

Ontology-based interactive visualization of patient-generated research questions

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THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL



National Institute of Environmental Health Sciences
Your Environment. Your Health.

Overview

- Background
 - Crohn's disease & colitis
 - IBD Partners discussion forum
- Ontology creation
- CCFA Explorer
 - Ontology visualization
 - Research topic visualization
 - Overview
 - Details
- Example scenario
- Feedback and future work

The screenshot displays the CCFA Explorer interface, which is divided into several panels:

- Ontology:** A hierarchical tree structure showing relationships between concepts like 'gastrointestinal system disease', 'diagnostic laboratory method', 'IBD course', 'symptom', 'comorbidity', 'treatment method', and 'life factor'.
- Topic Overview:** A bubble chart visualization where nodes represent topics, with size and color indicating their relative importance or frequency.
- Topic Details:** A list of specific research questions generated from the ontology. Each entry includes a user ID, number of votes, number of comments, and a category. For example, one question asks: "Question: The should compare individuals who manage their disease with medication and those who manage their disease with popular diets in the IBD community, such as SCQ, FODMAPS, paleo, etc." Another question asks: "Question: Which herbal remedies have been used to effectively treat IBD?"
- ISNE Parameters:** A control panel for the topic overview visualization, featuring sliders for 'perplexity' (set to 7), 'early exaggeration' (set to 4), 'learning rate' (set to 10), 'iterations' (set to 500), 'metric' (set to 'mutualsh'), and 'term count weight' (set to 0).
- Ontology Network Controls:** A simple control with a 'show empty nodes' checkbox.
- Topic List Controls:** A filter and sort section at the bottom right, with a filter set to 'Selected' and sorted by 'ID'.

Crohn's Disease and Colitis

- Crohn's disease
 - Inflammatory bowel disease (IBD)
 - Chronic
 - Diverse set of symptoms
 - Diarrhea
 - Inflammation (gut and other body parts)
 - Fatigue
 - Abdominal pain
 - Weight loss
 - Etc.
- Colitis
 - Inflammation of the inner lining of the colon
 - Commonly co-occurs with Crohn's disease

Crohn's Disease and Colitis

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- Colitis

- Inflammation of the inner lining of the colon
- Commonly co-occurs with Crohn's disease



No known cure

Certain therapies can help treat *symptoms*

Treatment largely consists of *disease management*

IBD Partners

(formerly CCFA Partners)

- Patient-powered online research network
 - Crohn's and Colitis Foundation
 - UNC-Chapel Hill School of Medicine
- Discussion forum
 - Patients propose and discuss research ideas
 - Researchers engage in discussion

The screenshot displays the IBD Partners website interface. At the top, there is a navigation bar with links for 'About', 'Resources', 'For Researchers', 'For Kids & Teens', and 'Help', along with a 'Sign In' button. Below the navigation bar, a main heading reads 'An IBD Patient-Powered Research Network'. A sub-heading explains that IBD Partners (formerly known as CCFA Partners) is an online research network brought to you by the Crohn's and Colitis Foundation and the University of North Carolina School of Medicine. It states that they bring together inflammatory bowel disease (IBD) patients and researchers in a revolutionary partnership aimed at optimizing treatment of IBD. To the right of this text is an illustration of two people, one pointing at a screen and the other looking at a document. Below the illustration is a link that says 'Want to learn more? View infographic'. A call-to-action button labeled 'Join' is positioned below the text. A purple banner below the 'Join' button contains the text: 'We believe that when patients and researchers work together we learn so much more about how to better treat inflammatory bowel diseases (IBD). Patients understand their own body and disease best and have valuable information to share. We provide a way for researchers to listen to patients about their experiences with IBD. By working together, we can answer the questions that are most important to patients.' Below the banner, there are two statistics: 'Our Community' with a 'See Our Community' button, stating 'We are one of the largest IBD research networks in the world.' and '15,680' patients, with a note 'We are now 15,680 patients strong.'; and '300+' researchers, with a note 'There are over 300 IBD researchers involved in our network.' Below the statistics, there is a 'How It Works' section with a sub-heading 'Patients Propose Research Ideas' and a description: 'Patients come up with insightful research ideas. We invite you to propose, vote, and discuss these ideas. IBD researchers will review these ideas. Your idea may even lead to a study!'. To the right of this section is a 'Popular Research Ideas' section with a sub-heading 'Popular Research Ideas' and a description: 'We should compare individuals who manage their disease with medication and those who manage their disease with popular diets in the IBD'.

Discussion Forum Data



Research topic
Research question
Description
User ID, Votes, Category

Comment
User ID

Comment
User ID



Discussion Forum Data



Research topic
Research question
Description
User ID, Votes, Category

Comment
User ID

Comment
User ID



Forum snapshot:

97 research *topics*

121 total *comments*

400 unique *users*

1246 total *votes*

Discussion Forum Data



Research topic
Research question
Description
User ID, Votes, Category

Comment
User ID

Comment
User ID



Example topic post:

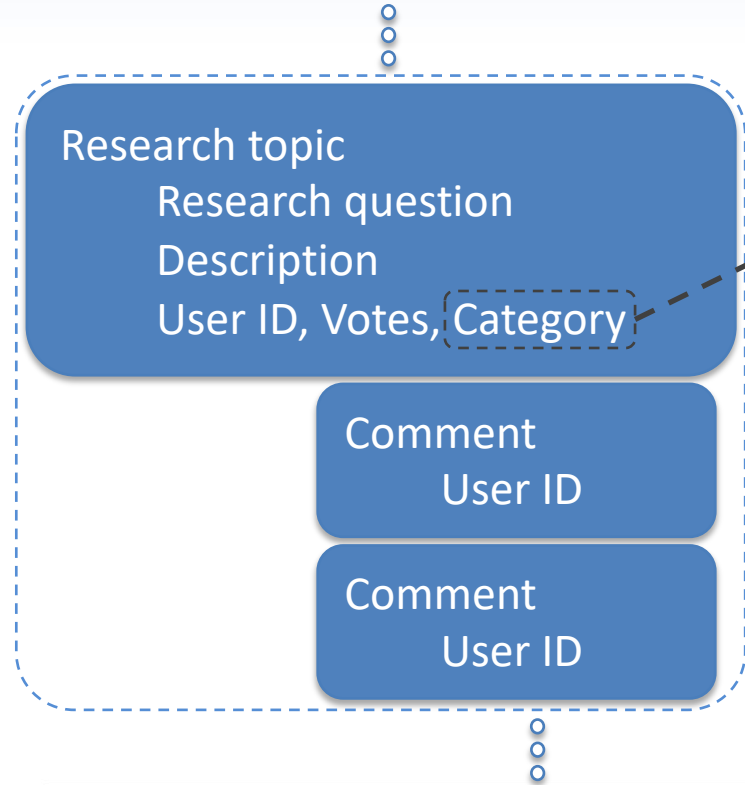
Question:

Nicotine has shown to be effective for UC [ulcerative colitis] in some individuals, both prior- and nonsmokers. What is the mechanism? Does nicotine affect the microbiome, the immune system or both?

Description:

Big Pharma will not take on the role of studying nicotine as there is no \$\$\$ in it. Few studies with small sample sizes have been done but more research is needed.

Discussion Forum Data



One of 9 predefined categories:

- diet
- medications
- procedures and testing
- environment
- alternative therapies
- lifestyle
- genetics
- exercise
- other

Discussion Forum Data



Research topic
Research question
Description
User ID, Votes, Category

Comment
User ID

Comment
User ID



Goals:

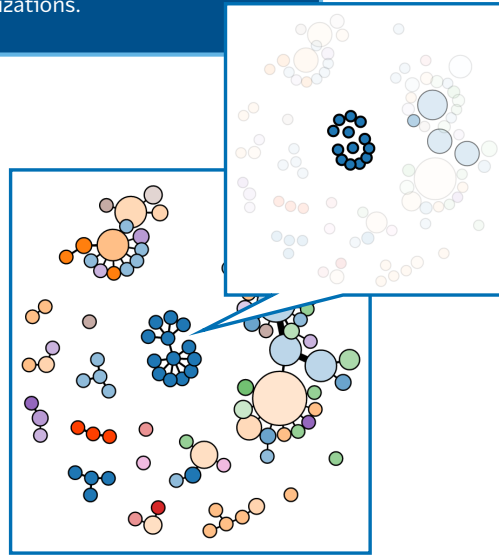
Identify common themes

Prioritize patient-generated
research questions

Initial Approach

Words	Counts
ulcerative colitis	20
inflammatory bowel	13
controlled trial	10
inflammatory bowel disease	10
bowel disease	10
top priority	10
periodontal disease	9
disease activity	8
vitamin d	7
ibd management	5
other auto-immune	4
disease	
small bc	
combina	

Phrases were extracted from forum text (i.e., from questions, descriptions, and comments). Those phrases with >2 appearances were used to create the initial visualizations.

