for coded content will depend on your specific use case and the data items in your information model. In addition, different countries, regions, and hospitals may apply different clinical techniques or practices, which can also result in differing coding requirements. Therefore, deciding which subsets to implement requires clarification of the scope of content needed, by answering questions such as:

- What will your SNOMED CT subsets be used for?
    - Will they be used to capture new data in a clinical information system to support frontline service delivery?
    - Will they be used for disease surveillance?
    - Will they be used to integrate data from various sources?
    - Will they be used for international collaboration?
    - Will they be used for retrospective analysis of data?
- Which data elements are required for your use case?
    - What coded data needs to be collected to support clinical care?
    - What coded data needs to be collected to provide disease surveillance?
    - What coded data needs to be shared between or integrated from different sources?
    - What coded data is required for international collaboration?
    - What coded data may be needed for retrospective data analysis?
- What existing subsets are available for the data elements of interest?
    - Where these subsets designed based on the same or compatible requirements?

Answering these questions will help in understanding which of the existing subsets are relevant for your context. It may also help to identify potential content gaps in the subsets, or extraneous concepts which are not required for your specific scenario. Please note that the questions above are provided for inspiration only. Additional questions specific to your use case are likely to be needed.

## Step 2 - Download Subsets

The second step is to download any available existing subsets that are associated with your required data elements.

The example COVID-19 subsets in this guide can be downloaded from Appendix A - Example Subsets.

## Subset Naming Convention

The example COVID-19 subsets provided by SNOMED International have been named using the following convention.

> ⓘ **Subset Naming Convention Templates**
>
> - SNOMED CT COVID-19 subsets: ***CV19-<category>-<subset>***
> - SNOMED CT COVID-19 subsets including subtypes of members: ***CV19-<category>-<subset>*-withSubtypes**

The table below shows some examples of subsets named using this convention.

| Examples of Named Subset | | |
|---|---|---|
| **Category** | **Subset** | **Name** |
| Provider and Facility Details (PRF) | Site of care subset | CV19-PRF-SiteOfCare |
| Patient Demographics (PAT) | Marital status subset | CV19-PAT-MaritalStatus |
| | Marital status subset including subtypes | CV19-ASS-MaritalStatus-withSubtypes |
| Clinical Assessment (ASS) | Symptoms subset | CV19-ASS-Symptoms |
| | Symptoms subset including subtypes | CV19-ASS-Symptoms-withSubtypes |

## Subset Categories

The international SNOMED CT subsets have been organized into a number of categories, based on groupings of data elements that are likely to be recorded together. The five categories identified are:

- Provider and Facility Details (PRF)
- Patient Demographics (PAT)
- Clinical Assessment (ASS)
- Tests and Investigations (INV)
- Prevention, Treatment, and Education (PTE)

Please follow the links above for information on the specific subsets within each category.

## Subset Types

Some of the international subsets have been developed intensionally, while others have been developed extensionally. Please refer to the Practical Guide to Reference Sets, section 2.1.1. Subset Definitions for information on the difference between intensionally and extensionally defined subsets.

For each extensionally-defined subset, where the members have subtypes, we provide two versions:

- One version which includes only the listed members. This version supports use cases (e.g. reporting, data integration) that require more abstract concepts.
- One version which includes the members listed and the subtypes of each of these members. This version supports use cases that may require more specific values (e.g. data collection where more clinical detail is required).

# Step 3 - Review and Adapt

The third step is to carefully review each international subset, and adapt it to meet your specific requirements. The subsets provided represent a collection of concepts that have been contributed from a range of SNOMED International Members. It is therefore important to review each subset member to:

1. Remove any concepts that are not required for your use case
2. Add any concepts missing from the subset that may be required for your specific use case;

3. Remove any concepts that are **not** included in the SNOMED CT versioned edition being used. This may involve
   - Checking the effective time of each international concept to ensure that it is less than or equal to the International Version used by your local SNOMED CT edition
   - Checking that any extension concepts are published in the SNOMED CT edition you are using
4. Ensure that your subset aligns with best practice principles for subset creation.
   - For example, this may involve checking that all members of the subset belong to a single hierarchy (in most cases), and that no two members subsume each other (in most cases).
   - For more information, please watch our e-learning presentation on this topic - Subset Creation Principles.

## Unpublished Content

Please note that the subsets in this guide may include some unpublished content that is planned for a future SNOMED CT edition. This content should not be used until it has been officially published, as we cannot guarantee that the identifiers or terms will not change. For this reason, these unpublished concepts are not included in the downloadable versions of the subsets. Unpublished concepts are included in this guide to assist with planning (e.g. planning of national extensions).

Unpublished content is shown in this guide using grey, italic font on a pink background, as shown in the example below.

| 308906005 | Secondary bacterial pneumonia (disorder) | Secondary bacterial pneumonia | 20160131 | - |
| 75570004 | Viral pneumonia (disorder) | Viral pneumonia | 20130731 | Yes |
| *138389411000119105* | *Acute bronchitis caused by severe acute respiratory syndrome coronavirus 2 (disorder)* | *Acute bronchitis caused by SARS-CoV-2* | *20200731* | Yes |
| *674814021000119106* | *Acute respiratory distress syndrome caused by severe acute respiratory syndrome coronavirus 2 (disorder)* | *Acute respiratory distress syndrome caused by SARS-CoV-2* | *20200731* | Yes |

**Unpublished concepts**

## Extension Content

In response to an immediate need for COVID-19-specific concepts, various Member countries have developed concepts within their national SNOMED CT Extensions. Some of these extension concepts are documented in this guide, for the interest of other Members. Please note, however, that extension concepts should only be used when the module in which they are published is included in the implemented SNOMED CT Edition. SNOMED CT extension concepts are not included in the subsets downloadable from the Reference Set tool.

## Feedback

SNOMED International welcomes comments on this guide and suggestions for new or updated content. Please use the *Feedback* button at the bottom of each page to send us your feedback.

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## Footnotes

[1]
*"Coronavirus Disease 2019 (COVID-19)" , Centers for Disease Control and Prevention,* https://www.cdc.gov/coronavirus/2019-ncov/php/reporting-pui.html
[2]
*"COVID-19 Hospitalisation in England Surveillance System (CHESS) Daily Reporting,NHS -* https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/phe-letter-to-trusts-re-daily-covid-19-hospital-surveillance-11-march-2020.pdf

# 2. Coding COVID-19 Related Data

The collection of coded COVID-19 related data can be critical for frontline service delivery, pandemic surveillance, and retrospective data analysis.

The following table lists a collection of data elements for which SNOMED CT can be used to capture COVID-19 related data.



| Data Group | Data Element |
|---|---|
| Provider and facility details<br><br>(section 2.1) | • Healthcare profession<br>• Site of care<br>• Health management finding<br>• Personal protective equipment |
| Patient demographics<br><br>(section 2.2) | • Biological sex<br>• Gender identity<br>• Marital status<br>• Ethnic group<br>• Racial group<br>• Occupation<br>• Foreign travel history<br>• Residential location type<br>• Next of kin relationship<br>• Living arrangements<br>• Care and support circumstances |
| Clinical assessment<br><br>(section 2.3) | • Symptoms<br>• Severity<br>• Clinical measurements<br>• Clinical findings<br>• Diagnosis and certainty<br>• Secondary conditions and complications<br>• Risk factors<br>• Comorbidities<br>• Exposure event<br>• Covid-19 and viral co-infections |
| Tests and Investigations<br><br>(section 2.4) | • Specimen<br>• Laboratory tests<br>• Substances and virus<br>• Laboratory test results<br>• Other investigations |

| Data Group | Data Element |
|---|---|
| Prevention, treatment and education<br><br>(section 2.5) | • Prevention<br>• Education<br>• Medication<br>• Administrative procedures<br>• Therapeutic procedures<br>• Treatment findings<br>• Treatment equipment |

| **Note** |
|---|
| The SNOMED CT subsets are provided as a guide only, and may need to be constrained or extended to meet local requirements. |

## 2.1 Provider and Facility Details

Information about the healthcare providers and facilities involved with the investigation, treatment, and care of patients with suspected or confirmed COVID-19 are usually recorded in electronic health records. The monitoring of medical equipment availability at healthcare facilities, such as Personal Protective Equipment (PPE) and respiratory devices, is also of utmost importance during the COVID-19 pandemic. Relevant details, which can be recorded using SNOMED CT include:

- Healthcare profession
- Site of care
- Health management finding
- Personal protective equipment

These data elements are described below, with example SNOMED CT subsets for each.



# 2.1.1 Healthcare Profession

The healthcare profession is the occupation or qualification of the healthcare provider who is involved in the investigation, treatment, care or education of the patient - for example  224547003 |Intensive therapy nurse (occupation)| or 76899008 |Infectious disease specialist (occupation)| .

**CV19-PRF-HealthcareProfession**

**Intensional Definition**:
< 223366009 |Healthcare professional (occupation)|

## 2.1.2 Site of Care

The site of care refers to the location of the specific investigation, treatment or care setting - for example  22232009 |Hospital (environment)| , 309904001 |Intensive care unit (environment)| , or 702917005 |Respiratory disease clinic (environment)| .

**CV19-PRF-SiteOfCare**

**Intensional Definition**:
< 43741000 |Site of care (environment)|
OR < 224884006 |Location within hospital premises (environment)|
OR < 440654001 |Inpatient environment (environment)|
OR < 440655000 |Outpatient environment (environment)|

Please refer to 2.1.1 Extension Concepts - Provider and Facility Details for a list of known extension concepts.

## 2.1.3 Health Management Finding

Health management finding includes concepts that describe the circumstances which affect whether the planned patient outcomes are attained, that different areas within a health organization are running appropriately, that tasks are correctly defined and assessed and that resources are used efficiently. -for example 305456005 |Under care of own general practitioner (finding)| , 706877002 |Problem with high complexity of treatment regime (finding)| or 129837009 |Ineffective protection (finding)| .

