

# Beyond the List:

## Refining your PubMed searches with interactive visualizations

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Format: Summary  Sort by: Most Recent  Per page: 200

## Search results

Items: 1 to 200 of 418407

<< First < Prev Page 1 of 2093 Next > Last >>

### ☐ [The future of medical education.](#)

1. Yeoh KG.  
Singapore Med J. 2019 Jan;60(1):3-8. doi: 10.11622/smedj.2019003. No abstract available.  
PMID: 30840994  
[Similar articles](#)

### ☐ [The Effect of Antenatal Betamethasone on White Matter Inflammation and Injury in Fetal Sheep and Ventilated Preterm Lambs.](#)

2. Stojanovska V, Barton SK, Tolcos M, Gill AW, Kluckow M, Miller SL, Zahra V, Hooper SB, Galinsky R, Polglase GR.  
Dev Neurosci. 2019 Mar 6:1-11. doi: 10.1159/000496466. [Epub ahead of print]  
PMID: 30840951  
[Similar articles](#)

### ☐ [Progress in the discovery of naturally occurring anti-diabetic drugs and in the identification of their molecular targets.](#)

3. He JH, Chen LX, Li H.  
Fitoterapia. 2019 Mar 3. pii: S0367-326X(19)30013-9. doi: 10.1016/j.fitote.2019.02.033. [Epub ahead of print] Review.  
PMID: 30840917  
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[Georgia Regents University  
Reese Library, GA \(254936\)](#)

[Prognosis/Broad \(62932\)](#)

[Therapy/Broad \(62533\)](#)

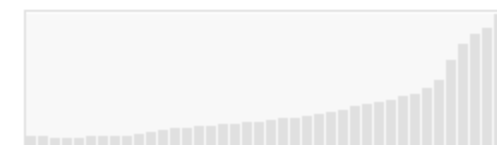
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Results by year







# Lists

## Pro

- Simple
- Great for providing access

## Con

- Are only ordered on one axis
- Don't show context

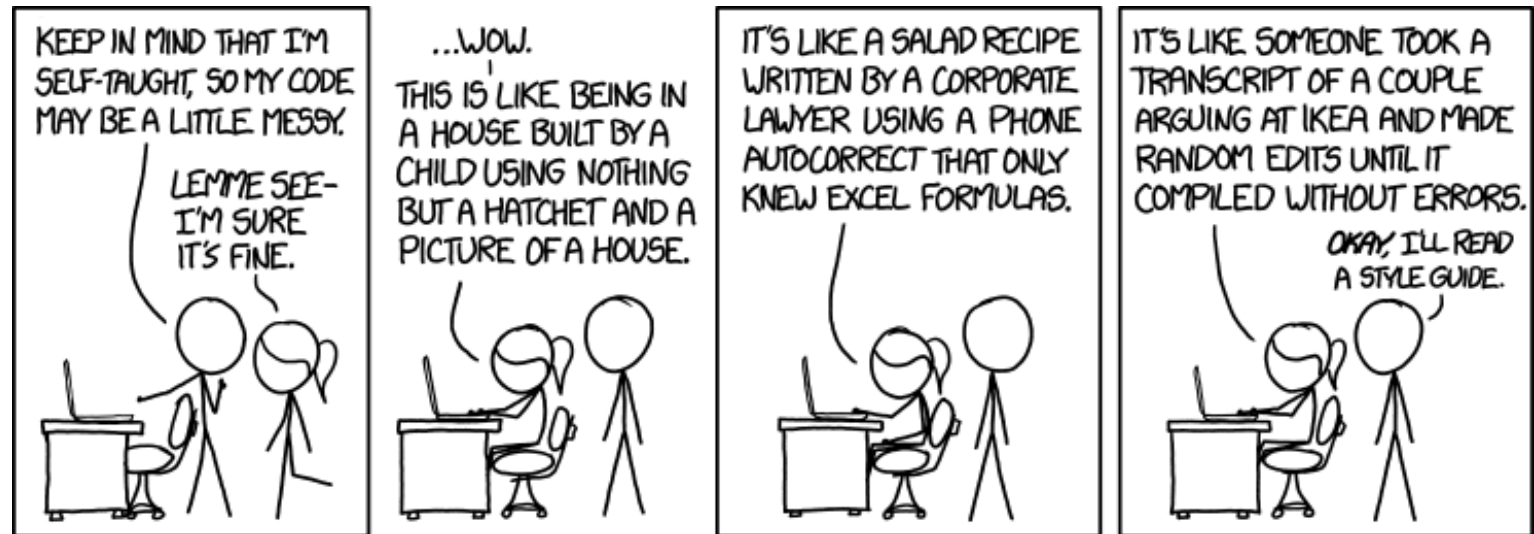
Can we do better?

“The fundamental task in data analysis is to make smart comparisons.  
We are always trying to ask the question, ‘Compared with what?’ ”

-- Edward Tufte

# Design Principles: Fast, Cheap and Out of Control

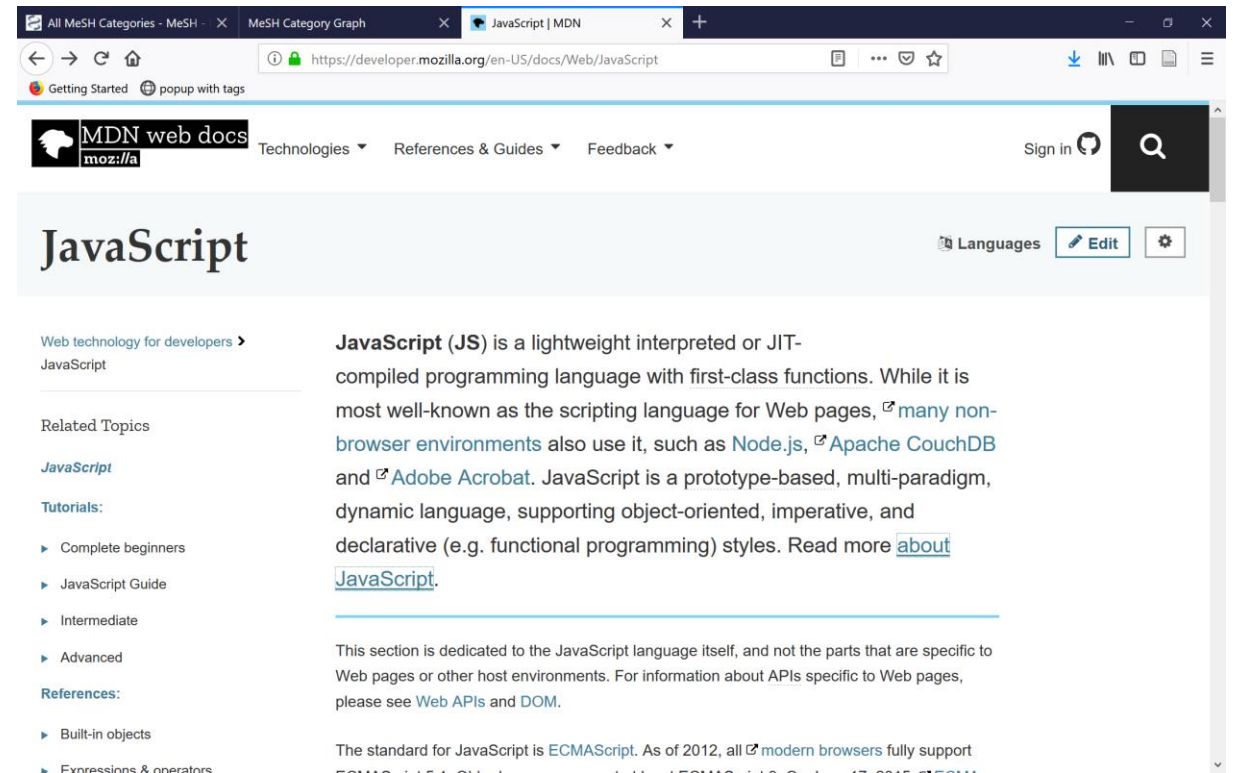
- Use existing libraries whenever possible
- Push as much out to the browser as possible
- Working code will work just fine...



<https://xkcd.com/1513/>

# Fun with JavaScript!

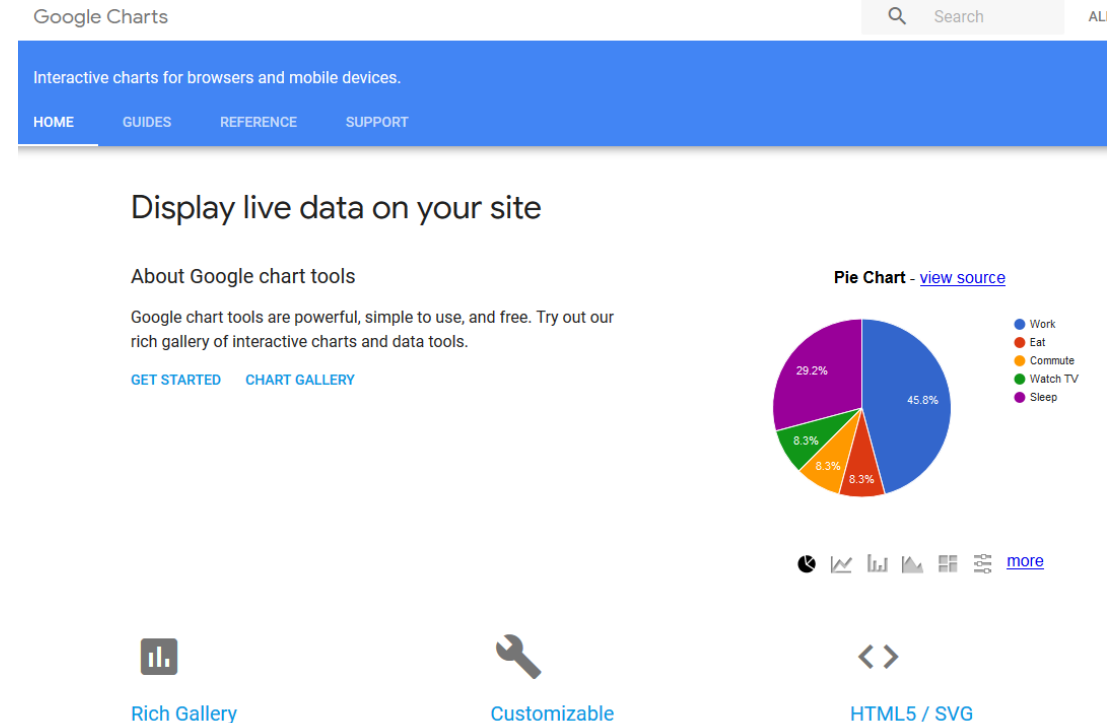
- Runs in the browser
  - Many browsers have built-in “developer” tools
- Lots of self-study materials available online
- Readily *extendable* using external libraries and frameworks





