# COVID-19 “Navigator”

**Asset Classification Guide**

## Overview

Recognizing the challenging times resulting from the COVID-19 Pandemic, a not-for-profit group of volunteers has assembled to provide a graphical “navigator” capability to help aid in the discovery, navigation, and ultimately access to resources associated with the outbreak. The challenge many face is that our understanding of the virus, and the corresponding tools, guidance, or other assets that are being made available are changing daily. Moreover, it can be a challenge to know what is available, or how those assets potentially fit together.

The COVID-19 Navigator relies upon an objective, qualitative set of classifications to feed a set of interactive tools allowing users of the portal to browse, interact, and navigate among the assets that are available. Key to making that all work is an underlying *metamodel* of fields. This classification aims to:

* Accurately reflect the status of the asset being described
* Faithfully represent assets to the best of our understanding
* Expose assets as they have been curated by others, but not assert relative value between assets

We recognize that this metadata model has likely utility beyond the scope of the COVID-19 pandemic, and the group is attuned to those needs. That said, the focus of this effort has been to address COVID-19, and we have made decisions accordingly. Downstream usage of this guide for other purposes will be addressed later.

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## Section I: Asset Classification Process

Key to maintaining a successful asset navigator is the accurate and timely classification of content to be included in the portal. Over the long term, our aspiration is that content developers and contributors would self-classify their content, so that it can be included in the navigation tool in as timely a fashion as possible. Below is the intended approach/workflow for classifying assets. Note that these are broad guidelines, and specific instances of artifacts may differ from this general approach.

### Acclimation Phase

The purpose of this phase is to familiarize oneself with the classification process, tools, definitions, and process. The steps here call out relevant resources and examples that will be useful when applying these techniques to classification of new assets, or adjudication of existing classified works.

**Step 1: Metadata Set Review.** Review the Metadata Set included in this document. It describes the fields that are used as part of the classification process, how they are intended to be used, and pragmatic definitions. A general understanding of what fields are being captured, and if/where those fields fit together will be helpful when doing classification work.

**Step 2: Pattern Catalog Review.**  We have discovered that assets of similar types (e.g., directory sites, workflows/pathways, etc.) have many common elements, and are often classified in very similar ways. To that end, we’ve created a simple “pattern catalog” identifying commonalities in terms of what metadata are used and how, based upon asset type. A scan of these patterns will make you familiar with what is available, so that you can judiciously apply that to any assets you might be classifying.

**Step 3: Examples Review.** Several example assets have been classified using the metadata set available, with some samples being compliant with common patterns, and others not. A quick review of some exemplar asset as classified will make you more comfortable with the process.

**Step 4: (not yet available) Browse the Tool**. Apply the COVID Navigator to do some asset discovery, interacting with the website as an applied use of the metadata included here. This usage will help you better understand what is being captured and why, and afford you better insight into the classification activities. We recognize that this step is dependent upon the initial build and rollout, which is not yet complete.

### Classification Phase

It is during this phase that assets are reviewed and classified against the metadata model. The purpose for this classification is to make assets discoverable and navigable, allowing consumers to be able to relate, group, and analyze candidate artifacts relative to one another. For this effort to be successful, fields need to be applied as consistently and faithfully as possible.

**Step 1: Familiarize yourself with the asset to be classified.** The goal is to understand the nature of the asset, how it is intended to be used, and what problem(s) it is solving or addressing. Information about the asset, its pedigree (authoring, stewardship, curation, endorsements), how it is expressed, where it is being stewarded, etc. are all relevant at this stage.

**Step 2: Make determination about whether the asset is appropriate to be classified.** Note that this effort is intended to support COVID-19 activities. At this step, an inclusion/exclusion decision should be made about the appropriateness of the asset should be made. *Note that we are not doing an “analysis of alternatives” or “picking a winner” from among like assets*. If an asset is relevant and appropriate it should be included, even if there are several other similar assets already listed. The ultimate decision about the utility and efficacy of assets will be made by the consumers. While some “light filtering” will be conducted to exclude assets of questionable origin or dubious quality, this is intended to be as non-judgmental as possible, and is not a formal curation endorsement effort. Factors to consider include:

* Relevance to COVID-19
* Origins from “reputable” sources (admittedly subjective)
* Accessibility to the asset for a general audience
* Review existing catalog of assets to see if it is already included

**Step 3: Determine the type of asset.** The *COVID-19 Placemat Project Metamodel* has identified approximately 8 asset types, each of which as specific data fields (“classifiers”) that are relevant. As such, a set of abstracted “patterns” have been collected to aid in the rapid classification of similar assets. [Please reference [Section 2](#_Section_2:_)]. Once you have determined the best-fit pattern for your specific asset under review, advance to the next step. If your asset does not fit any ascribed pattern, simply continue recognizing that each metadata field will need to be considered independently.

**Step 4: Adapt/Adjust the pattern and classify the Asset.** At this stage, the goal is to document the metadata for the asset in question. To foster consistency, a number of “common patterns”, based upon asset types, have been identified. Review and select the most appropriate pattern, if one applies, and leverage it to assist in classifying the asset under consideration.

Note that the patterns are best-practices and intended as accelerators, not limiting factors. The objective is to provide the best-fit classification for the asset in question. Consider each metadata field separately during this process, but paying particular attention to those fields that align with the best-fit pattern.

***Key Consideration 1****: When populating metadata fields, look for strong alignment topic-by-topic. The goal is not to represent all possibilities or nuanced conditions, as these fields are being used to assist in the discovery of the most relevant assets for any given search. In other words, “go for the 80% solution” where there is clear alignment.

Note: If every possible nuance is considered, it dilutes the impact of positive searches when looking for a particular asset. The intent is to have searches meeting user criteria to reflect strong positives. Where there is a desire to reflect more nuanced classifications, you can use keyword tags in those appropriate fields.*

***Key Consideration 2****: Apply the pattern as a best-practice, not an absolute requirement. When considering the asset in question, review the pattern and the fields indicated. Generally speaking, the patterns will help you make informed decisions. That said, deviation from the pattern to address asset-specific nuances is appropriate.*

***Key Consideration 3****: Null values are acceptable. Do not feel compelled to complete fields that are unknown or unclear. Note that a small number of fields have been designated as mandatory, which need to be completed.*

***Key Consideration 4****: Multiple-classifications are expected and designated as such in the metamodel diagram and descriptive information. Do not feel compelled to slot an asset into only one category if it reasonably and appropriately supports multiple categories.*

*For example, a guideline that applies to multiple care settings should be marked accordingly. That said, consideration 2 still applies. Just because a guideline could possibly apply to a care setting is not a reason to include it. When in doubt, indicate based upon the discerned intended use or your determination of fitness or appropriateness of the asset to support the field/category.*

***Key Consideration 5****: Some fields deliberately support multiplicities. For example, “Curation Authorities” provides the ability to indicate that a given asset is endorsed by multiple institutions or organizations.*

### Validation Phase

The validation phase comprises an expert review of each classified asset and its corresponding metadata tags. Note the primary function of the validation is quality assurance and not curation. In other words, this step assures that the metadata classifications are being used accurately and consistently. This is essential for the Navigator product to produce expected results.

We encourage submitters of content to conduct this phase as a quality review. Additionally, the COVID-Navigator group will validate submissions for consistency and quality.

The following items are representative (not intended to be a complete set) of the types of validation expected to be performed during validation. Note that these are not necessarily sequenced, and can be performed in any order:

* Validate that the short description adequately reflects the artifact being classified
* Validate accuracy of the URL
* Assure that the navigation-oriented fields (e.g., Subject, Care Setting, Care Process, and Asset [Type]) denote the likely uses and applicability of the artifact to those topics. This should be a “best fit” classification, and not explore extreme case possibilities
* Verify that keyword tags are appropriate and reasonably complete
* Make sure that multiple classification(s) have been considered and applied appropriately (e.g., check “all” boxes that reasonably apply, not just one category)
* While null/empty fields are okay, make sure that they are correct
* Validate pedigree, authorship, and curation/endorsements to faithfully reflect the artifact status
* Validate publication status and asset maturity for correctness

Generally speaking, the validation step should be conducted by someone with healthcare domain expertise, such as a member of clinical staff, health informatician, etc. As we anticipate that classification activities will be conducted by a wide range of skills, having “expert eyes” validate provides overall assurance around the quality of the work.