**CV19-PRF-HealthManagementFinding**

**Intensional Definition**:
< 129843006 |Health management finding (finding)|

## 2.1.4 Personal Protective Equipment

Personal protective equipment is protective clothing, helmets, or other garments or equipment designed to protect the wearer's body from injury or infection - for example  409528009 |Surgical face mask (physical object)| and 255716002 |Latex rubber gloves (physical object)|

**CV19-PRF-PersonalProtectiveEquipment**

**Intensional Definition**:
<< 409526008 |Personal protective equipment (physical object)|

## 2.1.1 Extension Concepts - Provider and Facility Details

This page includes examples of SNOMED CT extension content for the subsets listed in 2.1 Provider and Facility Details.

**Please note**: This extension content should only be used in clinical systems that implement the relevant SNOMED CT Edition.

# 2.1.1.1 Healthcare Profession

No known extension concepts for this data element have been published for the COVID-19 use case.

## 2.1.1.2 Site of Care

The following extensions concepts have been published for this COVID-19 data element.

| CV19-PRF-SiteOfCare | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
| 1454661000168105 | COVID-19 Clinic and Testing Center (environment) | COVID-19 Clinic and Testing Centre | AU 20200331 |

## 2.1.1.3 Health Management Finding

No known extension concepts for this data element have been published for the COVID-19 use case.

## 2.1.1.4 Personal Protective Equipment

No known extension concepts for this data element have been published for the COVID-19 use case.

# 2.2. Patient Demographics

General demographic characteristics are important to record for each patient being investigated or treated for COVID-19. Relevant patient demographics, which can be recorded using SNOMED CT includes:

- Biological sex
- Gender identity
- Marital status
- Ethnic group
- Racial group
- Occupation
- Foreign travel history
- Residential location type
- Next of kin relationship
- Living arrangements
- Care and support circumstances

These data elements are described below, with example SNOMED CT subsets for each.

## 2.2.1 Sex and Gender

Multiple types of sex and/or gender are recorded in clinical practice, including biological sex and gender identity. [1]

SNOMED CT supports the distinction between biological sex (e.g. 248152002 |Female (finding)| ) and gender identity (e.g. 703118005 |Feminine gender (finding)| ), as shown in the two subset definitions below.

| CV19-PAT-BiologicalSex |
|---|
| **Intensional Definition**: |
| < 429019009 |Finding related to biological sex (finding)| MINUS << 302081005 |Finding of sex of baby (finding)| |

| CV19-PAT-GenderIdentity |
|---|
| **Intensional Definition**: |
| < 365873007 |Gender finding (finding)| |

## 2.2.2 Marital or Partnership Status

The marital or partnership status of a patient describes their legal, civil or personal relationship with their significant other, for example 87915002 |Married (finding)|.

Only those options that are considered relevant to COVID-19 data collection are included in our example subset below. However this subset may be extended if required.

| CV19-PAT-MaritalOrPartnershipStatus | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** |
| 20295000 | Divorced (finding) | Divorced | 20020131 |
| 160504008 | Marital state unknown (finding) | Marital state unknown | 20020131 |
| 87915002 | Married (finding) | Married | 20020131 |
| 125681006 | Single person (finding) | Single person | 20020131 |
| 33553000 | Widowed (finding) | Widowed | 20020131 |

## 2.2.3 Ethnic Group

The ethnic group (or ethnicity) of a patient is the social or cultural group with whom they identify - for example, 33897005 |Chinese (ethnic group)| or 735001008 |Scandinavian (ethnic group)| .

| CV19-PAT-EthnicGroup |
|---|
| **Intensional Definition**:<br>< 372148003 |Ethnic group (ethnic group)| |

## 2.2.4 Racial Group

The racial group (or race) of a patient is the group (or groups) with whom they share inherited physical characteristics - for example, 414408004 |Hispanic (racial group)| or 413773004 |Caucasian (racial group)| .

| CV19-PAT-RacialGroup |
|---|
| **Intensional Definition**:<br>< 415229000 |Racial group (racial group)| |

## 2.2.5 Occupation

Occupation is the patient's job or profession - for example, 158942005 |Residential child care worker (occupation)| or 308223007 |Hairdresser (occupation)|.

| CV19-PAT-Occupation |
|---|
| **Intensional Definition**:<br>< 14679004 |Occupation (occupation)| |

## 2.2.6 Foreign Travel History

The foreign travel history of a patient is a record of their past visits to locations outside their country of residence. This may include a list of the specific countries and/or regions that they have travelled to (e.g. 223498002 |Africa (geographic location)| or 223585008 |South east Asian country (geographic location)| ), or a descriptive travel history finding (e.g. 161090005 |Travel abroad for business (finding)|).

| CV19-PAT-ForeignTravelHistory |
|---|

**Intensional Definition**:

< 223496003 |Geographical and/or political region of the world (geographic location)|
OR < 365457007 |Foreign travel history finding (finding)|
OR < 420008001 |Travel (event)|

| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time |
|---|---|---|---|
| *506931000000109* | *Recent travel to disease affected area (finding)* | *Recent travel to disease affected area* | *20200731* |

Please refer to 2.2.1 Extension Concepts - Patient Demographics for a list of known extension concepts.

## 2.2.7 Residential Location Type

The residential location type is the type of place in which the patient is currently living, or was living prior to admission to hospital - for example, 257564005 |Apartment (environment)| or 257670006 |Private house (environment)|.

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**CV19-PAT-ResidentialLocationType**

**Intensional Definition**:
< 272497004 |Residential environment (environment)|

---

## 2.2.8 Next of Kin Relationship

The next of kin relationship is the relationship that the patient has with their closest living relative (as chosen by the patient) - for example 444053001 |Husband of subject (person)| or 444301002 |Mother of subject (person)|.

---

**CV19-PAT-NextOfKinRelationship**

**Intensional Definition**:
< 444148008 |Person in family of subject (person)|

---

## 2.2.9 Living Arrangements

The living arrangements of the patient describes the familial and non-familial relationships of a person to all the other people with whom they usually reside - for example 105529008 |Lives alone (finding)| or 224133007 |Lives with family (finding)|.

---

**CV19-PAT-LivingArrangements**

**Intensional Definition**:
< 365481000 |Finding of household composition (finding)|

---

## 2.2.10 Care and Support Circumstances

The care and support circumstances of the patient describe how and by whom they are looked after when living at their usual place of residence - for example 427454004 |Cared for by neighbors (finding)| or 301887005 |Needs assistance at home (finding)|.

---

**CV19-PAT-CareAndSupportCircumstances**

**Intensional Definition**:
< 365483002 |Finding related to care and support circumstances and networks (finding)|

---

Footnotes

1

https://confluence.hl7.org/display/VOC/The+Gender+Harmony+Project

## 2.2.1 Extension Concepts - Patient Demographics

This page includes examples of SNOMED CT extension content for the subsets listed in 2.2. Patient Demographics.

**Please note**: This extension content should only be used in clinical systems that implement the relevant SNOMED CT Edition.

### 2.2.1.1 Sex and Gender

No known extension concepts for this data element have been published for the COVID-19 use case.

### 2.2.1.2 Marital Status

No known extension concepts for this data element have been published for the COVID-19 use case.

### 2.2.1.3 Ethnic Group

No known extension concepts for this data element have been published for the COVID-19 use case.

### 2.2.1.4 Racial Group

No known extension concepts for this data element have been published for the COVID-19 use case.

### 2.2.1.5 Occupation

No known extension concepts for this data element have been published for the COVID-19 use case.

### 2.2.1.6 Foreign Travel History

The following extensions concepts for this data element have been created for the COVID-19 use case.

| CV19-PAT-ForeignTravelHistory | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Edition** |
| 1454671000168104 | History of recent travel to high risk COVID-19 region (finding) | Recent travel to high risk COVID-19 region | AU 20200331 |

### 2.2.1.7 Residential Location Type

No known extension concepts for this data element have been published for the COVID-19 use case.

### 2.2.1.8 Next of Kin Relationship

No known extension concepts for this data element have been published for the COVID-19 use case.

### 2.2.1.9 Living Arrangements

No known extension concepts for this data element have been published for the COVID-19 use case.

### 2.2.1.10 Care and Support Circumstances

No known extension concepts for this data element have been published for the COVID-19 use case.

## 2.3. Clinical Assessment

The first step in delivering comprehensive care is to undertake a clinical assessment. Clinical assessment data which can be recorded using SNOMED CT includes:

- Symptoms
- Severity
- Clinical Measurements
- Clinical Findings
- Diagnosis and Certainty
- Clinical History
- Secondary Conditions and Complications
- Risk Factors
- Comorbidities
- Exposure Event
- Covid-19 and Viral Co-Infections

These data elements are described below, with example SNOMED CT subsets for each. For each subset member, we also indicate whether this concept is included in SNOMED International's Global Patient Set (GPS), which is available to be used internationally under the Creative Commons Attribution 4.0 International License.



