



ICD LOOKUP
Spiralogics

USER MANUAL

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VERSION 2.2.4



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ABBREVIATIONS

- ICD:** International Classification of Diseases
- ICD-CM:** International Classification of Diseases, Clinical Modification
- ICD-10-PCS:** International Classification of Diseases, Procedure Coding System

DEFINITIONS

ICD codes: It is a globally used diagnostic tool for epidemiology, health management and clinical purposes. ICD codes are found on patient paperwork, including hospital records, medical charts, visit summaries, and bills.

ICD 9 Codes: The International Classification of Diseases (ICD) is designed to promote international comparability in the collection, processing, classification, and presentation of mortality statistics.

ICD 10 codes: It is revised version of ICD 9 codes. It has almost twice as many categories as ICD-9. Some fairly minor changes have been made in the coding rules for mortality in this code.

ICD-10-CM: The International Classification of Diseases, Clinical Modification is used to code and classify morbidity data from the inpatient and outpatient records, physician offices, and most National Center for Health Statistics (NCHS) surveys.

ICD-9-CM: The International Classification of Diseases, Ninth Revision, Clinical Modification is the official system of assigning codes to diagnoses and procedures associated with hospital utilization in the United States.

ICD-10-CM/PCS: ICD-10-CM/PCS code sets will enhance the quality of data for tracking public health conditions, improved data for epidemiological research, measuring outcomes and care provided to patients, making clinical decisions, identifying fraud and abuse, designing payment systems/processing claims.

ICD conversion: It is the code-to-code translation for both ICD-10 and ICD-9 code sets. It is used to facilitate linking between the diagnosis codes in ICD-9-CM and the new ICD-10-CM code set.

Cause of injury: The ICD codes can be distinguished whether it is a cause of injury or not. For the cause of injury codes, an ICD-9 code must begin with the letter "E," and an ICD-10 code must begin with "V," "W," "X," or "Y."

Excluded code: There are certain ICD diagnosis codes which might not provide enough information related to the cause and nature of an illness, incident or injury. These ICD codes are invalid for all insurance type.

No fault excluded code: These ICD codes are invalid for 'No fault' insurance type, but are valid for other insurance type.

1. Executive Summary

1.1 Purpose of Document

This document assists users of Spiralogics ICD Lookup application to navigate through the application. It lays out detailed description of all the features and step-by-step guide for searching ICD codes and converting the ICD-9 and ICD-10 codes to their equivalent codes with different search features. Along with knowing how to move around within the application, it provides guidelines to users on how to get familiarized with the application.

1.2 Identification

| | |
|-----------------|---|
| Application URL | https://icd.spiralogics.com/ |
| OS | Windows |
| Version | 2.2.4 |
| Browser | Google Chrome, Microsoft Edge |

1.3 Scope

Spiralogics ICD application is a lookup tool to provide a streamlined search UI to its users while providing the most relevant search results in an aesthetically pleasing user interface. The application provides different search features such as conversions of ICD codes to their equivalent codes, auto complete search, search boosting and others.

2. Design Overview

2.1 Background Information

There are many ICD lookups tools which mainly focuses on converting the ICD codes to their equivalent codes. Those tools do not provide a user-friendly interface and it is difficult to search for ICD codes. Those ICD lookup tools are not equipped to group the related ICD codes and display them in a tree structure. They do not have any indication for ICD codes to inform the users whether the codes are cause of injury or any kind of excluded ICD codes. The Spiralogics ICD Lookup system is dedicated exclusively to helping the users look up ICD-10 codes and ICD-9 codes in a user-friendly manner. Spiralogics ICD application eases the search for ICD-9 and ICD-10 codes with different search features including search suggestion, fuzzy search, and stemming. It also provides a mechanism to rank the search results in order to provide the most suitable results to the users with the least amount of effort from the users.

2.2 Application Overview

Spiralogics ICD application is a lookup tool to provide a streamlined search UI to its users. User can enter ICD codes, its descriptions or any medical terms in the search bar. The system displays and highlights the entered keywords, synonyms, fuzzy search results as well as stemmers search results for the entered keyword. When user enters any keyword, auto complete search options for that keyword are also displayed. The application also provides search boosting feature to prioritize search according to the selected section. Related ICD codes are also grouped and formed into tree structure to ease the users to navigate through the list of codes and their descriptions. The application also provides an indication for the ICD codes, whether they are cause of injury or any kind of excluded codes.

3. Getting into the System

Firstly, the user opens the browser and enters the URL for Spiralogics ICD application. Then, the user is directed to the landing page. Landing page of the application presents an interface for searching the ICD codes.

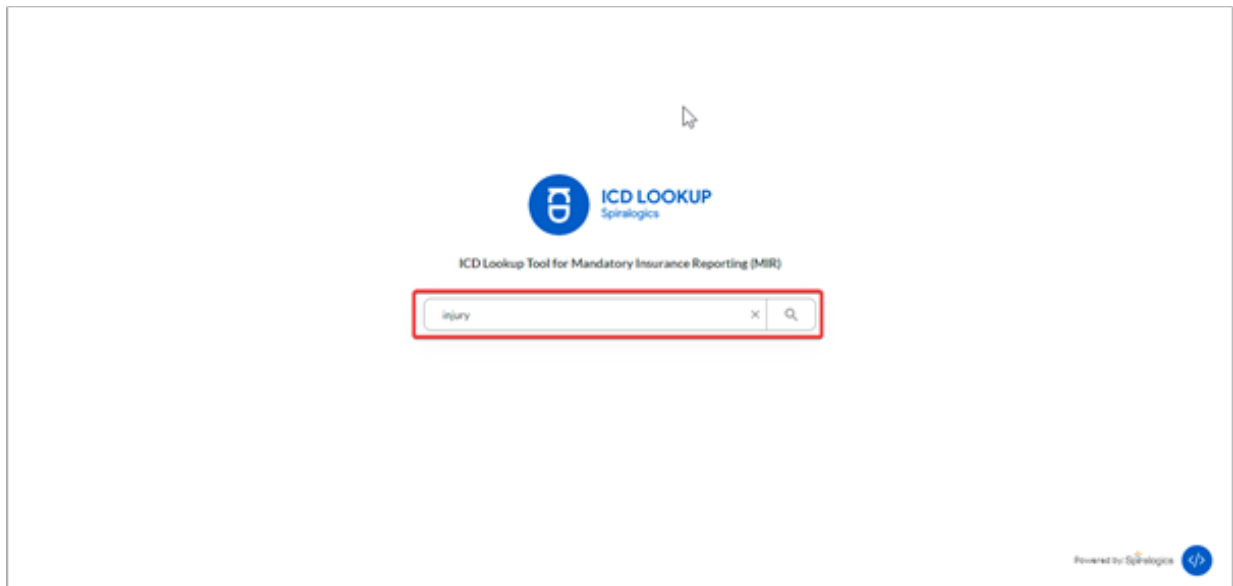


Fig(i): Landing Page

4. Using the System

4.1 Search Page

When a user enters the URL for Spiralogics ICD application and presses the 'Enter' key, the user is redirected to the landing page which is a search page. User can enter the ICD codes, its descriptions or any keyword related to the ICD code in the search bar.



Fig(ii): Search bar

4.1.1 Searching ICD Codes

In the search page, user can enter ICD codes as keywords in the search bar to search for the ICD codes that matches the entered keyword.



Powered by: Spiralogics

Fig(iii): Search ICD codes

4.1.2 Auto Complete Search

When user enters certain keyword, most relevant ICD codes along with their description related to the keyword are displayed below the search bar. The auto complete search results are displayed on entering any part of the description or any ICD code. User can select any suggestion to make the search more effective.

