

# COVID-19 and SARS-CoV-2 in SNOMED CT: Advice on competing International and UK codes

Published 14 May 2021

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## Introduction and purpose

This document is aimed at users preparing to implement the May 2021 UK Edition of SNOMED CT. The document:

- Highlights and explains issues regarding overlap between concepts included in the UK Extension and those included in the January 2021 International data relating to the documentation of a number of COVID-19 and SARS-CoV-2 items, and the potential data quality risks of such overlap.
- Describes steps to mitigate against these risks, including:
  - Data modifications undertaken by NHS Digital
  - Promoting awareness and use of published guidance materials
  - Additional suggestions and guidance relating to data retrieval

## Summary guidance

For reasons explored in the Background and Topic-specific guidance sections, NHS Digital anticipate that users may encounter competing UK and International SNOMED CT codes relevant to a number of COVID-19 and SARS-CoV-2 data items, notably relating to the following topic:

- Long-term effects of COVID-19
- SARS-CoV-2 vaccination and adverse reactions
- SARS-CoV-2 antibody test results

The presence of these competing or overlapping codes may present a risk to data quality. To mitigate against these risks the general guidance from NHS Digital is as follows:

- **For data entry** (in particular, situations when clinicians are selecting SNOMED CT codes to put in electronic patient records (EPRs):
  - Make use of published recommended guidance, training materials and codes or code lists in system design, and
  - Implement mechanisms which will direct users towards the recommended UK codes for each COVID-19 and SARS-CoV-2 topic, and which will discourage or prevent users from selecting (or, optionally, also even seeing) the competing International codes.
- **For data retrieval** (in particular, systems that run queries over already captured EPR data):
  - Do not assume that the data will only contain recommended UK codes. Instead consider whether any of the International codes may have been introduced to the data under study and modify queries accordingly.
  - Query modification may include extending query specifications to include selected International codes, keeping track of International code use and counts (which could be fed back to data sources to improve quality) and making judgements as to the semantics of the International codes in the context of each analysis (especially whether there are 'pairs' of UK and International codes that can be regarded as having 'the same' meaning).

The Background section provides an explanation as to why these overlaps are present in the data at all, and why they are particularly significant in the context of COVID-19 and SARS-CoV-2. The subsequent Topic-specific guidance sections expand this general guidance and provide greater detail for each area.

## Background

During 2020 NHS Digital issued several hundred new COVID-19-related codes within its extension. These include several to record and message aspects of SARS-CoV-2 antibody test results and SARS-CoV-2 vaccination events, as well as codes relating to the diagnosis and management of the long-term effects of COVID 19.

For its January 2021 release, the new version of the International data also adds new codes in all three of these areas. The new International codes will provide valuable support for COVID-19 testing, vaccination and management of the long-term effects of COVID 19 in many other SNOMED-using countries that do not have their own extensions.

The assessment of NHS Digital is that these new codes, in combination with the existing UK extension data (and released to the service in the May 2021 UK Edition) have potential, if selected for data entry, to disrupt established UK recording and data flows.

Users entering data will select codes that represent the idea they wish to record. By selecting these alternative International codes they may be using codes that are either (a) slightly different in meaning to recommended UK codes or (b) very similar in meaning but not the actual codes recommended for use and thus may be missed by analysis systems.

In a sense this phenomenon is not new: by design SNOMED CT contains examples of content with subtle differences in meaning. Sometimes the resulting overlaps reflect gradually evolving clinical practice (such as modified disease stratifications and definitions) and sometimes they reflect differences between local and international practice and understanding.

When these partial overlaps in meaning appear over longer timescales the service can react accordingly: clinical practice, clinical discourse and system designs have time to adjust, and recording practice settles on new agreed sets of codes for use.

By contrast, in the context of COVID-19 pandemic (and hence the reason for this paper) the timescales have been much shorter, the ideas being represented have been less stable, and there has been less opportunity to achieve professional consensus and familiarity with standard recording practices.

This guidance document highlights three areas of COVID-19 and SARS-CoV-2-related content where these overlaps may be a risk to data quality, and where additional steps may help mitigate against these risks. The document currently concentrates on these areas, however if NHS Digital or SNOMED CT users identify more areas of concern then the document can be adjusted accordingly.