# Google Charts

- Relatively simple
- Free!
- Can use with static tables of data or *interactive* data that you grab on the fly



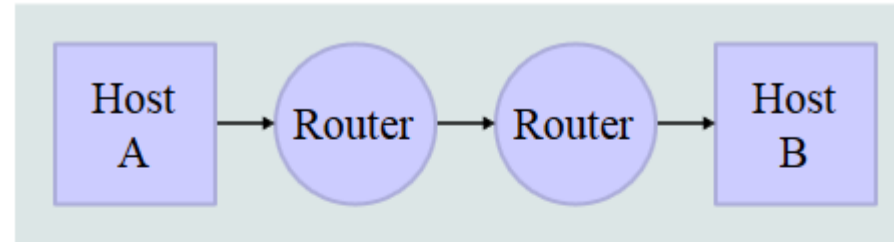
<https://developers.google.com/chart/>

# Basic Pattern

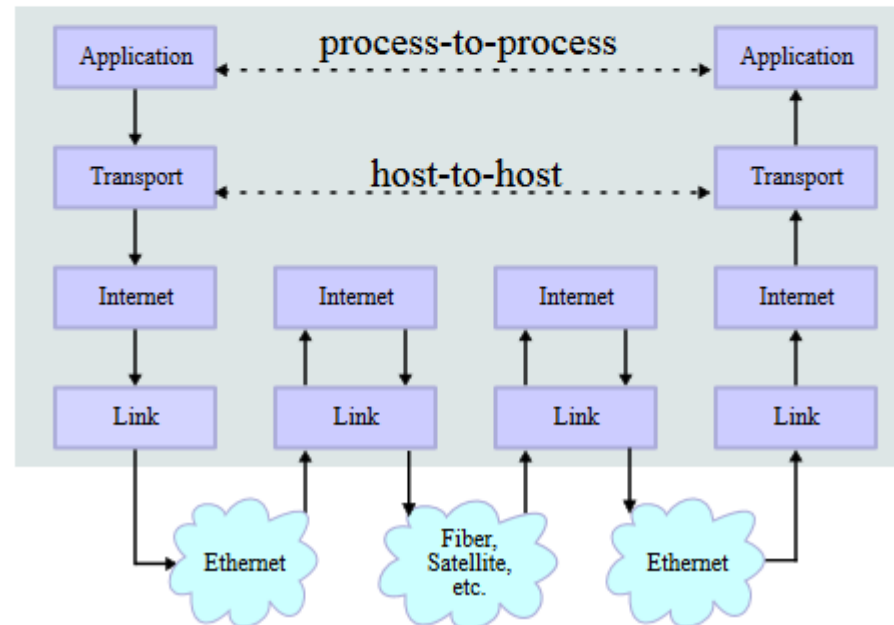
1. Send search to PubMed
2. Retrieve counts
3. Compare them to a baseline of some kind
4. Graph the difference
5. ???
6. Profit

# APIs

## Network Topology



## Data Flow



[Kbrose](#) -- Wikimedia

# APIs

```
{  
  "header": {  
    "type": "esearch",  
    "version": "0.3"  
  },  
  "esearchresult": {  
    "count": "20648",  
    "retmax": "0",  
    "retstart": "0",  
    "querykey": "1",  
    "webenv":  
    "NCID_1_65988278_130.14.22.33_9001_15519  
    95173_1918872135_0MetA0_S_MegaStore",  
    "idlist": [ ...  
  ]  
}
```

```
https://eutils.ncbi.nlm.nih.gov/entrez/eutils/  
search.fcgi?db=pubmed&usehistory=y&term  
=dengue+OR+dengue+fever&retmode=json  
&retmax=0&email=ed_sperr%40hotmail.com  
&tool=pmsearchbench
```

# E-Utilities

- API to NCBI databases
- Maintained by NLM
- Simple syntax for calls – easy to implement in many environments

[https://eutils.ncbi.nlm.nih.gov/entrez/eutils/esearch.fcgi?  
db=pubmed&term=diabetes&retmode=json&rettype=co  
unt](https://eutils.ncbi.nlm.nih.gov/entrez/eutils/esearch.fcgi?db=pubmed&term=diabetes&retmode=json&rettype=count)

- Brand-new documentation at <https://dataguide.nlm.nih.gov/>

esperr (Ed Sperr) x +

GitHub, Inc. (US) | https://github.com/esperr

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**Ed Sperr**  
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I am a librarian who mucks around with code...

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https://esperr.github.io/

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- members-by-interest** (HTML, ★ 5)  
Tool for ranking Members of congress by the bills they sponsor and cosponsor. Also displays interests for individual members.
- search-workbench** (JavaScript, ★ 6)  
Search Workbench is a tool for visually appraising, editing and comparing PubMed searches
- mesh-cat-graph** (HTML, ★ 2)  
Chart the proportion of MeSH categories is a given PubMed results set
- committee-flow** (HTML)  
Uses data from GPO to construct a Sankey diagram of how legislation goes from introduction to committee to floor vote
- congress-by-year** (JavaScript)  
Shows yearly trends for searches against govinfo for Bills, Laws and the Congressional Record
- pubvenn** (JavaScript)  
PubMed meets Venn diagrams

# Can we group citations by subject?

The contribution of genetic var X +

https://www.ncbi.nlm.nih.gov/pubm Search

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Format: Abstract Send to

Ren Fail. 2018 Nov;40(1):561-576. doi: 10.1080/0886022X.2018.1496931.

### The contribution of genetic variants of SLC2A1 gene in T2DM and T2DM-nephropathy: association study and meta-analysis.

Stefanidis I<sup>1</sup>, Tziastoudi M<sup>2</sup>, Tsironi EE<sup>3</sup>, Dardiotis E<sup>4</sup>, Tachmitzi SV<sup>3</sup>, Fotiadou A<sup>3</sup>, Pissas G<sup>1</sup>, Kytoudis K<sup>1</sup>, Sounidaki M<sup>1</sup>, Ampatzis G<sup>1</sup>, Mertens PR<sup>5</sup>, Liakopoulos V<sup>1</sup>, Eleftheriadis T<sup>1</sup>, Hadjiioeorgiou GM<sup>4</sup>, Santos M<sup>6</sup>, Zintzaras E<sup>2,7</sup>.

Author information

#### Abstract

An association study was conducted to investigate the relation between 14 variants of glucose transporter 1 gene (SLC2A1) and the risk of type 2 diabetes (T2DM) leading to nephropathy. We also performed a meta-analysis of 11 studies investigating association between diabetic nephropathy (DN) and SLC2A1 variants. The cohort included 197 cases (T2DM with nephropathy), 155 diseased controls (T2DM without nephropathy) and 246 healthy controls. The association of variants with disease progression was tested using generalized odds ratio (OR<sub>G</sub>). The risk of type 2 diabetes leading to nephropathy was estimated by the OR of additive and co-dominant models. The mode of inheritance was assessed using the degree of dominance index (h-index). We synthesized results of 11 studies examining association between 5 SLC2A1 variants and DN. OR<sub>G</sub> was used to assess the association between variants and DN using random effects models. Significant results were derived for co-dominant model of rs12407920 [OR = 2.01 (1.17-3.45)], rs841847 [OR = 1.73 (1.17-2.56)] and rs841853 [OR = 1.74 (1.18-2.55)] and for additive model of rs3729548 [OR = 0.52 (0.29-0.90)]. The mode of inheritance for rs12407920, rs841847 and rs841853 was 'dominance of each minor allele' and for rs3729548 'non-dominance'. Frequency of one haplotype (C-G-G-A-T-C-C-T-G-T-C-C-A-G) differed significantly between cases and healthy controls [p = .014]. Regarding meta-analysis, rs841853 contributed to an increased risk of DN [(OR<sub>G</sub> = 1.43 (1.09-1.88); OR<sub>G</sub> = 1.58 (1.01-2.48)] between diseased controls versus cases and healthy controls versus cases, respectively. Further studies confirm the association of rs12407920, rs841847, rs841853, as well as rs3729548 and the risk of T2DM leading to

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Similar articles

SLC2A1 Tag SNPs in Greek Patients with Diabetic R<sub>e</sub> [Ophthalmic Res. 2019]

Association between the interleukin-1 $\beta$  Gene (IL1B) C-511 [DNA Cell Biol. 2014]

Association between glucose transporter 1 rs84185 [J Diabetes. 2013]