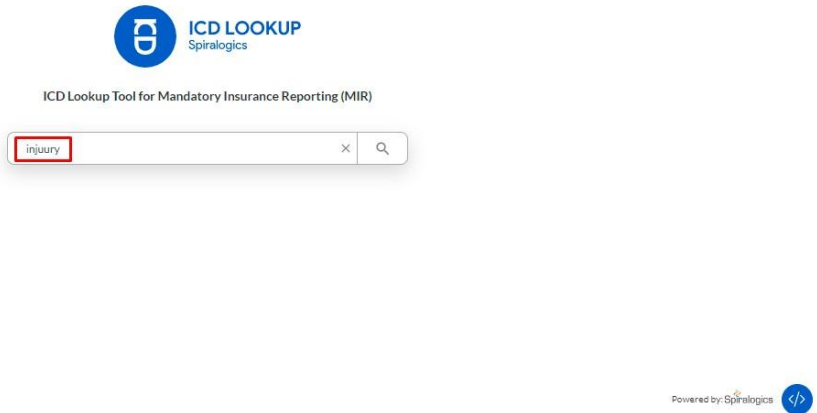


Powered by: Spiralogics

Fig(iv): Auto Complete Search

4.1.3 Search using misspelled terms

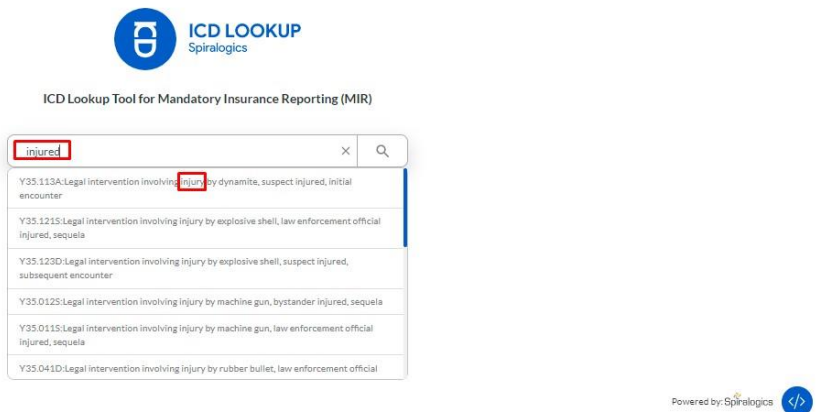
The system also supports fuzzy search. When user enters a keyword, the system shows the relevant results even when the search terms are misspelled.



Fig(v): Fuzzy search

4.1.4 Search using the stem of Queried Term

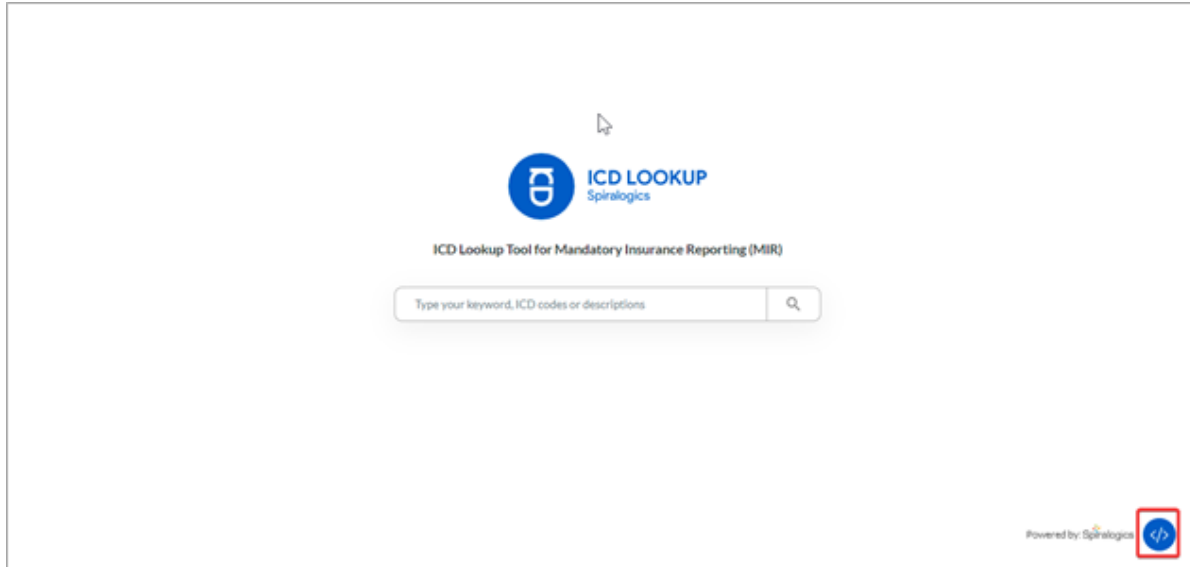
The system also has the feature for stemmers search. When user searches for any keyword, the system reduces the words to the root word and displays results based on all the forms of that word.



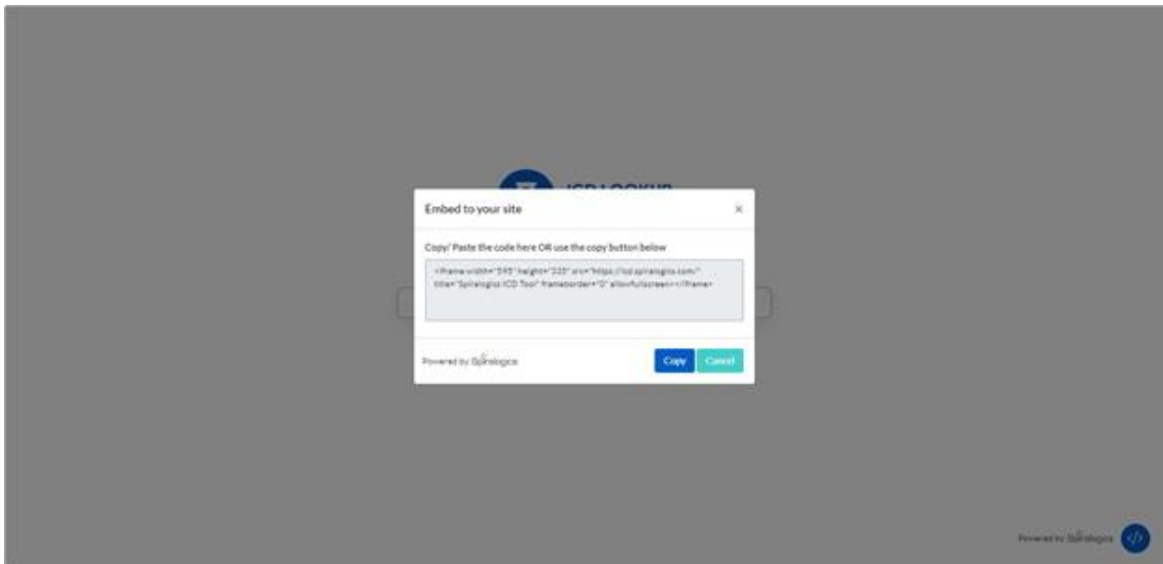
Fig(vi): Stemmers search

4.1.5 Embed code

An embed code has been made available for other developers to add the tool to their application. User can click on the embed code button and then copy the code for the application and embed it to their code as they will.



Fig(vii): Embed code button



Fig(viii): Window to copy the code

4.2 Search Results Page

On entering keyword and then clicking on the search button or 'Enter' key in the search page, the user is redirected to the search results page. The search results for the entered keyword are displayed in the search results page.

The screenshot shows the ICD Lookup tool interface. At the top, there is a search bar with the text 'e849.6' and a search icon. Below the search bar, the page displays 'Showing results 1 - 50 of 64 for e849.6'. The results are organized into sections, with the first section being 'E849.6 ICD 9 | Y92.29 ICD 10'. The results list includes descriptions such as 'Accidents occurring in public building' and 'Oth public building as place', each with a 'Cause of Injury' label and an 'Excluded' status. The page also includes a sidebar with navigation options like 'ICD 9 to ICD 10' and 'ICD 10 to ICD 9', and a checkbox for 'Include cause of injury'. At the bottom, there is a footer with copyright information: '© 2021 Spiraligica ICD Lookup Tool for Mandatory Insurance Reporting (MIR)' and 'ICD List Last Updated on: August 12, 2021. Build Version 2.2.4'.