## Topic-specific guidance

The following sections expand on the general guidance above to mitigate against data quality risks for both data entry and retrieval and provide greater detail for each area.

### Long-term effects of COVID-19

#### UK and International competing codes

Added for December 2020, the UK extension includes three codes to support the distinction, for recording purposes, between various acute and long-term COVID-19 diagnoses:

- **1325171000000109** Acute COVID-19 infection
- **1325181000000106** Ongoing symptomatic COVID-19

- **1325161000000102 Post-COVID-19 syndrome**

The choice of the three codes and the wording of their terms is deliberately a close mirror of the thinking in [NICE Guideline NG188](#), which also sets out detailed cases definitions that include exactly how long the ‘prolonged’ symptoms must be in order to qualify as a case of each:

- **Acute COVID-19:** signs and symptoms of COVID-19 for up to 4 weeks.
- **Ongoing symptomatic COVID-19:** signs and symptoms of COVID-19 from 4 to 12 weeks.
- **Post-COVID-19 syndrome:** signs and symptoms that develop during or after an infection consistent with COVID-19, continue for more than 12 weeks and are not explained by an alternative diagnosis.

An additional feature of the UK content is that it follows NG188 in avoiding the popular label ‘Long COVID’ for purposes of recording and case analysis. Therefore, this term does not appear in the UK edition against any of the three codes, and unmodified searches for ‘long COVID’ will not find any match in current UK SNOMED CT browsers.

The new International data content includes three codes with very similar terms:

- **1119302008 Acute COVID-19**
- **1119303003 Post-acute COVID-19**
- **1119304009 Chronic post-COVID-19 syndrome**

... of which 1119303003 Post-acute COVID-19 additionally carries both ‘Long COVID’ and ‘Long-haul COVID’ as synonyms. Two International codes also come with detailed case definitions as ‘text definitions’ in the new SNOMED release itself:

- **1119303003 Post-acute COVID-19 (disorder)**
  - Symptoms attributed to SARS-CoV-2 infection that persist for more than three weeks following onset.
- **1119304009 Chronic post-COVID-19 syndrome**
  - Symptoms related to COVID-19 that persist more than 12 weeks following onset.

There is therefore very near equivalence of meaning only in respect of:

**UK: 1325161000000102 Post-COVID-19 syndrome more than 12 weeks**

**INT: 1119304009 Chronic post-COVID-19 syndrome more than 12 weeks**

...noting that neither carries an alternative term of ‘Long COVID’.

Meanwhile, there is significant overlap but not equivalence between:

**UK: 1325171000000109 Acute COVID-19 infection up to 4 weeks**

**INT: 1119302008 Acute COVID-19 up to 3 weeks**

and

**UK: 1325181000000106 Ongoing symptomatic COVID-19 > 4 but < 12 weeks**

**INT: 1119303003 Post-acute COVID-19 > 3 but < 12 weeks**

Given all the above, from May 2021 UK clinicians may encounter several choices for recording judgements as to whether a patient should be considered as having prolonged symptomatic COVID-19:

1325171000000109 Acute COVID-19 infection up to 4 weeks

1119302008	Acute COVID-19	up to 3 weeks
1325181000000106	Ongoing symptomatic COVID-19	> 4 but < 12 weeks
<b>1119303003</b>	<b>Post-acute COVID-19</b>	<b>&gt; 3 but &lt; 12 weeks</b>
1325161000000102	Post-COVID-19 syndrome	more than 12 weeks
1119304009	Chronic post-COVID-19 syndrome	more than 12 weeks

Of these, if the data is indexed for searching using all International terms, only the one in bold (1119303003) will appear if the search includes the keywords 'long' and 'COVID'.

## Mitigating steps and guidance

### Current guidance

**Data entry:** Consistent UK recording of diagnostic assertions regarding the long-term effects of COVID-19 can be assisted by making use of the following published guidance:

- [NICE Guideline \[NG188\]: COVID-19 rapid guideline: managing the long-term effects of COVID-19](#)
  - The UK diagnostic codes are included in the [rationales](#) section.
- [National guidance for post-COVID syndrome assessment clinics](#) published by NHS England & NHS Improvement
  - Along with a suggested set of SNOMED CT codes to capture detailed aspects of patient management, the UK diagnostic codes are included in two 'minimum data set' lists in appendixes B and C.