## 2.3.1 Symptoms

Symptoms represent physical or mental features which are regarded as an indication of a condition or disease, particularly those features that are apparent to the patient. This SNOMED CT subset of COVID-19 symptoms has been developed based on a range of literature, including relevant articles found in Pubmed [1], research performed by Kings College London [2], and a review of COVID-19 data collection forms (e.g. [3]). Please note that this subset includes the concept 84387000 |Asymptomatic (finding)|, which can be used to represent the absence of symptoms.

| CV19-ASS-Symptoms | | | | |
|---|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time | In GPS |
| 21522001 | Abdominal pain (finding) | Abdominal pain | 20050131 | Yes |
| 84387000 | Asymptomatic (finding) | Asymptomatic | 20020131 | Yes |
| 29857009 | Chest pain (finding) | Chest pain | 20040731 | Yes |
| 43724002 | Chill (finding) | Chill | 20020131 | Yes |

| 49727002 | Cough (finding) | Cough | 20020131 | Yes |
|---|---|---|---|---|
| 62315008 | Diarrhea (finding) | Diarrhea | 20020131 | Yes |
| 267036007 | Dyspnea (finding) | Dyspnea | 20020131 | Yes |
| 84229001 | Fatigue (finding) | Fatigue | 20020131 | Yes |
| 103001002 | Feeling feverish (finding) | Feeling feverish | 20020131 | Yes |
| 386661006 | Fever (finding) | Fever | 20030131 | Yes |
| 25064002 | Headache (finding) | Headache | 20100131 | Yes |
| 66857006 | Hemoptysis (finding) | Hemoptysis | 20020131 | Yes |
| 79890006 | | Loss of appetite (finding) | Loss of appetite | 20020131 | Yes |
| 44169009 | Loss of sense of smell (finding) | Loss of sense of smell | 20200131 | Yes |
| 36955009 | Loss of taste (finding) | Loss of taste | 20020131 | Yes |
| 367391008 | Malaise (finding) | Malaise | 20020131 | Yes |
| 68962001 | Muscle pain (finding) | Muscle pain | 20020131 | Yes |
| 64531003 | Nasal discharge (finding) | Nasal discharge | 20020131 | Yes |
| 422587007 | Nausea (finding) | Nausea | 20070131 | Yes |
| 162397003 | Pain in throat (finding) | Pain in throat | 20020131 | Yes |
| 422400008 | Vomiting (disorder) | Vomiting | 20180731 | Yes |

## 2.3.2 Severity

Severity represents the quality of the condition - for example, 24484000 |Severe (severity modifier) (qualifier value)| . Severity may be recorded for each symptom, or as a general statement of their disease state [4].

| CV19-ASS-Severity | | | | |
|---|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time | In GPS |
| 255604002 | Mild (qualifier value) | Mild | 20020131 | Yes |
| 6736007 | Moderate (severity modifier) (qualifier value) | Moderate | 20020131 | Yes |
| 24484000 | Severe (severity modifier) (qualifier value) | Severe | 20020131 | Yes |
| 442452003 | Life threatening severity (qualifier value) | Life threatening severity | 20090731 | Yes |

## 2.3.3 Clinical Measurements

Clinical measurements involve the performance of physiological tests to diagnose and refine therapeutic management of an already established disease. The following clinical measurements can be used in the assessment of a COVID-19 patient.

| CV19-ASS-ClinicalMeasurements | | | | |
|---|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time | In GPS |
| 386725007 | Body temperature (observable entity) | Body temperature | 20170131 | Yes |
| 75367002 | Blood pressure (observable entity) | Blood pressure | 20170131 | Yes |
| 364075005 | Heart rate (observable entity) | Heart rate | 20170131 | Yes |
| 431314004 | Peripheral oxygen saturation (observable entity) | Peripheral oxygen saturation | 20080731 | Yes |
| 86290005 | Respiratory rate (observable entity) | Respiratory rate | 20170131 | Yes |

## 2.3.4 Clinical Findings

Clinical findings are the result of measuring, questioning, evaluating, or otherwise observing a patient or a specimen from a patient in healthcare. The following clinical findings are positive or negative indications that signs are present in a COVID-19 patient.

| CV19-ASS-ClinicalFindings | | | | |
|---|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** | **In GPS** |
| 288848001 | Able to breathe (finding) | Able to breathe | 20080731 | Yes |
| 371632003 | Coma (disorder) | Coma | 20020731 | Yes |
| 193894004 | Conjunctival hyperemia (finding) | Conjunctival hyperemia | 20100131 | Yes |
| 267036007 | Dyspnea (finding) | Dyspnea | 20020131 | Yes |
| 126664009 | Exudative pharyngitis (disorder) | Exudative pharyngitis | 20020131 | Yes |
| 442646005 | Imaging of lung abnormal (finding) | Imaging of lung abnormal | 20090731 | Yes |
| 274710003 | Lung field abnormal (finding) | Lung field abnormal | 20020131 | Yes |
| 91175000 | Seizure (finding) | Seizure | 20020131 | Yes |
| 271823003 | Tachypnea (finding) | Tachypnea | 20020131 | Yes |
| 288849009 | Unable to breathe (finding) | Unable to breathe | 20080731 | Yes |

Please refer to 2.3.1 Extension Concepts - Clinical Assessment for a list of known extension concepts.

## 2.3.5 Diagnosis and Certainty

A diagnosis is the identification of the nature of the illness, based on an examination of the symptoms, observations, measurements, test results and other investigation results. The following subset includes a range of diagnoses directly related to COVID-19.

| CV19-ASS-Diagnosis | | | | |
|---|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** | **In GPS** |
| 840539006 | Disease caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | COVID-19 | 20200131 | Yes |
| 840544004 | Suspected disease caused by severe acute respiratory coronavirus 2 (situation) | Suspected COVID-19 | 20200131 | Yes |
| *189486241000119100* | *Asymptomatic severe acute respiratory syndrome coronavirus 2 infection (finding)* | *Asymptomatic SARS-CoV-2* | *20200731* | *-* |
| *688232241000119100* | *Disease caused by severe acute respiratory syndrome coronavirus 2 absent (situation)* | *Disease caused by severe acute respiratory syndrome coronavirus 2 absent* | *20200731* | *-* |

Please refer to 2.3.1 Extension Concepts - Clinical Assessment for a list of known COVID-19 diagnosis extension concepts.

To represent the certainty of a positive COVID-19 diagnosis, the following subset may be used in conjunction with a diagnosis of 840539006 |COVID-19|.

| CV19-ASS-DiagnosisPresentCertainty | | | | |
|---|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** | **In GPS** |
| 410605003 | Confirmed present (qualifier value) | Confirmed present | 20040731 | Yes |
| 410592001 | Probably present (qualifier value) | Probably present | 20040731 | Yes |
| 415684004 | Suspected (qualifier value) | Suspected | 20050131 | Yes |

To represent the certainty of the absence of COVID-19, the following subset may be used in conjunction with a diagnosis of 688232241000119100 |Disease caused by severe acute respiratory syndrome coronavirus 2 absent (situation)| (to be published 20200731).

**CV19-ASS-DiagnosisAbsentCertainty**

| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time | In GPS |
|---|---|---|---|---|
| 410594000 | Definitely NOT present (qualifier value) | Definitely NOT present | 20040731 | Yes |
| 410593006 | Probably NOT present (qualifier value) | Probably NOT present | 20040731 | Yes |

## 2.3.6 Clinical History

The clinical history concepts are used to record information gained by a physician by asking specific questions, either of the patient or of other people who know the person and can give suitable information, with the aim of obtaining information useful in formulating a diagnosis and providing medical care to the patient.

**CV19-ASS-ClinicalHistory**

| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time | In GPS |
|---|---|---|---|---|
| 29250847100011 9105 | History of disease caused by severe acute respiratory syndrome coronavirus 2 (situation) | History of SARS-CoV-2 | 20200731 | - |

## 2.3.7 Secondary Conditions and Complications

A secondary condition is any additional health condition that occurs as a result of the natural progression or expected outcome of the primary condition. A complication is "a disorder caused by another disorder, procedure or event, which is not a natural progression or expected outcome of its cause [5] .

The following subset includes SNOMED CT clinical findings that may be recorded as either secondary conditions or complications [6] . Clinical judgement is required to determine whether these conditions are expected outcomes or unexpected complications of COVID-19.

**CV19-ASS-SecondaryConditionsAndComplications**

| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time | In GPS |
|---|---|---|---|---|
| 373895009 | Acute respiratory distress (finding) | Acute respiratory distress | 20020731 | Yes |
| 67782005 | Acute respiratory distress syndrome (disorder) | Acute respiratory distress syndrome | 20020131 | Yes |
| 62914000 | Cerebrovascular disease (disorder) | Cerebrovascular disease | 20020131 | Yes |
| 710027002 | Cytokine-associated toxicity (disorder) | Cytokine release syndrome | 20150731 | Yes |
| 3006004 | Disturbance of consciousness (finding) | Disturbance of consciousness | 20020131 | Yes |
| 56265001 | Heart disease (disorder) | Heart disease | 20020131 | Yes |
| 419099009 | Dead (finding) | Dead | 20060131 | Yes |
| 25374005 | Gastroenteritis (disorder) | Gastroenteritis | 20020131 | Yes |
| 90708001 | Kidney disease (disorder) | Kidney disease | 20020731 | Yes |
| 302846007 | Rhabdomyoma (disorder) | Rhabdomyoma | 20040731 | Yes |
| 308906005 | Secondary bacterial pneumonia (disorder) | Secondary bacterial pneumonia | 20160131 | Yes |
| 429340002 | Traumatic injury of skeletal muscle (disorder) | Traumatic injury of skeletal muscle | 20080131 | Yes |
| 75570004 | Viral pneumonia (disorder) | Viral pneumonia | 20130731 | Yes |
| 138389411000 119105 | Acute bronchitis caused by severe acute respiratory syndrome coronavirus 2 (disorder) | Acute bronchitis caused by SARS-CoV-2 | 20200731 | - |

