

# Tag Recommendations

There are two Tag Recommendation modes: Standard and Smart (Beta). In short, **standard tag recommendations** use keyword searches and is available to all users while **Smart Tag Recommendations** uses OpenAI, a Large Language Model that can read and answer questions, but *is only available to enterprise customers*.

## Standard Tag Recommendations

Nested Knowledge automatically generates Standard Tag Recommendations for every included study. These are available for Full Texts (by default) but you may also turn on Abstract Tag Recommendations in Settings.

### Tag Recommendations

Smart tag recommendations use GPT 4, a large language model from OpenAI, to provide automatic highlighting of full texts based on your configured tags. Standard recommendations use keyword lookup.

Tag recommendations may be shown on the abstract level, in addition to the default full-text level.

Choose type:

 Standard
   
 Smart BETA
 Abstract Tag Recommendations

### Standard Tag Recs: Full Text

Once you have uploaded the Full Text, standard tag recommendations will become available. To view them, open the "Full Text Tag Recs" tab on the right hand side, and Standard should be toggled by default. Doing so will open a list of tag recommendations, which are the results for an automatic search **by exact keyword** look up across the whole full text. If in form-based tagging mode (default) a recommendation will be shown as a potential answer to the tag question, whereas in standard mode, a list of recommendations for all tags will be shown.

Form-based appearance:

The screenshot shows a ClinicalTrials.gov study page. The main content area on the left lists study details: Study Type (Interventional), Actual Enrollment (155 participants), Allocation (Randomized), Intervention Model (Parallel Assignment), Masking (Triple), Primary Purpose (Treatment), and Official Title (A Phase 2b Multinational, Randomised, Double-blind, Parallel- Group, 24-week Placebo-controlled Study With 28-week Extension to Investigate the Use of Benralizumab in Patients With Chronic Spontaneous Urticaria Who Are Symptomatic Despite the Use of Antihistamines (ARROYO)). The right-hand panel contains a 'Navigation' menu with 'Back', 'Skip', and 'Complete' buttons. Below it is a 'Questions (0/4)' section with a search bar and a dropdown menu for 'Study Design' (Interventional). There is also a 'Full Text Tag Recs' section with 'Standard' and 'Smart BETA' tabs, and a table with a 'Tag' column and a row for 'Interventional'.

Standard appearance:

The screenshot shows the standard appearance of a ClinicalTrials.gov study page. The main content area on the left features a banner for 'ClinicalTrials.gov' and the study title 'A Study to Investigate the Use of Benralizumab in Patients With Chronic Spontaneous Urticaria Who Are Symptomatic Despite the Use of Antihistamines (ARROYO) (ARROYO)'. A disclaimer is visible at the bottom. The right-hand panel contains a 'Navigation' menu with 'Back', 'Skip', and 'Complete' buttons. Below it is a 'Tagging' section with a search bar and a dropdown menu for 'Select Tag'. There is also a 'Full Text Tag Recs' section with 'Standard' and 'Smart BETA' tabs, and a table with a 'Tag' column and rows for 'Sex', 'Interventional', and 'Study Design'.

To view the text that is associated with a given Tag Recommendation, click on the recommendation you're interested in. This will:

- Auto-jump the PDF to the relevant section,
- Put the tag name in the Search bar in the top left (underlined in red above), which also displays the number of occurrences of your tag,
- Highlight the text portion relevant to the recommended tag (red arrows above).

If you want to see all locations the tag occurs in the full text, you can scroll through and find relevant text contents by clicking the arrows on the Search bar.