Fig(ix): Search Results Page

4.2.1 Redirect back to home page

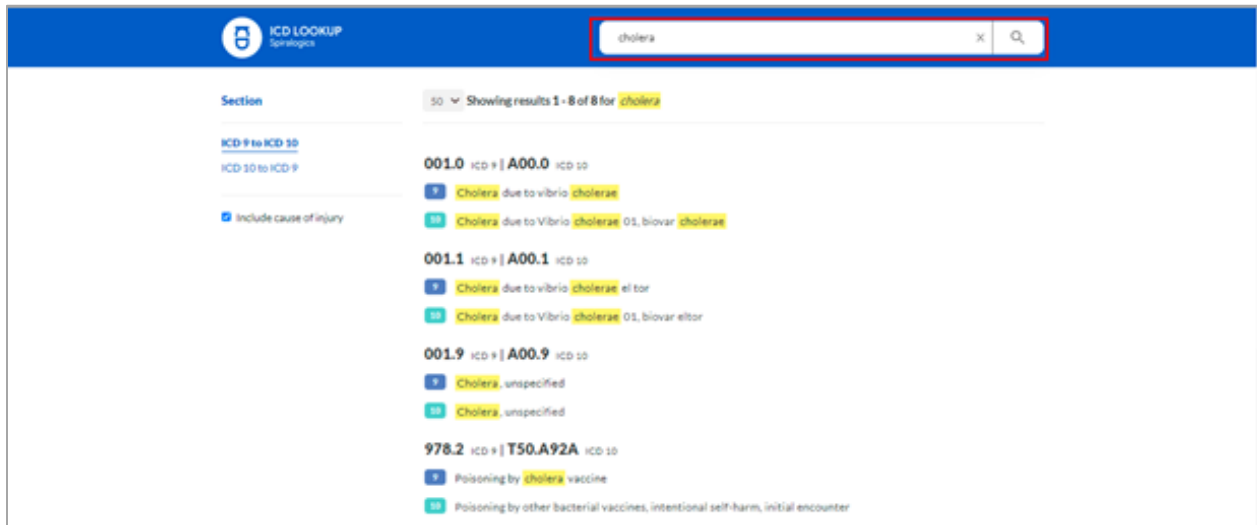
User can click on the logo of the application to redirect back to the home page.

The screenshot shows the ICD Lookup tool interface with the search bar containing the text 'cholera'. The results are organized into sections, with the first section being '001.0 ICD 9 | A00.0 ICD 10'. The results list includes descriptions such as 'Cholera due to vibrio cholerae' and 'Cholera due to Vibrio cholerae O1, biovar cholerae'. The application logo, which is a blue circle with a white 'S' and the text 'ICD LOOKUP Spiraligica', is highlighted with a red box in the top left corner of the page. The page also includes a sidebar with navigation options like 'ICD 9 to ICD 10' and 'ICD 10 to ICD 9', and a checkbox for 'Include cause of injury'. At the bottom, there is a footer with copyright information: '© 2021 Spiraligica ICD Lookup Tool for Mandatory Insurance Reporting (MIR)' and 'ICD List Last Updated on: August 12, 2021. Build Version 2.2.4'.

Fig(x): Redirect to home page

4.2.2 Edit or enter new keyword

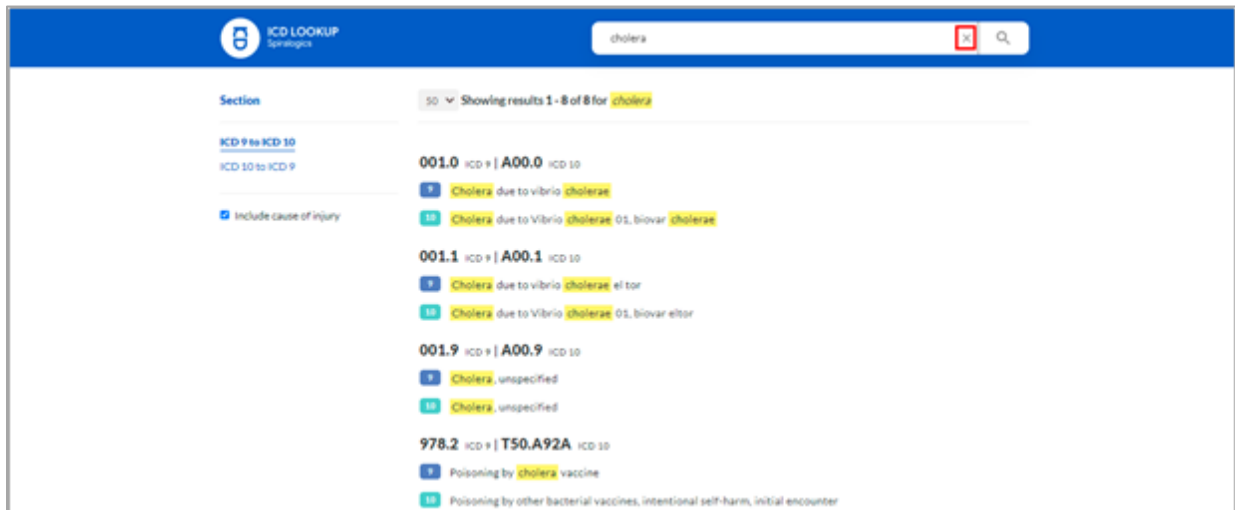
The search results page also consists of a search bar where the user can remove, edit or enter new keywords to display the search results for that keyword.



Fig(xi): Search bar in Search results page

4.2.3 Reset the search bar

User can clear the keywords entered in search bar by clicking on the 'x' button.