| CV19-ASS-SecondaryConditionsAndComplications | | | |
|---|---|---|---|
| 870590002 | Acute hypoxemic respiratory failure due to disease caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Acute hypoxemic respiratory failure due to disease caused by Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |
| 870589006 | Acute kidney injury due to disease caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Acute kidney injury due to disease caused by Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |
| 674814021000 119106 | Acute respiratory distress syndrome due to disease caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Acute respiratory distress syndrome due to disease caused by Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |
| 119731000146 105 | Cardiomyopathy due to disease caused by Severe acute respiratory syndrome virus 2 (disorder) | Cardiomyopathy due to disease caused by Severe acute respiratory syndrome virus 2 | 20200731 | - |
| 119741000146 102 | Conjunctivitis due to disease caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Conjunctivitis due to disease caused by Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |
| 119981000146 107 | Dyspnea caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Dyspnea caused by Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |
| 124056100000 0108 | Encephalopathy due to disease caused by Severe acute respiratory syndrome virus 2 (disorder) | Encephalopathy due to disease caused by Severe acute respiratory syndrome virus 2 | 20200731 | - |
| 119751000146 104 | Fever caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Fever caused by Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |
| 124054100000 0107 | Infection of upper respiratory tract caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Infection of upper respiratory tract caused by Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |
| 880529761000 119102 | Lower respiratory infection caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Lower respiratory infection caused by SARS-CoV-2 | 20200731 | - |
| 866151004 | Lymphocytopenia due to Severe acute respiratory syndrome coronavirus 2 (disorder) | Lymphocytopenia due to Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |
| 124053100000 0103 | Myocarditis due to disease caused by Severe acute respiratory syndrome virus 2 (disorder) | Myocarditis due to disease caused by Severe acute respiratory syndrome virus 2 | 20200731 | - |
| 124052100000 0100 | Otitis media due to disease caused by Severe acute respiratory syndrome virus 2 (disorder) | Otitis media due to disease caused by Severe acute respiratory syndrome virus 2 | 20200731 | - |
| 882784691000 119100 | Pneumonia caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Pneumonia caused by SARS-CoV-2 | 20200731 | - |
| 870591003 | Rhabdomyolysis due to disease caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Rhabdomyolysis due to disease caused by Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |
| 870588003 | Sepsis due to disease caused by Severe acute respiratory syndrome coronavirus 2 (disorder) | Sepsis due to disease caused by Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |
| 866152006 | Thrombocytopenia due to Severe acute respiratory syndrome coronavirus 2 (disorder) | Thrombocytopenia due to Severe acute respiratory syndrome coronavirus 2 | 20200731 | - |

Please refer to 2.3.1 Extension Concepts - Clinical Assessment for a list of known extension concepts.

## 2.3.8 Risk Factors

Risk factors are the known patient conditions which may increase the risk of the patient being especially vulnerable to the COVID-19 virus. The following clinical findings have been identified as potential risk factors of COVID-19 [3] [7] [8].

| CV19-ASS-RiskFactors | | | | |
|---|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** | **In GPS** |
| 111273006 | Acute respiratory disease (disorder) | Acute respiratory disease | 20020131 | - |
| 195967001 | Asthma (disorder) | Bronchial hypersensitivity | 20040731 | Yes |
| 78648007 | At risk for infection (finding) | At risk for infection | 20020131 | Yes |
| 27624003 | Chronic disease (disorder) | Chronic disease | 20020131 | - |
| 413834006 | Chronic disease of immune function (disorder) | Chronic disease of immune function | 20050131 | - |
| 17097001 | Chronic disease of respiratory system (disorder) | Chronic respiratory system disease | 20020131 | - |
| 128238001 | Chronic heart disease (disorder) | Chronic disorder of heart | 20020131 | - |
| 709044004 | Chronic kidney disease (disorder) | Chronic kidney disease | 20150731 | Yes |
| 328383001 | Chronic liver disease (disorder) | Chronic liver disease | 20090731 | Yes |
| 128283000 | Chronic nervous system disorder (disorder) | Chronic nervous system disorder | 20020131 | - |
| 13645005 | Chronic obstructive lung disease (disorder) | Chronic obstructive lung disease | 20020131 | Yes |
| 13213009 | Congenital heart disease (disorder) | CHD - Congenital heart disease | 20030731 | Yes |
| 190905008 | Cystic fibrosis (disorder) | Cystic fibrosis | 20020131 | Yes |
| 73211009 | Diabetes mellitus (disorder) | Diabetes mellitus | 20020131 | Yes |
| 414029004 | Disorder of immune function (disorder) | Disorder of immune function | 20190131 | - |
| 16538005 | Early postpartum state (finding) | Early postpartum state | 20020131 | - |
| 8517006 | Ex-smoker (finding) | Ex-smoker | 20020131 | Yes |
| 38341003 | Hypertensive disorder, systemic arterial (disorder) | Hypertensive disorder | 20020131 | Yes |
| 700250006 | Idiopathic pulmonary fibrosis (disorder) | Idiopathic pulmonary fibrosis | 20190731 | Yes |
| 234532001 | Immunodeficiency disorder (disorder) | Immunodeficiency disorder | 20020131 | Yes |
| 363346000 | Malignant neoplastic disease (disorder) | Malignant neoplastic disease | 20020131 | Yes |
| 414825006 | Neoplasm of hematopoietic cell type (disorder) | Neoplasm of hematopoietic cell type | 20050131 | - |
| 126713003 | Neoplasm of lung (disorder) | Neoplasm of lung | 20020131 | Yes |
| 414915002 | Obese (finding) | Obese | 20050131 | Yes |
| 370388006 | Patient immunocompromised (finding) | Patient immunocompromised | 20020731 | Yes |
| 370391006 | Patient immunosuppressed (finding) | Patient immunosuppressed | 20020731 | - |
| 77386006 | Pregnant (finding) | Pregnant | 20020131 | Yes |
| 6383007 | Premature labor (finding) | Premature labor | 20020131 | Yes |
| 31323000 | Severe combined immunodeficiency disease (disorder) | Severe combined immunodeficiency disease | 20020131 | - |
| 127040003 | Sickle cell-hemoglobin SS disease (disorder) | Sickle cell-hemoglobin SS disease | 20020131 | Yes |
| 77176002 | Smoker (finding) | Smoker | 20020131 | Yes |

The following procedures have been identified as potential risk factors of COVID-19 [8]

| CV19-ASS-ProcedureRiskFactors | | | | |
|---|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time | In GPS |
| 367336001 | Chemotherapy (procedure) | Chemotherapy | 20020131 | Yes |
| 788751009 | Corticosteroid and corticosteroid derivative therapy (procedure) | Corticosteroid and corticosteroid derivative therapy | 20200131 | - |
| 234336002 | Hemopoietic stem cell transplant (procedure) | Hemopoietic stem cell transplant | 20050131 | Yes |
| 86553008 | Immunosuppressive therapy (procedure) | Immunosuppressive therapy | 20020131 | Yes |
| 76334006 | Immunotherapy (procedure) | Immunological therapy | 20020131 | - |
| 108290001 | Radiation oncology AND/OR radiotherapy (procedure) | Radiation oncology AND/OR radiotherapy | 20020131 | Yes |
| 312235007 | Radiolabeled antibody therapy (procedure) | Radiolabeled antibody therapy | 20020131 | - |
| 313039003 | Solid organ transplant (procedure) | Solid organ transplant | 20060731 | - |

## 2.3.9 Comorbidities

Comorbidities are additional medical conditions of concern. The following SNOMED CT subset can be used to record comorbidities.

| CV19-ASS-Comorbidities |
|---|
| **Intensional Definition:** |
| **Intensional Definition**:<br>< 64572001 \|Disease (disorder)\| |

## 2.3.10 Exposure

An exposure event is when an individual comes into close contact with an infected person's contaminated droplets, carried in the air or on contaminated hands, surfaces or other objects. The subset below includes SNOMED CT events for recording exposure to COVID-19.

| CV19-ASS-ExposureEvent | | | | |
|---|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time | In GPS |
| 840546002 | Exposure to severe acute respiratory syndrome coronavirus 2 (event) | Exposure to SARS-CoV-2 | 20200131 | Yes |

An exposure finding is the result of an observation or evaluation that relates to the patient's exposure to an infection. The subset below includes SNOMED CT findings relating to COVID-19 exposure.

| CV19-ASS-ExposureFinding | | | | |
|---|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time | In GPS |
| *870577009* | *At increased risk of exposure to severe acute respiratory syndrome coronavirus 2 (finding)* | *At increased risk of exposure to severe acute respiratory syndrome coronavirus 2* | *20200731* | *-* |

Please refer to 2.3.1 Extension Concepts - Clinical Assessment for a list of known extension concepts.

## 2.3.11 Covid-19 and Viral Co-Infections

The following organism should be used when recording the organism causing COVID-19 infections.

| CV19-ASS-Organism | | | | |
|---|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time | In GPS |
| 840533007 | Severe acute respiratory syndrome coronavirus 2 (organism) | SARS-CoV-2 | 20200131 | Yes |

The following organisms can be used to record the cause of related viral co-infections.

| CV19-ASS-ViralCoInfections |
|---|
| **Definition**: |
| **Intensional Definition**:<br><< 49872002 \|Virus (organism)\| MINUS 840533007 \|Severe acute respiratory syndrome coronavirus 2 (organism)\| |

## Footnotes

[1]
Articles found using the Pubmed query "https://pubmed.ncbi.nlm.nih.gov/?term=covid+19&filter=pubt.review"
[2]
COVID Symptom Tracker Research Updates
[3]
COVID-19 Case Report Form, CDC, US
[4]
Coronavirus: what are asymptomatic and mild COVID-19?, Patient.info
Coronavirus: what are moderate, severe and critical COVID-19?, Patient.info
[5]
SNOMED CT Editorial Guide, SNOMED International
[6]
Clinical papers, including:
COVID-19: Gastrointestinal Manifestations and Potential Fecal-Oral Transmission
COVID-19 and the Cardiovascular System
Caution on Kidney Dysfunctions of COVID-19 Patients
Rhabdomyolysis as Potential Late Complication Associated with COVID-19
Neurological Manifestations of Hospitalized Patients with COVID-19 in Wuhan, China: A Retrospective Case Series Study
Dysregulation of Immune Response in Patients with COVID-19 in Wuhan, China
[7]
CHESS Daily Reporting, NHS, UK
[8]
COVID-19 - High Risk Shielded Patient List Identification Methodology - Clinical Inclusion Criteria, NHS, UK

## 2.3.1 Extension Concepts - Clinical Assessment

This page includes examples of SNOMED CT extension content for the subsets listed in 2.3. Clinical Assessment.

