IPS Terminology User Guide

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SNOMED International's IPS Terminology represents an evolution of the HL7 IPS Free Set, providing advanced terminology features for non-affiliates to use in their International Patient Summary (IPS) solutions. It adds a hierarchy, defining relationships and extra synonyms from the SNOMED CT international edition, to form a sub-ontology of SNOMED CT that can be loaded into a terminology server. A sub-ontology is a functional set of active concepts and relationships extracted from the full SNOMED CT ontology, that provides similar features for users that do not have access to a complete SNOMED CT Edition. The IPS Terminology is made available by SNOMED International as a free resource to support IPS implementations in non-Member countries and territories.

This user guide provides an overview of the IPS Terminology's scope and features, how to implement the IPS Terminology in a terminology server, some IPS Terminology use cases, and how to upgrade to a full SNOMED CT edition if additional terminology content is required.

Please note, users located in a Member country or territory, or with a valid affiliate license, should implement the IPS using a full edition of SNOMED CT, rather than the smaller IPS Terminology described in this guide.

Web browsable version: http://snomed.org/ipstug

SNOMED CT Document Library: http://snomed.org/doc

1 http://www.ihtsdo.org/
2 mailto:info@ihtsdo.org

1 1. Introduction

1.1 Background

SNOMED CT is the most comprehensive clinical terminology in use around the world. It enables clinicians to consistently record high-quality clinical content in electronic health records. SNOMED CT provides a standardized way to represent clinical phrases captured by the clinician, and enables the automatic interpretation and querying of these. The SNOMED CT terminology has unmatched breadth and depth and continues to grow and evolve, enabling clinicians to record data with enhanced accuracy and relevance. SNOMED CT is mapped to a range of other international standards and is used in more than eighty countries. To learn more about SNOMED CT please visit the SNOMED CT 5 step briefing[3] and Why SNOMED CT[4].

SNOMED International is a not-for-profit organization that owns and maintains SNOMED CT. SNOMED International is governed by representatives from more than 40 Member countries/territories and has participation from a strong community of experts. To learn more about SNOMED International and Membership please visit Who we are[5] and Get SNOMED CT[6].

The **International Patient Summary (IPS)** is a minimal and non-exhaustive set of basic clinical data of a patient, specialty-agnostic, condition-independent, but readily usable by all clinicians. The primary use case for the IPS is to support cross-border, unscheduled patient care. However, it has the potential to be used in many other use cases where the patient crosses information systems, like travel between provinces, cities, or organizations that use a different Health Information System and require a summary for immediate care. The IPS is maintained by a collaboration of different Standard Development Organizations including ISO, CEN, HL7 International, IHE International, and SNOMED International. To learn more about the IPS please visit the International Patient Summary[7] and the HL7 FHIR IPS Implementation Guide[8].

Since 2019, SNOMED International has made a free set of SNOMED CT codes available (the **HL7 IPS free set**), as part of the Global Patient Set (GPS)[9] to support the implementation of the HL7 FHIR IPS specification[10].

The new **IPS Terminology** is the next evolution of the HL7 IPS free set, providing advanced terminology features for non-Affiliates to use in their IPS implementations.

1.2 User Guide Scope

The IPS Terminology User Guide is designed to support implementers in non-Member regions, who plan to offer IPS functionality in a healthcare system, and need to understand the features, capabilities and limitations of the IPS Terminology package. This user guide provides an overview of the IPS Terminology's scope and features, how to implement the IPS Terminology in a terminology server, some IPS Terminology use cases, and how to upgrade to a full SNOMED CT edition if additional terminology content is required. The user guide also provides links to more detailed documentation and instructions, where relevant.

3 https://www.snomed.org/snomed-ct/five-step-briefing
4 https://www.snomed.org/snomed-ct/why-snomed-ct
5 https://www.snomed.org/snomed-international/who-we-are
6 https://www.snomed.org/snomed-ct/get-snomed
7 https://international-patient-summary.net
8 https://hl7.org/fhir/uv/ips
9 https://gps.snomed.org/
10 https://hl7.org/fhir/uv/ips

The design, content, and implementation techniques for SNOMED CT are described elsewhere - e.g. in the SNOMED CT Document Library[11] and the SNOMED CT Implementation Support Portal[12]. The design of the IPS information structures and their binding to SNOMED CT value sets are also documented elsewhere - e.g. in the HL7 FHIR IPS Implementation Guide[13].

1.3 Target Audience

The IPS Terminology and this user guide are provided to support non-Affiliates (i.e. users without a license to a full SNOMED CT edition), who need to implement an IPS solution for use cases such as patient data entry, interoperable information exchange, and simple data analytics. Non-Affiliates will be able to implement the basic features of SNOMED CT with this free resource.

The guide contains an overall description of the IPS Terminology and its features for decision-makers and it contains technical documentation for implementers.

All users either in a SNOMED International Member region or with an Affiliate license to a complete SNOMED CT edition, should **NOT** use the IPS Terminology. Instead, they should implement their IPS solutions using a full edition of SNOMED CT. To share IPS data with non-Affiliates, licensed users may choose to refer to the IPS Reference Set, available as a separate download on MLDS[14]. This reference set identifies the subset of key concepts from the IPS Terminology and is available as a supplementary package from SNOMED International's MLDS service[15].

11 http://snomed.org/doc
12 http://snomed.org/support
13 https://hl7.org/fhir/uv/ips
14 https://mlds.ihtsdotools.org/
15 https://mlds.ihtsdotools.org

2 2. IPS Terminology Overview

2.1 SNOMED CT HL7 IPS Free Set

In 2019, SNOMED International and HL7 International announced the formalization of a license agreement in which a relevant "Free for Use" Set of SNOMED CT coded concepts will be used within the HL7 International Patient Summary (HL7 IPS). HL7 is a not-for-profit, ANSI-accredited standard developing organization dedicated to providing a comprehensive framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information that supports clinical practice and the management, delivery, and evaluation of health services. The HL7 IPS is a minimal and non-exhaustive patient summary dataset, specialty-agnostic, and condition-independent, but readily usable by clinicians for the cross-border unscheduled care of a patient. The collaboration is consistent with the aims of both organizations to support international harmonization.