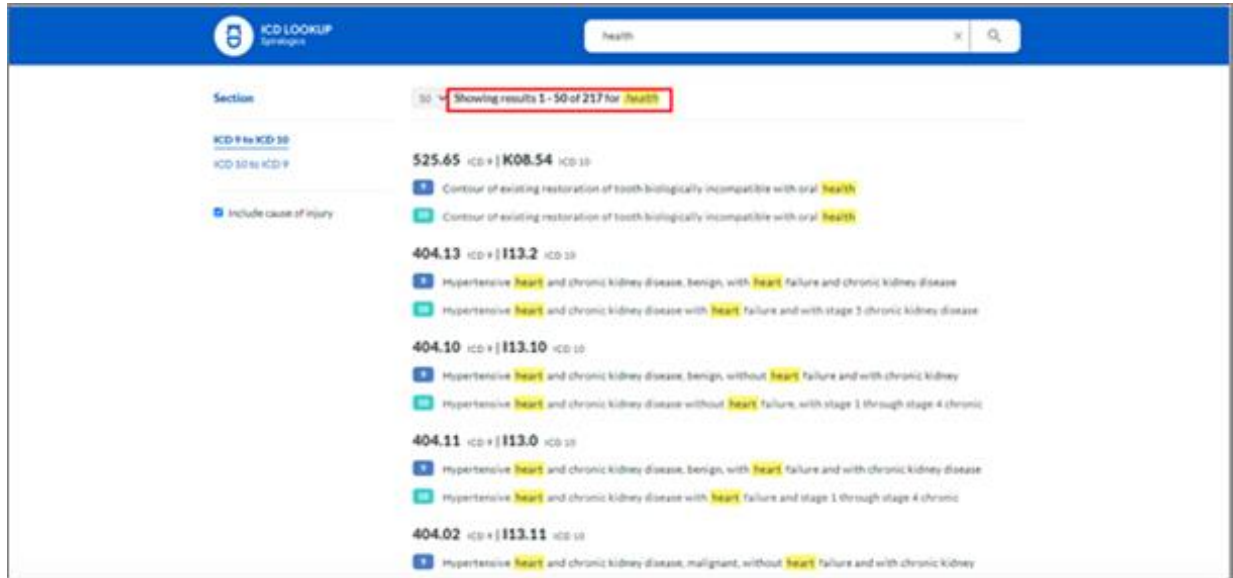


Fig(xii): Reset button

4.2.4 Pagination

4.2.4.1 Pagination information

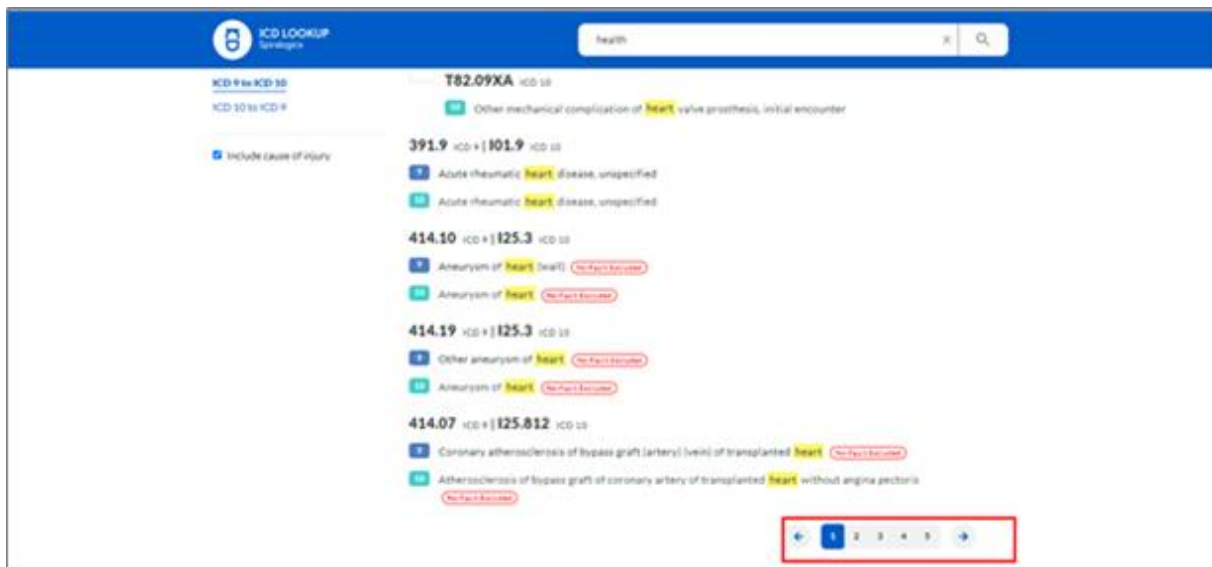
User can also see the number of results shown in the page and total number of results of ICD codes for the entered keyword on top of the search results page.



Fig(xiii): Pagination information

4.2.4.2 Pagination buttons

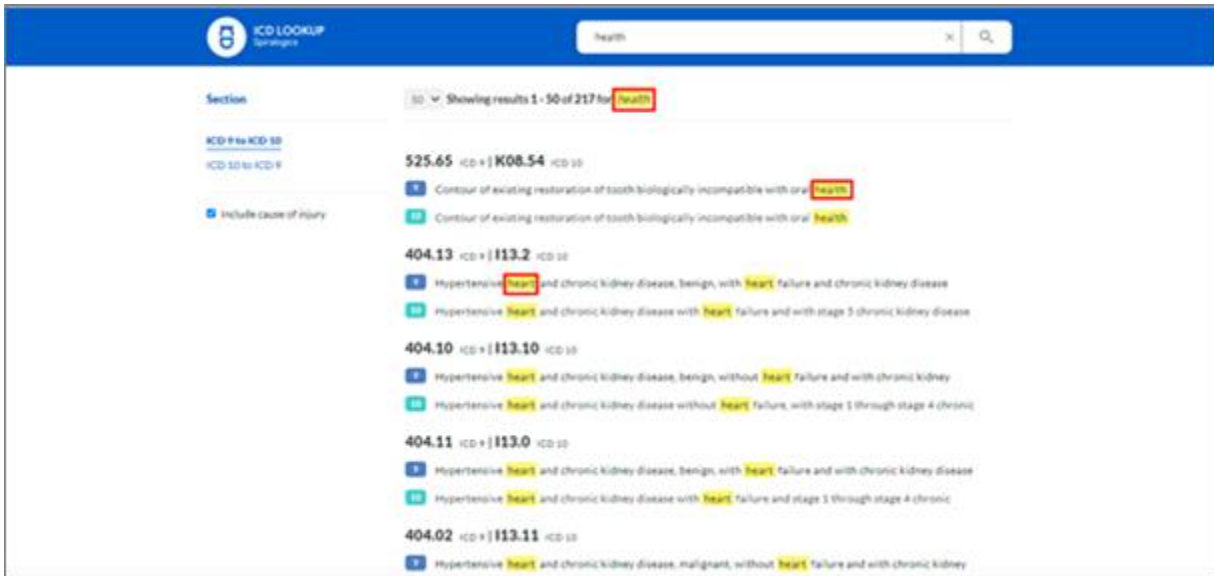
User can view more search results for the keyword by clicking on the pagination buttons at the bottom right of the search results page. User can click on the numbered pagination buttons to jump to a specific page or click on the previous and next buttons to change the page sequentially.



Fig(xiv): Pagination buttons

4.2.5 Highlighted keyword

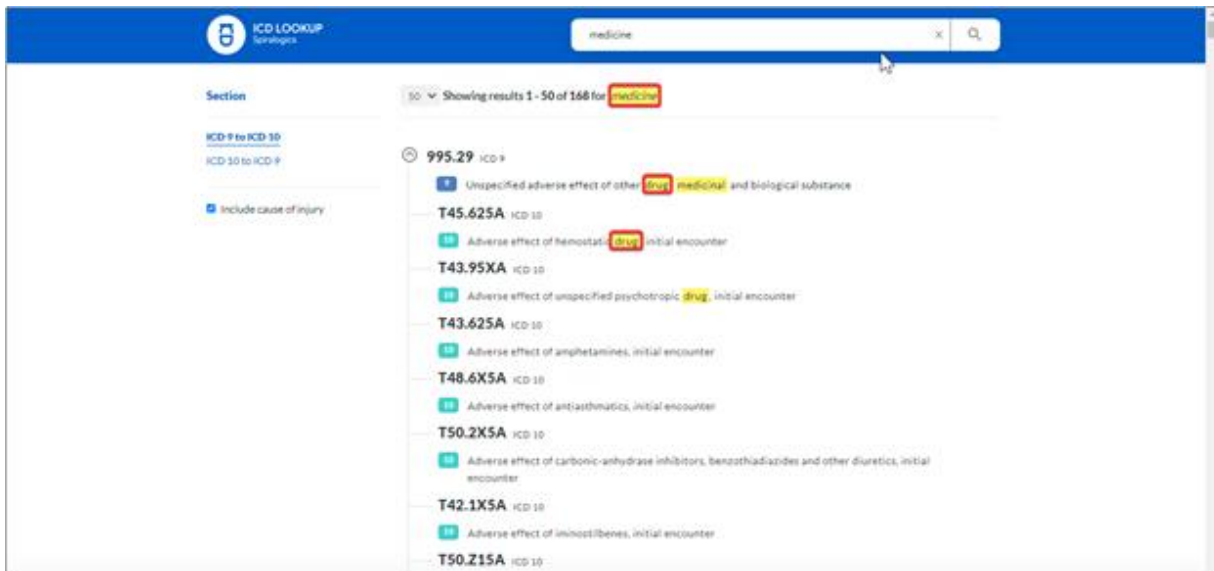
When user performs a search using a keyword, the words in the search results page that match the keyword entered by the user are highlighted.