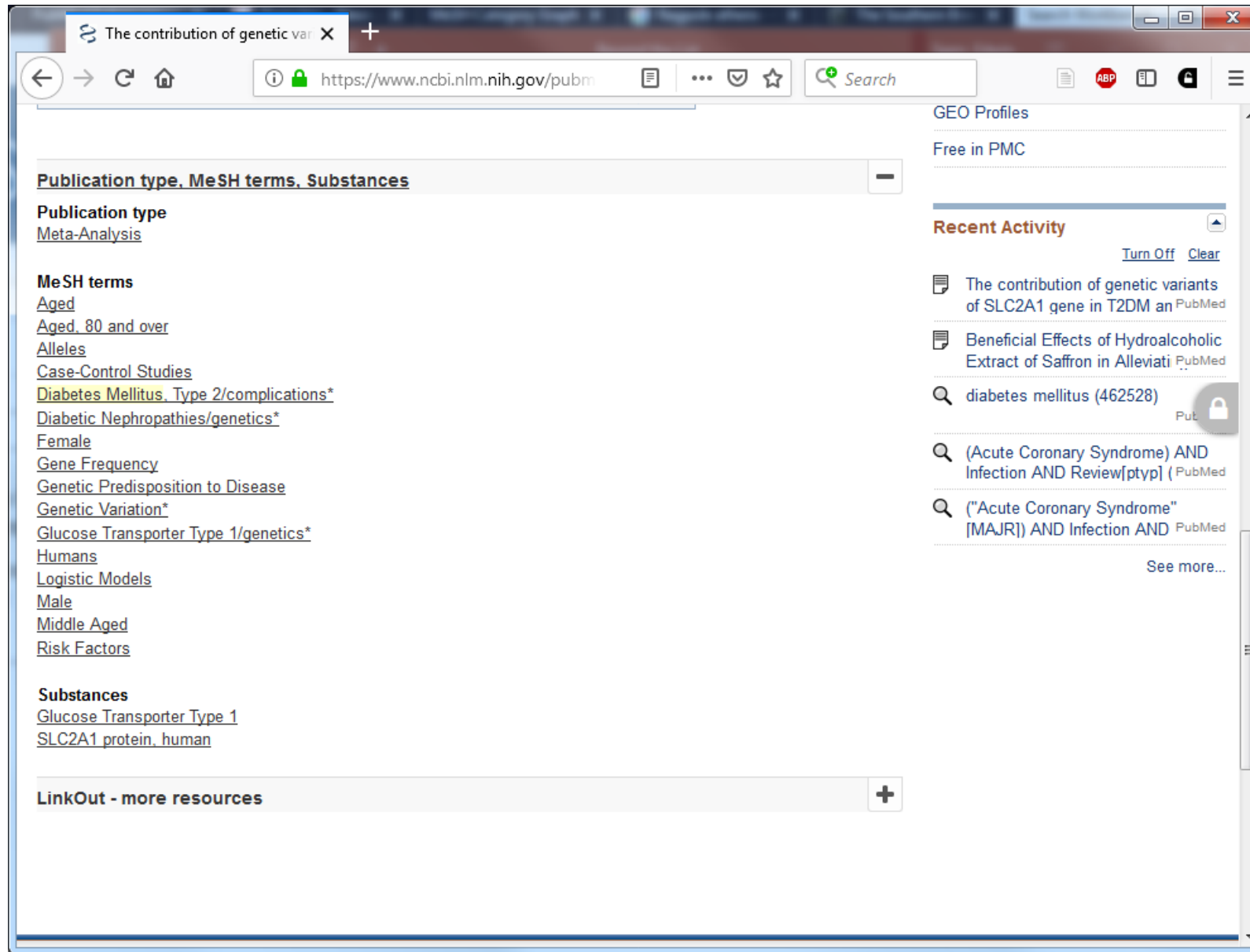
Review Relationship between five GLUT1 gene single [Mol Biol Rep. 2012]

Review Endothelial nitric oxide synthase gene [BMC Med Genet. 2014]

See reviews...

See all...





Diabetes Mellitus, Type 2 - MeSH

https://www.ncbi.nlm.nih.gov/mesh/

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### Diabetes Mellitus, Type 2

A subclass of DIABETES MELLITUS that is not INSULIN-responsive or dependent (NIDDM). It is characterized initially by INSULIN RESISTANCE and HYPERINSULINEMIA; and eventually by GLUCOSE INTOLERANCE; HYPERGLYCEMIA; and overt diabetes. Type II diabetes mellitus is no longer considered a disease exclusively found in adults. Patients seldom develop KETOSIS but often exhibit OBESITY.

Year introduced: 2005 (1984)

PubMed search builder options

[Subheadings:](#)

<input type="checkbox"/> analysis	<input type="checkbox"/> enzymology	<input type="checkbox"/> physiology
<input type="checkbox"/> anatomy and histology	<input type="checkbox"/> epidemiology	<input type="checkbox"/> physiopathology
<input type="checkbox"/> blood	<input type="checkbox"/> ethnology	<input type="checkbox"/> prevention and control
<input type="checkbox"/> cerebrospinal fluid	<input type="checkbox"/> etiology	<input type="checkbox"/> psychology
<input type="checkbox"/> chemically induced	<input type="checkbox"/> genetics	<input type="checkbox"/> radiotherapy
<input type="checkbox"/> classification	<input type="checkbox"/> history	<input type="checkbox"/> rehabilitation
<input type="checkbox"/> complications	<input type="checkbox"/> immunology	<input type="checkbox"/> statistics and numerical data
<input type="checkbox"/> congenital	<input type="checkbox"/> metabolism	<input type="checkbox"/> surgery
<input type="checkbox"/> diagnosis	<input type="checkbox"/> microbiology	<input type="checkbox"/> therapy
<input type="checkbox"/> diagnostic imaging	<input type="checkbox"/> mortality	<input type="checkbox"/> transmission
<input type="checkbox"/> diet therapy	<input type="checkbox"/> nursing	<input type="checkbox"/> urine
<input type="checkbox"/> drug therapy	<input type="checkbox"/> organization and administration	<input type="checkbox"/> veterinary
<input type="checkbox"/> economics	<input type="checkbox"/> parasitology	<input type="checkbox"/> virology
<input type="checkbox"/> embryology	<input type="checkbox"/> pathology	

PubMed Search Builder

Add to search builder AND

Search PubMed

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[Clinical Queries](#)

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Diabetes Mellitus, Type 2

MeSH

Diabetes Mellitus, Type 2 - MeSH

https://www.ncbi.nlm.nih.gov/mesh/

Previous Indexing:

- [Diabetes Mellitus \(1966-1983\)](#)

See Also:

- [Rats, Inbred OLETF](#)
- [Metabolic Syndrome](#)

All MeSH Categories

- [Diseases Category](#)
  - [Nutritional and Metabolic Diseases](#)
    - [Metabolic Diseases](#)
      - [Glucose Metabolism Disorders](#)
        - [Diabetes Mellitus](#)
          - Diabetes Mellitus, Type 2**
            - [Diabetes Mellitus, Lipotrophic](#)

All MeSH Categories

- [Diseases Category](#)
  - [Endocrine System Diseases](#)
    - [Diabetes Mellitus](#)
      - Diabetes Mellitus, Type 2**
        - [Diabetes Mellitus, Lipotrophic](#)

You are here: NCBI > Literature > MeSH Database

Support Center

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<a href="#">Training &amp; Tutorials</a>	<a href="#">Domains &amp; Structures</a>	<a href="#">BLAST</a>	<a href="#">Gene Expression Omnibus</a>	<a href="#">NCBI FTP Site</a>
<a href="#">Submit Data</a>	<a href="#">Genes &amp; Expression</a>	<a href="#">Nucleotide</a>	<a href="#">Genome Data Viewer</a>	<a href="#">NCBI on Facebook</a>
	<a href="#">Genetics &amp; Medicine</a>	<a href="#">Genome</a>	<a href="#">Human Genome</a>	<a href="#">NCBI on Twitter</a>

Browser window showing the MeSH (Medical Subject Headings) categories page. The URL is <https://www.ncbi.nlm.nih.gov/mesh/10000>.

**All MeSH Categories**

PubMed search builder options

☐ Restrict to MeSH Major Topic.

Tree Number(s): 0

**All MeSH Categories**

- [Analytical, Diagnostic and Therapeutic Techniques and Equipment Category](#) +
- [Anatomy Category](#) +
- [Anthropology, Education, Sociology and Social Phenomena Category](#) +
- [Check Tags Category](#) +
- [Chemicals and Drugs Category](#) +
- [Disciplines and Occupations Category](#) +
- [Diseases Category](#) +
- [Geographical Locations Category](#) +
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- [Organisms Category](#) +
- [Persons Category](#) +
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**PubMed Search Builder**