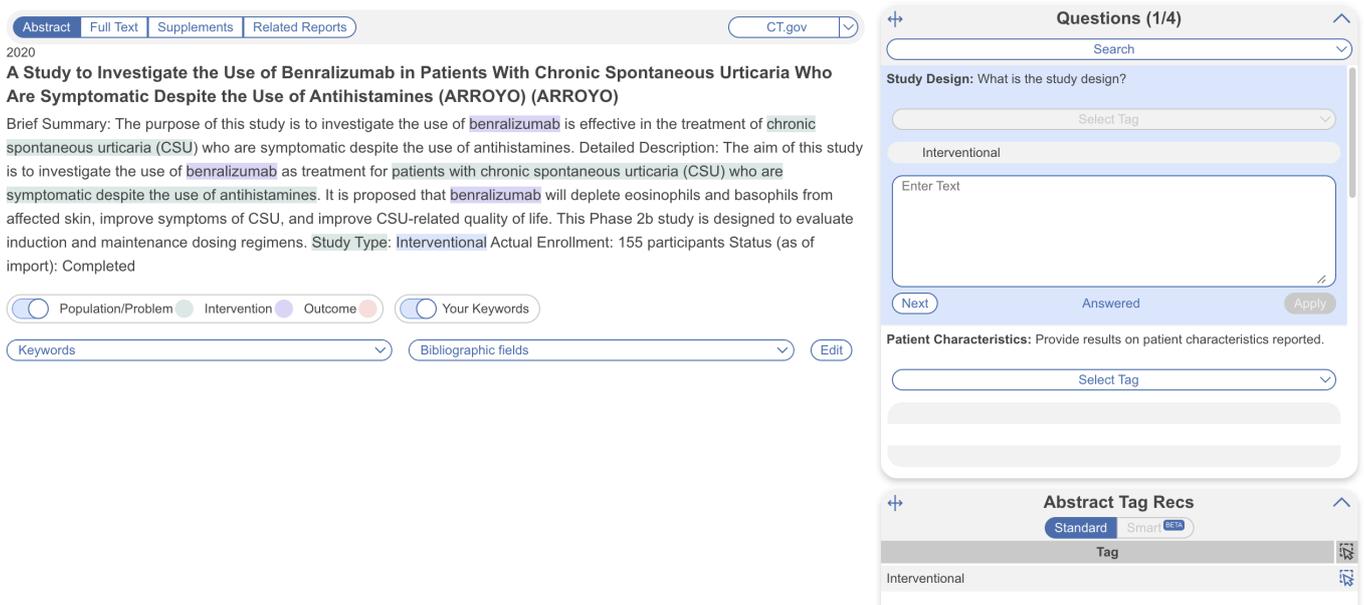
When you are ready to apply a Tag Recommendation, all you need to do is:

- Click on it,
- Select the text content of interest (using the techniques outlined below).

Once added, the Tag Recommendation will disappear from the Tag Recommendations list and appear as an applied Tag.

## Standard Tag Recs: Abstracts

Similarly, when standard tag recommendations for abstracts is turned on, any recommendations will be highlighted in blue when clicked on.



## Aliases

If a tag has an alias and the original tag name does not generate any recommendations, the alias will then be searched in order to generate a tag recommendation. To add an alias to a tag, navigate to the tag hierarchy, click on the tag, and add an alias. In the below example, "Gender" was added as an alias to the "Sex" tag. As a result, when "Sex" is unavailable, the standard tag recommendations will search the either the abstract or full text for "Gender" instead and this will be displayed in the tab.

## Tag: Sex

Edit Contents Hide Merge Delete

**Tag Name**

**Question Type** ?

**Description**

**Parent Tag**

**Order under Parent** ?

**Add Alias:**

 +  
 ×Cancel Update

## Smart (Beta) Tag Recommendations (for Enterprise subscriptions only)

Introducing Nested Knowledge's Smart Tag Recommendations beta, which utilizes OpenAI's GPT-4 model to read and understand your tags, search within your full texts, and offer both smart recommendations and automatic excerpts of text.

Smart Tag Recommendations are an upgraded version of the above tag recommendations that utilizes GPT 4, a language model provided by OpenAI, to search for tags and automatically highlight corresponding excerpts. To see a full disclosure of what data Smart Tag Recommendations use and how it works, see the [Nested Knowledge AI Disclosure](#).

Unlike “standard” tags, instead of searching the full text for key words alone, Smart Tag Recommendations uses artificial intelligence to search for similar or applicable terms and/or specific answers to your form-based questions. Compatible with Standard and Form-based Tagging modes, you can toggle on this feature in Admin Settings, provided you have an Enterprise subscription.

### Tagging

In Standard tagging, the entire tagging hierarchy is made available as an open-ended list.