### Maintenance/Sustainment Phase

The long-term goal is to provide processes and infrastructure to allow for the efficient and effective long-term sustainment of the data within the COVID Navigator. As such, the intention is to provide self-service tooling to allow for asset contributors to self-classify their work, with operational staff/volunteers providing quality assurance and promotion activities. The policies around version management, correction of errors, the metadata lifecycle and refresh cycle have not yet been established as of this writing (July 2020).

## Section 2: COVID-19 Metadata Graphic Map



Figure . COVID Navigator Metamodel Diagram

The diagram above depicts the content of the COVID-019 Metamodel. While it has been visually rendered as hierarchical, assets can and will be multiply classified, making it more polyarchal in nature. A quick synopsis of the above follows, to help provide clarity around the fields and how they are expected to be used:

**Personas** (designated with a “1” symbol) have been identified to optimize the user experience around the specific factors of relevance based upon a self-identified user role. Users may change personas freely, and functionality is not limited by persona. The persona selection will simply influence defaults in look-and-feel behavior based upon likely needs and interests of that role.

**Navigation Elements** (Designated with a “2” symbol) appear to the left side of the diagram, and are grouping functions that will allow for interactive click-and-orient functionality within the user experience. These focus on likely interactions with the classified inventory of assets, serving as grouping mechanisms, traversal of data, and dynamic discovery.

**Item Detail** (Designated with a “3” symbol) appear to the right side of the diagram, and are used primarily as *filter criteria* to narrow the scope of a search and interaction to only those assets passing the identified filter criteria.

**Multiplicity** (designated with a “list” symbol) is supported, in certain areas, allowing for multiple values to correspond with a specific asset entry. For example, an asset may be curated by multiple external parties.

**Mandatory Metadata Elements** (designated in BOLD) are reflected in the detail side of the model. Note that while the intention is to have as complete a set of metadata as possible for each entry, only those fields marked as mandatory are essential to classification. While navigation elements are not individually market as mandatory, any classified asset must include one or more classifications.

## Section 3: Metadata Catalog and Definitions

This section provides the detail around each of the metadata fields in the model and how they are intended to be used in classification. Note that the overarching guidelines for their use appear in Section 1. **In an effort to remain pragmatic, you will find that not every field contains a definition, particularly for those areas where there is a de-facto or consensus definition** in prevalent use (for example, the meaning of “Patient” as a role). For fields that are likely ambiguous, or where specific meanings or intentions are conveyed within the model, definitions have been included.

Representative values, such as “e.g.” instances, are included for illustrative purposes and are not specific selection requirements. Where value sets are restricted to enumerated lists or external references (such as coding systems), they are cited. Feedback to this guide or the metadata set can be provided via THIS LINK.

### Metadata Descriptors Part I: Item Detail

The metadata included in *Part I: Item Detail* provides overall information about the asset itself, and is objectively included. The fields in Part I have very limited subjectivity in interpretation, and serve to describe the asset to the consumer/stakeholder, as well as assisting in sorting/filtering of potential content of interest.

**General Descriptors**

The following metadata items provide overall description, reference data, and location data of the asset being described.

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Mandatory? | Format | Description |
| Asset Name | Yes | Free Text | Title or Name of the referenced asset. |
| Subsection Reference | No | Free Text | Citation to specific portion of a larger document (e.g., Section Number, Page Number, Appendix, etc. Used primarily for document-oriented references or digital equivalent (PDF) |
| Language | No | Free Text | The natural/human language of expression of the asset. English will be assumed to be the default if unspecified. |
| Short Description | Yes | Free Text | 2-4 sentence narrative describing the asset referenced. Goal is to convey to an unfamiliar party the nature, purpose, and content of the asset referenced. |
| Asset Last Revision Date | No | Date | If known, the date of the last update of the asset referenced. This could be a publication date, authoring date, revision date, etc. |
| Hyperlink | Yes | URL | Web endpoint where the asset can be accessed, referenced, or retrieved. |
| Metadata Revision Date | Yes | Date | Represents the date of the update of this metadata set corresponding to the asset being reviewed. Intent is that this will be system generated. |
| Keywords | No | Comma delineated list | Recommended where they will add clarity or improve discoverability. Where possible, reference accepted industry keywords (e.g., MeSH Topic Descriptors). Focus on those keywords with prevalence and strong alignment to the core nature of the asset. (e.g., Apply the “80-20” guideline) |