Fig(xv): Highlighted keyword

4.2.6 Highlighted synonyms

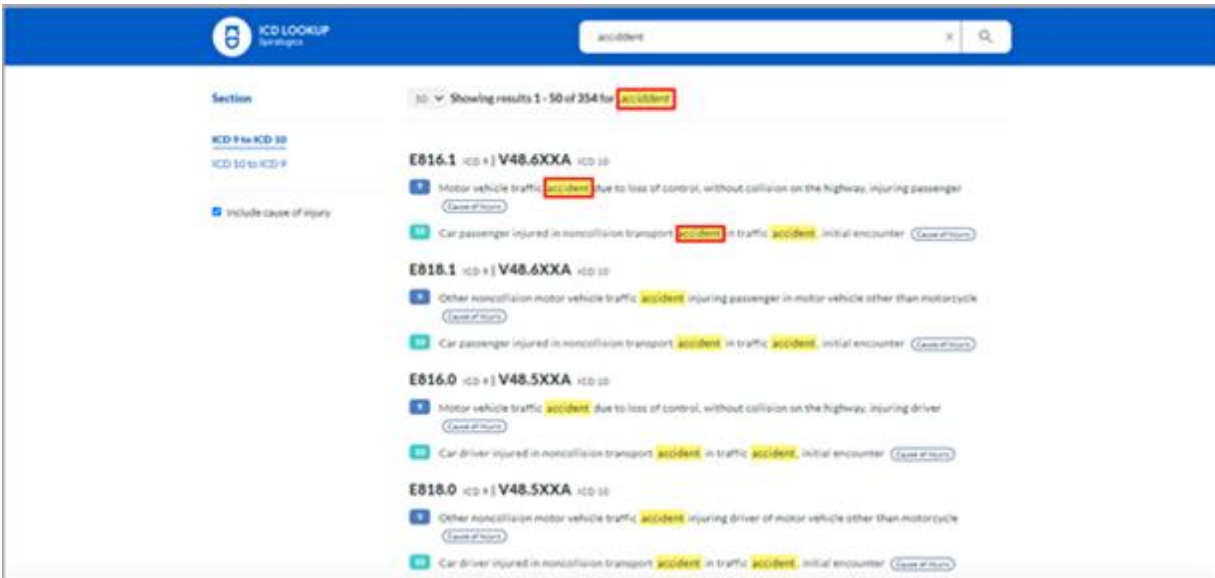
On entering keywords, the system also highlights the synonyms (words that have same meaning) of the entered keyword in the search results page.



Fig(xvi): Highlighted synonyms

4.2.7 Fuzzy search results

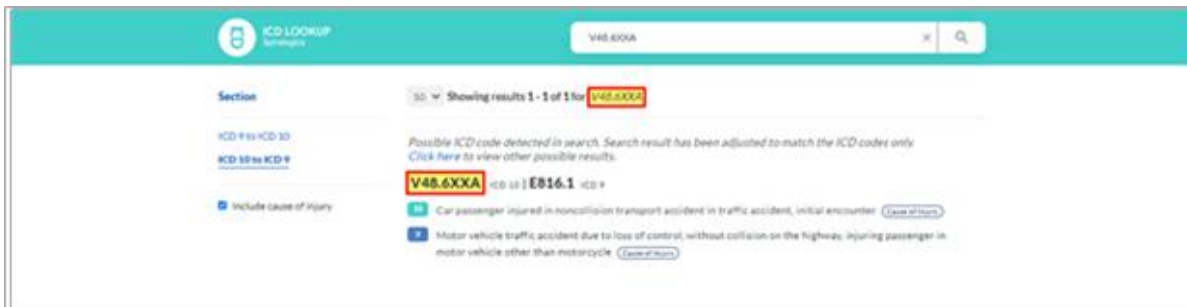
The system also supports fuzzy search. When user enters a keyword, the system displays and highlights the relevant results even when the queried terms are misspelled.



Fig(xvii): Fuzzy results

4.2.8 ICD code search results

User can enter ICD codes as keywords to search for specific ICD code. The entered ICD codes are displayed and highlighted in the search results.



Fig(xviii): ICD code search results

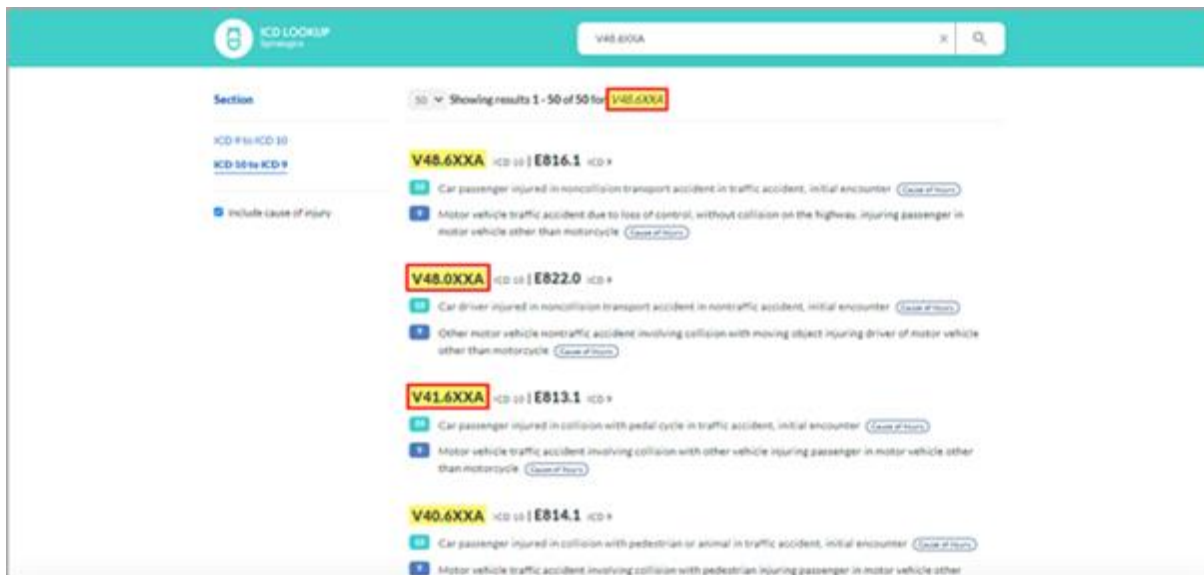
4.2.9 Fuzzy search results for ICD code

The application detects a possible ICD code and searches for the exact match to display in the search results page. If user wishes to view other search results that are related to the keyword (fuzzy search results), user can click on 'click here' on the notification message above the search results.



Fig(xix): Fuzzy search for the ICD code

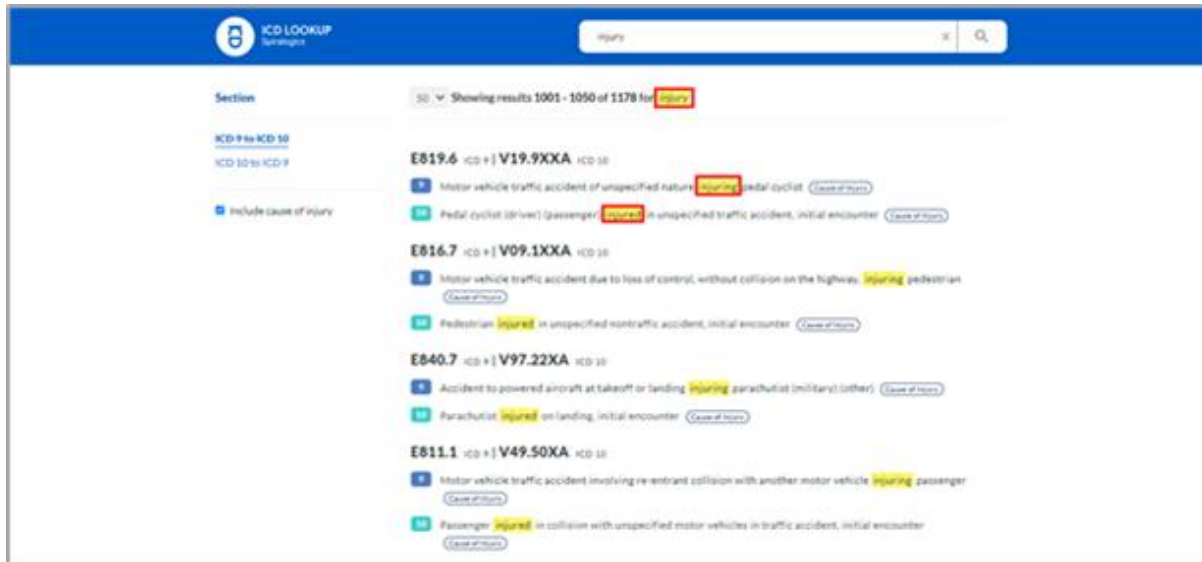
When user clicks on 'click here', all the fuzzy search results that are most relevant results for the entered ICD code are highlighted and displayed in the search results.