The SNOMED CT International Patient Summary (IPS) is international in scope and in addition to harmonization with HL7 IPS, is aligned with CEN's European Standard for the Patient Summary. The IPS free set consists of more than 8,000 SNOMED CT terms for use in implementations of the HL7 CDA R2 and FHIR IPS Implementation Guides worldwide. The SNOMED CT HL7 IPS free set contains concepts that can record the following data:

- General information about the patient (e.g., gender)
- Medical summary of most important clinical data (e.g., allergies, current medical problems, major surgical procedures)
- A list of current medications

The HL7 IPS Free Set is available for non-affiliates directly from HL7, and as part of the Global Patient Set[16] a package that collects different free sets released by SNOMED International, these releases consists of a list of concept identifiers, fully specified names, preferred terms (in international English) and active/inactive status flags. The HL7 IPS Free Set is designed to support data sharing. However, it lacks the additional capabilities of the SNOMED CT terminology, which is available via a full SNOMED CT release. The HL7 IPS Free Set is also available for Members and Affiliates as a reference set, distributed in a RF2 release package via a National Release Center or the international MLDS service[17]. This reference set is maintained and updated annually, in line with the July SNOMED CT International Release. For more information, please contact info@snomed.org[18].

2.2 IPS Terminology

SNOMED International's IPS Terminology represents an evolution of the HL7 IPS Free Set, providing advanced terminology features for non-affiliates to use in their IPS solutions. In particular, it adds a hierarchy, defining relationships and extra synonyms from the SNOMED CT international edition, to form a sub-ontology of SNOMED CT. A sub-ontology is a functional set of concepts and relationships extracted from the full SNOMED CT ontology that provides the following features:

- It can be loaded in a SNOMED CT compatible terminology server
- It includes all the active concepts from the HL7 IPS Free Set
- The concepts are organized into the same hierarchies as the SNOMED CT International Edition (e.g., Clinical Findings, Procedures)
- The content is expanded to include a minimal set of additional grouper concepts
- The content also includes (inferred) relationships that define the meaning of the included concepts
- The US-English and GB-English language reference sets are included just like in the complete International Edition

16 https://www.snomed.org/snomed-international/learn-more/global-patient-set
17 https://mlds.ihtsdotools.org
18 mailto:info@ihtsdo.org

- ECL (Expression Constraint Language) queries can be executed over the IPS Terminology to support value set definitions and simple data analytics

Please note that the IPS Terminology contains only a subset of the full international release of SNOMED CT, and therefore the features above are limited to this restricted content.

The IPS Terminology is made available as an RF2 package with a similar format to other SNOMED CT releases. However, the package is not fully RF2 compatible, the content is available only in "snapshot" format (i.e. the current state of each component), and it includes only components that are active at the time the terminology is extracted. The relationship ids are published using temporary ids. Each IPS Terminology release replaces the previous one, providing a new snapshot of active content; it's not designed for incremental updates.

The IPS Terminology package does not include historical information (which is normally available to licensed Affiliates in full SNOMED CT releases).

The IPS Terminology package can be loaded into SNOMED International's Snowstorm[19], a freely available, open-source terminology server maintained by SNOMED International. SNOMED International provides a browser for the IPS Terminology[20].

2.2.1 Feature Comparison

The IPS Terminology is a subset of the SNOMED CT International Edition. It is designed to provide the necessary terminology features for a simple IPS implementation. It has more features than the IPS Free Set, but less than a complete SNOMED CT edition. A complete SNOMED CT edition provides advanced features to improve the capabilities of an implementation.

The table below provides a high-level comparison of the key features of each type of terminology resource.

Feature	IPS Free Set	IPS Terminology	SNOMED CT International Edition
Concepts	8,000+	15,000+	354,000+
Descriptions	16,000+ (FSN and preferred synonym)	42,000+ (all types)	1,276,000+ (all types)
Relationships	No	40,000+	1,215,000+
Hierarchies	No	Yes, limited	Yes, all
ECL support	No	Yes	Yes
Stated axioms	No	No	Yes
Module dependency	No	No	Yes

19 https://github.com/IHTSDO/Snowstorm
20 http://ips-browser.snomedtools.org/

Feature	IPS Free Set	IPS Terminology	SNOMED CT International Edition
History mechanisms	No	No	Yes
RF2 format	No	Active Snapshot only	Full, Snapshot, Delta (computable)
Terminology server use	No	Yes	Yes
Postcoordination support	No	No	Yes
Extension support	No	No	Yes

2.2.2 Example of Use

The HL7 FHIR IPS Implementation guide[21] specifies the terminology binding for each of the coded data elements within the IPS composition[22]. For example, the Procedures-IPS value set[23] defines the valid values for the 'code' data element in the Procedures resource[24]. The Procedures-IPS value set[25] is defined using a logical definition, consisting of the following inclusion and exclusion clauses.