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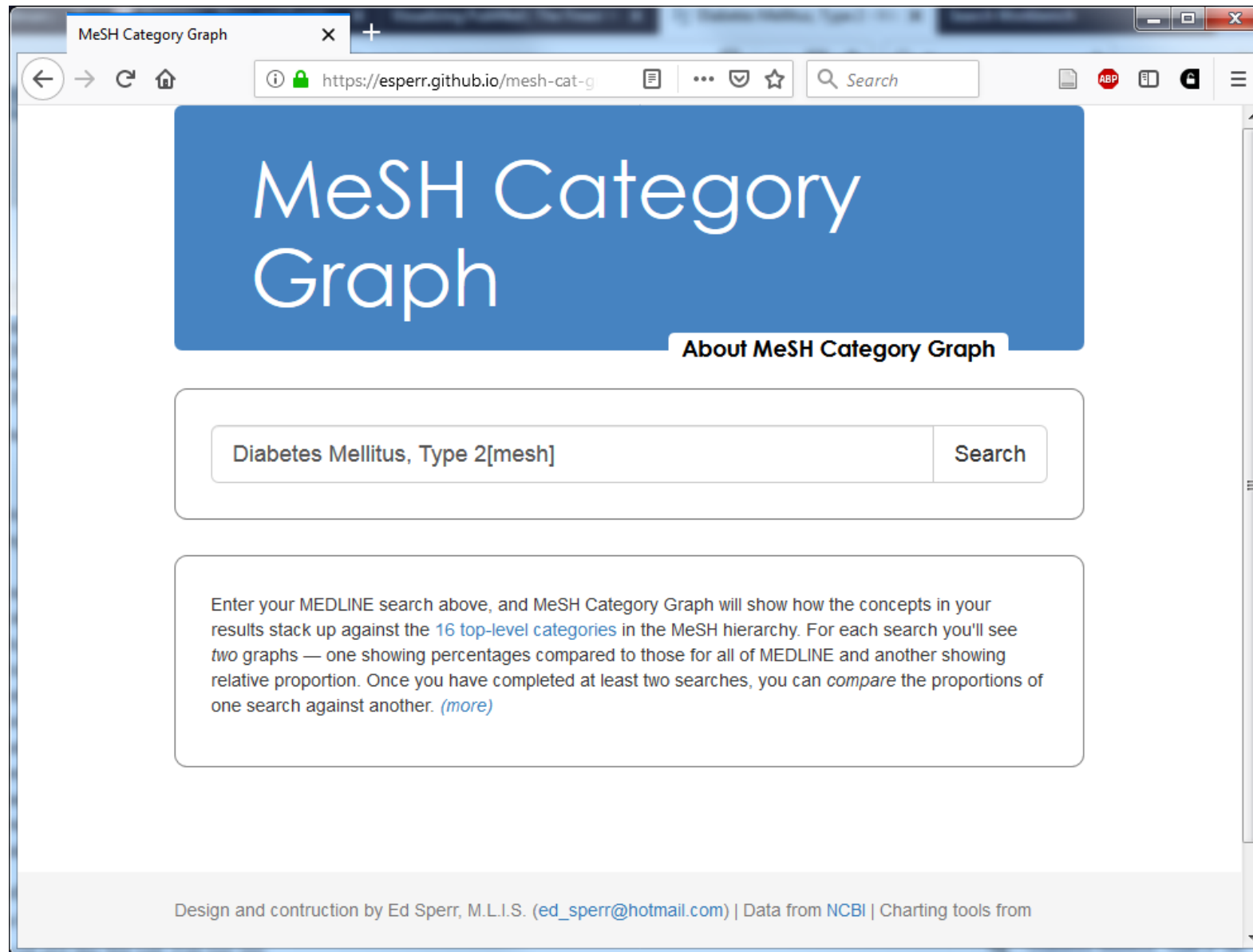
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- [Clinical Queries](#)
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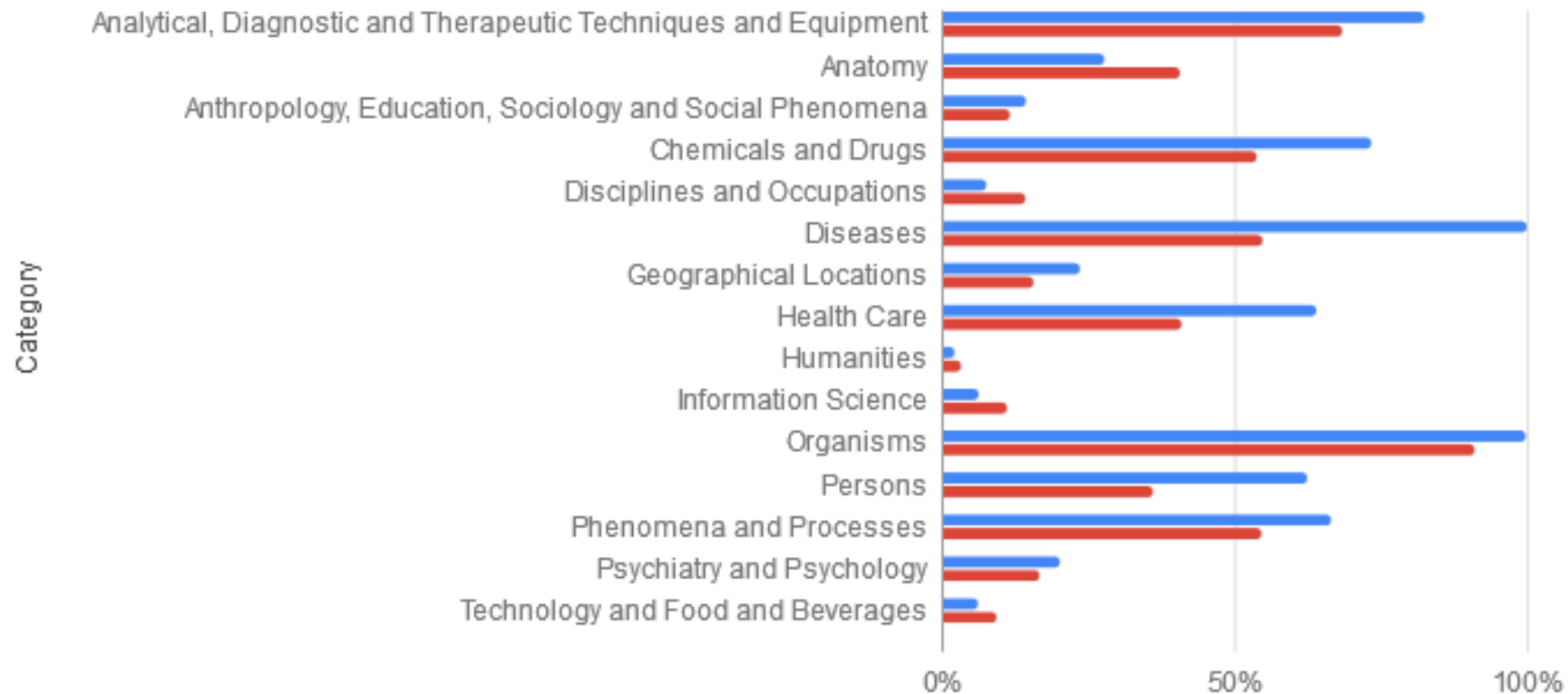
- [Diseases Category](#) MeSH
- [All MeSH Categories](#) MeSH
- [Diabetes Mellitus, Type 2](#) MeSH
- ["Diabetes Mellitus, Type 2" \(4\)](#) MeSH
- [Risk factors contributing to type 2 diabetes and recent advance](#) PubMed