Fig(xx): Fuzzy search results for ICD code

4.2.10 Stemmers Search Results

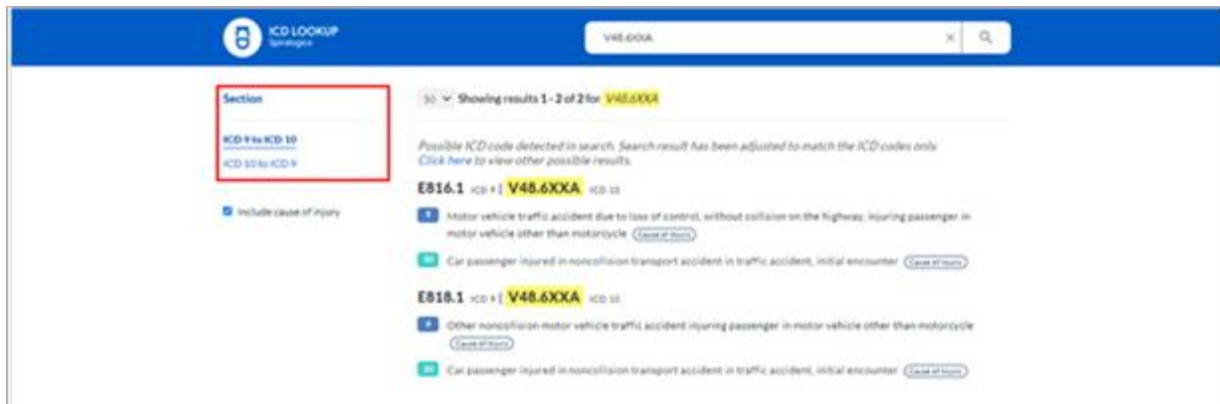
The system also has the feature for stemmers search. When user searches for any keyword, the system reduces the words to the root word or stem and displays and highlights all the forms of that word.



Fig(xxi): Stemmer results

4.2.11 ICD conversion with Section

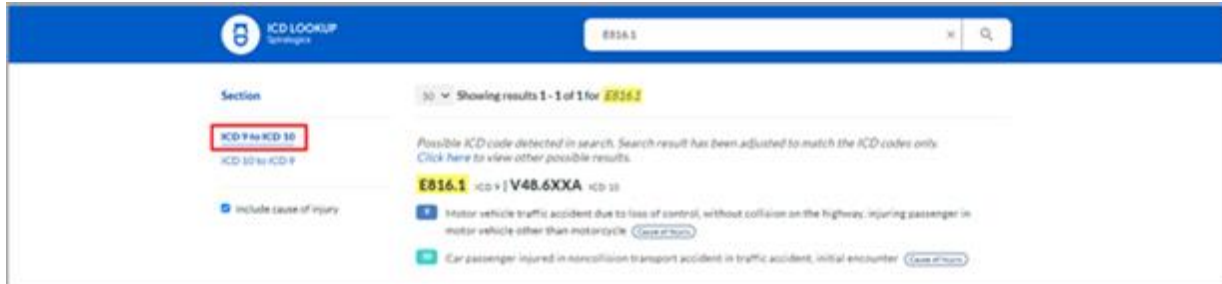
The application is updated to allow users to select the preferred conversion between ICD 9 and ICD 10. The options 'ICD 9 to ICD 10' and 'ICD 10 to ICD 9' are displayed to the left of the search results under Section.



Fig(xxii): Sections

4.2.11.1 ICD conversion for 'ICD 9 to ICD 10'

By default, the application searches on ICD 9 to ICD 10 conversion table whenever a user performs a search. By default, when a user performs a search, ICD 9 to ICD 10 conversion is selected and 'Blue' theme is displayed for the application.



Fig(xxiii): Search boosting with 'ICD 9'

4.2.11.2 Search boosting for 'ICD 10 to ICD 9'

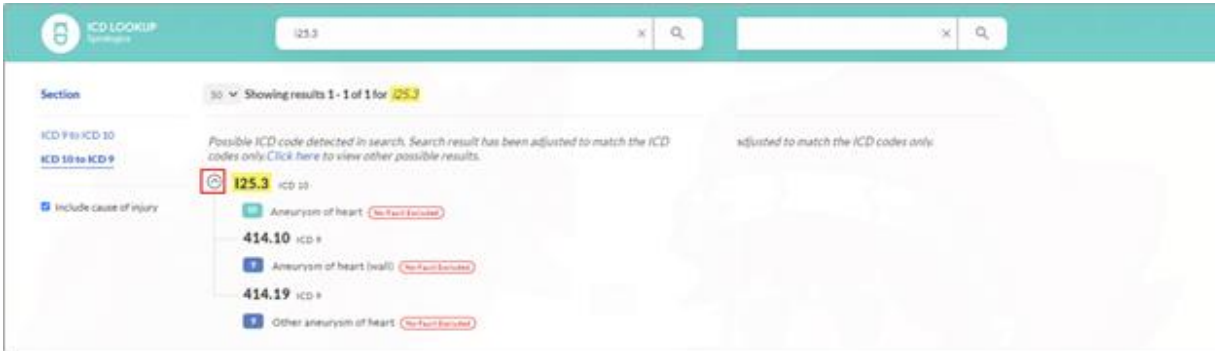
However, clicking on ICD 10 to ICD 9 option allows the users to search for corresponding ICD 9 code and description for the entered ICD 10 code or description by searching on ICD 10 to ICD 9 conversion table. On selecting ICD 10 to ICD 9, the color theme is changed to Green.



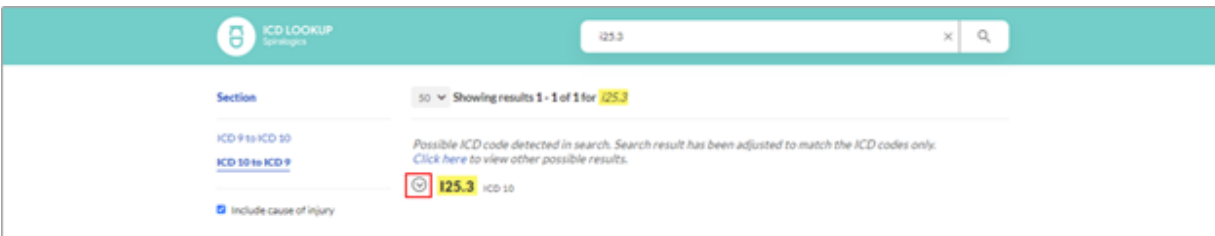
Fig(xxiv): Search boosting with 'ICD 10'

4.2.12 Grouping ICD Code and Form Collapsible Tree Structure

If an ICD 9 code has multiple ICD 10 codes or vice versa, the search results are grouped and formed into a collapsible tree structure. When user searches for ICD code or any keyword, the relevant results are grouped and then branched into sub-categories (branches) and are displayed under the corresponding ICD code. The branches for the entered ICD code can be hidden using the collapse button and then again expanded using the expand button.



Fig(xxv): Grouping and Tree Structure of ICD code (expanded)



Fig(xxvi): Grouping and Tree Structure of ICD code (collapsed)

4.2.13 Indication for Cause of Injury and Exclusion

The search results are also labelled with the indication of the cause of injuries and the types of exclusions of the ICD codes. An ICD code in the search result may contain the following tags:

- Cause of injury
- All excluded
- No fault excluded

4.2.13.1 Indication of Cause of Injury Code

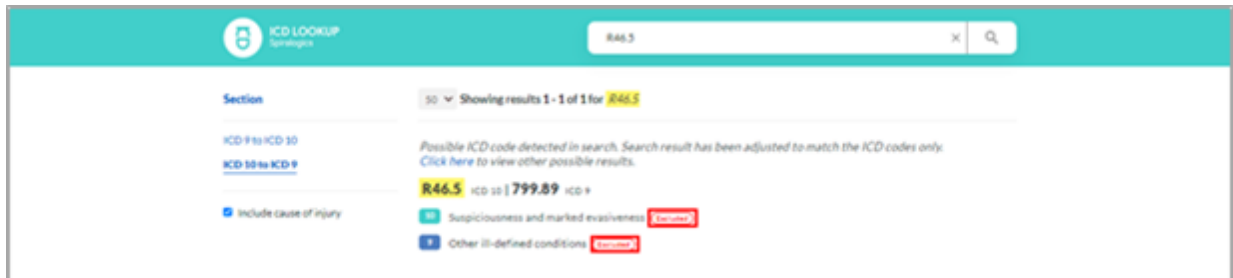
The ICD codes can be distinguished whether it is a cause of injury or not. Such ICD codes are indicated as 'Cause of Injury'.