- Include codes from `http://snomed.info/sct`[26] where concept descends from 71388002 (Procedure)
- Exclude codes from `http://snomed.info/sct`[27] where concept is-a 14734007 (Administrative procedure)
- Exclude codes from `http://snomed.info/sct`[28] where concept is-a 59524001 (Blood bank procedure)
- Exclude codes from `http://snomed.info/sct`[29] where concept is-a 389067005 (Community health procedure (procedure))
- Exclude codes from `http://snomed.info/sct`[30] where concept is-a 442006003 (Determination of information related to transfusion)
- Exclude codes from `http://snomed.info/sct`[31] where concept is-a 225288009 (Environmental care procedure)

21 https://hl7.org/fhir/uv/ips
22 http://hl7.org/fhir/uv/ips/ipsStructure.html
23 http://hl7.org/fhir/uv/ips/ValueSet-procedures-uv-ips.html
24 http://hl7.org/fhir/uv/ips/StructureDefinition-Procedure-uv-ips.html
25 http://hl7.org/fhir/uv/ips/ValueSet-procedures-uv-ips.html
26 http://www.snomed.org/
27 http://www.snomed.org/
28 http://www.snomed.org/
29 http://www.snomed.org/
30 http://www.snomed.org/
31 http://www.snomed.org/

- Exclude codes from `http://snomed.info/sct`[32] where concept is-a 308335008 (Patient encounter procedure)
- Exclude codes from `http://snomed.info/sct`[33] where concept is-a 710135002 (Promotion (procedure))
- Exclude codes from `http://snomed.info/sct`[34] where concept is-a 389084004 (Staff related procedure (procedure))

This logical definition is equivalent to the following SNOMED CT Expression Constraint (ECL) query[35], which can be executed against any full edition of SNOMED CT to extract the list of concepts to include in this value set.

```
< 71388002 |Procedure|[36]
  MINUS (< 14734007 |Administrative procedure|[37]
    OR < 59524001 |Blood bank procedure|[38]
    OR < 389067005 |Community health procedure|[39]
    OR < 442006003 |Determination of information related to transfusion|[40]
    OR < 225288009 |Environmental care procedure|[41]
    OR < 308335008 |Patient encounter procedure|[42]
    OR < 710135002 |Promotion|[43]
    OR < 389084004 |Staff related procedure|[44] )
```

When using the IPS Terminology for recording and sharing IPS data, it may be necessary to simplify these terminology bindings to ensure that only codes included in the IPS Terminology are referenced by the ECL query. For this example, the following query (which refers only to concepts contained in the IPS Terminology) can be used to extract the list of IPS Terminology concepts to include in this value set.

```
< 71388002 |Procedure|[45]
  MINUS (< 14734007 |Administrative procedure|[46]
    OR < 308335008 |Patient encounter procedure|[47] )
```

This ECL expression can be submitted to a terminology server (on which the IPS Terminology has been installed), via a standard HL7 FHIR Terminology Services API[48], to extract the SNOMED CT concepts that may be used in the Procedures-IPS value set. This capability is available in all standard SNOMED CT Releases, but it was not previously possible with the HL7 IPS Free Set. However, this has been enabled by the new features of the IPS Terminology. Using ECL expressions in this way, implementers can update their value sets with each new release of the IPS Terminology.

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32 http://www.snomed.org/
33 http://www.snomed.org/
34 http://www.snomed.org/
35 http://snomed.org/ecl
36 http://snomed.info/id/71388002
37 http://snomed.info/id/14734007
38 http://snomed.info/id/59524001
39 http://snomed.info/id/389067005
40 http://snomed.info/id/442006003
41 http://snomed.info/id/225288009
42 http://snomed.info/id/308335008
43 http://snomed.info/id/710135002
44 http://snomed.info/id/389084004
45 http://snomed.info/id/71388002
46 http://snomed.info/id/14734007
47 http://snomed.info/id/308335008
48 http://www.hl7.org/implement/standards/fhir/snomedct.html

3 3. Using a Terminology Server

3.1 Overview

The recommended approach for implementing the IPS Terminology within a software application is to use a terminology server. In a service-oriented architecture, software like Electronic Health Records and Data Analytics tools can delegate all terminology operations to a terminology server. The IPS Terminology can be loaded into Snowstorm[49], the open-source terminology server developed by SNOMED International.

3.2 a. Download the IPS Terminology

Before you can start using the IPS Terminology, you must first download the IPS Terminology package from the IPS Terminology website[50]. The IPS Terminology package uses the same format as the RF2 (Release format 2[51]) release file specification. However, the IPS Terminology package is a subset of the complete SNOMED CT international release, containing only active components in the SNAPSHOT release format. It does not include historical content, complete metadata values, or stated Description Logic axiom definitions. All these features are available in any complete SNOMED CT Edition.

The IPS Terminology's RF2 zip package will be used in the terminology server import process described below, using Snowstorm as an example. Please refer to your terminology server documentation for further instructions.

3.3 b. Download Snowstorm

Snowstorm[52] is an open-source terminology server developed and maintained by SNOMED International. To download the most recent release of Snowstorm, please visit Snowstorm's GitHub repository releases page[53], and follow the installation instructions[54].

3.4 c. Load the IPS Terminology into Snowstorm

The IPS Terminology package is designed to be loaded into an empty terminology server instance. Follow the standard steps described in the Snowstorm configuration guide[55] to import the IPS Terminology package into the MAIN branch as the only terminology in the Snowstorm instance.

---

49 https://github.com/IHTSDO/snowstorm
50 https://www.value.snomed.org/international-patient-summary-terminology
51 https://confluence.ihtsdotools.org/display/DOCRELFMT
52 https://github.com/IHTSDO/snowstorm
53 https://github.com/IHTSDO/snowstorm/releases/
54 https://github.com/IHTSDO/snowstorm/blob/master/docs/getting-started.md
55 https://github.com/IHTSDO/snowstorm/blob/master/docs/loading-snomed.md

After the import process is complete, the IPS Terminology content will be available for access through the terminology server's APIs.

3.5 d. Access the IPS Terminology via the FHIR API

Snowstorm offers a standard FHIR API that implements the HL7 FHIR Terminology Module specification[56]. This provides access to the terminology using FHIR Operations and returning content structured as FHIR Resources, the full specification of the SNOMED CT representation in FHIR is available in the FHIR documentation[57].

3.5.1 Base URL

The terminology server API will be exposed through the server that the Snowstorm instance is running. For example, if the server is using port 8080 on your local machine - i.e.

```
http://localhost:8080
```

Then the base URL for the FHIR API would be:

```
http://localhost:8080/fhir[58]
```

3.5.2 FHIR Operations

The FHIR terminology services API can support a range of common implementation use cases, including powering searches in a user interface, filtering content for specific clinical fields (by applying an ECL constraint to the terms entered by the user), and restricting results to a particular clinical domain (e.g., diseases, procedures, substances). In the following sections, we explain some common FHIR terminology operations that can be used for these implementation purposes.