# Percentage of results in each category for "Diabetes Mellitus, Type 2[mesh]"

Your search

All MEDLINE



Made with Mesh Category Graph: <http://esperr.github.io/mesh-cat-graph/>

Percentage

## Proportion of results for "Heart Diseases[mesh]" in each category compared to baseline

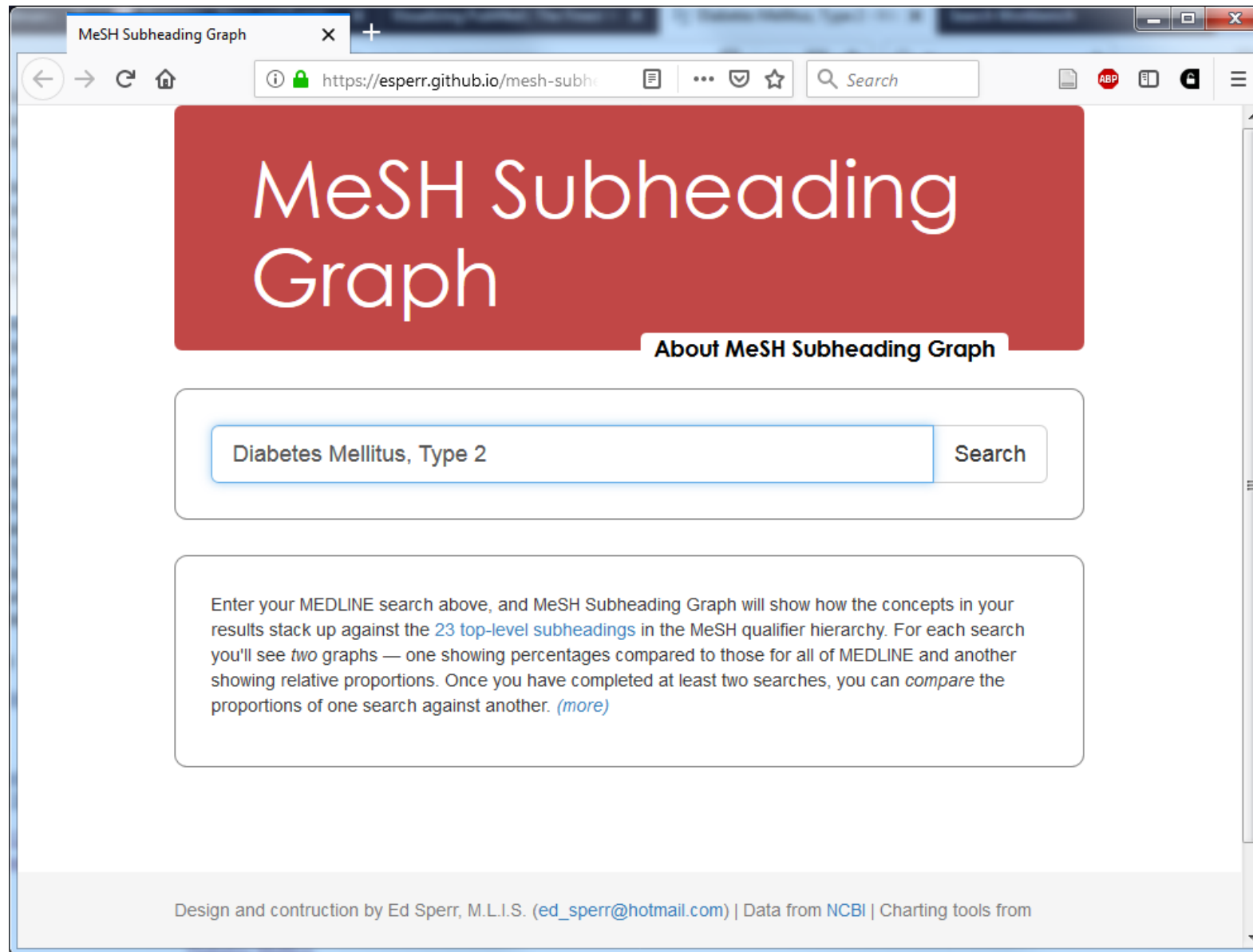


Made with Mesh Category Graph: <http://esperr.github.io/mesh-cat-graph/>

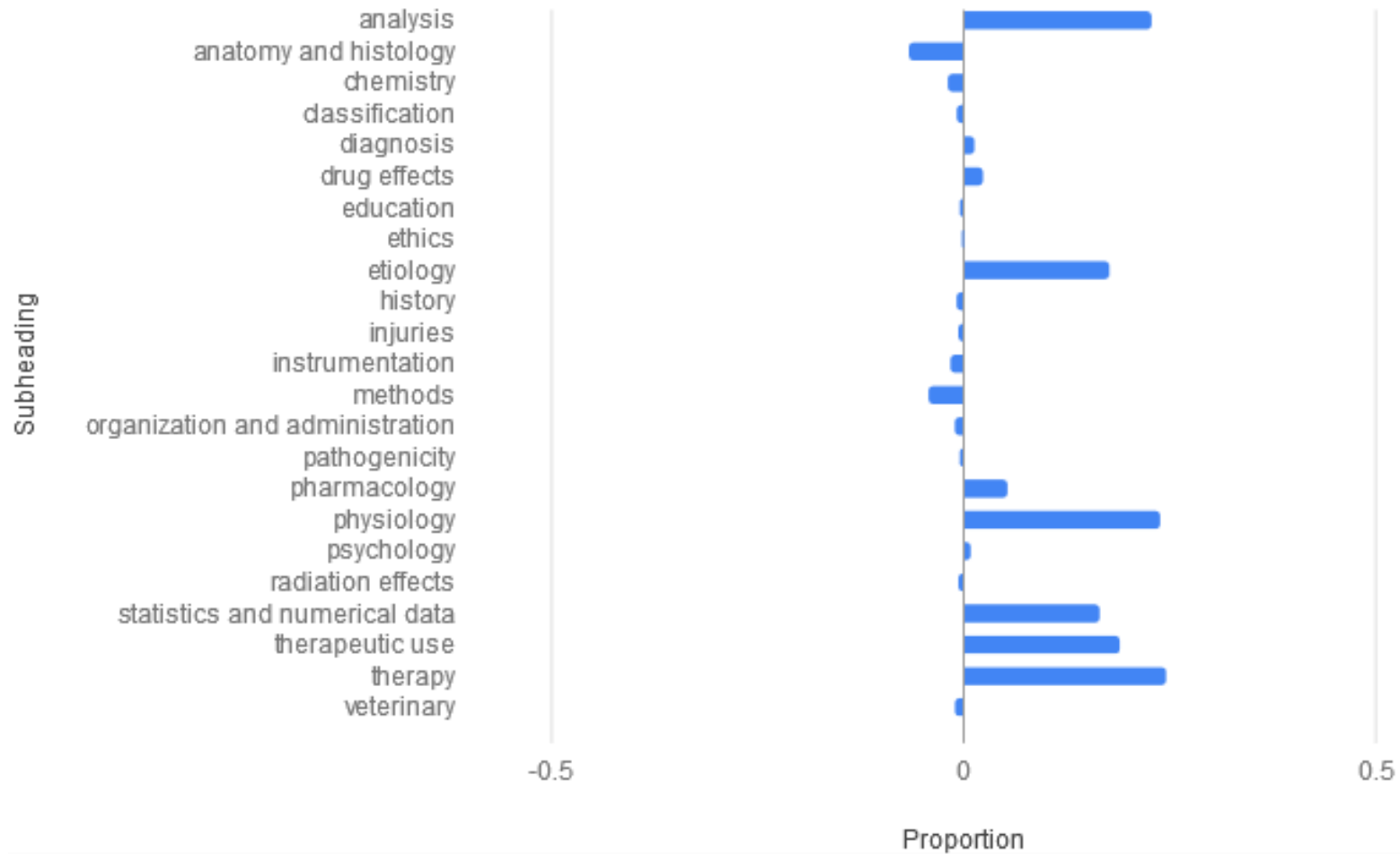
Proportion



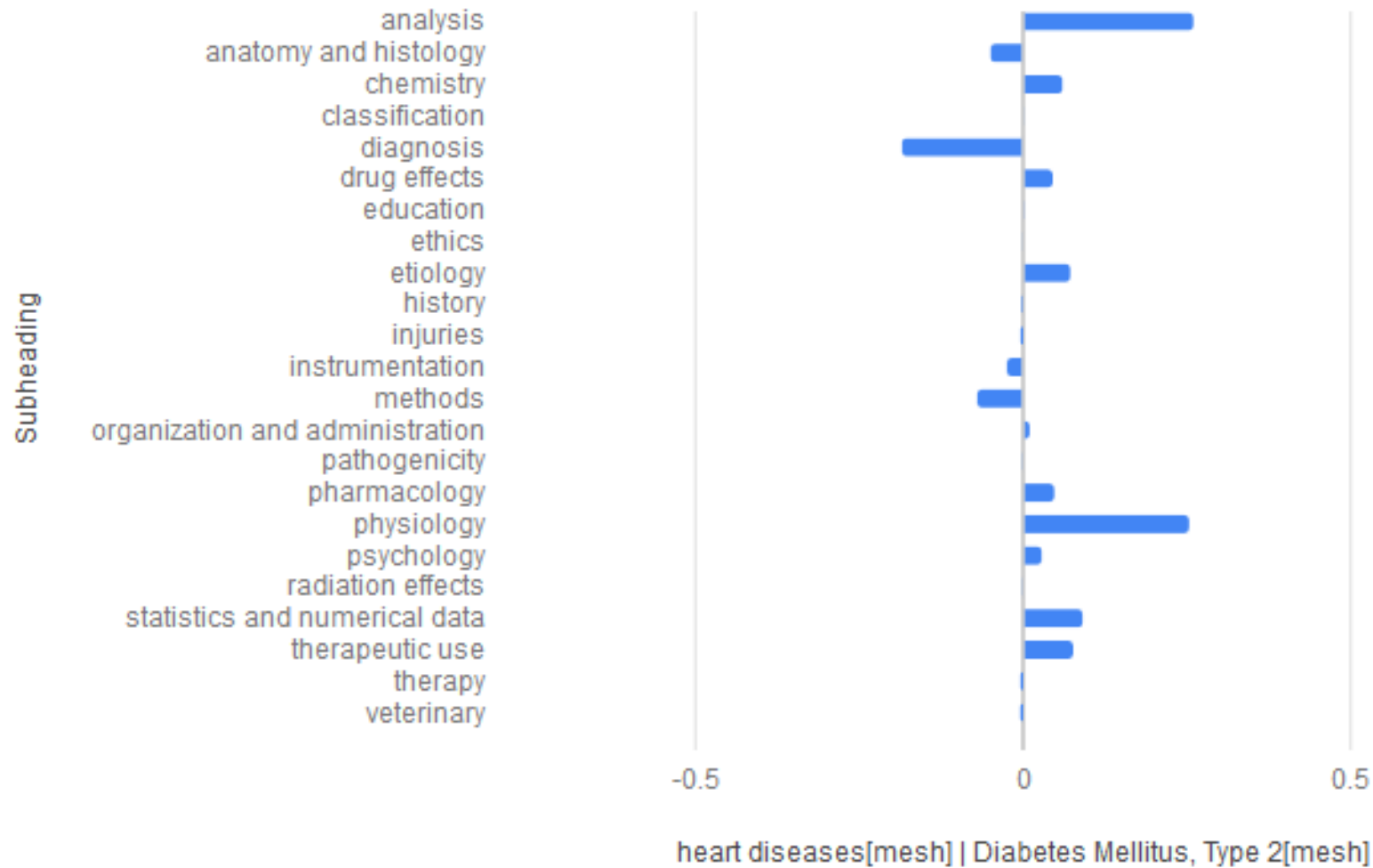




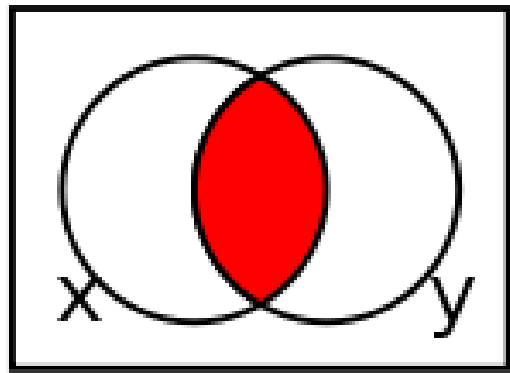
## Proportion of subheadings for "Diabetes Mellitus, Type 2[mesh]" compared to baseline



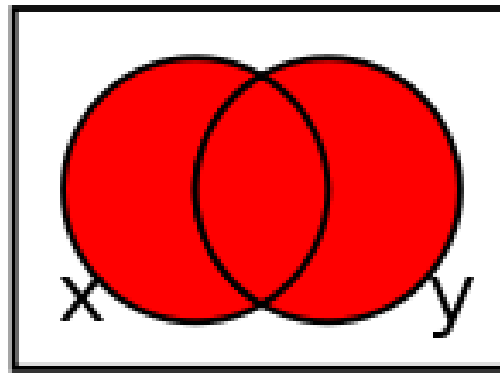
Made with Mesh Subheading Graph: <http://esperr.github.io/mesh-subhead-graph/>