**Please note**: This extension content should only be used in clinical systems that implement the relevant SNOMED CT Edition.

### 2.3.1.1 Symptoms

No known extension concepts have been published for this COVID-19 data element.

### 2.3.1.2 Severity

No known extension concepts have been published for this COVID-19 data element.

However, the following related extension concepts have been published.

| Severity procedures and observable entities | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Edition |

| Severity procedures and observable entities | | | |
|---|---|---|---|
| 1300681000000102 | Assessment using coronavirus disease 19 severity scale (procedure) | Assessment using COVID-19 severity scale | UK 20200401 |
| 1300631000000101 | Coronavirus disease 19 severity score (observable entity) | COVID-19 severity score | UK 20200401 |

### 2.3.1.3 Clinical Measurements

No known extension concepts have been published for this COVID-19 data element.

### 2.3.1.4 Clinical Findings

No known extension concepts have been published for this COVID-19 data element.

# 2.3.1.5 Diagnosis

The following extension concepts have been created for this COVID-19 data element.

| CV19-ASS-Diagnosis | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Edition** |
| 1240751000000100 | Coronavirus disease 19 caused by severe acute respiratory syndrome coronavirus 2 (disorder) | COVID-19 | UK 20200401 |
| 1240761000000102 | Suspected coronavirus disease 19 caused by severe acute respiratory syndrome coronavirus 2 (situation) | Suspected COVID-19 | UK 20200401 |

# 2.3.1.6 Clinical History

No known extension concepts have been published for this COVID-19 data element.

# 2.3.1.7 Secondary Conditions and Complications

The following extensions concepts have been published for this COVID-19 data element.

| CV19-ASS-SecondaryConditionsAndComplications | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Edition** |
| 118901000146108 | Acute respiratory disease caused by severe acute respiratory syndrome coronavirus 2 (disorder) | Acute respiratory disease caused by severe acute respiratory syndrome coronavirus 2 | NL 20200325 |
| 118911000146105 | Gastroenteritis caused by severe acute respiratory syndrome coronavirus 2 (disorder) | Gastroenteritis caused by severe acute respiratory syndrome coronavirus 2 | NL 20200325 |
| 118921000146100 | Suspected acute respiratory disease caused by severe acute respiratory syndrome coronavirus 2 (situation) | Suspected acute respiratory disease caused by severe acute respiratory syndrome coronavirus 2 | NL 20200325 |
| *119731000146105* | *Cardiomyopathy due to infection by severe acute respiratory syndrome coronavirus 2 (disorder)* | *Cardiomyopathy due to infection by severe acute respiratory syndrome coronavirus 2* | *NL 20200925* |
| *119741000146102* | *Conjunctivitis due to infection by severe acute respiratory syndrome coronavirus 2 (disorder)* | *Conjunctivitis due to infection by severe acute respiratory syndrome coronavirus 2* | *NL 20200925* |
| *119971000146105* | *Disease due to infection by severe acute respiratory syndrome coronavirus 2 (disorder)* | *Disease due to infection by severe acute respiratory syndrome coronavirus 2* | *NL 20200925* |
| *119981000146107* | *Dyspnea due to infection by severe acute respiratory syndrome coronavirus 2 (finding)* | *Dyspnea due to infection by severe acute respiratory syndrome coronavirus 2* | *NL 20200925* |
| *119751000146104* | *Fever due to infection by severe acute respiratory syndrome coronavirus 2 (finding)* | *Fever due to infection by severe acute respiratory syndrome coronavirus 2* | *NL 20200925* |
| *119761000146101* | *Infection of heart caused by severe acute respiratory syndrome coronavirus 2 (disorder)* | *Infection of heart caused by severe acute respiratory syndrome coronavirus 2* | *NL 20200925* |
| 1240571000000101 | Gastroenteritis caused by severe acute respiratory syndrome coronavirus 2 (disorder) | Gastroenteritis caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |

| CV19-ASS-SecondaryConditionsAndComplications | | | |
|---|---|---|---|
| 12405410000001 07 | Infection of upper respiratory tract caused by severe acute respiratory syndrome coronavirus 2 (disorder) | Upper respiratory tract infection caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |
| 12405310000001 03 | Myocarditis caused by severe acute respiratory syndrome coronavirus 2 (disorder) | Myocarditis caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |
| 12405210000001 00 | Otitis media caused by severe acute respiratory syndrome coronavirus 2 (disorder) | Otitis media caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |
| 12405510000001 05 | Pneumonia caused by severe acute respiratory syndrome coronavirus 2 (disorder) | Pneumonia caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |
| 12405610000001 08 | Encephalopathy caused by severe acute respiratory syndrome coronavirus 2 (disorder) | Encephalopathy caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |

### 2.3.1.8 Risk Factors

No known extension concepts have been published for this COVID-19 data element.

However, the following related extension concepts have been published.

| Risk Categories | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
| 130059100000010 1 | Low risk category for developing complication from coronavirus disease 19 caused by severe acute respiratory syndrome coronavirus 2 infection (finding) | Low risk category for developing complication from COVID-19 infection | UK 20200401 |
| 130057100000010 0 | Moderate risk category for developing complication from coronavirus disease 19 caused by severe acute respiratory syndrome coronavirus 2 infection (finding) | Moderate risk category for developing complication from COVID-19 infection | UK 20200401 |
| 130056100000010 7 | High risk category for developing complication from coronavirus disease 19 caused by severe acute respiratory syndrome coronavirus 2 infection (finding) | High risk category for developing complication from COVID-19 infection | UK 20200401 |

# 2.3.1.9 Comorbidities

No known extension concepts have been published for this COVID-19 subset.

### 2.3.1.10 Exposure Event

The following extension concepts have been published for this COVID-19 data element

| CV19-ASS-ExposureEvent | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
| 12404310000 00104 | Exposure to severe acute respiratory syndrome coronavirus 2 infection (event) | Exposure to SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) infection | UK 20200401 |
| 12404410000 00108 | Close exposure to severe acute respiratory syndrome coronavirus 2 infection (event) | Close exposure to SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) infection | UK 20200401 |

### 2.3.1.11 Covid-19 and Viral Co-Infections

No known extension concepts have been published for this COVID-19 data element.

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### Footnotes

[1]
https://pubmed.ncbi.nlm.nih.gov/?term=covid+19&filter=pubt.review

## 2.4 Tests and Investigations

Laboratory testing for COVID-19 and the associated SARS-CoV-2 virus includes methods that detect the presence of the virus and antibodies produced in response to infection, in specimen samples taken from potentially infected individuals. Test and investigation data which can be recorded using SNOEMD CT includes:

- Specimen
- Laboratory Tests
- Substances and Virus
- Laboratory Test Results
- Other Investigations

These data elements are described below, with example SNOMED CT subsets for each.
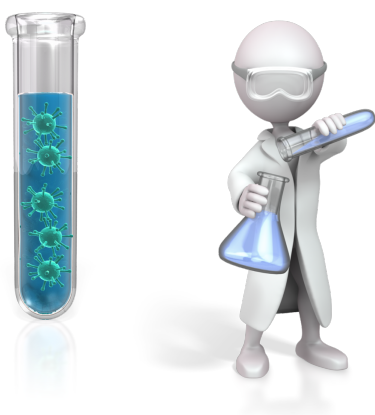


## 2.4.1 Specimen

Specimens are samples of substances taken from an individual for testing - for example 258500001 | Nasopharyngeal swab (specimen)| or 119339001 |Stool specimen (specimen)|. The following specimens may be relevant to COVID-19 testing in one or more countries affected by the virus.

| CV19-INV-Specimen | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** |
| 697989009 | Anterior nares swab (specimen) | Anterior nares swab | 20140131 |
| 119297000 | Blood specimen (specimen) | Blood specimen | 20040731 |
| 258607008 | Bronchoalveolar lavage fluid sample (specimen) | Bronchoalveolar lavage fluid sample | 20080731 |
| 258606004 | Lower respiratory sample (specimen) | Lower respiratory sample | 20080731 |
| 258500001 | Nasopharyngeal swab (specimen) | Nasopharyngeal swab | 20080731 |
| 258411007 | Nasopharyngeal aspirate (specimen) | Nasopharyngeal aspirate | 20080731 |
| 258412000 | Oropharyngeal aspirate (specimen) | Oropharyngeal aspirate | 20080731 |
| 418564007 | Pleural fluid specimen (specimen) | Pleural fluid specimen | 20080731 |
| 122610009 | Specimen from lung obtained by biopsy (specimen) | Specimen from lung obtained by biopsy | 20080731 |
| 445447003 | Specimen from trachea obtained by aspiration (specimen) | Specimen from trachea obtained by aspiration | 20100731 |
| 119334006 | Sputum specimen (specimen) | Sputum specimen | 20080731 |
| 119339001 | Stool specimen (specimen) | Stool specimen | 20030731 |

**CV19-INV-Specimen**

| 472901003 | Swab from nasal sinus (specimen) | Swab from nasal sinus | 20130131 |
|---|---|---|---|
| 258529004 | Throat swab (specimen) | Throat swab | 20080731 |
| 122877000 | Upper respiratory fluid specimen obtained by tracheal aspiration (specimen) | Upper respiratory fluid specimen obtained by tracheal aspiration | 20040731 |
| 309164002 | Upper respiratory swab sample (specimen) | Upper respiratory swab sample | 20080731 |
| 122575003 | Urine specimen (specimen) | Urine specimen | 20080731 |
| *461911000124106* | *Swab specimen from oropharynx (specimen)* | *Oropharyngeal swab* | *20200731* |

## 2.4.2 Laboratory Tests

Laboratory tests can be performed to detect the presence of the COVID-19 virus and antibodies produced in response to this virus. The following SNOMED CT concepts can be used to record laboratory tests that may be performed during the investigation process.