### Mitigating steps

If users are only offered the UK published codes at the time of making an EHR diagnosis entry (e.g. using a data entry template designed according to the guidance above) then it would be hoped that consistent recording can be achieved. If, however, recording workflow includes an element of searching through less-constrained SNOMED CT (e.g. in a browser or search control) then there is a risk that the alternative, International codes may be matched and selected.

A particular risk is if the search contains the keywords 'long' and 'COVID'. These will – in an unmodified search and if they match anything – only return the International code 1119303003 Post-acute COVID-19. Not only would this lead to the recording of a non-recommended UK code, but also would result in the selection of an International code with a time frame of 'greater than 3 but less than 12 weeks', which may well not be what the clinician wanted if they had in mind the enduring 'greater than 12 weeks' phenomenon.

In order to limit the availability of the International 1119303003 Post-acute COVID-19 code (with its 'long' synonyms), NHS Digital will 'hide' the 'long-' containing terms (carried by 1119303003) to minimise its detection in search-based workflows:

- *Long COVID-19*
- *Long-haul COVID-19*

This 'hiding' is achieved by omitting the relevant 'description identifiers' from the NHS Realm language reference set (RLR).

In *theory* this ought to result in their non-availability to users for indexing, searching and data entry – it is essentially not possible to build well-formed SNOMED CT data without using the RLR file. However, it is also not possible to know that this is what will happen in every implementation, so it cannot be regarded as a guarantee of their exclusion from records.

## Additional guidance

### Data retrieval and analysis:

Given that, despite everyone’s best efforts, there may still be instances of ‘competing’ International codes in data sets used for subsequent analysis, NHS Digital suggests that analysis is designed and performed on the assumption that *some* International codes may be present. This will mean considering extending query specifications to detect international codes and then to try and understand how, in the context of the data under study, they relate to the intended UK codes.

As explored in the discussion above, there are three UK and three International diagnosis codes, so it is tempting to regard them as having some kind of simple 1:1 correspondence. However it is not simple:

- Only one of the three in each scheme share a time period (the ‘more than 12 week’ ‘post...’ codes) and may be matched with some degree of confidence.
- Of the other two, the ‘acute’ pair differ in their 3 or 4 week upper bound, and the ongoing symptomatic/post-acute pair differ by lower bound dates and by the (potential) presence of ‘long...’ synonyms on the international code (meaning it may therefore have been selected to record the enduring ‘12+ week’ phenomenon):

UK codes:	Correspondence ‘confidence’ (see text)	International codes:
1325171000000109 Acute COVID-19 infection	✓/✗ 3 vs 4 weeks	1119302008 Acute COVID-19
1325181000000106 Ongoing symptomatic COVID-19	✗ ✗ 3 vs 4 weeks and ‘Long...’ synonyms	1119303003 Post-acute COVID-19 (syns: ‘Long COVID’ and ‘Long-haul COVID’)
1325161000000102 Post-COVID-19 syndrome	✓ > 12 weeks	1119304009 Chronic post-COVID-19 syndrome

It may therefore not be possible to determine correspondence with complete confidence, however knowledge of how the data had been collected may give a clue to how any International codes were introduced, and thus what they ‘mean’ or are the ‘same as’ when compared to UK codes.

## SARS-CoV-2 vaccination and adverse reactions

### UK and International competing codes

For the most part, the new International codes relating to SARS-CoV-2 vaccination add details not required within the UK solution, mainly in respect of whether the vaccine product was an mRNA or antigen vaccine type. This additional content will therefore be mainly an ever present “noise” whenever clinicians search for codes relating to COVID vaccination.

## The full list of International codes is given in Contact details

If you have any questions about the topics discussed in this document please contact NHS Digital at:



covid19information.standards@nhs.net.

For the latest information on NHS Information Standards relevant to COVID-19, please visit:  
[https://hscic.kahootz.com/connect.ti/COVID19\\_info\\_sharing/grouphome](https://hscic.kahootz.com/connect.ti/COVID19_info_sharing/grouphome)

Appendix 1.

There are, however, some new codes within the set that are near duplicates of those already within the UK extension, and therefore have the capability to disrupt the designs currently supporting the UK's national SARS-CoV-2 vaccination programme.