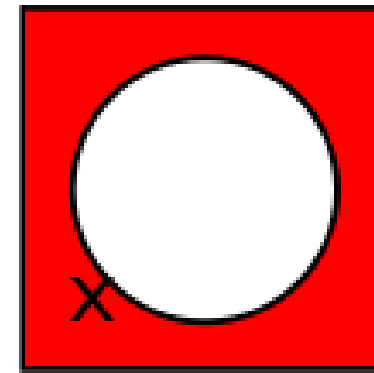
**Can we tell something about how the  
parts of a search are connected?**



$$x \wedge y$$



$$x \vee y$$

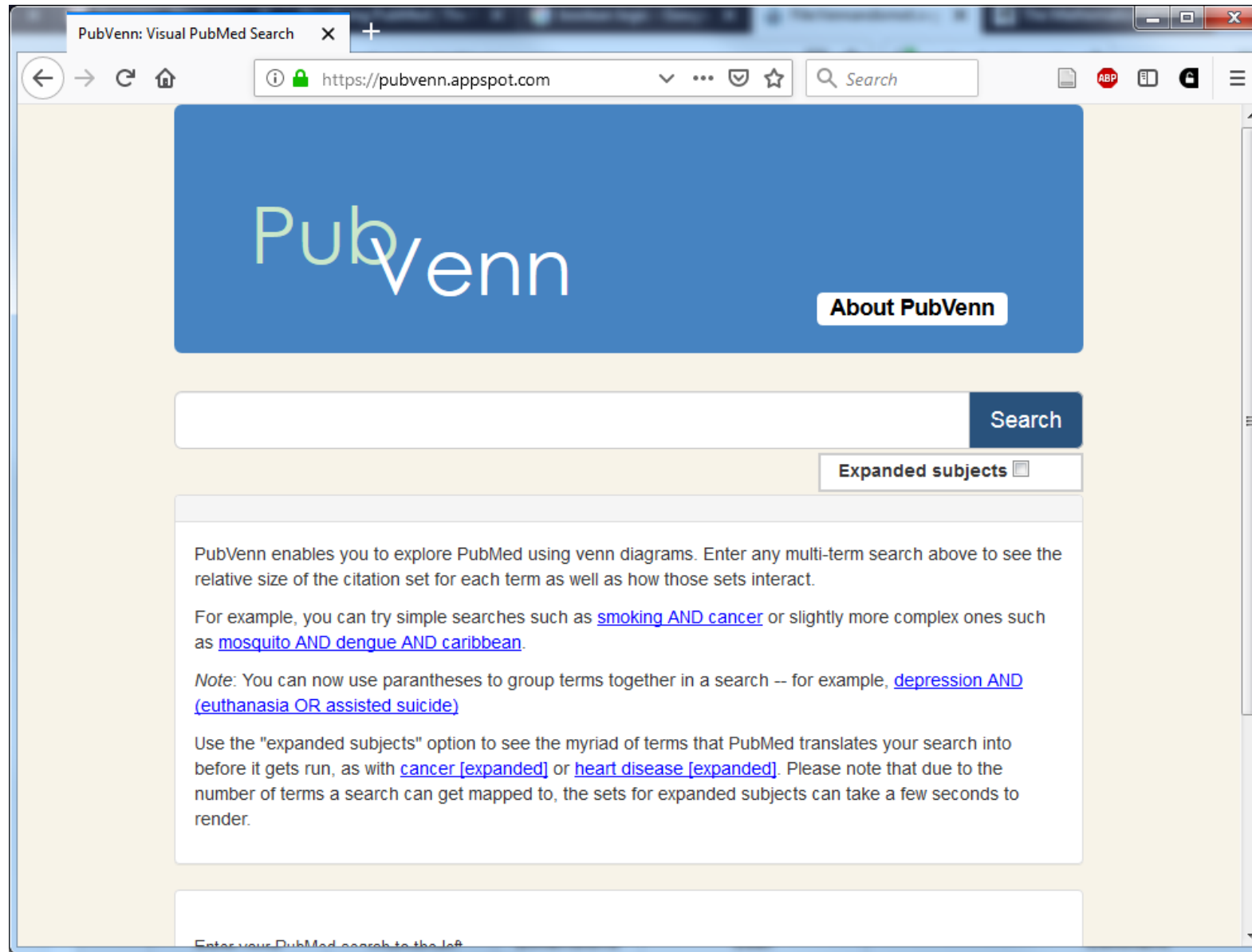


$$\neg x$$

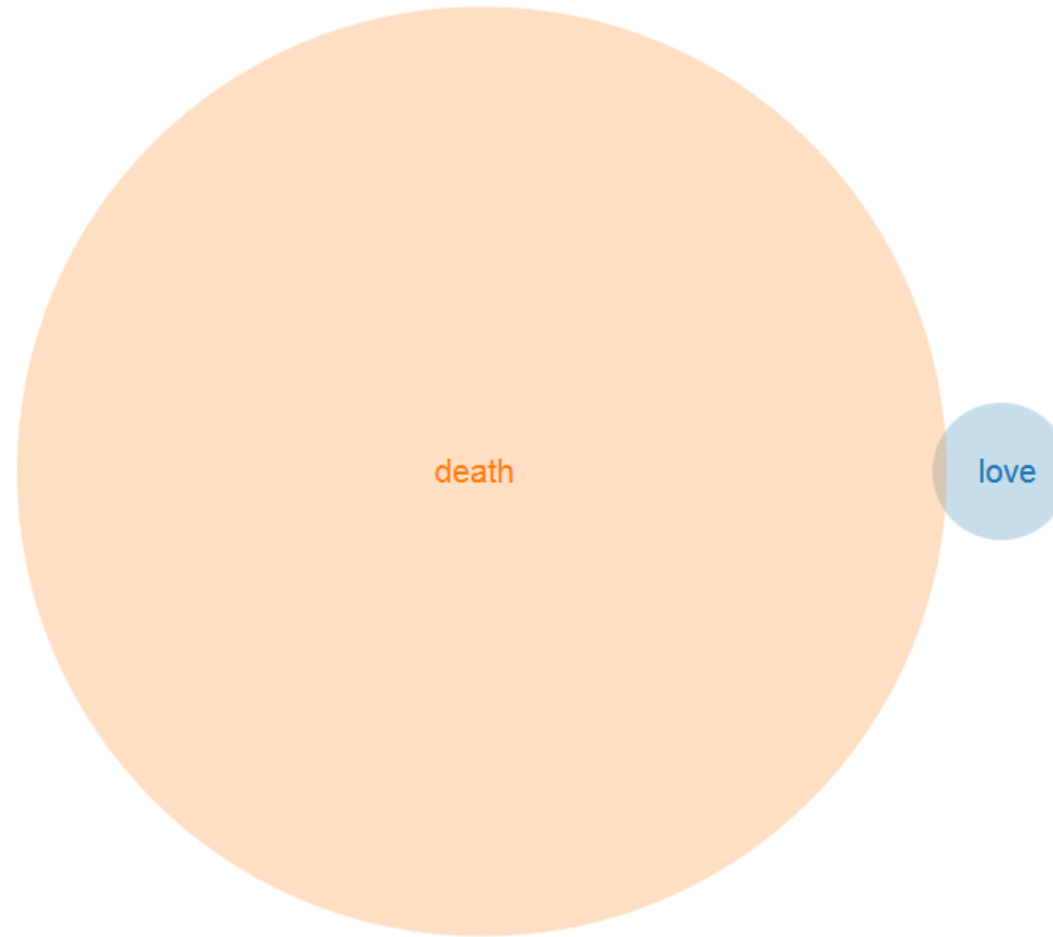
Figure 2. Venn diagrams for conjunction, disjunction, and complement



[Watchduck](#) -- Wikimedia

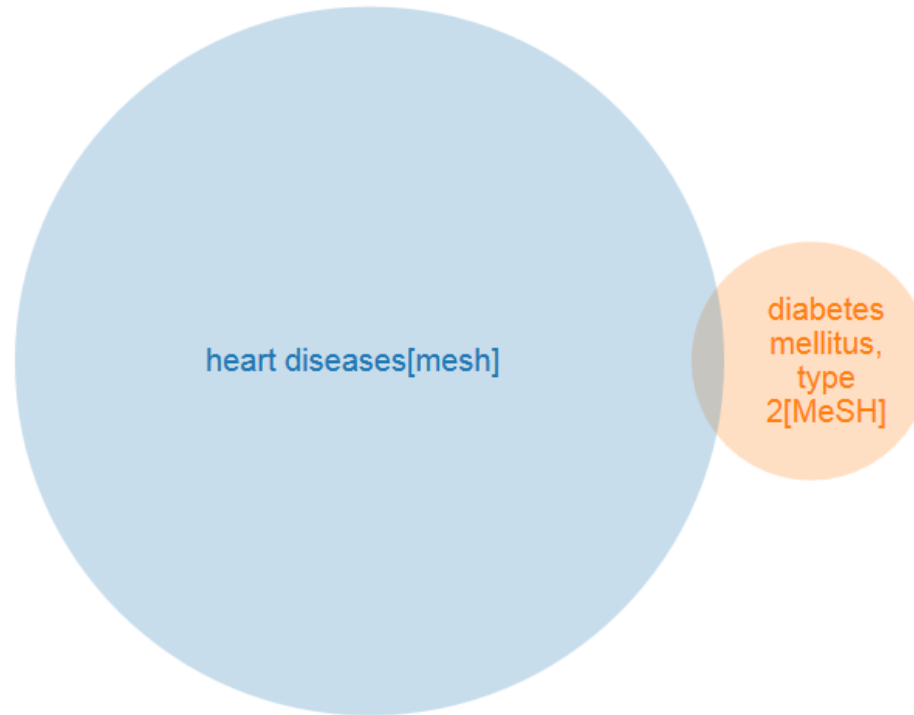


love AND death



Made with PubVenn: <https://pubvenn.appspot.com/>

heart diseases[mesh] AND diabetes  
mellitus, type 2[MeSH]