**CV19-INV-LaboratoryTests**

| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time |
|---|---|---|---|
| 444077007 | Analysis using reverse transcriptase polymerase chain reaction technique (procedure) | Analysis using reverse transcriptase PCR | 20100131 |
| 76978006 | Enzyme-linked immunosorbent assay (procedure) | Enzyme-linked immunosorbent assay | 20080731 |
| 30662005 | Fluorescent immunoassay (procedure) | Fluorescent immunoassay | 20020131 |
| 414464004 | Immunoassay method (procedure) | Immunoassay method | 20050131 |
| 122435008 | Measurement of viral antibody (procedure) | Measurement of viral antibody | 20100131 |
| 9718006 | Polymerase chain reaction analysis (procedure) | Polymerase chain reaction analysis | 20080731 |
| 122433001 | Viral antigen assay (procedure) | Viral antigen assay | 20050131 |
| 118147004 | Viral nucleic acid assay (procedure) | Viral nucleic acid assay | 20020131 |
| 88667002 | Viral serologic study (procedure) | Viral serologic study | 20150131 |
| *1445431000168101* | *Detection of nucleic acid of severe acute respiratory syndrome coronavirus 2 (observable entity)* | *Detection of nucleic acid of severe acute respiratory syndrome coronavirus 2* | *20200731* |
| *1454581000168100* | *Detection of nucleic acid of severe acute respiratory syndrome coronavirus 2 in bronchoalveolar lavage fluid (observable entity)* | *Detection of nucleic acid of severe acute respiratory syndrome coronavirus 2 in bronchoalveolar lavage fluid* | *20200731* |
| *1454411000168105* | *Detection of nucleic acid of severe acute respiratory syndrome coronavirus 2 in nasopharyngeal swab (observable entity)* | *Detection of nucleic acid of severe acute respiratory syndrome coronavirus 2 in nasopharyngeal swab* | *20200731* |
| *1454491000168101* | *Detection of nucleic acid of severe acute respiratory syndrome coronavirus 2 in oropharyngeal swab (observable entity)* | *Detection of nucleic acid of severe acute respiratory syndrome coronavirus 2 in oropharyngeal swab* | *20200731* |
| *1454561000168109* | *Detection of nucleic acid of severe acute respiratory syndrome coronavirus 2 in sputum (observable entity)* | *Detection of nucleic acid of severe acute respiratory syndrome coronavirus 2 in sputum* | *20200731* |
| *1240511000000106* | *Detection of severe acute respiratory syndrome coronavirus 2 using polymerase chain reaction (observable entity)* | *Detection of severe acute respiratory syndrome coronavirus 2 using polymerase chain reaction* | *20200731* |

| CV19-INV-LaboratoryTests | | | |
|---|---|---|---|
| *1240461000000109* | *Measurement of severe acute respiratory syndrome coronavirus 2 antibody (observable entity)* | *Measurement of severe acute respiratory syndrome coronavirus 2 antibody* | *20200731* |
| *1240471000000102* | *Measurement of severe acute respiratory syndrome coronavirus 2 antigen (observable entity)* | *Measurement of severe acute respiratory syndrome coronavirus 2 antigen* | *20200731* |

Please refer to 2.4.1 Extension Concepts - Tests and Procedures for a list of known extension concepts.

# 2.4.3 Substances and Virus

Please refer to 2.4.1 Extension Concepts - Tests and Procedures for a list of known extension concepts. An antibody is a protective protein produced by the immune system in response to the presence of a foreign substance, called an antigen. The following antibody/antigen and virus organism concepts can be used to record the focus of a COVID-19 investigation.

| CV19-INV-SubstancesAndVirus | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** |
| 840535000 | Antibody to severe acute respiratory syndrome coronavirus 2 (substance) | Antibody to SARS-CoV-2 | 20200131 |
| 840536004 | Antigen of severe acute respiratory syndrome coronavirus 2 (substance) | Antigen of SARS-CoV-2 | 20200131 |
| 840533007 | Severe acute respiratory syndrome coronavirus 2 (organism) | SARS-CoV-2 | 20200131 |
| *870361009* | *Immunoglobulin G antibody to severe acute respiratory syndrome coronavirus 2 (substance)* | *SARS-CoV-2 IgG* | *20200731* |
| *870362002* | *Immunoglobulin M antibody to severe acute respiratory syndrome coronavirus 2 (substance)* | *SARS-CoV-2 IgM* | *20200731* |
| *1240411000000107* | *Ribonucleic acid of Severe acute respiratory syndrome coronavirus 2 (substance)* | *Severe acute respiratory syndrome coronavirus 2 RNA* | *20200731* |

## 2.4.4 Laboratory Test Results

Laboratory test results are used to specify whether the Laboratory test focus was detected or not detected following the conducted laboratory test. The following qualifier values may be used for this purpose.

| CV19-INV-LabTestResults | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** |
| 260373001 | Detected (qualifier value) | Detected | 20020131 |
| 419984006 | Inconclusive (qualifier value) | Inconclusive | 20060131 |
| 260415000 | Not detected (qualifier value) | Not detected | 20020131 |
| 125154007 | Specimen unsatisfactory for evaluation (finding) | Specimen unsatisfactory for evaluation | 20020131 |
| *1240581000000104* | *Severe acute respiratory syndrome coronavirus 2 detected (finding)* | *Severe acute respiratory syndrome coronavirus 2 detected* | *20200731* |
| *1240591000000102* | *Severe acute respiratory syndrome coronavirus 2 not detected (finding)* | *Severe acute respiratory syndrome coronavirus 2 not detected* | *20200731* |

Please refer to 2.4.1 Extension Concepts - Tests and Procedures for a list of known extension concepts.

## 2.4.5 Other Investigations

Other investigative procedures - e.g. 719410009 |Consultation via video conference (procedure)| and 386472008 |Telephone consultation (procedure)| and 243791004 |Viral screening (procedure)| - may be performed to assess a COVID-19 patient. The following subset represents procedures that can be performed during the clinical assessment process.

| CV19-INV-InvestigationProcedures |
| --- |
| **Intensional Definition:** |
| < 386053000 \|Evaluation procedure (procedure)\|<br>OR < 308335008 \|Patient encounter procedure (procedure)\|<br>OR < 17636008 \|Specimen collection (procedure)\| |

The following subset represents a collection of findings with context that may be related to these investigations and captured using SNOMED CT - for example 269944001 |Nasal swab taken (situation)| or 168331006 |Blood sent for virology (situation)|.

| CV19-INV-InvestigationFindings |
| --- |
| **Intensional Definition:** |
| < 313333008 \|Sample obtained (situation)\|<br>OR < 168123008 \|Sample sent for examination (situation)\| |

Please refer to 2.4.1 Extension Concepts - Tests and Procedures for a list of known extension concepts.

---

### Footnotes

1
https://thenativeantigencompany.com/why-we-need-antigen-and-antibody-tests-for-covid-19/

## 2.4.1 Extension Concepts - Tests and Investigations

This page includes examples of SNOMED CT extension content for the subsets listed in 2.4 Tests and Investigations.

**Please note**: This extension content should only be used in clinical systems that implement the relevant SNOMED CT Edition.

### 2.4.1.1 Specimen

No known extension concepts have been published for this COVID-19 data element.

### 2.4.1.2 Laboratory Tests

The following extensions concepts have been published for this COVID-19 data element.

| CV19-INV-LaboratoryTests | | | |
| --- | --- | --- | --- |
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Edition** |
| 1445431000168101 | 2019 novel coronavirus nucleic acid assay (procedure) | COVID-19 nucleic acid assay | AU 20200331 |
| 1454411000168105 | Nucleic acid assay of severe acute respiratory syndrome coronavirus 2 in nasopharyngeal swab specimen (procedure) | Nasopharyngeal swab COVID-19 nucleic acid assay | AU 20200331 |
| 1454491000168101 | Nucleic acid assay of severe acute respiratory syndrome coronavirus 2 in oropharyngeal swab specimen (procedure) | Oropharyngeal swab COVID-19 nucleic acid assay | AU 20200331 |

| CV19-INV-LaboratoryTests | | | |
|---|---|---|---|
| 1454561000168109 | Nucleic acid assay of severe acute respiratory syndrome coronavirus 2 in sputum specimen (procedure) | Sputum COVID-19 nucleic acid assay | AU 20200331 |
| 1454581000168100 | Nucleic acid assay of severe acute respiratory syndrome coronavirus 2 in bronchoalveolar lavage fluid specimen (procedure) | Bronchoalveolar lavage fluid COVID-19 nucleic acid assay | AU 20200331 |
| 1454651000168108 | COVID-19 serology (procedure) | COVID-19 serology | AU 20200331 |
| 1240511000000106 | Detection of severe acute respiratory syndrome coronavirus 2 using polymerase chain reaction technique (procedure) | Detection of SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) using polymerase chain reaction technique | UK 20200401 |
| 1240461000000109 | Measurement of severe acute respiratory syndrome coronavirus 2 antibody (procedure) | Measurement of SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) antibody | UK 20200401 |
| 1240471000000102 | Measurement of severe acute respiratory syndrome coronavirus 2 antigen (procedure) | Measurement of SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) antigen | UK 20200401 |
| 1240741000000103 | Severe acute respiratory syndrome coronavirus 2 serology (observable entity) | SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) serology | UK 20200401 |