3.5.2.1 CodeSystem.$lookup

The FHIR CodeSystem lookup[59] operation returns information about a concept (e.g. definition status and descriptions) based on the given SNOMED CT concept identifier (code). For example:

```
http://localhost:8080/fhir[60]/CodeSystem/$lookup?system=http://snomed.info/
sct&code=900000000000508004[61]
```

The parameters include the "system" (i.e. "sct") and the "code" to look for (e.g. "900000000000508004"). One of the use cases for the lookup operation is to retrieve terms and properties for a concept id received from another system.

56 https://hl7.org/fhir/terminology-module.html
57 https://hl7.org/fhir/snomedct.html
58 http://localhost:8080/swagger-ui.html
59 https://hl7.org/fhir/codesystem-operation-lookup.html
60 http://localhost:8080/swagger-ui.html
61 https://snowstorm-fhir.snomedtools.org/fhir/CodeSystem/$lookup?system=http://snomed.info/sct&code=900000000000508004

3.5.2.2 CodeSystem.$validate-code

The validate-code[62] operation is used to validate if a code is included in the given code system. For example:

http://localhost:8080/fhir[63]/CodeSystem/$validate-code?system=http://snomed.info/sct&code=155574008[64]

The parameters include the "system" (i.e. "sct") and the "code" to validate (e.g. "155574008"). One example of a use case for validation is to check if a given conceptId is a valid SNOMED CT concept.

3.5.2.3 ValueSet.$expand

The expand[65] operation retrieves a list of concepts that are part of a value set, with the option of filtering by a text string. For example:

http://localhost:8080/fhir[66]/ValueSet/$expand?url=http://snomed.info/sct?fhir_vs=ecl/%3C%2071388002&count=20&includeDesignations=true&filter=append[67]

In this example, the URL parameters include an implicit value set (i.e. "fhir_vs=ecl/") defined using an ECL Expression[68], with a text filter using the "filter" parameter (i.e. "filter=append"). The example above will find the procedures ("< 71388002"), which match the search string "append".

3.5.3 Examples

The following example URLs use the public Snowstorm API provided by SNOMED International. Please click on these links to see an example of each response.

- Lookup: https://snowstorm.snomedtools.org/fhir/CodeSystem/$lookup?system=http://snomed.info/sct&code=900000000000508004
- Validate: https://snowstorm.snomedtools.org/fhir/CodeSystem/$validate-code?system=http://snomed.info/sct&code=155574008
- Expand: https://snowstorm.snomedtools.org/fhir/ValueSet/$expand?url=http://snomed.info/sct?fhir_vs=ecl/%3C%2071388002&count=20&includeDesignations=true&filter=append

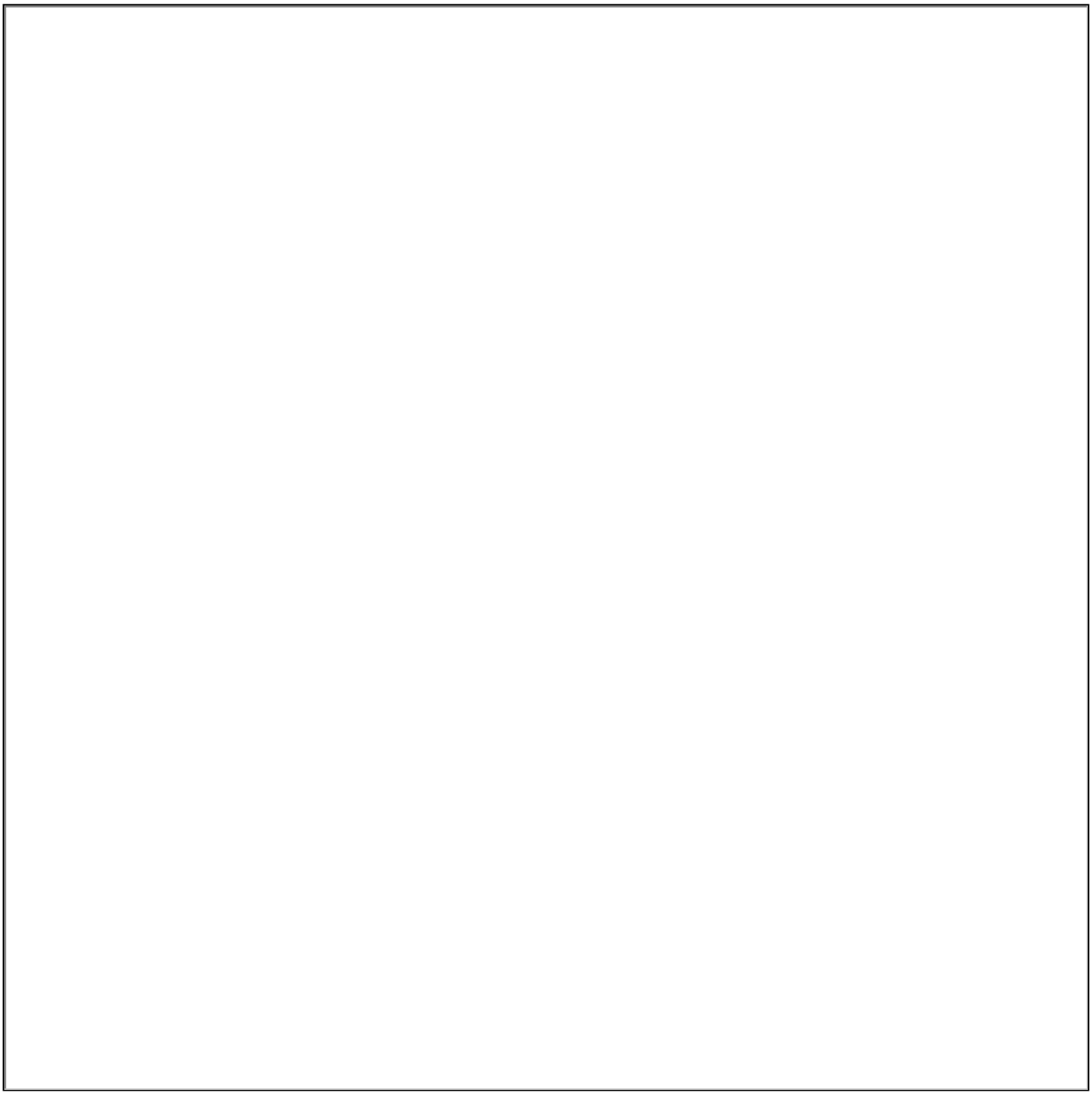
3.6 e. Use the IPS Terminology in a software application