Made with PubVenn: <https://pubvenn.appspot.com/>



# **Can we show trends for a search over time?**

Diabetes Mellitus, Type 2[mesh]



tuberculosis



heart diseases[mesh]



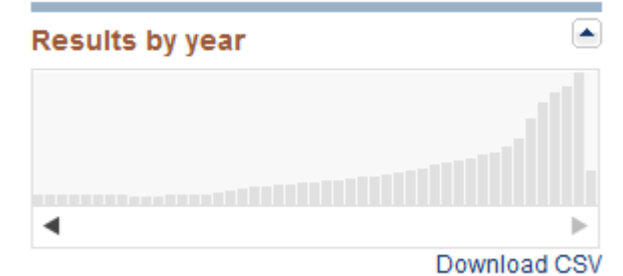
malaria

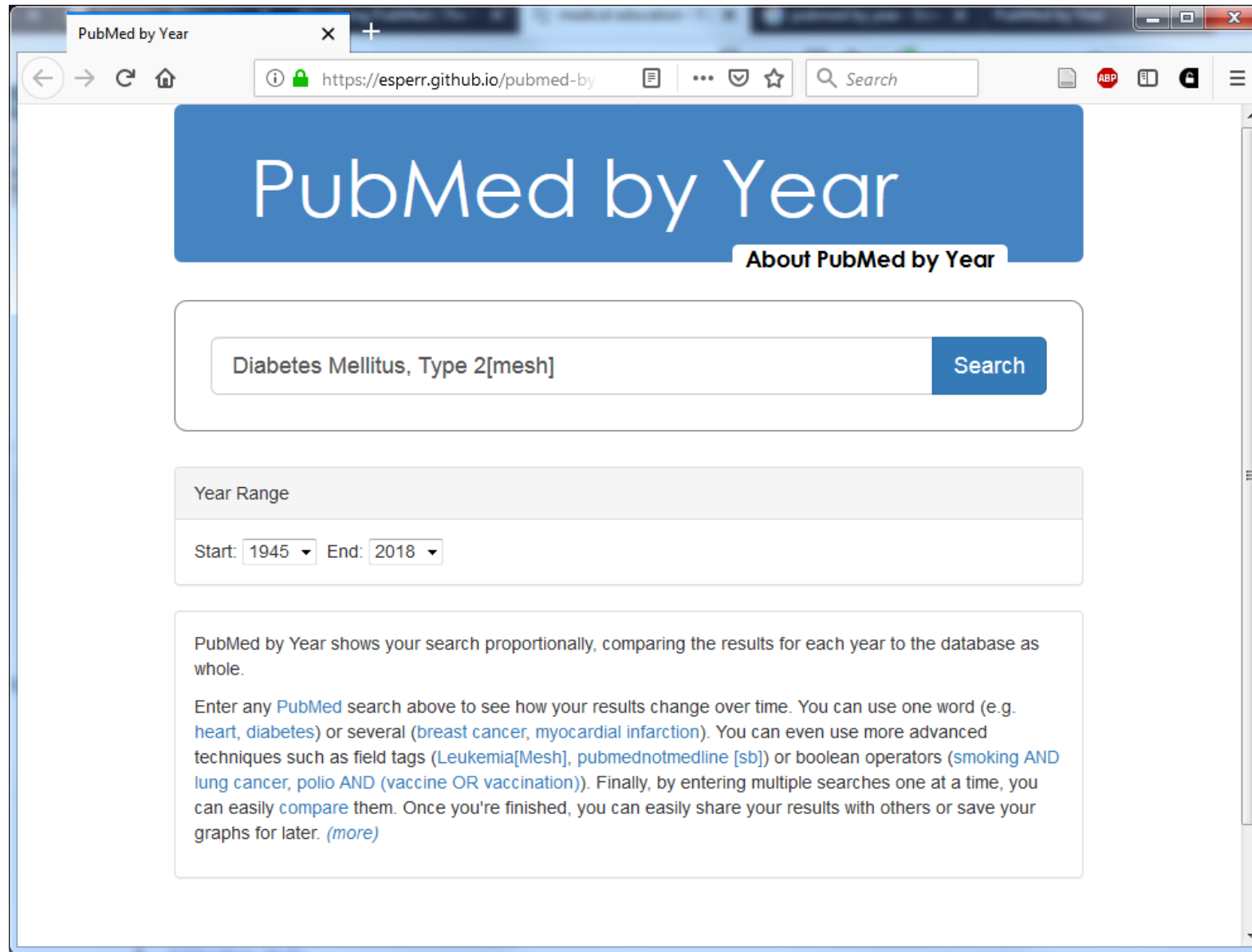


surgery



medical education

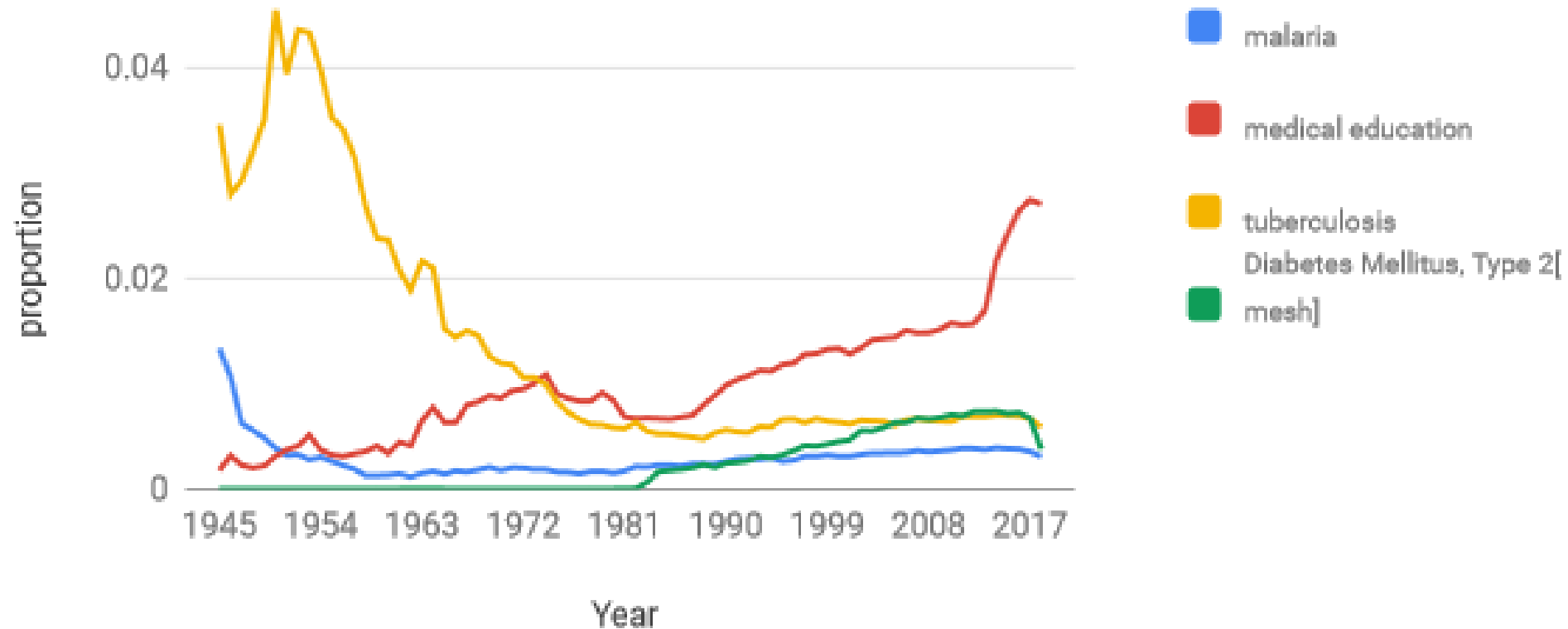






## Proportion of citations in PubMed

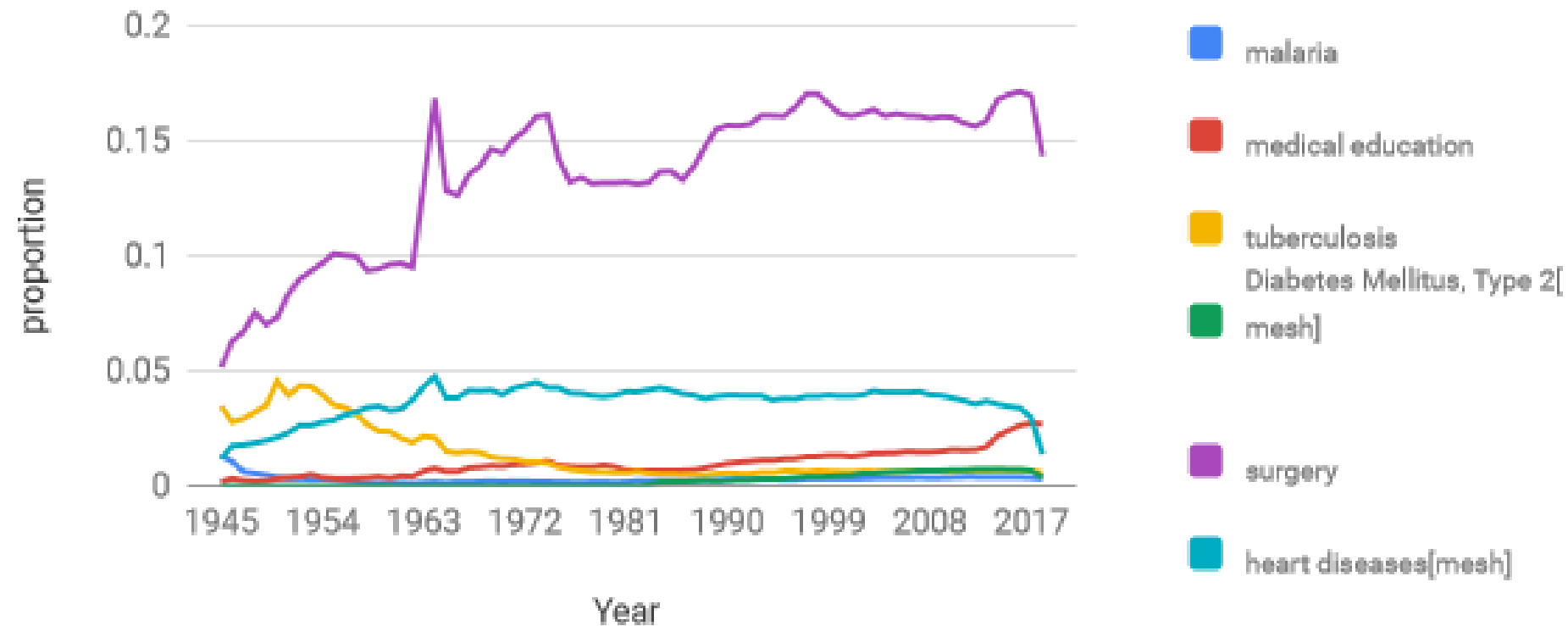
proportion for each search by year, 1945 to 2018