In Form-based tagging, tags can be turned into questions to be posed to the reviewer. There are three types of questions: Single Apply questions apply the tag selected, Single Select questions allow for only one of the child tags to be applied and Multiple Select questions allow for multiple child tags to be applied. All tags may have text text content. Switching between these modes results in no loss of data.

#### Choose mode:

- Standard
- Form-based

### Tag Recommendations

Smart tag recommendations use GPT 4, a large language model from OpenAI, to provide automatic highlighting of full texts based on your configured tags. Standard recommendations use keyword lookup.

Tag recommendations may be shown on the abstract level, in addition to the default full-text level.

#### Choose type:

- Standard
  - Smart BETA
- [Regenerate Recommendations](#)
- Abstract Tag Recommendations

### Import

Import existing tagging data for any record already in your nest by uploading a spreadsheet.

#### Upload data:

[Begin](#)

After toggling on Smart Tag Recommendations, the feature runs in the background to update all recommendations for included studies with full texts in the Tagging queue. This currently takes around 1-2 minutes per study, so it can take some time for recommendations to be generated if you have a large number of included studies. It will also automatically update when new studies are added to the queue. Note: the current limit for generating recommendations is up to 250 studies.

Once updated, a list of tag recommendations will be shown. Similarly to Standard Tag Recommendations, clicking on any recommendation will auto-fill the excerpt box, auto-jump you to the area of the pdf based on the AI's findings and you can apply tags as normal. Below, the recommendation for the tag “Disease Symptom Scores” was selected and the associated text evidence was automatically highlighted in the full text. From here, you can apply tag or clear the selection if you do not wish to apply with this excerpt.

The screenshot shows a clinical trial abstract page with a tagging sidebar. The abstract text is highlighted, and the sidebar shows tag recommendations like 'Disease Symptoms Scores'.

**Primary Outcome Measures:**

- Change from baseline in weekly Itch Severity Score (ISS7) at Week 12 [ Time Frame: Week 12 ]

Change from baseline in weekly Itch Severity Score (ISS7) at Week 12 between benralizumab and placebo. The minimum ISS7 is 0 and the maximum is 21, being 21 the most severe score. The baseline ISS7 will be the sum of the ISS during the 7 days prior to day of randomisation. The ISS7 at Week 12 will be the sum of the daily ISS during the previous 7 days.

**Secondary Outcome Measures:**

- Change from baseline in Urticaria Activity Score (UAS7) at Week 12 [ Time Frame: Week 12 for all patients ]
- Change from baseline in Urticaria Activity Score (UAS7) at Week 24 [ Time Frame: Week 24 relative to baseline for all patients ]
- Proportion of responders Urticaria Activity Score (UAS7≤6) at Week 12 [ Time Frame: Week 12 for all patients ]
- Change from baseline in weekly hives severity score (HSS7) at Week 12 [ Time Frame: Week 12 for all patients ]

The minimum HSS7 is 0 and the maximum is 21. The baseline HSS7 will be the sum of the HSS during the 7 days prior to day of randomisation. The HSS7 at Week 12 will be the sum of the daily

https://clinicaltrials.gov/ct2/show/NCT4612725

**Navigation:** Back, Skip, Complete

**Tagging:**

Tag	Contents
Placebo and Benralizumab	Biological: Placebo and Benraliz...
Benralizumab	Biological: Benralizumab
Completed	

Completed

Disease Symptoms Scores

Change from baseline in weekly Itch Severity Score (ISS7) at Week 12 between benralizumab and placebo.

Apply Tag

**Tag Recommendations:** Standard, Smart BETA

Tag
Recruitment Status
Clinical Trial Phase
Interventions/Treatments
Placebo and Benralizumab
Benralizumab
Disease Symptoms Scores
Del. Scores

Comments (0)

History

In Form-based Tagging mode, selecting a tag recommendation will populate the answer to the question for you as well as auto-highlighting in the full text.

## Abstract Tag Recommendations

In addition to Full Text Smart Tags, for further assistance, you also have the option to turn on Tag Recommendations (both Standard and Smart) for included Abstracts (see Settings). The format is the same as Full Text Smart Tags, but labelled "Abstract Tag Recs" when the Abstract tab is toggled. It is powered by GPT 4 Turbo.