Using the HL7 FHIR terminology services API, as described in the previous section, a clinical application can enable the user to search for clinical elements in the IPS Terminology. The search can be constrained to a specific domain (e.g. Conditions or Procedures) using the ECL query language[69]. For example, as shown below, a Procedure data entry field can be bound to the procedure codes in the IPS terminology using the ECL query "< 71388002 | Procedure|" in a ValueSet.$expand operation. Note: The ECL query is shown in its terse, percent-encoded form within the URL below (i.e. "%3C%2071388002")

62 https://hl7.org/fhir/codesystem-operation-validate-code.html
63 http://localhost:8080/swagger-ui.html
64 https://snowstorm-fhir.snomedtools.org/fhir/CodeSystem/$validate-code?system=http://snomed.info/sct&code=155574008
65 https://hl7.org/fhir/valueset-operation-expand.html
66 http://localhost:8080/swagger-ui.html
67 https://snowstorm-fhir.snomedtools.org/fhir/ValueSet/$expand?url=http://snomed.info/sct?fhir_vs=ecl/%3C%2071388002&count=20&includeDesignations=true&filter=append
68 https://confluence.ihtsdotools.org/display/DOCECL
69 http://snomed.org/ecl

http://localhost:8080/fhir[70]/ValueSet/$expand?url=http://snomed.info/sct?fhir_vs=ecl/%3C%2071388002&count=20&includeDesignations=true&filter=append[71]

This API call (which includes the term filter "append") can be used to create a user interface similar to this one:



The terminology code system and code system version used to refer to the IPS Terminology are shown below:

- Code system
    - coding.system = "http://snomed.info/sct"

70 http://localhost:8080/swagger-ui.html
71 https://snowstorm-fhir.snomedtools.org/fhir/ValueSet/$expand?url=http://snomed.info/sct?fhir_vs=ecl/%3C%2071388002&count=20&includeDesignations=true&filter=append

- Code system version
  - coding.version = "http://snomed.info/sub/999991001000101"
  - coding.version = "http://snomed.info/sub/999991001000101/version/<publicationDate>"
    - e.g., "http://snomed.info/sub/999991001000101/version/20220430"

If a terminology server is not available, it is possible to create a plain list from the RF2 files, but the most advanced features described in this guide (e.g., concept hierarchies and ECL queries) are not supported by the HL7 IPS Free Set. Users without access to a terminology server can also browse the IPS Terminology and execute ECL queries (for design-time use) in the IPS Terminology browser provided by SNOMED International[72].

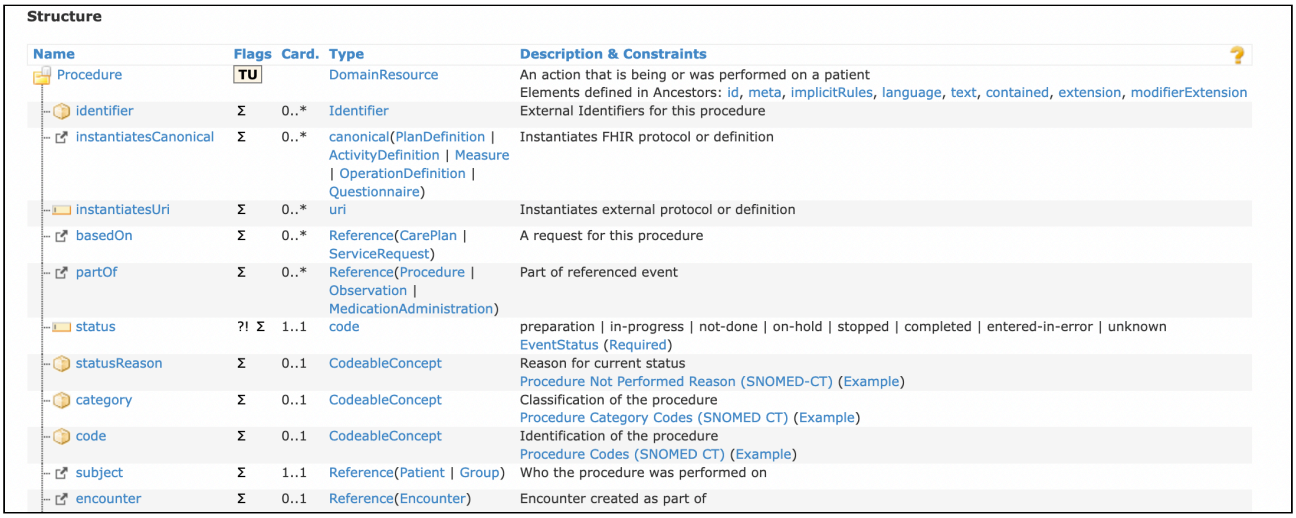
3.7 f. Store IPS Terminology codes in FHIR resources