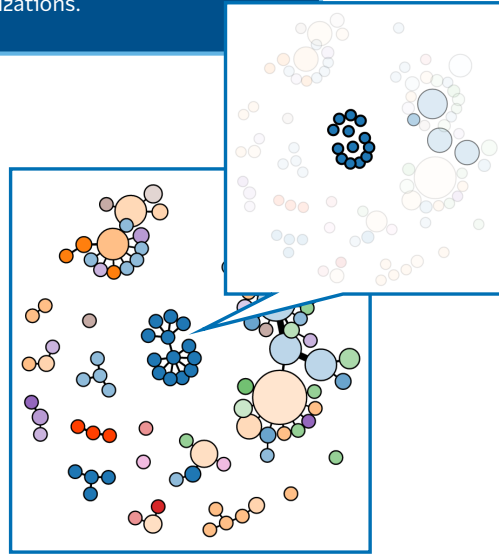


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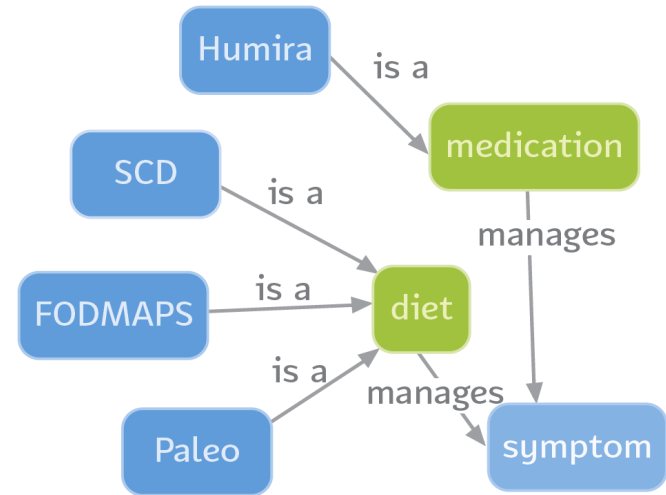
This didn't turn out to be as informative as we'd hoped. The frequency of words and/or word phrases didn't successfully capture the 'aboutness' of the conversation on the CCFA forum.



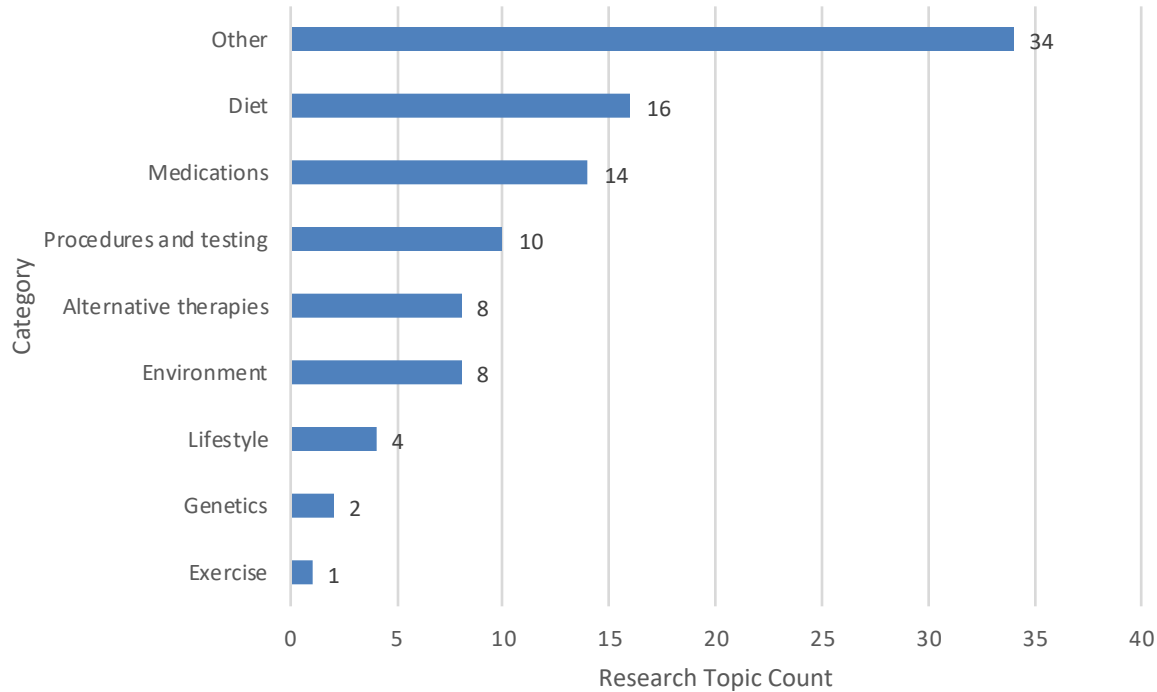
Ontology Creation

- **Ontology**

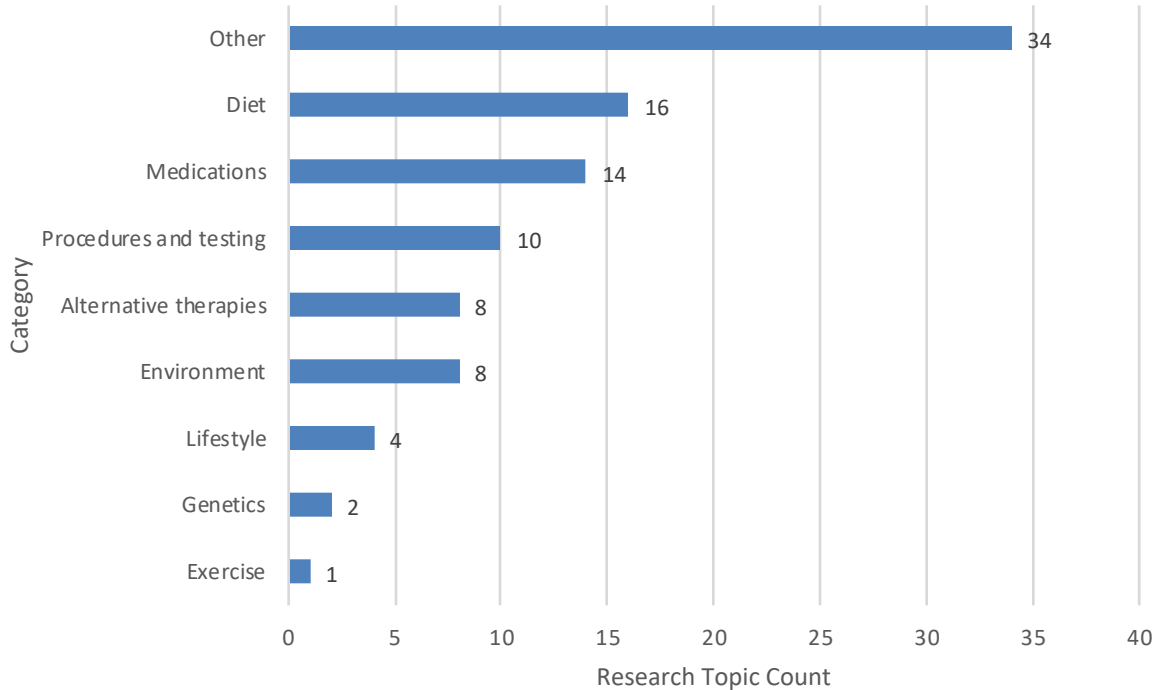
- Controlled vocabulary
- Represent knowledge about a domain of interest
- Enable multiple types of relationships
 - “is a”
 - “treats”
 - Etc.



Content Analysis



Content Analysis

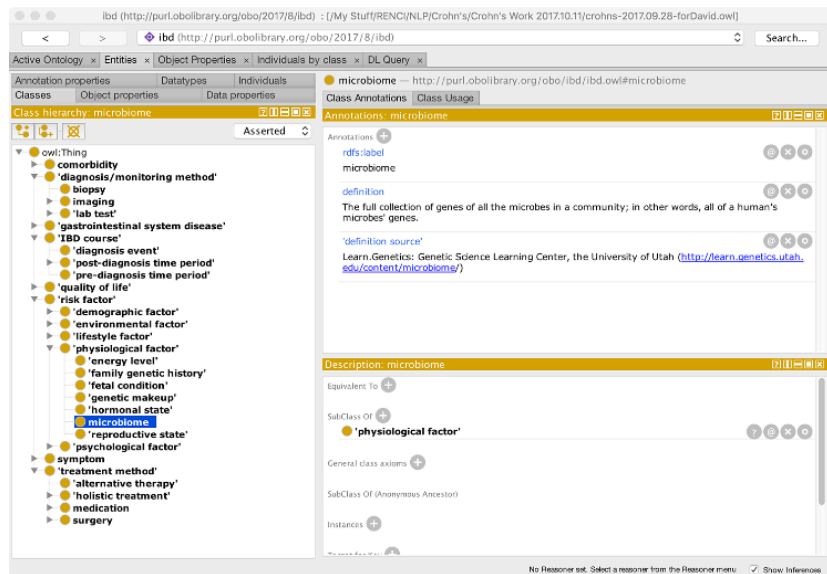


“Sometimes there is no existing theory or research on your message populations; you may not know what the important variables are. The only way to discover them is to explore the content.”

Wildemuth BM. Applications of Social Research Methods to Questions in Information and Library Science. Westport, Conn: Libraries Unlimited; 2009.