In addition, the following extension concepts for laboratory test related situations.

| CV19-INV-LaboratoryTestSituations | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
| 1321041000000101 | Self-taking of swab for severe acute respiratory syndrome coronavirus 2 offered (situation) | Self-taking of swab for SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) offered | UK 20200401 |
| 1321051000000103 | Swab for severe acute respiratory syndrome coronavirus 2 taken by healthcare professional (situation) | Swab for SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) taken by healthcare professional | UK 20200401 |
| 1321031000000105 | Swab for severe acute respiratory syndrome coronavirus 2 taken by subject (situation) | Self-taken swab for SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |

## 2.4.1.3 Substances and Virus

The following extensions concepts have been published for this COVID-19 data element.

| CV19-INV-SubstancesAndVirus | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
| 1240401000000105 | Antibody to severe acute respiratory syndrome coronavirus 2 (substance) | Antibody to SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |
| 1240391000000107 | Antigen of severe acute respiratory syndrome coronavirus 2 (substance) | Antigen of SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |
| 1240411000000107 | Ribonucleic acid of severe acute respiratory syndrome coronavirus 2 (substance) | Ribonucleic acid of SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |
| 1240421000000101 | Serotype severe acute respiratory syndrome coronavirus 2 (qualifier value) | Serotype SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |
| 1240381000000105 | Severe acute respiratory syndrome coronavirus 2 (organism) | SARS-CoV-2 - severe acute respiratory syndrome coronavirus 2 | UK 20200401 |

## 2.4.1.4 Laboratory Test Results

The following extensions concepts have been published for this COVID-19 data element

**CV19-INV-LaboratoryTestResults**

| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
|---|---|---|---|
| 1300721000000109 | Coronavirus disease 19 caused by severe acute respiratory syndrome coronavirus 2 confirmed by laboratory test (situation) | COVID-19 confirmed by laboratory test | UK 20200401 |
| 1300731000000106 | Coronavirus disease 19 caused by severe acute respiratory syndrome coronavirus 2 confirmed using clinical diagnostic criteria (situation) | COVID-19 confirmed using clinical diagnostic criteria | UK 20200401 |
| 1321121000000107 | Coronavirus disease 19 caused by severe acute respiratory syndrome coronavirus 2 excluded using clinical diagnostic criteria (situation) | COVID-19 excluded using clinical diagnostic criteria | UK 20200401 |
| 1321111000000101 | Coronavirus disease 19 caused by severe acute respiratory syndrome coronavirus 2 excluded by laboratory test (situation) | COVID-19 excluded by laboratory test | UK 20200401 |
| 1240581000000104 | Severe acute respiratory syndrome coronavirus 2 detected (finding) | SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) detected | UK 20200401 |
| 1240591000000102 | Severe acute respiratory syndrome coronavirus 2 not detected (finding) | SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) not detected | UK 20200401 |

### 2.4.1.5 Other Investigations

The following extensions concepts have been published for this COVID-19 data element.

**CV19-INV-OtherInvestigation**

| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
|---|---|---|---|
| 1300681000000102 | Assessment using coronavirus disease 19 severity scale (procedure) | Assessment using COVID-19 severity scale | UK 20200401 |
| 1320971000000102 | Taking of swab for severe acute respiratory syndrome coronavirus 2 (procedure) | Taking of swab for SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |
| 1240451000000106 | Telephone consultation for suspected severe acute respiratory syndrome coronavirus 2 (procedure) | Telephone consultation for suspected SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) | UK 20200401 |

In addition, the following extension concepts related to investigation situations have been published.

**Other Investigation Situations**

| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
|---|---|---|---|
| 1321221000000103 | Consultation via video conference not available (situation) | Consultation via video conference not available | UK 20200401 |

### Footnotes

1
https://thenativeantigencompany.com/why-we-need-antigen-and-antibody-tests-for-covid-19/

# 2.5 Prevention, Treatment and Education

Preventing the potential spread of COVID-19 can involve a range of precautions, such as isolation and the wearing of personal protective equipment, and education to patients, healthcare workers and the broader community. Once COVID-19 is diagnosed, various treatments may be considered, together with education for the patient and their families/caregivers.

- Prevention

- Education
- Medication
- Administrative Procedures
- Therapeutic Procedures
- Treatment Findings
- Treatment Equipment

These data elements are described below, with example SNOMED CT subsets where applicable.
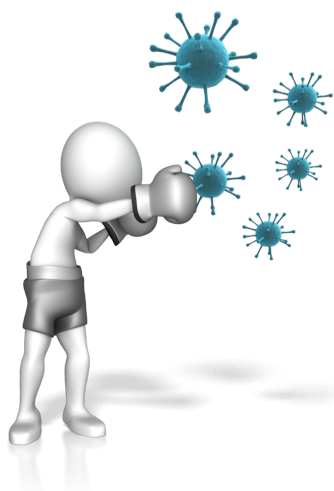


# 2.5.1 Prevention

Precautionary measures, such as 840534001 |SARS-CoV-2 vaccination|, 225368008 |Contact tracing|, and 170499009 |Isolation of infection contact (procedure)| are extremely important in the fight against infectious diseases such as COVID-19. The following preventative measures can be recorded using SNOMED CT.

| CV19-PTE-PreventionProcedures | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** |
| 409524006 | Airborne precautions (procedure) | Airborne precautions | 20040731 |
| 225368008 | Contact tracing (procedure) | Contact tracing | 20020131 |
| 409529001 | Contact precautions (procedure) | Contact precautions | 20040731 |
| 409525007 | Respiratory secretion precautions (procedure) | Respiratory secretion precautions | 20040731 |
| 77248004 | Infection control procedure (procedure) | Infection control procedur | 20020131 |
| 361235007 | Isolation of infected patient (procedure) | Isolation of infected patient | 20020131 |
| 170499009 | Isolation of infection contact (procedure) | Isolation of infection contact | 20020131 |
| 170500000 | Isolation of infection carrier (procedure) | Isolation of infection carrier | 20020131 |
| 840534001 | Severe acute respiratory syndrome coronavirus 2 vaccination (procedure) | SARS-CoV-2 vaccination | 20200309 |

## 2.5.2 Education

Education is an important aspect of preventing and managing COVID-19 infection. The following SNOMED CT concepts may be used to record this data.

| CV19-PTE-Education | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** |
| 698608004 | Hand washing education (procedure) | Hand washing education | 20140131 |
| 385820004 | Infection control education (procedure) | Infection control education | 20100731 |
| *868263005* | *Education about infectious disease (procedure)* | *Education about infectious disease* | *20200731* |

Please refer to 2.5.1 Extension Concepts - Treatment and Education for a list of known extension concepts.

# 2.5.3 Medication

A number of countries are trialling the use of medication to treat COVID-19. Many of these medications can be found in the 373873005 |Pharmaceutical / biologic product (product)| hierarchy of SNOMED CT. However until there is sufficient evidence, the WHO is cautioning against associations recommending or administering these unproven treatments to patients with COVID-19 or people self-medicating with them[1]. For this reason, we have not included a medication subset at this time.

## 2.5.4 Administrative Procedures

Patients with severe symptoms or complications may require admission to hospital, or other administrative procedures. The following administrative procedures may be recorded using SNOMED CT.

| CV19-PTE-AdministrativeProcedures | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time |
| 183452005 | Emergency hospital admission (procedure) | Emergency hospital admission | 20020131 |
| 305376003 | Admission to infectious diseases department (procedure) | Admission to infectious diseases department | 20020131 |
| 305351004 | Admission to intensive care unit (procedure) | Admission to intensive care unit | 20020131 |
| 305360007 | Admission to respiratory medicine department (procedure) | Admission to respiratory medicine department | 20020131 |
| 32485007 | Hospital admission (procedure) | Hospital admission | 20020131 |
| 417005 | Hospital re-admission (procedure) | Hospital re-admission | 20020131 |

## 2.5.5 Therapeutic Procedures

Patients suffering from severe symptoms or complications may require a range of therapeutic procedures, many of them involving supportive care to help them breathe. The following therapeutic procedures may be recorded using SNOMED CT.

| CV19-PTE-TherapeuticProcedures | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Effective Time |
| 40617009 | Artificial respiration (procedure) | Artificial respiration | 20020131 |
| 233573008 | Extracorporeal membrane oxygenation (procedure) | Extracorporeal membrane oxygenation | 20020131 |
| 447996002 | Intubation of respiratory tract (procedure) | Intubation of respiratory tract | 20110731 |

| CV19-PTE-TherapeuticProcedures | | | |
|---|---|---|---|
| 243141005 | Mechanically assisted spontaneous ventilation (procedure) | Mechanically assisted spontaneous ventilation | 20020131 |
| 428311008 | Noninvasive ventilation (procedure) | Noninvasive ventilation | 20080131 |
| 371908008 | Oxygen administration by mask (procedure) | Oxygen administration by mask | 20020731 |
| 371907003 | Oxygen administration by nasal cannula (procedure) | Oxygen administration by nasal cannula | 20020731 |
| 11140008 | Respiratory assist, manual (procedure) | Respiratory assist, manual | 20020131 |
| *829831000000100* | *Insertion of fiducial marker into lung using computed tomography guidance (procedure)* | *Insertion of fiducial marker into lung using computed tomography guidance* | *20200731* |

## 2.5.6 Treatment Findings

Clinical findings relating to the treatment required or used by a patient may be captured in a health record. The following treatment findings may be recorded using SNOMED CT.