The FHIR IPS Implementation Guide[73] describes the FHIR resources that are collected into an IPS bundle. Some data elements in these resources use the datatype "CodeableConcept" and are bound to a SNOMED CT value set. These data elements can be populated with codes from the IPS Terminology via a Terminology Server. For example, a response for a **ValueSet.$expand** operation, which selects all procedures, may look like this:


```
{
  "resourceType": "ValueSet",
  "url": "http://snomed.info/sct?fhir_vs=ecl/< 71388002",
  "expansion": {
    "total": 49,
    "offset": 0,
    "contains": [
      {
        "system": "http://snomed.info/sct",
        "code": "80146002",
        "display": "Appendectomy",
        "designation": [ … ] // 4 items
      },
      {
        "system": "http://snomed.info/sct",
        "code": "17041004",
        "display": "Incision of appendix",
        "designation": [ … ] // 3 items
      },
      {
        "system": "http://snomed.info/sct",
        "code": "51113007",
        "display": "Lysis of adhesions of appendix",
        "designation": [ … ] // 3 items
      },
```


The "expansion.contains" property lists all the matches, and each one includes the necessary values for populating a CodableConcept data element. For example, this might be used to populate the "code" data element in a FHIR Procedure resource[74].

72 http://ips-browser.snomedtools.org/
73 http://hl7.org/fhir/uv/ips/
74 https://www.hl7.org/fhir/procedure.html



Structure

Name	Flags	Card.	Type	Description & Constraints
Procedure	TU		DomainResource	An action that is being or was performed on a patient Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	External Identifiers for this procedure
instantiatesCanonical	Σ	0..*	canonical(PlanDefinition | ActivityDefinition | Measure | OperationDefinition | Questionnaire)	Instantiates FHIR protocol or definition
instantiatesUri	Σ	0..*	uri	Instantiates external protocol or definition
basedOn	Σ	0..*	Reference(CarePlan | ServiceRequest)	A request for this procedure
partOf	Σ	0..*	Reference(Procedure | Observation | MedicationAdministration)	Part of referenced event
status	?! Σ	1..1	code	preparation | in-progress | not-done | on-hold | stopped | completed | entered-in-error | unknown EventStatus (Required)
statusReason	Σ	0..1	CodeableConcept	Reason for current status Procedure Not Performed Reason (SNOMED-CT) (Example)
category	Σ	0..1	CodeableConcept	Classification of the procedure Procedure Category Codes (SNOMED CT) (Example)
code	Σ	0..1	CodeableConcept	Identification of the procedure Procedure Codes (SNOMED CT) (Example)
subject	Σ	1..1	Reference(Patient | Group)	Who the procedure was performed on
encounter	Σ	0..1	Reference(Encounter)	Encounter created as part of

The CodableConcept[75] data type uses a Coding[76] property to represent the details of the concept. Using SNOMED CT, the properties "System", "Code" and "Display" of a Coding[77] should always be completed. For example, this is a fragment of a FHIR Procedure resource instance[78]:

```
"status": "completed",
"code": {
  "coding": [
    {
      "system": "http://snomed.info/sct",
      "code": "73761001",
      "display": "Colonoscopy (procedure)"
    }
  ],
  "text": "Colonoscopy"
},
"subject": {
  "reference": "Patient/example"
},
```

The "version" property of the Coding data type is optional and can be completed if this value is obtained from the terminology server.

3.8 g. Update the IPS Terminology to a New Version

As SNOMED CT evolves, some concepts might be inactivated, and some new concepts may appear. A full SNOMED CT edition will include the complete history tracking of these changes, including inactive content and historical associations[79] with proposed replacements. However, any future versions of the IPS Terminology will include only the content that is active at the time of release. Therefore, to update the IPS Terminology in the terminology server, it is necessary to remove all indices and reimport the new IPS content.

75 https://www.hl7.org/fhir/datatypes.html#CodeableConcept
76 https://www.hl7.org/fhir/datatypes.html#Coding
77 https://www.hl7.org/fhir/datatypes.html#Coding
78 https://www.hl7.org/fhir/procedure-example-colonoscopy.json.html
79 https://confluence.ihtsdotools.org/display/DOCRELFMT/5.2.5.1+Historical+Association+Reference+Sets

To do this using the command-line tool of Snowstorm, the import parameters should include "–delete-indices":

```
java -Xms2g -Xmx4g -jar target/snowstorm*.jar --delete-indices --import=<Absolute-path-of-SNOMED-CT-RF2-zip>
```

If the Snowstorm instance is updated to a complete SNOMED CT edition, the first import should delete indexes in the same way. However, the second and subsequent import of a complete SNOMED CT edition can be performed as usual. These will result in incremental updates since the previous edition.

3.9 H. Request New Content for the IPS Terminology

The content of the IPS Terminology is defined by the terminology bindings created by the HL7 FHIR IPS group. All inquiries about the content of the IPS Terminology should be directed to info@snomed.org[80] or support@snomed.org[81].

80 mailto:info@snomed.org
81 mailto:support@snomed.org

4 4. Use cases

4.1 Overview

The main use cases for the IPS Terminology are:

1. Create and store IPS data within a non-Affiliate organization(see page 18)
2. Send IPS data to/from non-Affiliate users(see page 19)
3. Perform simple data analytics(see page 21)

In this section, we describe each of these IPS Terminology use cases.

4.2 Use case 1 - Create and store IPS data within a non-affiliate organization

The IPS is a summary document that can be created by a clinician to describe the most clinically important items in the patient's history. It can also be automatically derived from existing electronic clinical documents. Or it can use a mix of these two approaches.

4.2.1 Creating IPS data

When a clinical user is directly entering information into an IPS document, the software user interface will provide a structured data entry form to add content, allowing the user to search and select concepts from the IPS Terminology when appropriate.