The Ontology

Protégé



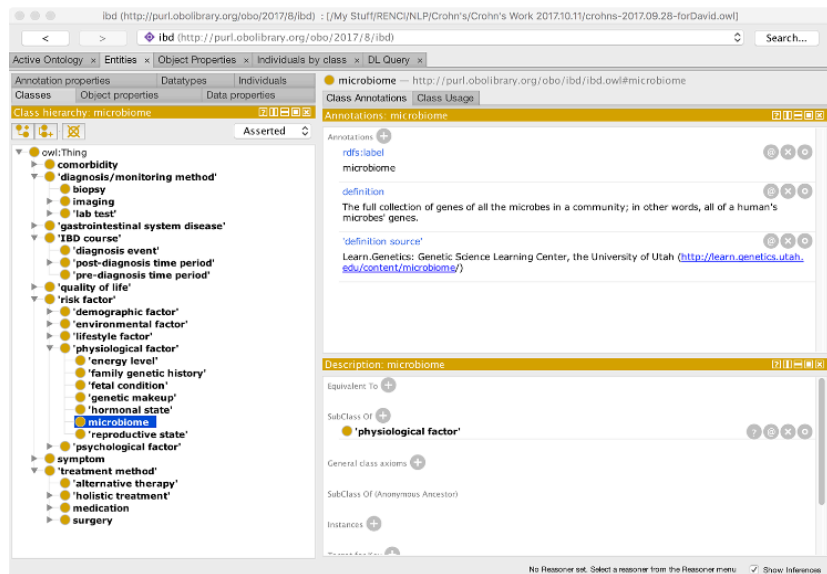
Borrows some terms from pre-existing ontologies:

Ontology of Adverse Events, Disease Ontology

REPRESENTATIVE CLASSES	POSTS
comorbidity	11
diagnosis/monitoring method	7
IBD course	39
pre-diagnosis time period	1
diagnosis event	5
post-diagnosis time period	31
quality of life	8
risk factor	58
demographic factor	7
environmental factor	18
lifestyle factor	20
physiological factor	28
psychological factor	5
symptom	36
gastrointestinal manifestation	12
extra-gastrointestinal manifestation	3
treatment method	50
alternative therapy	7
holistic treatment	12
medication	28
surgery	13

The Ontology

Protégé



337 classes
7 top-level classes

OWL → ROBOT → OBO Graph (JSON)

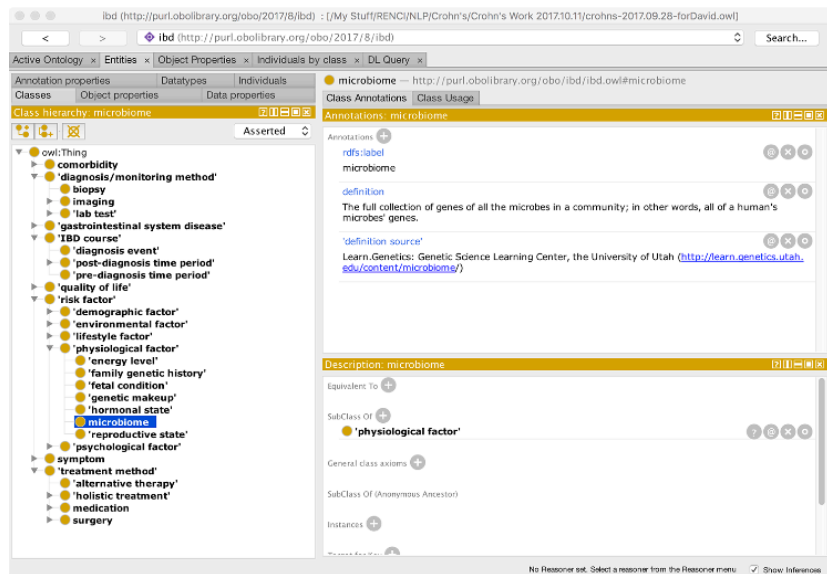
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Protégé



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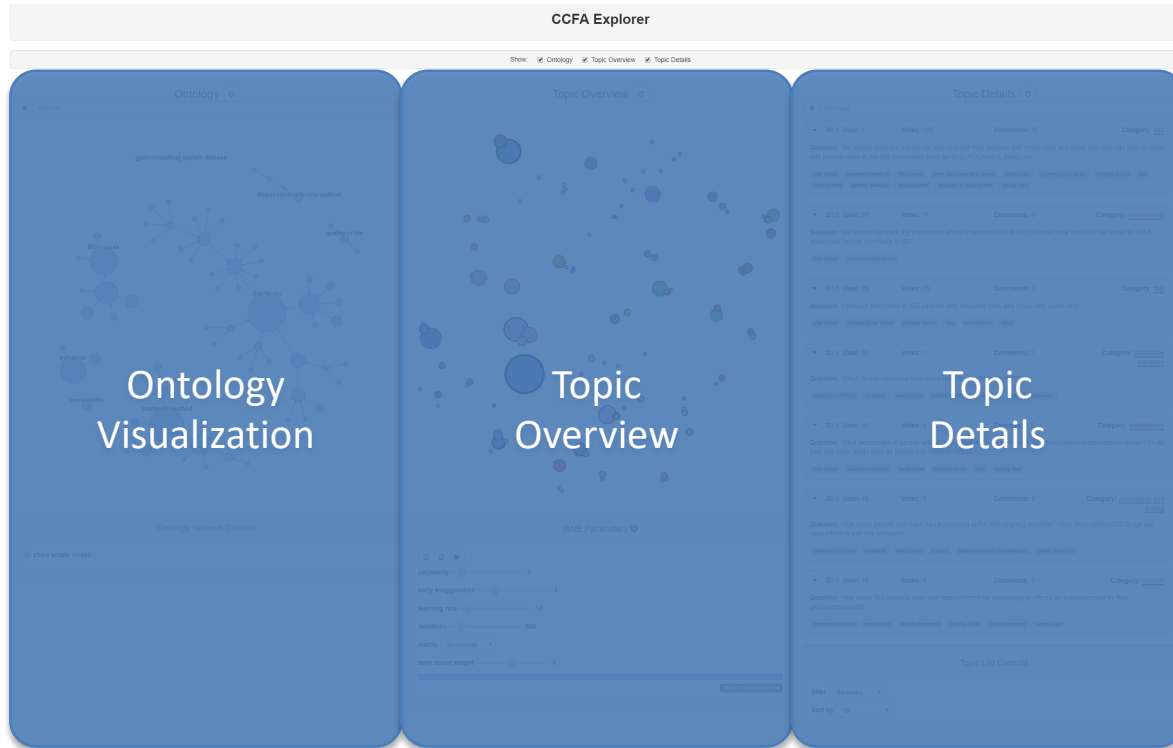
Research Topics ↔ Ontology Terms (Classes)

Borrows some terms from pre-existing ontologies:

Ontology of Adverse Events, Disease Ontology

REPRESENTATIVE CLASSES	POSTS
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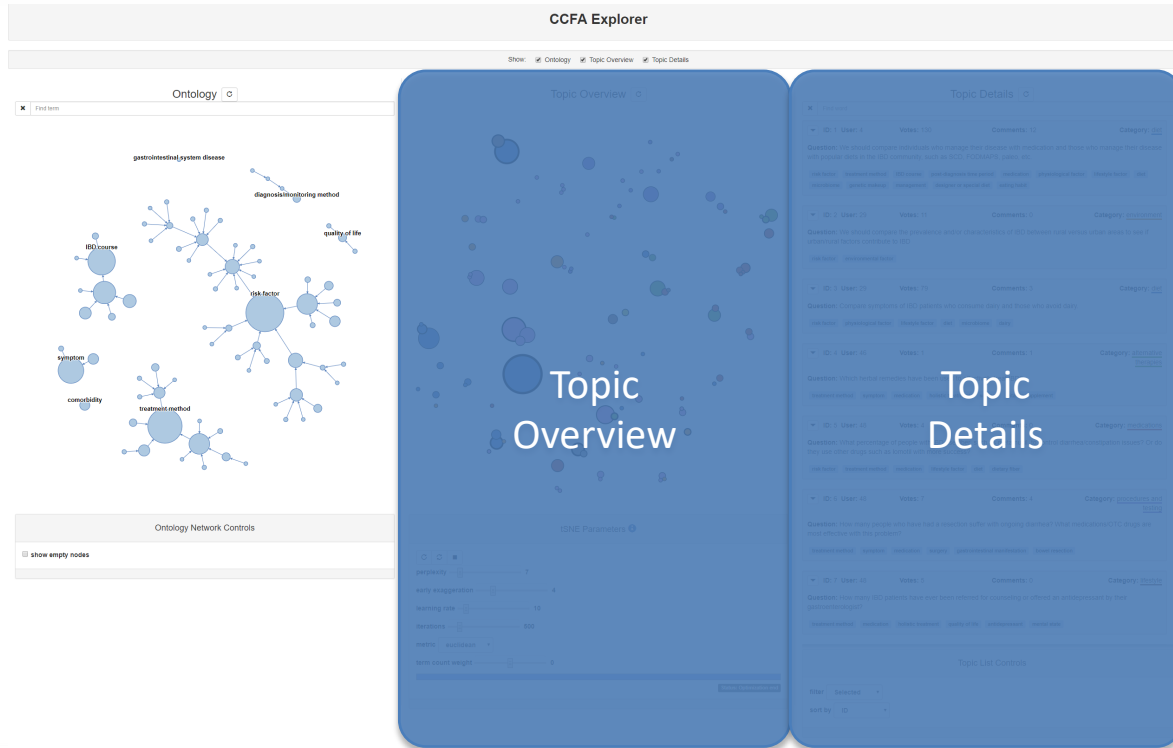
CCFA Explorer