**Format Descriptors**

The following metadata items characterize the innate representation, or means by which the asset is being expressed. This gets to the “type of asset” it is, and how that asset has been published.

| Field | Mandatory? | Format | Description |
| --- | --- | --- | --- |
| **Representation/Formalism** | Yes | Value from Value Set  | Enumerated Values in the list below. Select the value best fitting to the asset selected. For composite assets, select the multiple types that best apply.  |
|  |  |  “Narrative” | Artifact is primarily human-readable text |
|  |  | “Executable” | Artifact is intended for computer consumption, such as a program, application, applet, source code, etc. |
|  |  | “Formal Model” | Artifact is a model expressed using some formal language or visual notation, and can be validated, parsed, and potentially executed. (Examples include BPMN, UML, CQL) |
|  |  | “Terminology” | Artifact is a formal expression of coded values and their interrelationships (clinical coding, medical ontologies, etc.). Examples include SNOMED-CT, ICD, LOINC, etc. |
|  |  | “Data Type” | Selection with Keyword Annotation. Suggested keyword values include Vocabulary Resources, FHIR Resources |
|  |  | “API” | Artifact is (or includes) and endpoint allow for programmatic access, such as an application programming interface. Example includes a REST endpoint (such as a FHIR interface). |
| **Publication Type** | Yes | Value from Value Set | Enumerated Values in the list below. Select the value best fitting to the asset selected. *[Note that for the purposes of this model, publication type is distinct from asset maturity. Asset maturity considers factors such as peer review, evidence-basis, and systematic review. These are not to be considered for this metadata field]* |
|  |  | “Consensus Opinion” | Represents broad acceptance of an established point-of-view, such as often appear in professional journals or outputs from professional societies. |
|  |  | “Editorial” | Point-of-view from an organization, society, or publication on behalf of that entity. |
|  |  | “Letter (to the editor)” | Point-of-view from a community member/stakeholder offered to a publication, society, or other entity. |
|  |  | “News” |  |
|  |  | “Paper” | Availability of the asset as a formal published work, such as “white papers”, inclusion in journals, etc. |
|  |  | “Systematic Review” | Answer to pre-defined research questions using explicit, reproducible methods to identify, critically appraise, and combine results of primary research study [NCBI/NLM] |
|  |  | “Web” | Indicates availability of the asset not reflected in any of the above categories.  |
|  |  | “Other | To be used when no other categories appropriately apply. |

**Versioning and Maturity Descriptors**

The following metadata items characterize the relative maturity of the asset, reflecting the extent to which that asset has been used, reviewed, tested, etc.

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Mandatory? | Format | Description |
| **Asset Version** | No | Free Text | Represents the self-identified versioning of the asset (may be a date, version number, revision number, etc.) |
| **Asset Maturity** | No | Value from Value Set | Enumerated Values in the list below. Select the value best fitting to the asset selected. Note that levels are successive, with Level 5 indicating support or advancement for all qualities of the levels underneath it. *Levels not expressly defined are intermediates to be used as indicators of assets that have passed the prior strata but not completed expectations of the next.**Note that it is perfectly appropriate to revise the Asset Maturity classification as testing, peer review, and evidence-basis evolve.* |
|  |  | “Level 5: Very Mature” | Represents the highest level of maturity attainable by a given asset. Thorough, rigorous, systematic review, testing, and validation of the asset has been conducted by qualified authorities in the corresponding discipline. |
|  |  | “Level 4: More Mature” | (between level 3 and 5) |
|  |  | “Level 3: Mature” | Represents substantial review and validation of the asset, such as providing evidence-basis and/or professional peer review of the asset by qualified experts.  |
|  |  | “Level 2: Less Mature” | (between level 1 and 3) |
|  |  | “Level 1: Immature” | Reflects unsubstantiated, unproven, or postulated content.  |

**Context of Use Descriptors**

The following metadata items designate the source of the asset being classified, and/or third-party review and assertions relative to the asset. It also addresses intended jurisdictional scope-of-applicability, such as country, region, or locality of relevance.