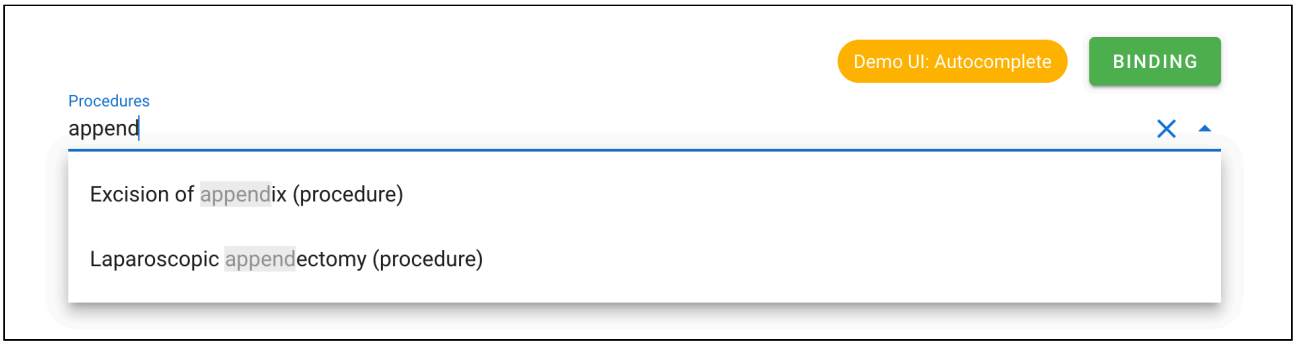
For example, in the "Procedures" section of an IPS document, the data entry software should allow the clinician to search for concepts in the IPS Terminology, which are constrained to the 71388002 | Procedure|[82] hierarchy, excluding some administrative concepts (as described in the IPS terminology binding for the procedure value set[83]). The recommended way to implement a user interface (UI) like this is to access the IPS Terminology from a terminology server and to constrain the scope of the search using an ECL query that matches with the value set inclusion and exclusion criteria.

For example, as explained in **section e** of the 3. Using a Terminology Server(see page 11) page, the following ECL

```
((< 71388002 |Procedure (procedure)|[84] )
  MINUS (< 14734007 |Administrative procedure (procedure)|[85]
    OR < 308335008 |Patient encounter procedure (procedure)|[86] ))
```

can be used in a FHIR API request to create a data entry form with a text search and autocomplete feature like this one:

82 http://snomed.info/id/71388002
83 http://hl7.org/fhir/uv/ips/ValueSet-procedures-uv-ips.html
84 http://snomed.info/id/71388002
85 http://snomed.info/id/14734007
86 http://snomed.info/id/308335008



When the content of the IPS is auto-generated from an existing electronic document, it may be possible to map the existing codes to the IPS Terminology. To do this, implementers should create maps from the existing code systems to the IPS Terminology and use these to convert the codes from the existing documents into IPS Terminology codes to use in the IPS document (in real-time).

4.2.2 Storing FHIR IPS Data

The codes and terms included in the IPS Terminology can be used to populate FHIR resources[87], as defined in the IPS implementation guide[88]. The example below shows a CodeableConcept data element (i.e., "Code") populated with a code from the IPS Terminology as a fragment of the FHIR Procedure resource[89].

```
"status": "completed",
"code": {
  "coding": [
    {
      "system": "http://snomed.info/sct",
      "code": "73761001",
      "display": "Colonoscopy (procedure)"
    }
  ],
  "text": "Colonoscopy"
},
"subject": {
  "reference": "Patient/example"
},
```

4.3 Use case 2 - Send IPS data to/from non-affiliate users

A key use case for the IPS is to exchange clinical information between systems. The goal of the IPS Terminology, in this use case, is to provide a free, common language for the interoperable sharing of this data worldwide.

87 http://hl7.org/fhir/uv/ips/StructureDefinition-Composition-uv-ips.html
88 http://hl7.org/fhir/uv/ips/
89 https://www.hl7.org/fhir/procedure-example-colonoscopy.json.html

4.3.1 Receiving IPS data

Coded IPS data received by non-affiliates can be displayed to users and stored in local systems using the original codes and terms received from the sending system. In some cases, the receiving system may also choose to map these codes to local terminologies used by the receiving system.

When a SNOMED CT code is received by a non-affiliate, the receiving system may use its terminology server to check whether or not the code is in the IPS Terminology. Any SNOMED CT code received by a non-affiliate system that **is** included in the IPS Terminology may subsequently be used for simple data analytics or property lookup (see use case 3). However, if the sending system is using a full SNOMED CT edition, then the SNOMED CT codes sent in the IPS document may fall outside the scope of the IPS Terminology. If this is the case, then the receiving system may only store, display and/or resend the code and term that is received. Alternatively, the receiving organization may obtain a SNOMED CT license for the full SNOMED CT Edition. For more information, please contact info@snomed.org[90].

If an affiliate sending system requires a non-affiliate receiving system to be able to perform some simple analytics operation or lookup on the data, then the sending system may decide to supplement each CodeableConcept with the original code's proximal ancestor(s) that are contained in the IPS Terminology. For example, using the following ECL query:

```
(> |X|[91] AND ^ 816080008 |International Patient Summary|[92] ) MINUS (> (> |X|[93] AND ^ 816080008 |
International Patient Summary|[94] ))
```

it is possible to find the closest supertypes of a concept (X) that are included in the IPS Terminology. Please note that this ECL can only be performed by an affiliate with a license to use a SNOMED CT edition that contains the concept |X| and its associated relationships.

4.3.2 Sending IPS data

Once the IPS document is created and coded with IPS Terminology codes, the document is ready to share. By coding using the IPS Terminology, this data becomes interoperable with any other user worldwide. The IPS Terminology includes all concepts that are common and free to use in any SNOMED CT implementation, thus removing any barriers of membership and cost.

When an IPS document is created by an affiliate user, they have access to the entire breadth of the terminology, allowing them to represent a broader range of clinical meanings. These affiliate users can also expand their implementations by representing new clinical meanings with post-coordination or a local extension. As explained in the previous section, an affiliate user may also decide to supplement each CodeableConcept with the original code's proximal ancestors belonging to the IPS Terminology for maximum interoperability. These proximal ancestors should be sent in addition to the original code recorded by the clinician to avoid losing part of the original meaning.