3 linked views

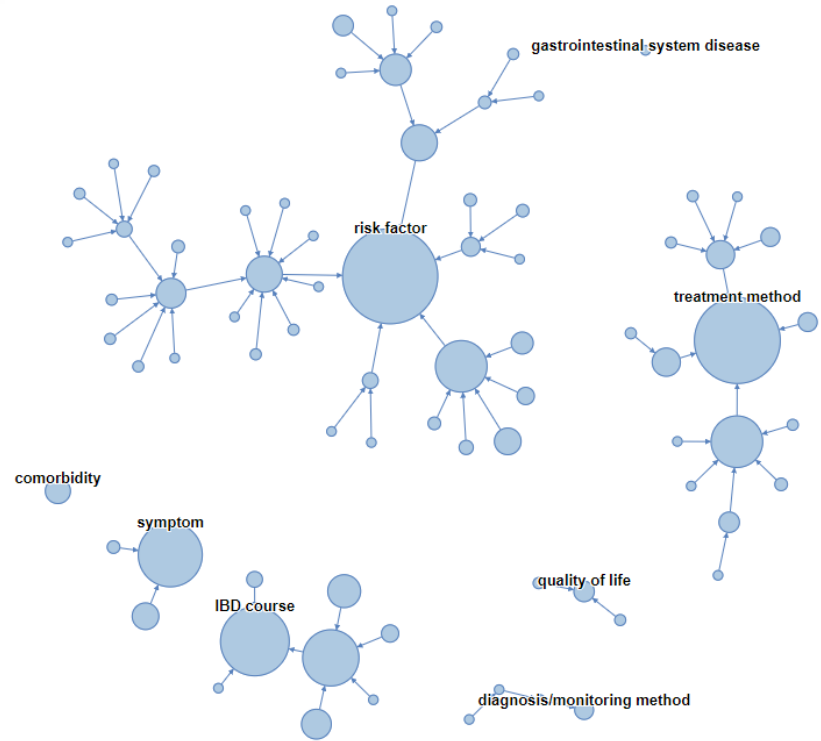
D3
React/Flux
Bootstrap

Ontology Visualization

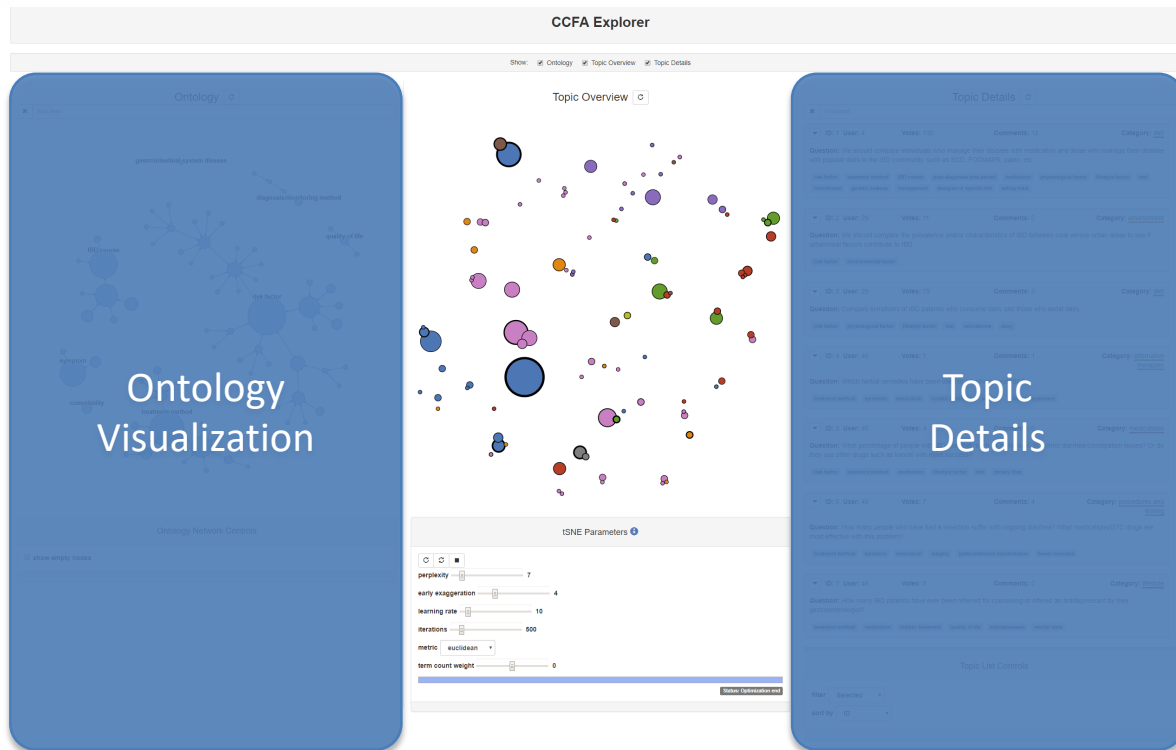


Ontology Visualization

- Force-directed network
 - Node size
 - Number of topics labeled with term
 - Labeled with child implies labeled with parent
 - Links
 - Class relationships
 - Currently only “is a”

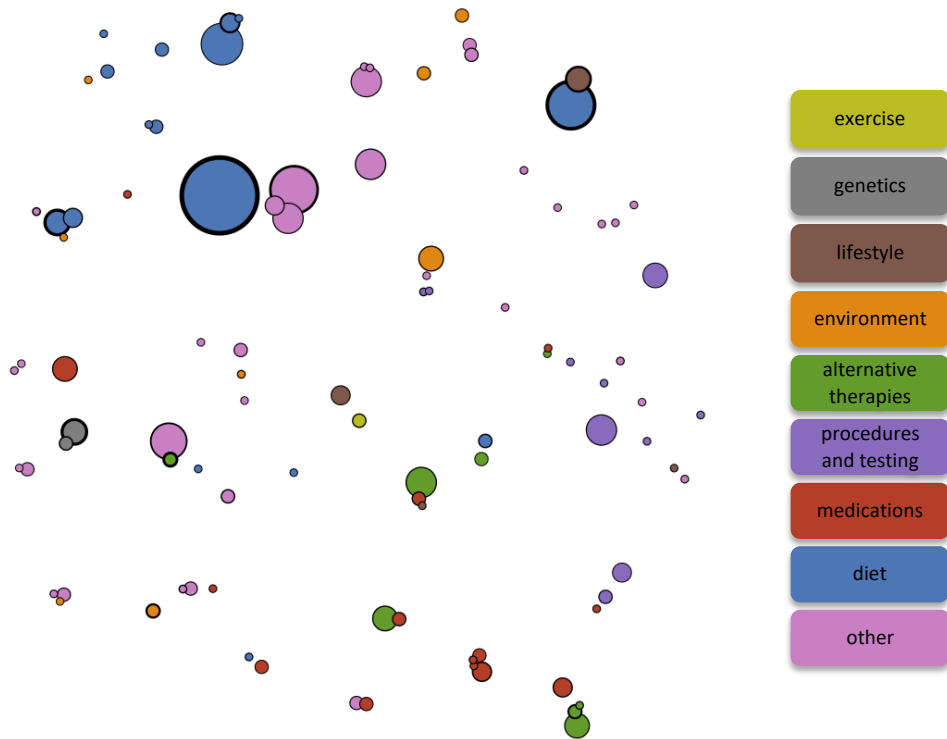


Topic Overview



Topic Overview

- **t-SNE Layout**
 - Based on labeled ontology terms
 - Clusters of topics with similar ontology terms
- **Glyph**
 - Size
 - Number of comments
 - Border width
 - Number of votes
 - Color
 - Category