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Mandatory? | Format | Description |
| **Pedigree** | Yes | Value from Value Set | The source of the asset being described. Note that pedigree source will likely be maintained at an institutional level, and it is possible to have multiple sources for a given asset. Source field is linked to one or more instances of Entity Detail. |
| **Curation** | No | Name/Value Pair for each curation instance. | Indicates a third-party review and endorsement of the asset, typically with some indication of the strength of the endorsement. Note that assets may be curated by multiple curation authorities, thus the need for multiple instances of name/value pairs. |
| Curator |  | Organization Name | The organization or institution conducting the curation. These can be public or private sector entities, and is represented as a link to an Entity Detail instance.  |
| Curation Value |  | Value from Set:* Recommended
* Referenced
* Unspecified
 | Indicates the strength of endorsement of the designated artifact from the curation authority. Recommended is an explicit endorsement of the asset. Referenced is an implicit endorsement (such as link to the asset without an explicit endorsement). If the nature of the endorsement is not clear, unspecified may be used. |
| **Applicability** | Indicate as appropriate |  | When specified indicates the geopolitical jurisdiction of the asset. Assumed to be global unless otherwise designated. (For HL7 stakeholders, this is analogous to HL7 Realm); Note that multiple jurisdicational indicators must be supported.Note: Unspecified assets will be assumed to be globally applicable |
| Global |  | Yes/Not Specified | Indicates applicability as a universally applicable asset, if known;  |
| Jursidictional |  | Enumerated Value Set | Indicates applicability of the asset to some jurisdictional authority at a sub-national level (such as county/providence/etc.) |
| Jurisdiction [0.n] |  |  | Jurisdictions are able to represent either pan-national (e.g., NATO, APAC, EU) or sub-national (provinces, states, counties, etc).  |
| Country [0..n] |  | Country Code, if appropriate | Indicates country(ies) to which the asset applies; (Will address specificity in data entry tooling) |
| Keyword |  |  | Allows for designation of local/jurisdictional authority |
|  |  |  |  |

**Entity Detail**

The following metadata items are used to represent either organizations, projects, or individuals which need to be discoverable within the Navigator tool. Typical usages for such Entities include authors, content sources, curators, working groups, standards bodies, or other collaborating entities. Note that Entities may be either individuals or organizations.

|  |  |  |  |
| --- | --- | --- | --- |
| **[Entity] Name** | Yes | Free Text/Value Set | Name designation of the identified organization/project/person |
| Description | No | Free Text | Narrative description of the entity being cited. |
| Affiliation | No | If present, both sub-fields must be populated | Indicates relationship between entities, such as a researcher being on faculty for an academic institution. |
| **Entity Classification** | Yes if Affiliation is Selected | Value Set | Selection from the Value set, following. Select the category best suited to the institution represented. Categories are intended to be used as mutually exclusive, so pick the most appropriate designation. |
|  |  | “Government-Sourced” | Represents a contribution from a government entity at any level. |
|  |  | “NGO-Sourced” | Represents non-governmental entities, such as public-private partnerships or quasi-government commercial entities. |
|  |  | “Commercially Sourced” | Represents private-sector entities, companies, etc. |
|  |  | “College/Professional Society” | Represents specialty organizations, such as clinical colleges, professional consortia, standards groups, etc. |
|  |  | “Healthcare Delivery System” | Represents healthcare provider organizations, care delivery networks, etc. |
|  |  | “Other” | Any institution not adequately addressed by the remaining categories. |
| **Identifying Detail [1..n]** | Yes | Multi-entry field of three values. |  |
| Point of Contact | No | Person Name | Identifies the person or endpoint to be used by interested parties/external contact requests. |
| URL/URI | No | URI | Best endpoint for information discovery relative to the entity being described. |
| Short Description | No |  |  |
| Affiliations [0..n] | No | Multi-entry field, 3 entries each of which allow multiplicity | Designates inter-entity and entity-activity relationships. (For example, linking a project to an organization, or indicating that one is participating in an externally sponsored activity). |
| Entity Affiliation | No | Link To Entity [0..n] | Indicates relationship to other entities. Entity-to-Entity links. |
| Owns Activities | No | Link to Activities [0..n] | Designates activities that are sponsored and/or fall under the governance of the Entity being detailed. |
| Participant in Activity | No | Link to Activities [0..n] | Designates activities in which the Entity being detailed is a participant but not the sponsor or governing authority. |
| Collaboration Posture | No | Enumerated Value Set  | Designtors indicating the receptiveness of the organization to being approached for joint work or engagement |
|  |  | VALUES NOT YET DETERMINED | REMAINS TO BE DONE |
| Keyword |  |  | Allows for designation of local/jurisdictional authority |