The screenshot shows a clinical trial abstract page with a tagging sidebar. The abstract text is highlighted, and the sidebar shows tag recommendations like 'Abstract Tag Recs'.

**Nest Home:** Activity, Settings

**Literature Search:** Other Sources, Duplicate Review, Search Exploration

**Dual Screening:** Adjudicate Screening

**Tagging:**

**MA Extraction:**

**Critical Appraisal:**

**Study Inspector:**

**Synthesis:** Manuscript Editor, Abstract Editor, Export

Abstract | Full Text | Supplements | Related Reports

Mazzitelli, 2023

**Molnupiravir and Nirmatrelvir/Ritonavir: Tolerability, Safety, and Adherence in a Retrospective Cohort Study.**

BACKGROUND Molnupiravir (MOL) and nirmatrelvir/ritonavir (NIR) were recently approved for the early treatment of COVID-19, but real-life data on tolerability, safety, and adverse events (AEs) are still scarce. METHODS We conducted a retrospective cohort study including all patients who were prescribed MOL and NIR at the Infectious Diseases Unit of Padua University Hospital, between January and May 2022. Demographic, clinical, and safety variables were recorded. RESULTS We included 909 patients, 48.3% males and 95.2% vaccinated against SARS-CoV-2. The median age was 73 (IQR: 62-82) years. MOL and NIR were prescribed in 407 (44.8%) and 502 (55.2%) patients, respectively. Overall, 124/909 (13.6%) patients experienced any AEs following antivirals intake: 98/124 (79%) patients reporting adverse events presented grade 1 AEs, 23/124 (18.5%) grade 2 AEs and 3 (2.5%) grade 3 AEs. Treatment discontinuation was recorded in 4.8% of patients. AEs were significantly higher in women, in patients treated with NIR compared to MOL and in people who were not vaccinated. CONCLUSIONS In our real-life setting, AEs were higher than those reported by clinical trials, and were particularly associated with NIR use and with not being vaccinated. Further analyses are needed to better assess safety of oral antivirals and to define which patient's profile may benefit most from MOL and NIR.

Population/Problem Intervention Outcome Your Keywords

Keywords Bibliographic fields Edit

**Navigation:** Back, Skip, Complete

**Tagging:**

Tag	Contents
Included in Review and Nest	

Select Tag

Enter Text

Apply Tag

**Abstract Tag Recs:** Standard, Smart BETA

Tag
Median Age
Molnupiravir
Nirmatrelvir/ritonavir

Comments (0)