90 mailto:info@snomed.org
91 http://snomed.org/fictid#
92 http://snomed.info/id/816080008
93 http://snomed.org/fictid#
94 http://snomed.info/id/816080008

4.4 Use case 3 - Perform simple data analytics

SNOMED CT enables advanced data analytics over coded data, using the hierarchies and concept definitions to support the selection of concepts based on their meaning. SNOMED CT queries can assist in a range of use cases, including population surveillance, quality metrics, clinical decision support, clinical research, or simple searching.

For example, a research use case may have the following requirements:

> **"Identify all diabetic patients with a history of cardiovascular disease for inclusion in a clinical trial for a new drug"**

Using the IPS Terminology and the ECL language[95], it is possible to create queries that can be used to match codes in an IPS document, to identify a candidate set of patients.

The 'code' data element in the Problem List resource can be used to find each patient's diagnosis. By checking if each Problem.code value, in the IPS document, is a member of the following ECL result sets, it is possible to identify patients that match the clinical trial's inclusion criteria.

Diabetic patients	<< 73211009 |Diabetes mellitus (disorder)|[96]
Any cardiovascular diseases	<< 49601007 |Disorder of cardiovascular system (disorder)|[97]

These ECL queries can be passed to a terminology server API to obtain the list of diagnoses that are relevant for the clinical trial. The IPS documents are then checked for the co-occurrence of these diseases to identify the trial candidates.

95 http://snomed.org/ecl
96 http://snomed.info/id/73211009
97 http://snomed.info/id/49601007

5 5. Upgrading to a complete SNOMED CT Edition

The IPS Terminology provides the basic terminology features needed to implement the International Patient Summary. However, it does not include the full set of features provided by a complete SNOMED CT edition - including the version history, historical associations, translations, mappings, and the more extensive clinical content.

Given that the IPS Terminology is a subset of the full SNOMED CT international edition with a very similar distribution format and implementation mechanisms, the process of upgrading the IPS Terminology to a complete edition of SNOMED CT is straightforward. Once a license for the chosen SNOMED CT edition has been obtained, and the associated release package has been downloaded, the terminology server can be updated by loading the Snapshot files from the new package. Any ECL queries that were used with the IPS Terminology will continue to work on the new SNOMED CT edition - however, these queries will be able to select a larger set of matching concepts from a complete edition. New ECL queries may also be developed to take advantage of the extra content available in the complete edition.

Additional tooling may be required to support extra features, such as the creation of extensions, reference sets, mappings, translations, and post-coordination.

Access to a complete edition of SNOMED CT is available:

- To users living in a SNOMED International Member country or territory, from the local SNOMED CT National Release Center[98], or
- To users from a non-Member country, from SNOMED International's Member Licensing and Distribution Service (MLDS)[99].

98 https://www.snomed.org/our-stakeholders/members
99 https://mlds.ihtsdotools.org

6 Previous Versions

This page provides access to downloadable PDF copies of the current and previous versions of this document.
The most recent version should also be available via a link on the front page of the document.

7 Recent Updates

7.1 The most recently updated pages in this document are listed below

- 3. Using a Terminology Server(see page 11)
  2022-Nov-25 • updated by Alejandro Lopez Osornio[100] • view change[101]
- 2. IPS Terminology Overview(see page 7)
  2022-Nov-25 • updated by Alejandro Lopez Osornio[102] • view change[103]
- 5. Upgrading to a complete SNOMED CT Edition(see page 22)
  2022-Oct-12 • updated by Alejandro Lopez Osornio[104] • view change[105]
- 4. Use cases(see page 18)
  2022-Oct-12 • updated by Alejandro Lopez Osornio[106] • view change[107]
- 2. IPS Terminology Overview(see page 7)
  2022-Apr-11 • updated by Linda Bird[108] • view change[109]
- 3. Using a Terminology Server(see page 11)
  2022-Apr-07 • updated by Linda Bird[110] • view change[111]
- 1. Introduction(see page 5)
  2022-Apr-05 • updated by Alejandro Lopez Osornio[112] • view change[113]
- 4. Use cases(see page 18)
  2022-Mar-04 • updated by Linda Bird[114] • view change[115]
- IPS Terminology User Guide(see page 4)
  2022-Mar-04 • created by Linda Bird[116]
- 5. Upgrading to a complete SNOMED CT Edition(see page 22)
  2022-Mar-04 • updated by Linda Bird[117] • view change[118]
- 1. Introduction(see page 5)
  2022-Feb-09 • updated by Linda Bird[119] • view change[120]
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100 https://confluence.ihtsdotools.org/display/~alopez
101 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123577&selectedPageVersions=1&selectedPageVersions=2
102 https://confluence.ihtsdotools.org/display/~alopez
103 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123576&selectedPageVersions=1&selectedPageVersions=2
104 https://confluence.ihtsdotools.org/display/~alopez
105 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123581&selectedPageVersions=1&selectedPageVersions=2
106 https://confluence.ihtsdotools.org/display/~alopez
107 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123579&selectedPageVersions=1&selectedPageVersions=2
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109 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123576&selectedPageVersions=1&selectedPageVersions=2
110 https://confluence.ihtsdotools.org/display/~lbird
111 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123577&selectedPageVersions=1&selectedPageVersions=2
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115 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123579&selectedPageVersions=1&selectedPageVersions=2
116 https://confluence.ihtsdotools.org/display/~lbird
117 https://confluence.ihtsdotools.org/display/~lbird
118 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123581&selectedPageVersions=1&selectedPageVersions=2
119 https://confluence.ihtsdotools.org/display/~lbird
120 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123583&selectedPageVersions=1&selectedPageVersions=2

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122 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123585&selectedPageVersions=1&selectedPageVersions=2
123 https://confluence.ihtsdotools.org/display/~lbird
124 https://confluence.ihtsdotools.org/pages/diffpagesbyversion.action?pageId=142123586&selectedPageVersions=1&selectedPageVersions=2