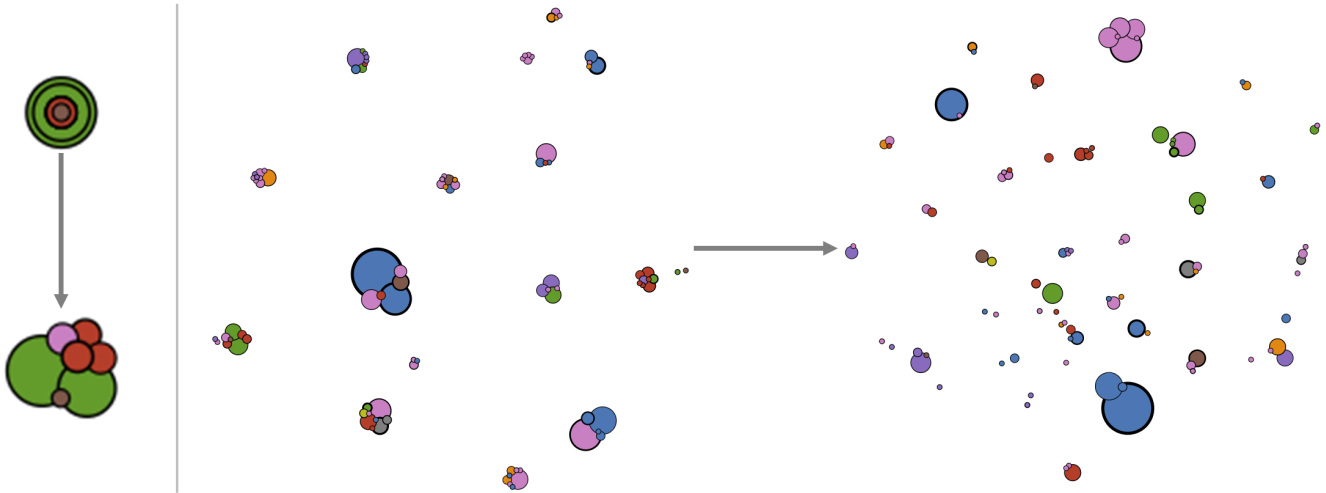


t-SNE Modifications



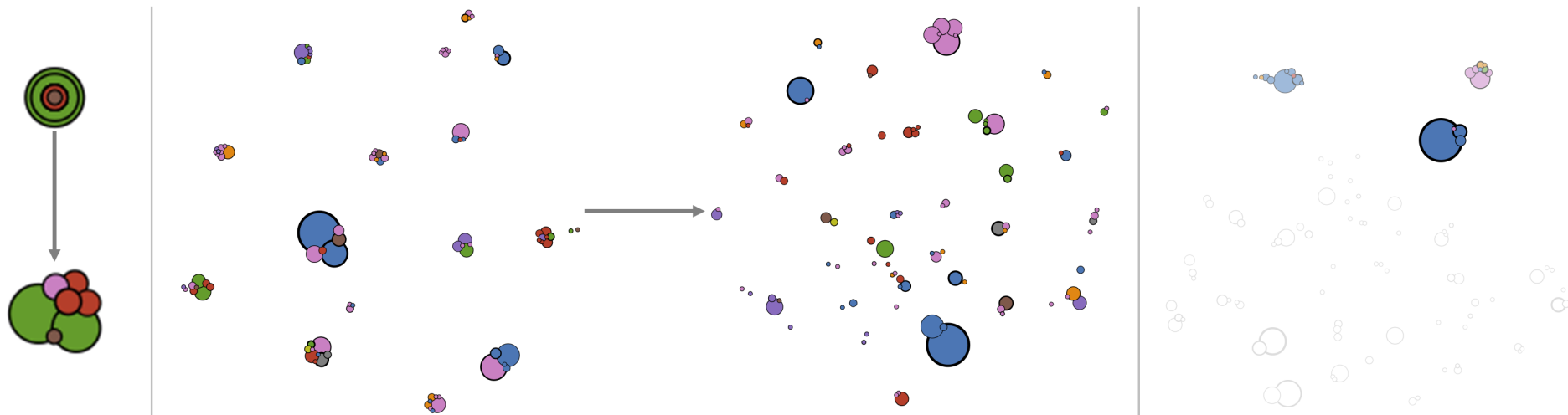
1. Force-directed layout of overlapping glyphs

t-SNE Modifications



2. Differential weighting of higher-level (left)
vs. lower level (right) ontology terms

t-SNE Modifications



3. Emphasizing selected ontology terms for layout

Topic Details



ID: 83 User: 2560

Votes: 3

Comments: 3

Category: [procedures and testing](#)

Question: Creation of a test to verify or deny IBD in persons struggling with symptoms

treatment method

IBD course

symptom

surgery

diagnosis/monitoring method

diagnosis event

pre-diagnosis time period

Topic Details



ID: 83 User: 2560

Votes: 3

Comments: 3

Category: [procedures and testing](#)

Question: Creation of a test to verify or deny IBD in persons struggling with symptoms

Description: It took 16 years to verify my Cohn's, from age 13-29 years. Had all sorts of tests and was treated like I was crazy. Spent a month in treatment due to anorexia because eating was so painful. Diagnosed by having exploratory surgery. Because of that I had malnutrition, lost all my teeth and suffered way too long.

treatment method

IBD course

symptom

surgery

diagnosis/monitoring method

diagnosis event

pre-diagnosis time period

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Question: Creation of a test to verify or deny IBD in persons struggling with symptoms

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Comments

- User:** 2777 There is a blood test for this.
- User:** 2777 There is a blood test for this. It was only developed a few years ago.
- User:** 727 Do you know the name of the test?

[treatment method](#) [IBD course](#) [symptom](#) [surgery](#) [diagnosis/monitoring method](#) [diagnosis event](#) [pre-diagnosis time period](#)

Topic Details

- List

- Sort

- Topic ID
- User ID
- Votes
- Comments
- Category

- Filter

- Selected topics
- Selected ontology terms

- Highlight

- Text from search box in red

The screenshot displays a search interface for the CCFA Explorer. At the top, a search bar contains the text 'genetic'. Below the search bar, three search results are listed, each with a dropdown arrow, ID, User, Votes, Comments, and Category. The first result (ID: 15) has 144 users, 58 votes, and 7 comments, with the category 'other'. The second result (ID: 16) has 168 users, 19 votes, and 1 comment, with the category 'genetics'. The third result (ID: 17) has 212 users, 75 votes, and 3 comments, with the category 'genetics'. Each result includes a 'Question' and a 'Description' section. The second and third results also feature a 'Comments' section with numbered user responses. The text in the search bar and the 'genetics' category labels are highlighted in red. The interface includes various ontology-based filters such as 'risk factor', 'IBD course', 'post-diagnosis time period', 'physiological factor', 'remission', 'hormonal state', 'treatment method', 'medication', 'genetic makeup', and 'family genetic history'.

Search results for 'genetic':

- ID: 15** | User: 144 | Votes: 58 | Comments: 7 | Category: [other](#)
Question: What is the effect of hormones, particularly increased estrogen, on Crohn's disease.
Filters: risk factor, IBD course, post-diagnosis time period, physiological factor, remission, hormonal state
- ID: 16** | User: 168 | Votes: 19 | Comments: 1 | Category: [genetics](#)
Question: Are there sub-types of UC? IBD has been broken into UC and Crohn's which helped with treatment. What other sub-categories are there? Could explain why certain meds work for some and not others, and shed light on question of **genetics**?
Description: I have UC and so far no treatment works. My mother had the same problem until she had a colectomy. Perhaps if we understood why our disease is different than some other folks' UC, we could devise a better treatment plan.
Comments:
1. **User: 1001** | Response from the CCFA Partners Research Team: There are different "sub-types" of UC that have to do with the area of involvement. People can have "proctitis" which involves only the rectum, "proctosigmoiditis" which involves the left side of the colon, and "extensive" disease which involves most or all of the colon. Knowing these areas of involvement is important, as there are medications (such as enemas or suppositories) that work very well in the end part of the colon. In fact, studies have shown that combination therapy with rectal and oral mesalamine preparations is more effective than either alone for inducing remission in patients with left sided ulcerative colitis. At this point, we do not have information that **genetic** aspects guide therapeutic efficacy of medications. We do have ongoing studies looking at the **genetics** of IBD, including ones by Dr. Balfour Sartor, Dr. Judy Cho, Dr. Ramnik Xavier, and Dr. Steve Brant, which are designed to increase our understanding of the role of **genetics** in IBD. If you are interested in learning more about either study, please see our affiliated studies page here.
Filters: risk factor, treatment method, medication, physiological factor, genetic makeup, family genetic history
- ID: 17** | User: 212 | Votes: 75 | Comments: 3 | Category: [genetics](#)
Question: I propose a **genetics**-based investigation that explores why some drugs work for some people but not others.
Description: Many IBD patients go through years of pain and suffering because they haven't found "their drug" yet. This immense suffering could be reduced if we could determine which individuals respond to which drugs and WHY, as determined by their environment and DNA.
Comments:
1. **User: 168** | I posted a similar question - but I'd like to see more than just **genetics**. I'd like to see more categorizations of IBD, beyond just UC and Crohn's.
2. **User: 480** | I think the study being conducted through 23andMe is going to address this question! If you're in the US, you can participate (and also get a free 23andMe test if you qualify) here: <https://www.23andme.com/ibd/> if you already have a 23andMe profile, you can still participate in the research here: https://www.23andme.com/you/survey/take/ibd_main/ibd_background/
3. **User: 1001** | From the CCFA Partners Research Team: This is the wave of the future in IBD therapy, "personalized medicine." Studies are currently under way to investigate the role of **genetics** in disease course and therapeutics. While we do not study this directly within CCFA Partners, external researchers are studying the **genetics** of IBD and are recruiting

Interactive Selection and Highlighting

- Selection
 - Ontology terms
 - Research topics
 - Selection in any view updates all views

Interactive Selection and Highlighting

- Selection
 - Ontology terms
 - Research topics
 - Selection in any view updates all views
- Relationships
 - Co-occurrence
 - Between *ontology terms*
 - Number of topics in common
 - Union for multiple
 - Association
 - Between *research topics*
 - Number of terms in common
 - Union for multiple
 - Connection
 - Between *terms and topics*
 - Topic labeled with term or not
 - Sum for multiple

Interactive Selection and Highlighting

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Topic 1
Term 1, Term 2, Term 3

Topic 2
Term 1

Topic 3
Term 2, Term 3, Term 4

Interactive Selection and Highlighting

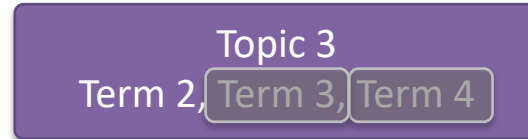
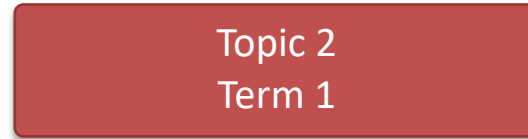
- Selection

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 - Sum for multiple

Select *Term 3* and *Term 4*



Interactive Selection and Highlighting

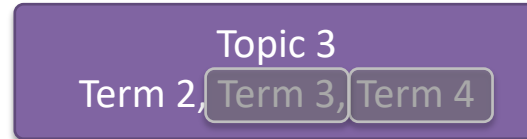
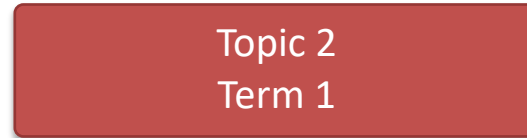
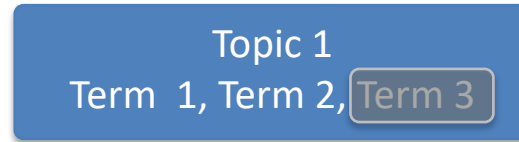
- Selection

- Ontology terms
- Research topics
- Selection in any view updates all views

- Relationships

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 - Between *ontology terms*
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 - Number of terms in common
 - Union for multiple
- Connection
 - Between *terms and topics*
 - Topic labeled with term or not
 - Sum for multiple

Select *Term 3* and *Term 4*



Co-occurrence:

Term 1: 1
Term 2: 2
Term 3: 2
Term 4: 1

Interactive Selection and Highlighting

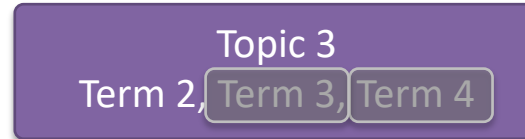
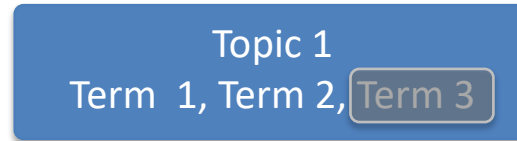
- Selection

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 - Number of terms in common
 - Union for multiple
- Connection
 - Between *terms and topics*
 - Topic labeled with term or not
 - Sum for multiple

Select *Term 3* and *Term 4*



Co-occurrence:

Term 1: 1
Term 2: 2
Term 3: 2
Term 4: 1

Connection:

Topic 1: 1
Topic 2: 0
Topic 3: 2

Interactive Selection and Highlighting

- Selection

- Ontology terms
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- Relationships

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 - Between *ontology terms*
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 - Between *research topics*
 - Number of terms in common
 - Union for multiple
- Connection
 - Between *terms and topics*
 - Topic labeled with term or not
 - Sum for multiple

Select *Topic 2* and *Topic 3*

Topic 1
Term 1, Term 2, Term 3

Topic 2
Term 1

Topic 3
Term 2, Term 3, Term 4

Interactive Selection and Highlighting

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- Relationships

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 - Number of terms in common
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- Connection
 - Between *terms and topics*
 - Topic labeled with term or not
 - Sum for multiple

Select *Topic 2* and *Topic 3*

Topic 1
Term 1, Term 2, Term 3

Topic 2
Term 1

Topic 3
Term 2, Term 3, Term 4

Association:

Topic 1: 3
Topic 2: 1
Topic 3: 3

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Select *Topic 2* and *Topic 3*

Topic 1
Term 1, Term 2, Term 3

Topic 2
Term 1

Topic 3
Term 2, Term 3, Term 4

Association:

Topic 1: 3
Topic 2: 1
Topic 3: 3

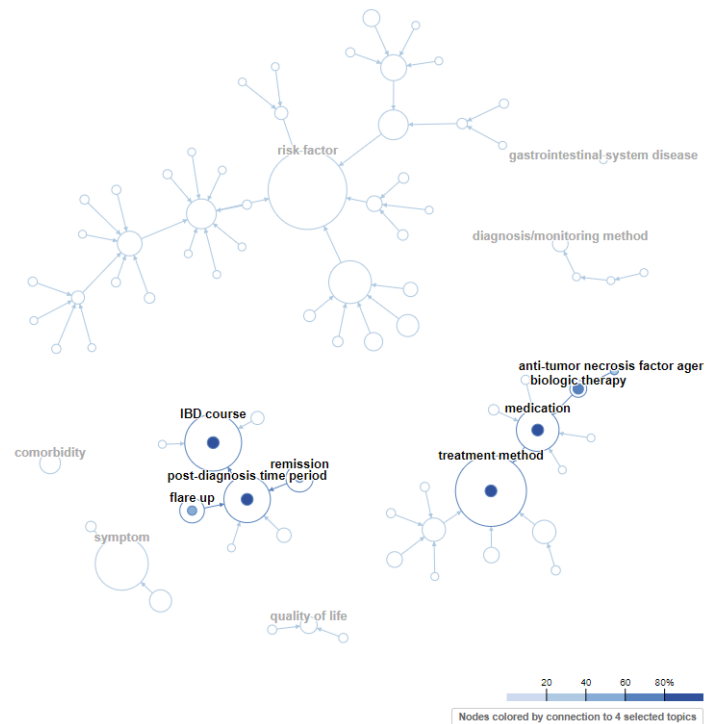
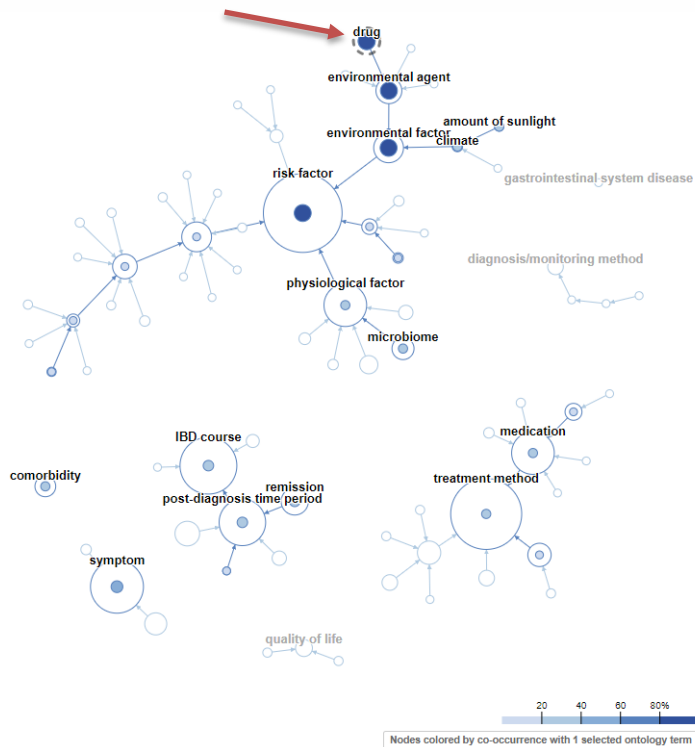
Connection:

Term 1: 1
Term 2: 1
Term 3: 1
Term 4: 1

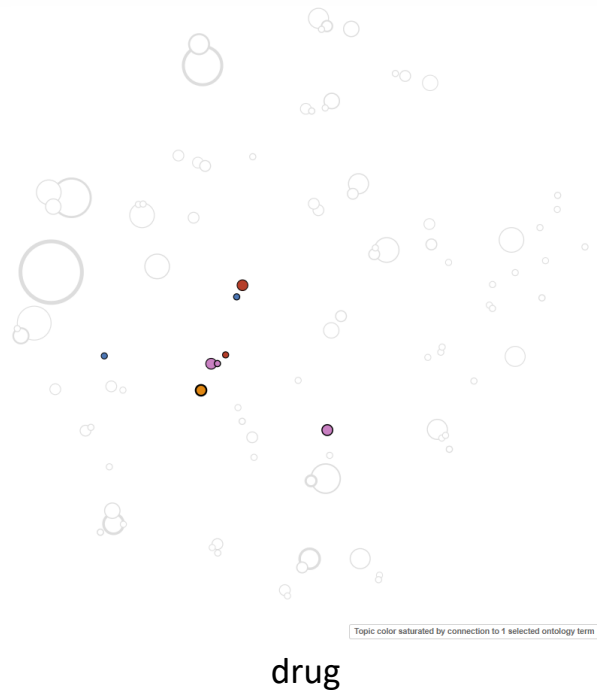
Ontology Highlighting

Node interior size and color proportional to
co-occurrence/connection

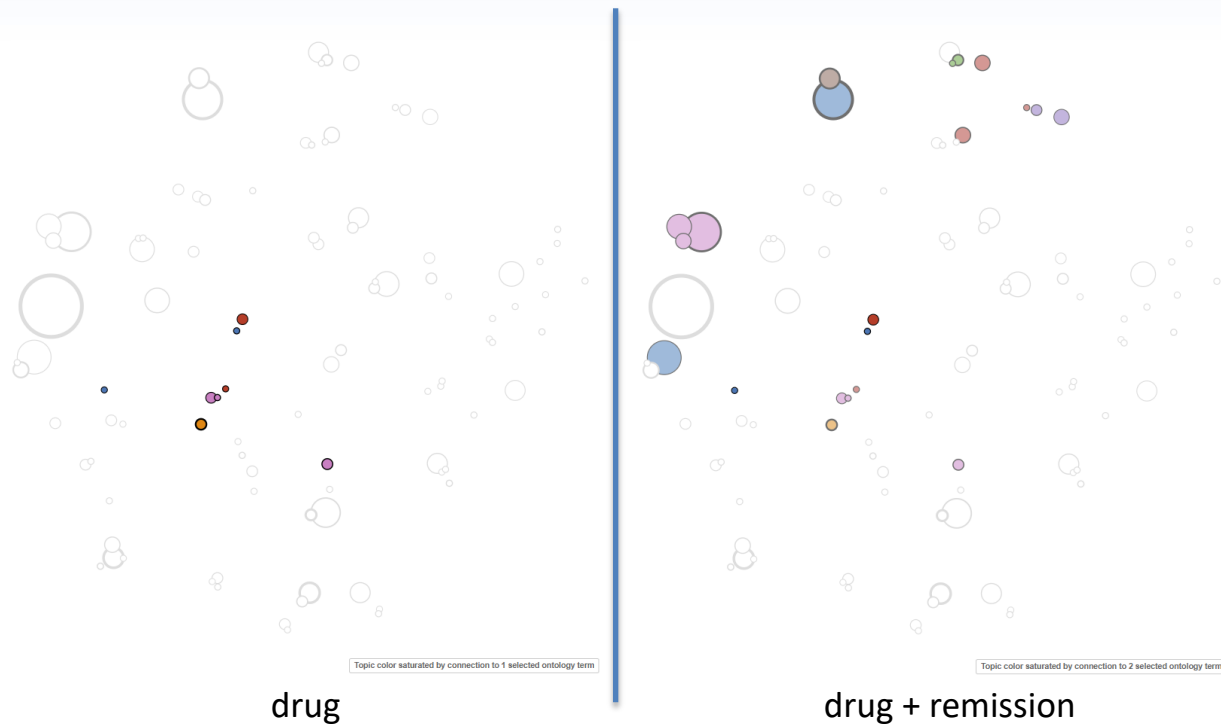
Labels shown if > 25%



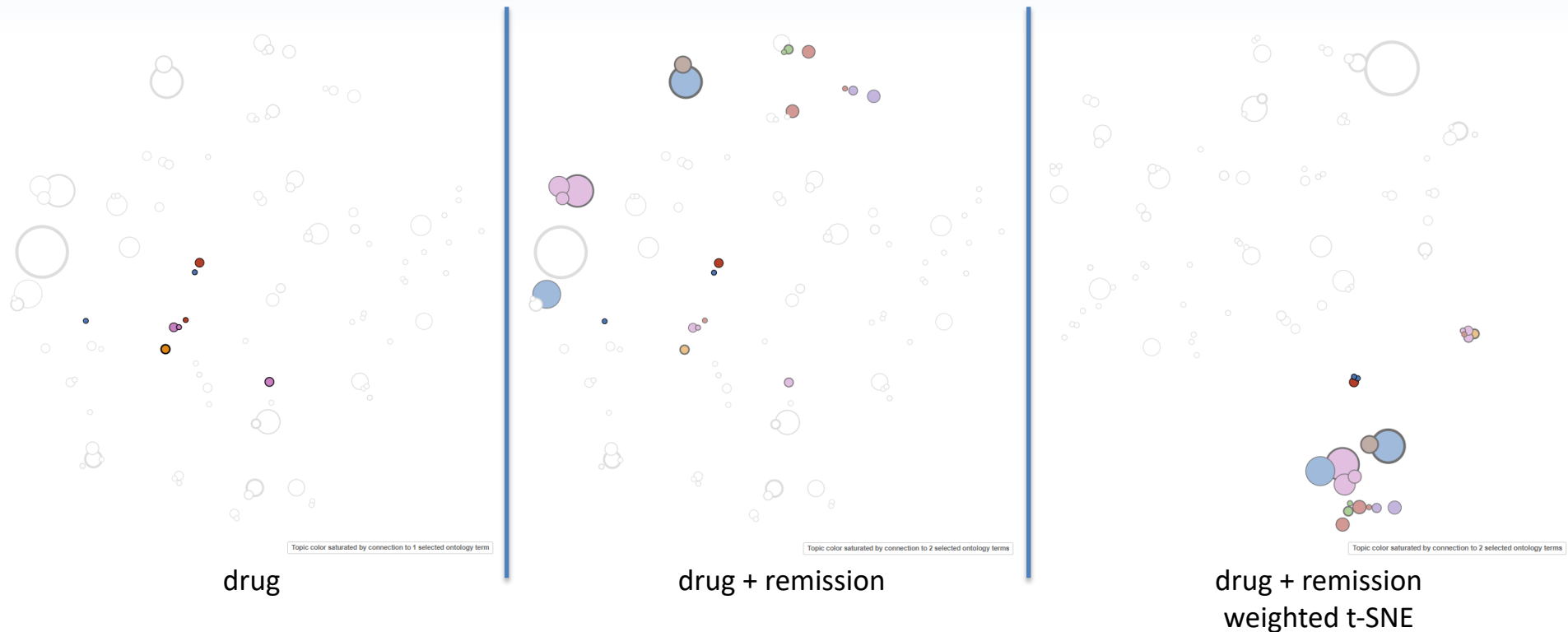
Topic Overview Highlighting



Topic Overview Highlighting



Topic Overview Highlighting



Topic Details Highlighting

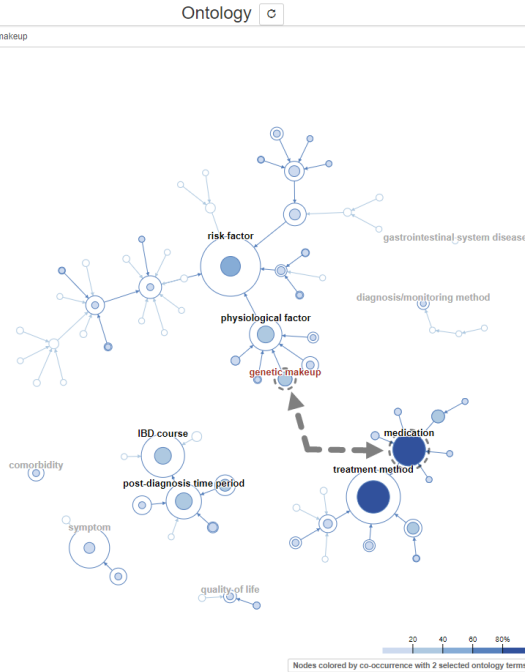
Ontology terms colored as in ontology network visualization

The image displays three question cards, each enclosed in a dashed border. Each card contains a question, a description, and a row of ontology terms highlighted in colored boxes. The terms are: 'treatment method' (blue), 'medication' (orange), 'holistic treatment' (green), 'antidepressant' (red), 'quality of life' (purple), and 'mental state' (brown). The cards are as follows:

- Card 1:** ID: 7, User: 48, Votes: 5, Comments: 0, Category: lifestyle. Question: How many IBD patients have ever been referred for counseling or offered an antidepressant by their gastroenterologist? Description: Depression and anxiety levels are very high in this population. Extending care to the whole person would make sense in managing disease and quality of life.
- Card 2:** ID: 18, User: 213, Votes: 12, Comments: 4, Category: alternative therapies. Question: What is the comparative safety and efficacy of natural supplements (vitamin D, fish oil, turmeric) commonly used in IBD versus prescription medications? Description: Many of us try natural supplements instead of or in addition to prescription medications in the management of IBD. Are natural supplement products more safe or effective when compared to prescription medications? Is combining natural supplements with prescription treatments more effective?
- Card 3:** ID: 24, User: 213, Votes: 15, Comments: 1, Category: medications. Question: What pain treatment options (pharmacologic or otherwise) do IBD patients find most effective, and what are the risks associated with these treatments? Description: Many pain medications are addictive and/or harmful, particularly in IBD patients. Pain is a common symptom of IBD. I would like to explore patient experiences of the efficacy of pain treatments including: acupuncture, massage therapy, heat therapy, NSAIDs, acetaminophen, SNRI antidepressants, tramadol, opiate pain medications. Either through literature review or additional research, it would be valuable to see a comprehensive review of risks and benefits of common pain treatments specific to use in IBD patients.

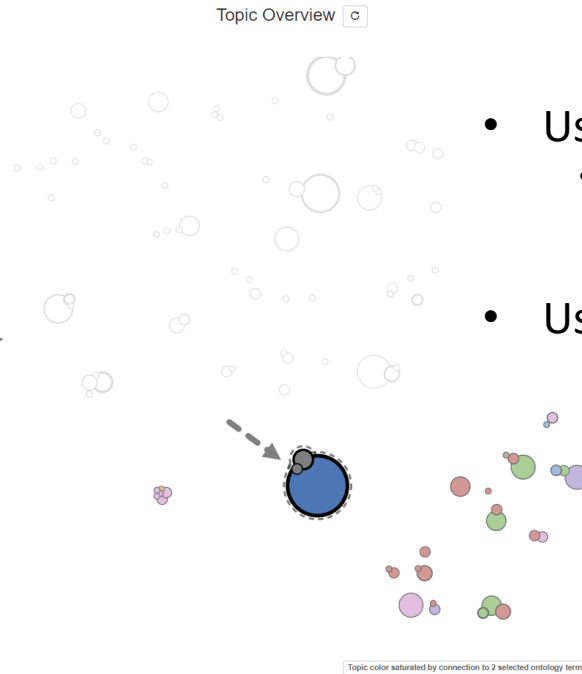
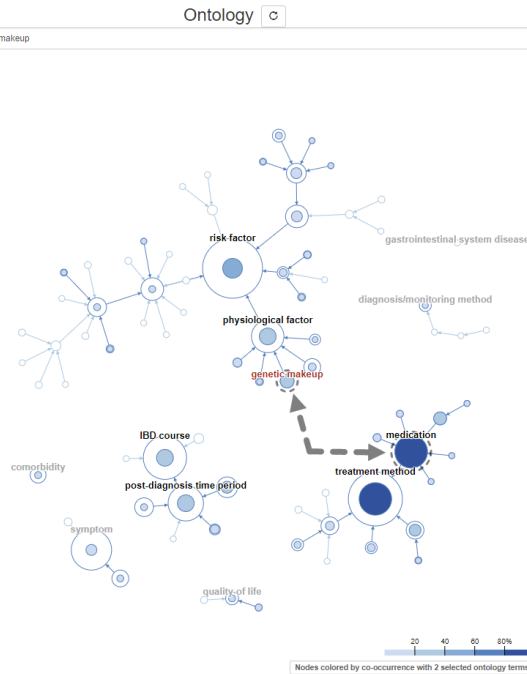
Filtered by selected topics

Example Scenario



- User searches for *genetic makeup*
 - Highlighted in red
- User selects *genetic makeup*
 - Notices *medication* co-occurs with *genetic makeup*
- User select *medication* also