For example, when recording whether a first or second vaccine dose has just been given, the UK solution provides and recommends only these two codes, regardless of which vaccine *product* was used:

- **132468100000101 Administration of first dose of SARS-CoV-2 vaccine**
- **132469100000104 Administration of second dose of SARS-CoV-2 vaccine**

..the detail of *which vaccine product* used is handed off entirely to the associated prescribing record. However, the new International code set introduces the following codes which do include reference to the broad type of SARS-CoV-2 vaccine (antigen vs. mRNA):

- **840534001 Administration of SARS-CoV-2 antigen vaccine**
- **1119350007 Administration of SARS-CoV-2 mRNA vaccine**
- **1144997007 Administration of first dose of SARS-CoV-2 mRNA vaccine**
- **1144998002 Administration of second dose of SARS-CoV-2 mRNA vaccine**

At best, this now means there will be two different codes that a UK clinician might reasonably use to record, for example, the first dose of the Pfizer mRNA vaccine:

- **UK: 132468100000101 Administration of first dose of SARS-CoV-2 vaccine**
- **INT: 1144997007 Administration of first dose of SARS-CoV-2 mRNA vaccine**

The International code convention of naming the broad vaccine type, as well as being present in the vaccination workflow codes, is also present in adverse reaction codes: For example, consider this code from the existing UK solution:

**UK: 132466100000105 Adverse reaction to SARS-CoV-2 vaccine**

...and this new International code and its *preferred term*:

**INT: 1142180003 Adverse reaction to COVID-19 vaccine**

Superficially, these might appear to mean the same thing, but they do not. The UK one is silent on the type of vaccine that caused the reaction. By contrast, the Fully Specified Name of the International code reveals that it actually has a narrower definition, being restricted to reactions only when caused by an mRNA or antigen vaccine product:

**INT: 1142180003 Adverse reaction to component of vaccine product containing Severe acute respiratory syndrome coronavirus 2 antigen or Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid (disorder)**

Although operationally *very* similar at this time (given that no other *type* of licensed vaccine currently exists), they can't be declared equivalent (because of the potential for development of a third or subsequent distinct vaccine type) and both will remain available in the active UK data for clinicians to select. The predicted outcome would be that new episodes of adverse reactions to the vaccines may become coded to both codes, rather than only to one.



## Current guidance

Current recommended coding guidance for recording important life-cycle steps in the SARS-CoV-2 vaccination process can be found in the section titled **SNOMED CT codes relating to COVID-19 Vaccination** [here](#). As can be seen at this reference, ***all recommended clinical codes are from the UK extension.***

System developers are recommended to limit selection and recording availability to those codes specified in the standard UK list.

## Additional guidance

Data retrieval and analysis:

As explained in the ‘competing codes’ section above, the inclusion of the International set of vaccination codes means that there may still be instances of ‘competing’ International codes in data sets used for subsequent analysis. NHS Digital recommends therefore that analysis is designed and performed on the assumption that some International codes may be present.

Given the number of codes available and the variety of contexts in which they may be used this document does not attempt to produce a table of (near) equivalence. As recommended before, consideration should be given to modifying query designs to look for near-equivalent International codes, and knowledge of how the data had been collected may give clues as to how any International codes were introduced, and thus what they ‘mean’ or are the ‘same as’ when compared to UK codes.

## SARS-CoV-2 antibody test results

### UK and International competing codes

Two new codes have been added to the new International Edition, and are judged to be duplicates of existing codes for antibody test result findings already published in the UK Extension:

INT: 897034005      **Severe acute respiratory syndrome coronavirus 2 antibody test positive (finding)**

UK: 1322871000000109 **Severe acute respiratory syndrome coronavirus 2 antibody detection result positive (finding)**

INT: 897035006      **Severe acute respiratory syndrome coronavirus 2 antibody test negative (finding)**

UK: 1322891000000108 **Severe acute respiratory syndrome coronavirus 2 antibody detection result negative (finding)**

## Current guidance

The existing UK codes are currently included in the [guidance](#) for the national naming, coding and processing of SARS-COV-2 Pathology tests

These UK codes are judged to be duplicates of the new International codes, so from May 2021 the UK pair will become inactive in the UK, and they will be assigned historical SAME\_AS associations to the active International codes.

The UK guidance will be updated accordingly, and thereafter future messaging and analytics should be based on the new International codes.