History

## Internal Validation Testing of Abstract Smart Tag Recommendations

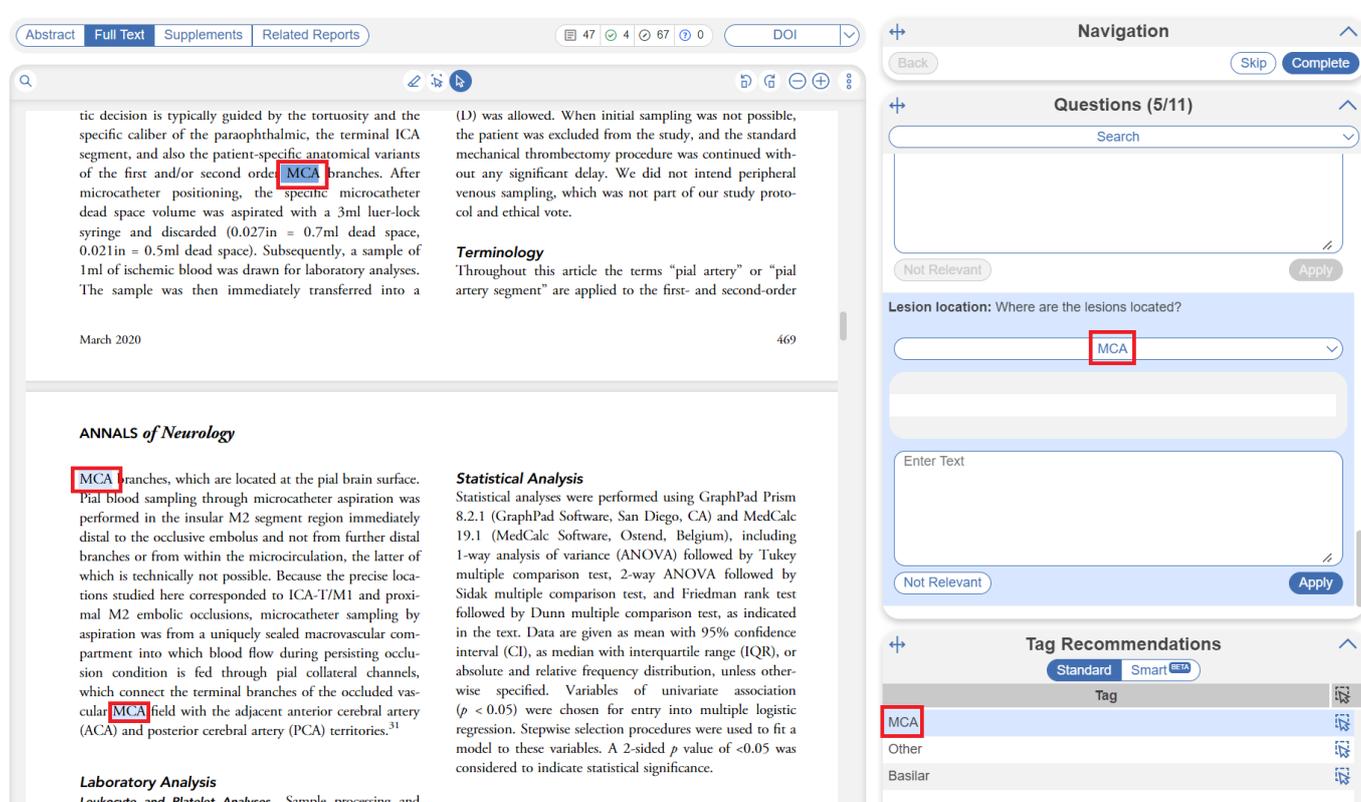
In an internal validation, when compared against expert tagging, Smart Tag Recommendations had recall of approximately 50%-60% across three diverse Systematic Literature Review topics when employing OpenAI's GPT 4 Turbo to tag Abstracts from underlying records. Given the customizability of tags and the distinct content in different reviews, recall and accuracy of Smart Tag Recommendations (for both Abstracts and Full Texts) will vary by project, driving home the need for expert confirmation of any Smart Tag Recommendation.

## Guidelines for Optimizing Smart Tag Recommendations

Check out our [guidelines for optimizing Smart Tag Recommendations](#) and its ability to assist with your review.

## Standard vs Smart Tag Recommendations Example

In Standard mode, only the tag name is searched in the full text. In Smart mode, GPT 4 uses similarly reported terms to find the most applicable excerpt. In the below example, for the question “Where are the lesions located?”, Standard mode only searches the tag answers: “ICA terminus” “MCA” etc. Clicking on MCA, the exact name is searched in the full text only:



However, in Smart mode, a deeper dive is conducted. The AI was able to correctly identify the section where all the lesions were located, auto-selecting “Other” as the answer to encompass the multiple locations:

The screenshot displays a web interface with a main content area on the left and a sidebar on the right. The main content area shows a medical article titled "Kollikowski et al: Hyperacute Ischemic Stroke". The article text discusses experimental data on immune cells and platelets, CT-perfusion scan results, and patient inclusion criteria. The sidebar contains three sections: "Navigation" with "Back", "Skip", and "Complete" buttons; "Questions (5/11)" with a search bar and a question about lesion location; and "Tag Recommendations" with a dropdown menu set to "Other".

## Regenerating Smart Tag Recommendations and Error Reporting

If you make changes to your tag hierarchy or switched tagging modes after turning on Smart Tag Recommendations, you may wish to update the recommendations accordingly. Due to expense of generating smart tag recommendations, a limited number of regenerations are allowed in a nest at this time. This limit is 1 regeneration.