Fig(xxvii): Indication of 'Cause of Injury'

4.2.13.2 Indication of All Excluded Code

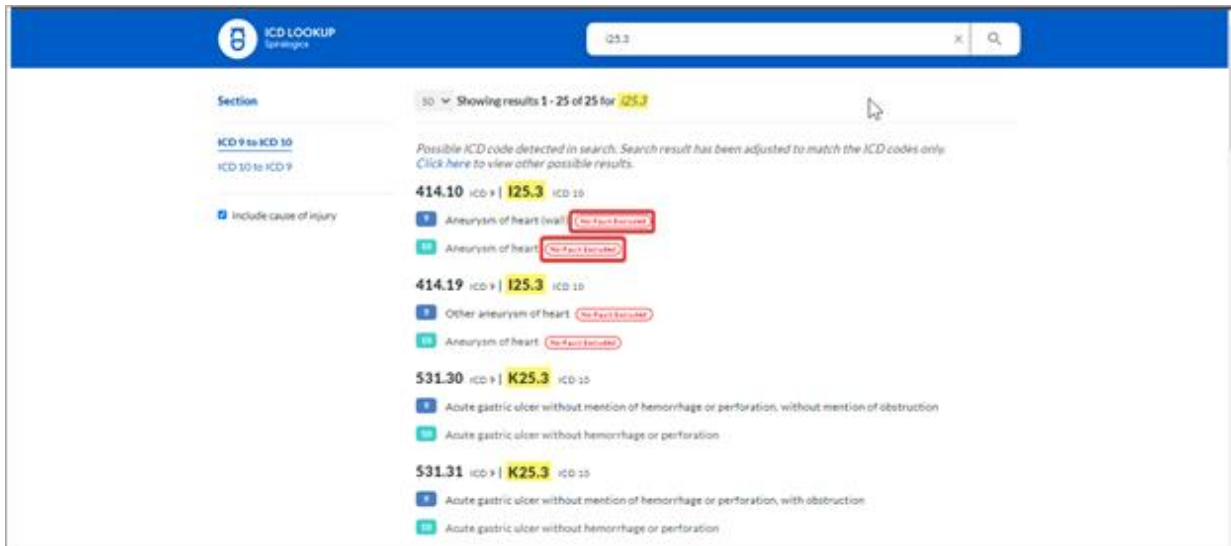
There are certain ICD diagnosis codes that might not provide enough information related to the cause and nature of an illness, incident or injury. These codes have been excluded from use. Such codes are indicated as 'Excluded'.



Fig(xxviii): Indication of 'Excluded' code

4.2.13.3 Indication of No Fault Excluded Code

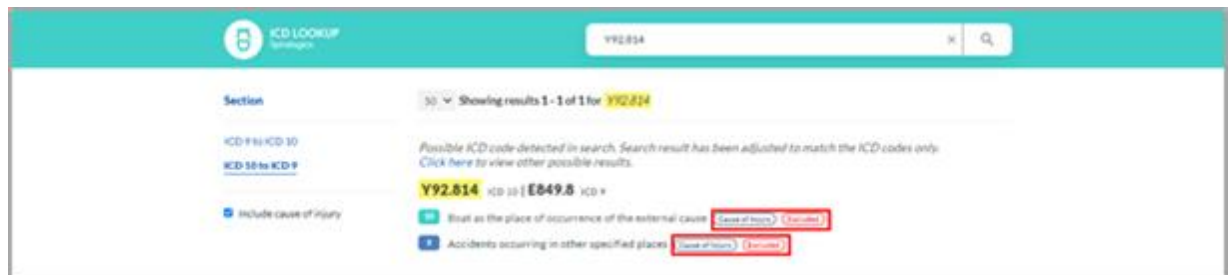
There are certain ICD diagnosis codes that are resulting from injury to an individual or damage to property in an accident, regardless of who is at fault for causing the accident. Such codes are indicated as 'No Fault Excluded'.



Fig(xxix): Indication of 'No fault excluded' code

4.2.13.4 Indication of Multiple Cause of Injury and Exclusions

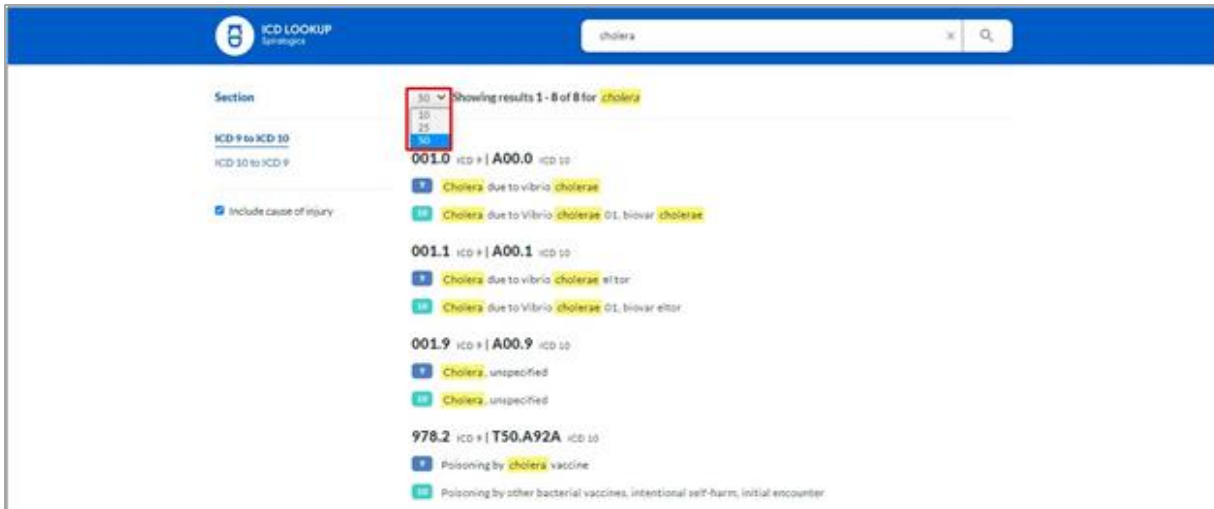
A single ICD code may also have multiple indication of cause of conditions. The ICD code can be both 'Cause of injury' and 'Excluded'.



Fig(xxx): Multiple Indication

4.2.14 Page Size Selector

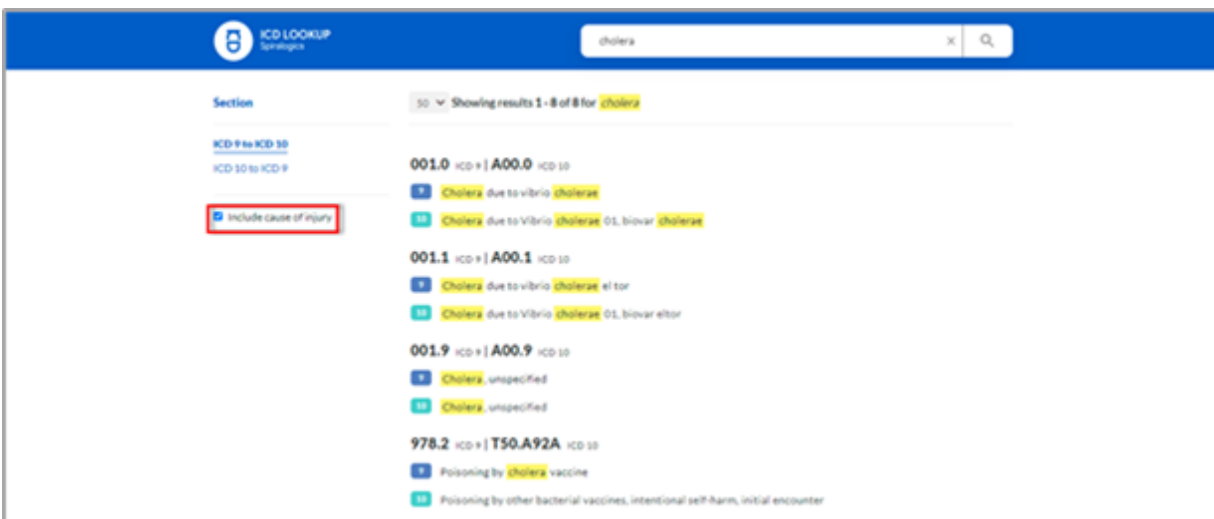
A dropdown is available in Search Results page to allow users to select the number of search results to be displayed in a single page. User can select either of 10, 25 or 50 from the dropdown options. The Search Results page displays 50 results in a page by default.