### Metadata Descriptors Part II: Item Classification for Navigation

The metadata included in *Part II: Item Classification for Navigation* contains interpretations around the intended purpose, use, context, and relevance of the asset as pertaining to the knowledge landscape. The intention of this section is to provide dimensional “axes” allowing for the discovery, navigation, and inter-relationship among “like-assets” with the intention of helping consumers find the information of relevance to their need.

**Classification and Navigation Fields**

This section is more subjective than the Item Detail portion of the classification. The goal is to reflect the faithful representation of the artifact to foster its discoverability and utility accurately to its intended objective. Many of the fields in this section allow for multiple selections. Please apply judiciously based upon the likely interest of the asset to that stakeholder group.

| Field | Mandatory? | Format | Description |
| --- | --- | --- | --- |
| **Intended Audience(s) [1..n]** | Yes | Value from value set designated below | Select the appropriate intended consumer/stakeholder group with likely primary interest in the artifact.  |
| Patient |  | Yes/Not Specified |  |
| Direct Care |  | Yes/Not Specified | Includes entirety of the community providing patient care services, and directly interacting with patients. Including providers, nurses, allied health professionals, etc. |
| Administration |  | Yes/Not Specified |  |
| Research |  | Yes/Not Specified |  |
| Public Health  |  | Yes/Not Specified |  |
|  |  |  |  |
| **Care Setting [0..n]** |  | Value from value set designated below | Reflects where the asset is intended to be used, based upon location or environment of care (physical, logical, or virtual). Multiple-selections are permissible for these items. Please select only those settings where there is high-relevance and high-probability of interest. Note that capabilities and staff may vary among settings. |
| Home |  | Yes/Not Specified |  |
| Telemedicine |  | Yes/Not Specified |  |
| Ambulatory |  | Yes/Not Specified |  |
| Acute Care |  | Yes/Not Specified |  |
| Laboratory Environments  |  | Yes/Not Specified | Represents specific procedural-oriented diagnostic, and therapeutic environments, such as GI, Cardiology, etc. ; This category also represents labs such as clinical/surgical labs, specimen collection, etc. |
| Keywords-Care Setting |  |  | Allows for keyword annotations to care setting(s), such as special labs (e.g., Cath, etc.) |
| **Care Process [1..n]** |  | Value from value set designated below | Phase of care cycle relevant to the asset being classified. Identifies the innate nature of the asset as pertaining to the activity lifecycle. |
| Prevention |  | Yes/Not Specified |  |
| Screening |  | Yes/Not Specified |  |
| Diagnosis |  | Yes/Not Specified |  |
| Treatment |  | Yes/Not Specified |  |
| Followup |  | Yes/Not Specified |  |
| Keywords |  |  | Allows for keyword annotations to care process |
| **Subject [1..n]** | At least one selection required |  | Primary topic or topics of relevance as relating to the asset under review. Field allows for multiple classification, though that should be applied judiciously.  |
| Care Management |  | Yes/Not Specified | Workflow, organizational processes, such as care plans, pathways, etc. |
| Treatment |  | Yes/Not Specified | Specific interventions such as medications, procedures, therapies. |
| Clinical Features and Diagnosis |  | Yes/Not Specified |  |
| Resource Management |  | Yes/Not Specified | Includes both equipment and personnel. |
| Personal Protection |  | Yes/Not Specified |  |
| Logistics |  | Yes/Not Specified | The detailed coordination of a complex operation involving many people, facilities, or supplies;  |
| Clinical Epidemiology |  | Yes/Not Specified | Predictive models of surges; intra-health-system planning and prediction. |
| Laboratory |  | Yes/Not Specified |  |
| Co-morbidities |  | Yes/Not Specified | Assets focused on cohorts such as diabetes, asthma, etc. Use keywords to elaborate. |
| Special Populations |  | Yes/Not Specified | Assets focused on special populations, such as children, pregnancy, etc. Use keywords to elaborate. |
| Infection Control |  | Yes/Not Specified |  |
| Epidemiology |  | Yes/Not Specified |  |
| Public Health & Case Reporting |  | Yes/Not Specified | Jurisdictional (state/county/locality) organizations that administer public health |
| Ethics |  | Yes/Not Specified |  |
| Research |  | Yes/Not Specified |  |
| Other (see keywords) |  | Yes/Not Specified |  |
| Keywords - Subject |  |  | Allows for keyword annotations to subject. |
| **Resource [Type]** |  |  |  |
| Activity |  | Value Set (see below); multi-selection | Used to represent projects, collaborations, or other engagement efforts (non-assets). Note that this field is included to assist in the discovery of ongoing efforts, and is a complement to asset-based discovery. Note that Activities will relate to a corresponding Entity Detail for descriptive info. Activities are classified based upon the value set, following, indicating the core nature of the activity. Multi-select should be supported. |
|  |  |  “Research” |  |
|  |  | “Authoring” |  |
|  |  | “Implementation” |  |
|  |  | “Collaboration” |  |
| Data Visualization |  | Yes/Not Specified | (suggested keywords: dashboards, maps, etc.) |
| Data Collection |  | Yes/Not Specified | (Suggested keywords: datasets, registries, outcomes) |
| Knowledge Resource |  | (See Knowledge Resource Type Detail Breakout Table, following) | Assertion or manifestation of clinical knowledge. See detail breakout table. |
| Directory/List |  | Yes/Not Specified | (suggested keywords, curation authority, jurisdiction, etc) |
| Keywords |  |  | Allows for keyword annotations to Asset Type |