Since they have been inactivated as duplicate, the challenge of these codes is different to the earlier sections. They are, however, included to indicate that on many occasions – in particular where there is agreement on true duplication – the notion of ‘competing’ codes can

be handled in SNOMED CT by the well-established ‘inactivation plus historical association’ approach.

## Data entry and retrieval

It is valuable to see that ‘inactivation plus historical association’ changes can and do happen, often in high priority areas. It is important therefore to understand the value of keeping data entry specifications, retrieval queries and documentation (a) in step with the evolving reference data and (b) aware of the techniques needed to consider and retrieve inactive components where they have previously been used for recording but are no longer detected by queries that only look for active components.

## Contact details

If you have any questions about the topics discussed in this document please contact NHS Digital at:

[covid19information.standards@nhs.net](mailto:covid19information.standards@nhs.net).

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## Appendix 1

### New international SARS-CoV-2 Vaccination codes

CONCEPTID	PREFERRED TERM	FULLY SPECIFIED NAME	SEMANTIC TAG
1119305005	SARS-CoV-2 antigen vaccine	Vaccine product containing only Severe acute respiratory syndrome coronavirus 2 antigen	(medicinal product)
1119349007	SARS-CoV-2 mRNA vaccine	Vaccine product containing only Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid	(medicinal product)
1119350007	Administration of SARS-CoV-2 mRNA vaccine	Administration of vaccine product containing only Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid	(procedure)
1144997007	Administration of first dose of SARS-CoV-2 mRNA vaccine	Administration of first dose of vaccine product containing only Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid	(procedure)
1144998002	Administration of second dose of SARS-CoV-2 mRNA vaccine	Administration of second dose of vaccine product containing only Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid	(procedure)
1142180003	Adverse reaction to COVID-19 vaccine	Adverse reaction to component of vaccine product containing Severe acute respiratory syndrome coronavirus 2 antigen or Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid	(disorder)
1142181004	Adverse reaction to COVID-19 mRNA vaccine	Adverse reaction to component of vaccine product containing only Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid	(disorder)
1142182006	Adverse reaction to COVID-19 antigen vaccine	Adverse reaction to component of vaccine product containing only Severe acute respiratory syndrome coronavirus 2 antigen	(disorder)

CONCEPTID	PREFERRED TERM	FULLY SPECIFIED NAME	SEMANTIC TAG
1142178009	SARS-CoV-2 antigen vaccine or SARS-CoV-2 mRNA vaccine	Vaccine product containing Severe acute respiratory syndrome coronavirus 2 antigen or Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid	(medicinal product)
1145003007	Hypersensitivity to SARS-CoV-2 mRNA vaccine	Hypersensitivity to vaccine product containing only Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid	(finding)
1145026000	SARS-CoV-2 vaccine contraindicated	Severe acute respiratory syndrome coronavirus 2 antigen or Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid vaccine contraindicated	(situation)
1145022003	SARS-CoV-2 mRNA vaccine contraindicated	Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid vaccine contraindicated	(situation)
1145035007	Second dose of SARS-CoV-2 mRNA vaccine contraindicated	Second dose of Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid vaccine contraindicated	(situation)
1145023008	SARS-CoV-2 antigen vaccine contraindicated	Severe acute respiratory syndrome coronavirus 2 antigen vaccine contraindicated	(situation)
1145028004	SARS-CoV-2 vaccination not indicated	Severe acute respiratory syndrome coronavirus 2 antigen or Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid vaccination not indicated	(situation)
1145029007	SARS-CoV-2 mRNA vaccination not indicated	Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid vaccination not indicated	(situation)
1145030002	SARS-CoV-2 antigen vaccination not indicated	Severe acute respiratory syndrome coronavirus 2 antigen vaccination not indicated	(situation)
1145031003	SARS-CoV-2 vaccine declined	Severe acute respiratory syndrome coronavirus 2 antigen or Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid vaccine declined	(situation)
1145032005	SARS-CoV-2 mRNA vaccine declined	Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid vaccine declined	(situation)
1145034006	Second dose of SARS-CoV-2 mRNA vaccine declined	Second dose of Severe acute respiratory syndrome coronavirus 2 messenger ribonucleic acid vaccine declined	(situation)
1145033000	SARS-CoV-2 antigen vaccine declined	Severe acute respiratory syndrome coronavirus 2 antigen vaccine declined	(situation)