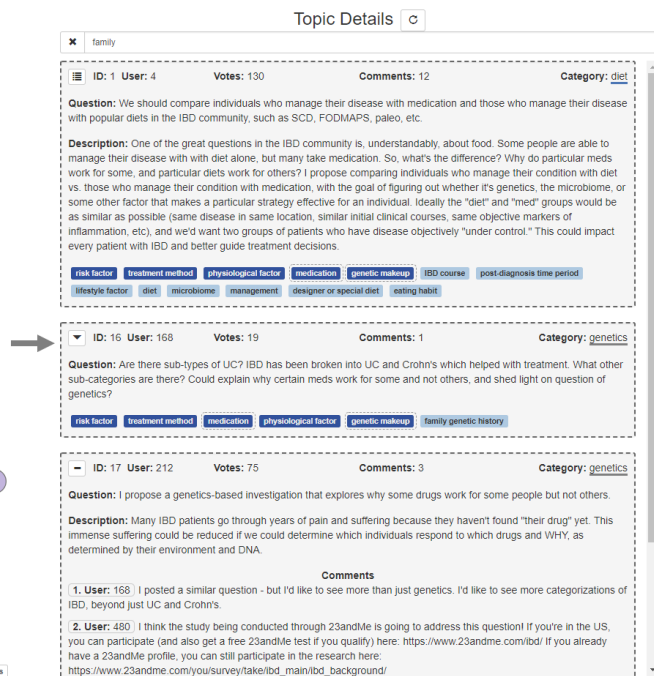
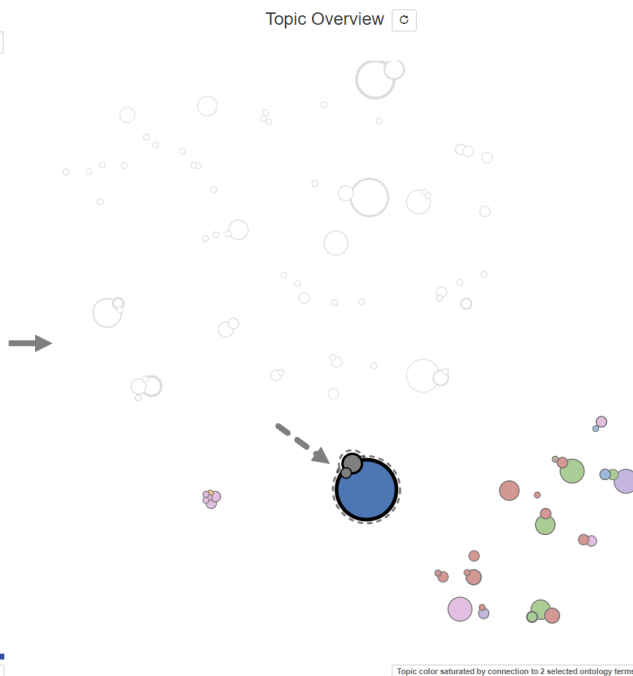
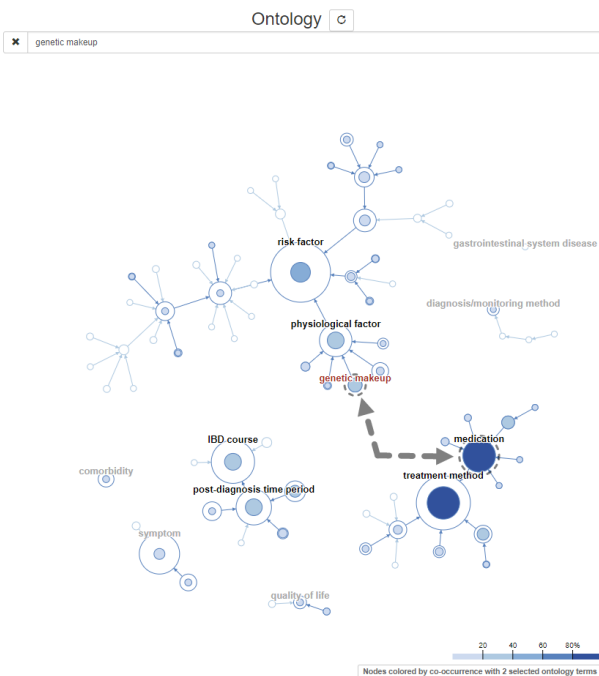
Example Scenario



- User re-runs t-SNE
 - Notices cluster of three topics, including one very large glyph
- User selects these three topics

Example Scenario

- User filters topic details to show only these topics for in-depth inspection/comparison



Feedback and Future Work

- **Demonstration to IBD Partners**
 - Generally positive feedback
 - Useful way to explore the forum data
 - Quickly identify major themes and popular research topics
 - Some features may be too complex for more naïve users
 - Two particular themes identified
 - Patient-facing interface
 - Find similar patients
 - More easily identify research topics relevant to them
 - Researcher-facing interface
 - Quickly identify relevant information in their research area
 - Quickly generate summaries of relevant information
 - Easily presented to stakeholders

Feedback and Future Work

- **Interface**
 - Redesign ontology visualization
 - Improve navigation
 - Explore automatic text summarization
 - Include in summary panel for selected terms/topics

Feedback and Future Work

- Interface

- Redesign ontology visualization
 - Improve navigation
- Explore automatic text summarization
 - Include in summary panel for selected terms/topics

- Data processing

- Explore ways to automate/semi-automate topic classification
- Enable ontology editing/expansion

The screenshot shows the IBD Partners website. The header includes the IBD PARTNERS logo and navigation links: About, Resources, For Researchers, For Kids & Teens, Help, and Sign In. Below the header is a secondary navigation bar with links: Home, Research Ideas, My Health Data, My Contributions, Members, and Blog.

The main content area features a section titled "An IBD Patient-Powered Research Network". It includes a sub-header, a paragraph describing the network, and an illustration of two people interacting with a play button icon. Below this is a "Join" button and a "View infographic" link.

A purple banner below contains two columns of text. The left column states: "We believe that when patients and researchers work together we learn so much more about how to better treat inflammatory bowel diseases (IBD)." The right column states: "Patients understand their own body and disease best and have valuable information to share. We provide a way for researchers to listen to patients about their experiences with IBD. By working together, we can answer the questions that are most important to patients."

Below the banner is a "Our Community" section. It includes a "See Our Community" button and a statistics box showing "15,680" patients strong. To the right of this box, the text "15,680 > 400" is displayed in large, bold black font.

Below the community section is a "How It Works" section with a numbered list. The first item is "Patients Propose Research Ideas" with a sub-header and a paragraph: "Patients come up with insightful research ideas. We invite you to propose, vote, and discuss research ideas. IBD researchers will review these ideas. Your idea may even lead to a study!"

To the right of the "How It Works" section is a "Popular Research Ideas" section with a sub-header and a paragraph: "We should compare individuals who manage their disease with medication and those who manage their disease with popular diets in the IBD"

Feedback and Future Work

- **Interface**

- Redesign ontology visualization
 - Improve navigation
- Explore automatic text summarization
 - Include in summary panel for selected terms/topics

- **Data processing**

- Explore ways to automate/semi-automate topic classification
- Enable ontology editing/expansion

- **User evaluations**

The screenshot shows the IBD Partners website. The header includes navigation links: Home, Research Ideas, My Health Data, My Contributions, Members, Blog, and a Sign In button. The main content area features a section titled "An IBD Patient-Powered Research Network" with a video player and a "View infographic" link. Below this is a "Join" button and a purple banner with text about patient and researcher collaboration. A statistics section shows "Our Community" with 15,680 patients and 300+ researchers. A "How It Works" section includes a "Patients Propose Research Ideas" sub-section and a "Popular Research Ideas" sub-section.

15,680 > 400

Questions?

Thanks to IBD Partners for their help with this work!

The screenshot displays a web-based interface for visualizing research questions. It is divided into three main sections: **Ontology**, **Topic Overview**, and **Topic Details**.

- Ontology:** Shows a network graph with nodes and edges. The central node is "risk factor", which is connected to "gastrointestinal system disease", "treatment method", "comorbidity", "symptom", "IBD course", "quality of life", and "pharmacokinetics monitoring method". Below the graph are "Ontology Network Controls" with a "show empty nodes" checkbox.
- Topic Overview:** A tSNE visualization showing clusters of research questions represented by colored circles of varying sizes. Below this is the "tSNE Parameters" control panel, which includes sliders for "perplexity" (set to 7), "early exaggeration" (set to 4), "learning rate" (set to 10), and "iterations" (set to 500). It also features a "metric" dropdown set to "euclidean" and a "term count weight" slider set to 0. A "Status: Optimization end" indicator is visible at the bottom right.
- Topic Details:** A list of seven research questions, each with its ID, user, votes, comments, and category. Each question includes a "Question" text and a set of associated terms (e.g., "risk factor", "treatment method", "IBD course").
 - ID: 1:** User: 4, Votes: 130, Comments: 12, Category: diet. Question: We should compare individuals who manage their disease with medication and those who manage their disease with popular diets in the IBD community, such as SCD, FODMAPS, paleo, etc.
 - ID: 2:** User: 29, Votes: 11, Comments: 0, Category: environment. Question: We should compare the prevalence and/or characteristics of IBD between rural versus urban areas to see if urban/rural factors contribute to IBD.
 - ID: 3:** User: 29, Votes: 79, Comments: 3, Category: diet. Question: Compare symptoms of IBD patients who consume dairy and those who avoid dairy.
 - ID: 4:** User: 46, Votes: 1, Comments: 1, Category: alternative therapies. Question: Which herbal remedies have been used to effectively treat IBD?
 - ID: 5:** User: 46, Votes: 4, Comments: 0, Category: medications. Question: What percentage of people with IBD use fiber, such as metaculic, to control diarrhea/constipation issues? Or do they use other drugs such as komolil with more success?
 - ID: 6:** User: 46, Votes: 7, Comments: 4, Category: procedures and testing. Question: How many people who have had a resection suffer with ongoing diarrhea? What medications/OTC drugs are most effective with this problem?
 - ID: 7:** User: 46, Votes: 5, Comments: 0, Category: lifestyle.