Knowledge Artifact Type – Detail Breakout Table

| Field | Mandatory? | Format | Description |
| --- | --- | --- | --- |
| **Knowledge Artifact**  | Yes, when Asset [Type] is designated as a Knowledge Resource | Value from Value Set | Select the most relevant artifact type. Intention is that categories are mutually exclusive, unless composite artifacts are represented. For composite artifacts, indicate all that apply.  |
| Guidelines |  | Yes/Not Specified | Systematically developed statements to assist practitioners and patient decisions about appropriate healthcare for specific circumstances. Often produced by professional societies. |
| CDS Rules |  | Yes/Not Specified | Assistive knowledge, such as might be used in alerts, reminders, etc. |
| Models |  | Yes/Not Specified | Formal representation for the interaction of variables or factors. These can vary widely from a simple truth table to a complex predictive model. Examples include risk calculators, dosing calculators, order sets, checklists (pre-op, post-op).Use keywords to elaborate as appropriate. |
| Policies & Procedures |  | Yes/Not Specified | Policy is a rule that is an obligation; procedures are accepted practices. Often organizationally defined or instituted.  |
| Workflows |  | Yes/Not Specified | Procedural algorithms, flowcharts, or process steps. For instance, clinical pathways expressed via BPM+. |
| Recommendation |  | Yes/Not Specified | Suggested best-practice, such as may be found in a consensus recommendation.  |
| Clinical Trial |  |  |  |
| Systematic Review |  |  |  |
| Keywords |  |  | Allows for keyword annotations to Knowledge Resource |

## Section 4: Pattern Catalog (based on type of knowledge assets, ~8 or so anticipated)

* **Knowledge Asset Pattern**
* **Directory**
* **Calculator**
* **Consensus Review [Article]**
* **Computable Guideline (e.g., FHIR Resource etc.)**
* **Software Asset (application, website, etc.)**

## Section 5: Asset Classification Examples