Fig(xxxi): Page Size Selector

4.2.15 Filtering Result for Cause of Injury

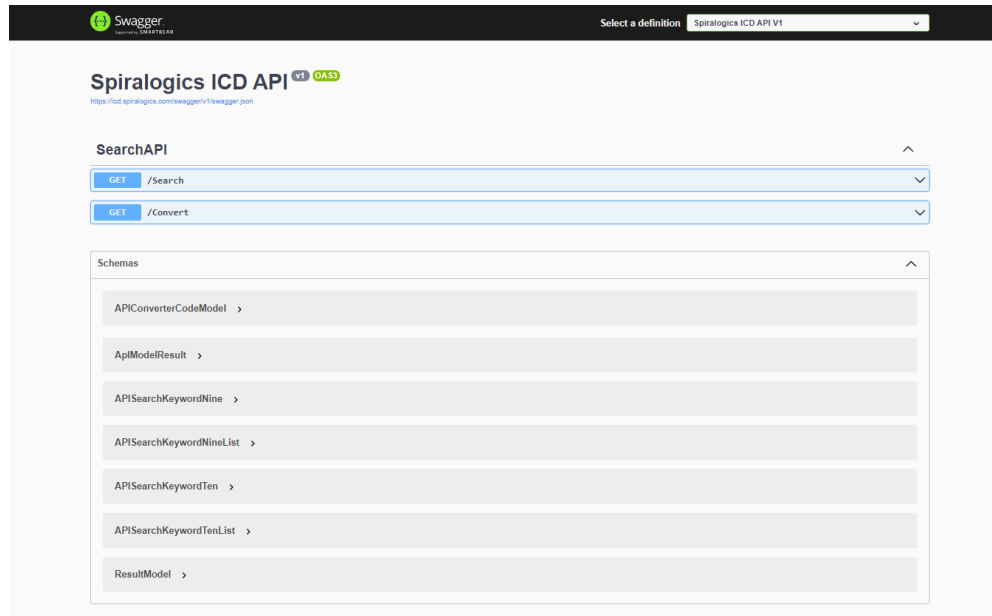
A checkbox with label **Include cause of injury** (which is checked by default) is available to the left of search results under Section. User can select or deselect the checkbox in order to filter the ICD codes that are cause of injury. When a user deselects this checkbox, the ICD codes that are the cause of injury is removed from the search results. The user can select the checkbox again to include the ICD codes that are cause of injury.



Fig(xxxii): Include Cause of Injury

4.3 Swagger UI

Swagger UI has been made available for other developers to visualize and interact with the API's resources without having any of the implementation logic in place. Developers can get access to Spiralogics ICD API Swagger by just appending “/swagger” on the URL i.e., <https://icd.spiralogics.com/swagger>



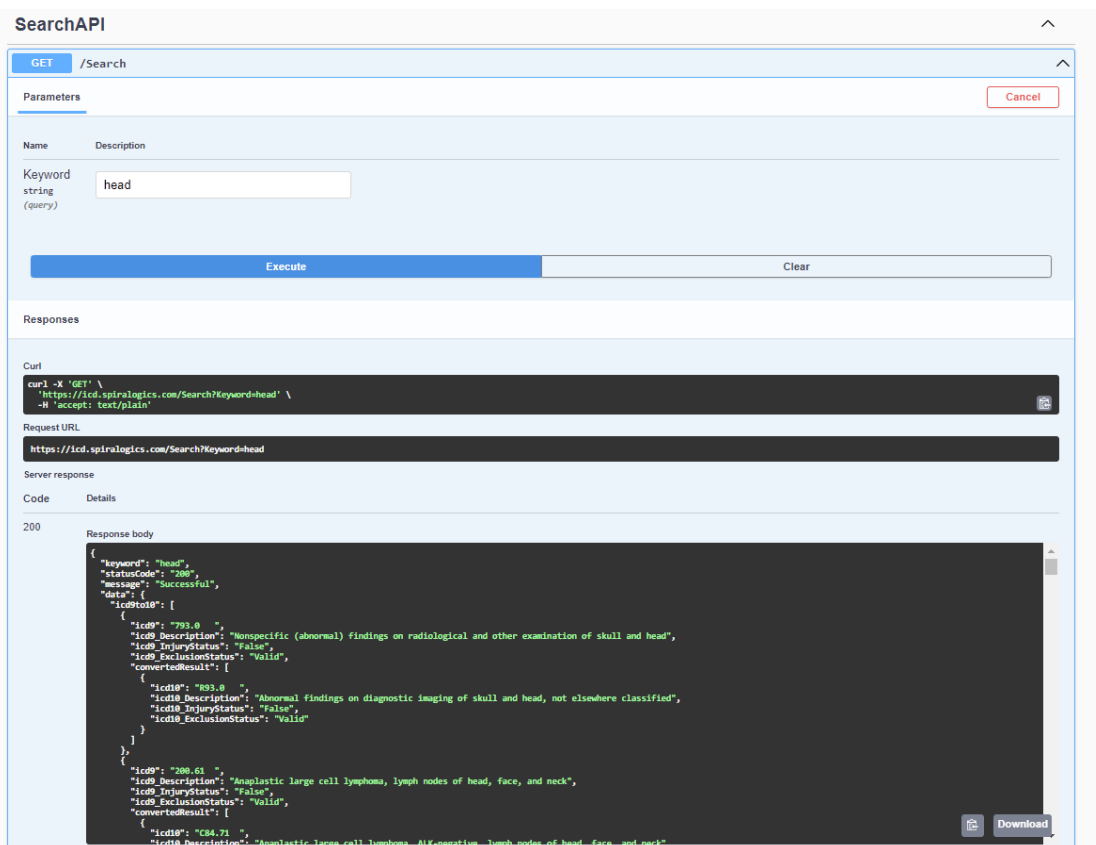
Fig(xxviii): Swagger UI

4.3.1 Search API

URL: <https://icd.spiralogics.com/Search>

The API takes keyword/phrase or ICD Codes as a parameter and returns up to 50 ICD 9 results and 50 ICD 10 results based on entered keyword.

Example: <https://icd.spiralogics.com/Search?Keyword=head>



Fig(xxix): Search API

4.3.2 Convert API

URL: <https://icd.spiralogics.com/Convert>

The API takes a valid ICD code as a parameter and returns the corresponding converted ICD code and description (convert ICD9 to 10 and vice versa).

Example: <https://icd.spiralogics.com/Convert?code=e851>

GET /Convert

Parameters Cancel

| Name | Description |
|---------------------------|-------------------------------------|
| code string (query) | <input type="text" value="e849.6"/> |

Execute Clear

Responses

Curl

```
curl -X 'GET' \
  'https://icd.spiralogics.com/Convert?code=e849.6' \
  -H 'accept: text/plain'
```

Request URL

```
https://icd.spiralogics.com/Convert?code=e849.6
```

Server response

| Code | Details |
|------|--|
| 200 | <p>Response body</p> <pre>{ "searchCode": "E849.6", "statusCode": "200", "message": "Successful", "data": { "icd9to10": [{ "icd9": "E849.6", "icd9_Description": "Accidents occurring in public building", "icd9_InjuryStatus": "True", "icd9_ExclusionStatus": "Excluded", "convertedResult": [{ "icd10": "Y92.29", "icd10_Description": "0th public building as place", "icd10_InjuryStatus": "True", "icd10_ExclusionStatus": "Excluded" }] }] }, "icd10to9": [] }</pre> <p>Download</p> |

Fig(xxx): Covert API