Since the use of OpenAI for tag recommendations is in its beta phase, meaning it is technically feature complete but still in its early stages, there is a possibility you may run into errors. Be sure to [let us know if this occurs](#).

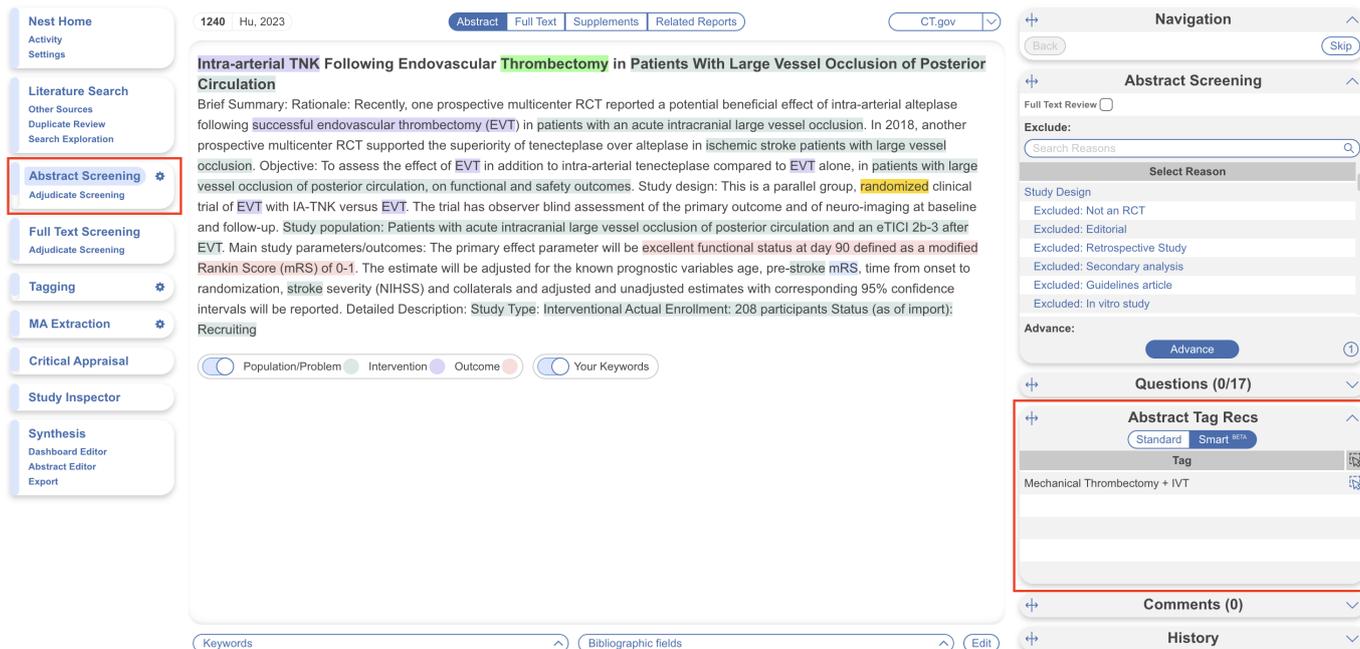
Wondering why Smart Tag Recommendations is unavailable or blank? You may not currently have access due to your subscription type. Upgrade to an Enterprise subscription to access Smart Tag Recommendations and toggle on in Settings. If this is not the case, it may be because it hasn't finished loading yet, check background jobs in the top right. Lastly, the feature may just not have any recommendations for that particular tag or question, try a clicking on a few more and see if it works! If none of these are applicable, contact us [support@nested-knowledge.com](mailto:support@nested-knowledge.com)

Additionally, when generating new recommendations for identical or similar questions (within or between nests), a certain level of change in the recommendations should be expected. This is

because GPT-4 is nondeterministic, due to how it parallelizes floating point arithmetic for performance.

## Tag Recommendations in Screening Module

Tag recommendations are also displayed in the Screening module. When viewing the abstract, abstract tag recommendations are displayed if turned on in Settings. When viewing the full text, full text tag recommendations are displayed if turned on.



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