| CV19-PTE-TreatmentFindings | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Effective Time** |
| 79031000119101 | Dependence on respirator (finding) | Dependence on respirator | 20150731 |
| 931000119107 | Dependence on supplemental oxygen (finding) | Dependence on supplemental oxygen | 20120731 |
| 444932008 | Dependence on ventilator (finding) | Dependence on ventilator | 20100731 |
| 763326004 | Difficult mask ventilation (finding) | Difficult mask ventilation | 20180731 |
| 419991009 | Endotracheal tube present (finding) | Endotracheal tube present | 20060131 |
| 405496006 | Inability to ventilate patients lungs mechanically (finding) | Inability to ventilate patients lungs mechanically | 20040131 |
| 22803001 | Normal respiratory function (finding) | Normal respiratory function | 20020131 |
| 718085007 | Unable to intubate and unable to ventilate (finding) | Cannot intubate cannot ventilate | 20160731 |
| 128258000 | Ventilation finding (finding) | Ventilation finding | 20020131 |
| *371825009* | *Patient on oxygen (finding)* | *Patient on oxygen* | *20020731* |
| *371820004* | *Patient ventilated (finding)* | *Patient ventilated* | *20020731* |

## 2.5.7 Treatment Equipment

Respiratory equipment includes those medical devices used to support breathing and respiratory function - for example

706173000 |Intensive-care ventilator (physical object)| , and 464328001 |Thoracic cannula (physical object)| .

| CV19-PTE-TreatmentEquipment |
|---|
| **Intensional Definition**:<br>&lt; 277973009 \|Respiratory equipment (physical object)\|<br>  OR &lt; 336589003 \|Oxygen equipment (physical object)\|<br>  OR &lt; 334943003 \|Respiratory appliances (physical object)\|<br>  OR &lt; 304077006 \|Respiratory system device (physical object)\|<br>  OR &lt; 706167001 \|Anesthesia and respiratory device (physical object)\| |

## Footnotes

1

https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov/solidarity-clinical-trial-for-covid-19-treatments

## 2.5.1 Extension Concepts - Prevention, Treatment and Education

This page includes examples of SNOMED CT extension content for the subsets listed in 2.5 Prevention, Treatment and Education.

**Please note**: This extension content should only be used in clinical systems that implement the relevant SNOMED CT Edition.

### 2.5.1.1 Prevention

The following extensions concepts have been published for this data element.

| CV19-PTE-PreventionProcedures | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
| 1321161000000104 | Household isolation to prevent exposure of community to contagion (procedure) | Household isolation to prevent exposure of community to contagion | UK 20200401 |
| 1321141000000100 | Reverse isolation of household to prevent exposure of uninfected subject to contagion (procedure) | Shielding of household to prevent exposure of uninfected subject to contagion | UK 20200401 |
| 1321151000000102 | Reverse self-isolation of uninfected subject to prevent exposure to contagion (procedure) | Shielding of uninfected subject to prevent exposure to contagion | UK 20200401 |
| 1321131000000109 | Self-isolation to prevent exposure of community to contagion (procedure) | Self-isolation to prevent exposure of community to contagion | UK 20200401 |
| 1240491000000103 | Severe acute respiratory syndrome coronavirus 2 vaccination (procedure) | SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) vaccination | UK 20200401 |
| 1321231000000101 | Signposting to coronavirus disease 19 Home Management Service (procedure) | Signposting to CHMS (COVID-19 Home Management Service) | UK 20200401 |
| 1321061000000100 | Signposting to National Health Service online isolation note service (procedure) | Signposting to NHS online isolation note service | UK 20200401 |

In addition, the following extension concepts for prevention-related situations have been published.

| Prevention Situations | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
| 1240681000000103 | Severe acute respiratory syndrome coronavirus 2 vaccination not done (situation) | SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) vaccination not done | UK 20200401 |
| 1240701000000101 | Severe acute respiratory syndrome coronavirus 2 vaccine not available (situation) | SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) vaccine not available | UK 20200401 |
| 1240781000000106 | Severe acute respiratory syndrome coronavirus 2 vaccination invitation short message service text message sent (situation) | SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) vaccination invitation short message service text message sent | UK 20200401 |
| 1240651000000109 | Severe acute respiratory syndrome coronavirus 2 vaccination declined (situation) | SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) vaccination declined | UK 20200401 |
| 1240661000000107 | Severe acute respiratory syndrome coronavirus 2 vaccination contraindicated (situation) | SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) vaccination contraindicated | UK 20200401 |
| 1240671000000100 | Severe acute respiratory syndrome coronavirus 2 vaccination not indicated (situation) | SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) vaccination not indicated | UK 20200401 |

And, the following extension concepts for prevention-related findings have been published.

| Prevention Findings | | | |
|---|---|---|---|
| Concept id | Fully Specified Name | en-US Preferred Term | Edition |
| 1240631000000102 | Did not attend severe acute respiratory syndrome coronavirus 2 vaccination (finding) | Did not attend SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) vaccination | UK 20200401 |

| **Prevention Findings** | | | |
|---|---|---|---|
| 1321071000000107 | Has National Health Service digital isolation note (finding) | Has NHS digital isolation note | UK 20200401 |
| 1240601000000108 | High priority for severe acute respiratory syndrome coronavirus 2 vaccination (finding) | High priority for SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) vaccination | UK 20200401 |
| 1321091000000106 | Household isolation note issued to patient (finding) | Household isolation note issued to patient | UK 20200401 |
| 1321081000000109 | Self-isolation note issued to patient (finding) | Self-isolation note issued to patient | UK 20200401 |

# 2.5.1.2 Education

The following extensions concepts have been published for this data element.

| **CV19-PTE-EducationSituation** | | | |
|---|---|---|---|
| **Concept id** | **Fully Specified Name** | **en-US Preferred Term** | **Edition** |
| 1240731000000107 | Advice given about severe acute respiratory syndrome coronavirus 2 by telephone (situation) | Advice given about SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) by telephone | UK 20200401 |
| 1240721000000105 | Advice given about severe acute respiratory syndrome coronavirus 2 infection (situation) | Advice given about SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) infection | UK 20200401 |
| 1240711000000104 | Educated about severe acute respiratory syndrome coronavirus 2 infection (situation) | Educated about SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) infection | UK 20200401 |
| 1321171000000106 | Provision of advice, assessment or treatment limited due to coronavirus disease 19 caused by severe acute respiratory syndrome coronavirus 2 pandemic (situation) | Provision of advice, assessment or treatment limited due to COVID-19 pandemic | UK 20200401 |

# 2.5.1.3 Medication

No known extension concepts for this data element have been published for the COVID-19 use case.

## 2.5.1.4 Therapeutic Procedures

No known extension concepts for this data element have been published for the COVID-19 use case.

## 2.5.1.5 Treatment Findings

No known extension concepts for this data element have been published for the COVID-19 use case.

## 2.5.1.6 Treatment Equipment

No known extension concepts for this data element have been published for the COVID-19 use case.

# 3. Mapping to ICD-10

The following map members from SNOMED CT to the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (© World Health organisation 1994) 2016 Version are published (or will be published) in the SNOMED CT International Edition. These maps use ICD-10 codes identified in the WHO's Emergency use ICD codes for COVID-19 disease outbreak update [1].



| SNOMED CT | | ICD-10 | | | |
|---|---|---|---|---|---|
| SNOMED CT Id | SNOMED CT Fully Specified Name | ICD-10 Code | ICD-10 Term | Map Details | Effective Time |
| 840539006 | Disease caused by severe acute respiratory syndrome coronavirus 2 (disorder) | U07.1 | COVID-19, virus identified<br>-- with laboratory testing confirmation<br>-- confirmed | | 20200309 |
| 840546002 | Exposure to severe acute respiratory syndrome coronavirus 2 (event) | Z20.8 | Exposure to COVID-19 or to a confirmed case | | 20200309 |

| 840544004 | Suspected disease caused by severe acute respiratory coronavirus 2 (situation) | U07.2 | COVID-19, virus not identified<br>-- clinically-epidemiologically diagnosed<br>-- probable<br>-- suspected | | 20200731 |

## Footnotes

1
http://www9.who.int/classifications/icd/covid19/en/

# Appendix A - Example Subsets

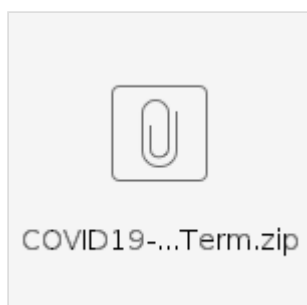The example SNOMED CT subsets included in this guide are available to download below in two formats:

- RF2 - This format uses the standard Simple Reference Set structure defined in the SNOMED CT Release File Specification. Please download this format if you plan to upload the subsets into an RF2-compliant terminology server, such as SNOMED International's Snowstorm.
- RF2+Terms - This format adds the US-english preferred term to each member in the subset. Please download this format if you plan to open the subsets directly (e.g. in a text editor or spreadsheet tool) for review.

Please read the important note below before downloading these subset files.

**SNOMED CT Example COVID-19 Subsets (RF2):**

COVID19-..._RF2.zip

**SNOMED CT Example COVID-19 Subsets (RF2+Terms):**

COVID19-...Term.zip

> ⓘ **Important Note**
>
> SNOMED International has created the SNOMED CT subsets in this guide to provide examples of SNOMED CT concepts that may be used to code a variety of COVID-19 related data elements.
>
> These subsets have been guided by the collective needs and experiences of our SNOMED International Members, and may therefore contain concepts that are not appropriate for use in all countries, regions and use cases. Furthermore, they do not contain all SNOMED CT concepts required by every country, region and use case. As explained in 1.1 How to Use this Guide, these subsets should not be used in a production system without careful review and update to ensure that each subset fully meets the requirements of the intended use case. SNOMED International has provided these example subsets in good faith, and accepts no responsibility for how they are used. SNOMED International makes no guarantee that these subsets will be maintained moving forward after new releases of the SNOMED CT International Edition are published.
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