Made with PubMed by Year: <http://esperr.github.io/pubmed-by-year>

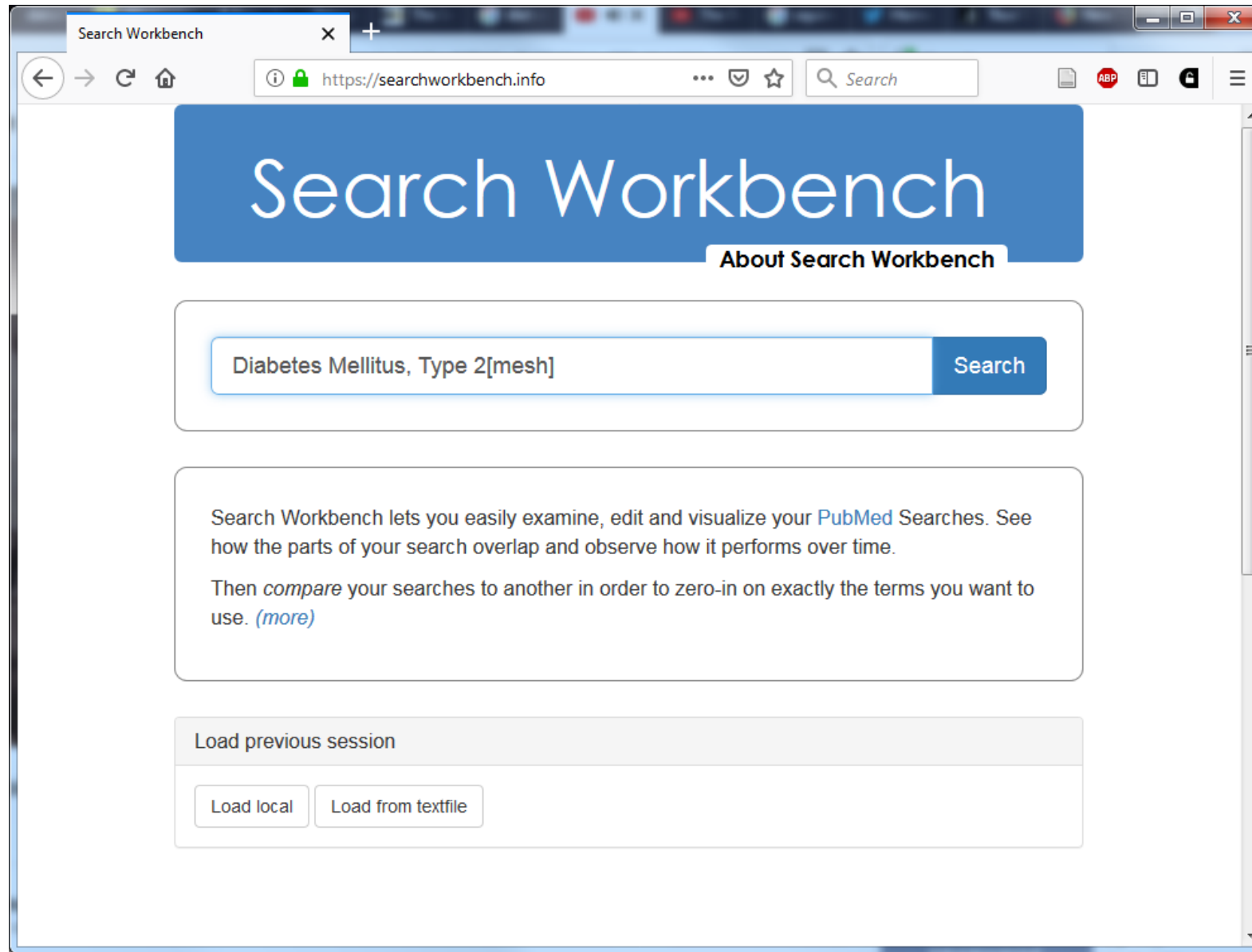
## Proportion of citations in PubMed

proportion for each search by year, 1945 to 2018

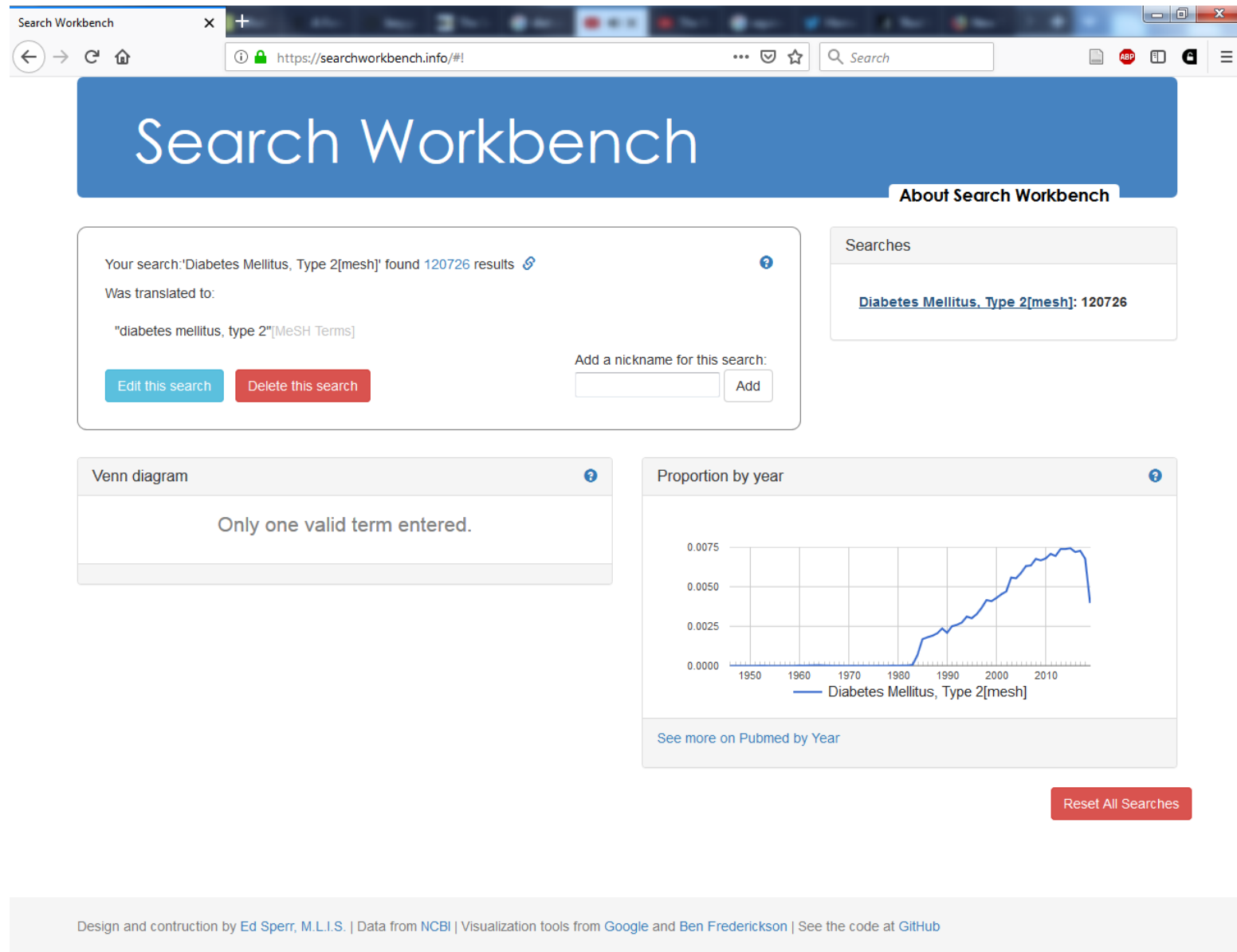


Made with PubMed by Year: <http://esperr.github.io/pubmed-by-year>

**Is it useful to combine these  
techniques?**







Search Workbench

https://searchworkbench.info/#!/

# Search Workbench

About Search Workbench

Search

Searches

Diabetes Mellitus, Type 2[mesh]: 120726

Was translated to:

"diabetes mellitus, type 2/drug therapy"[MeSH Terms]

Run this search Add a Hedge Cancel

Add a nickname for this search:

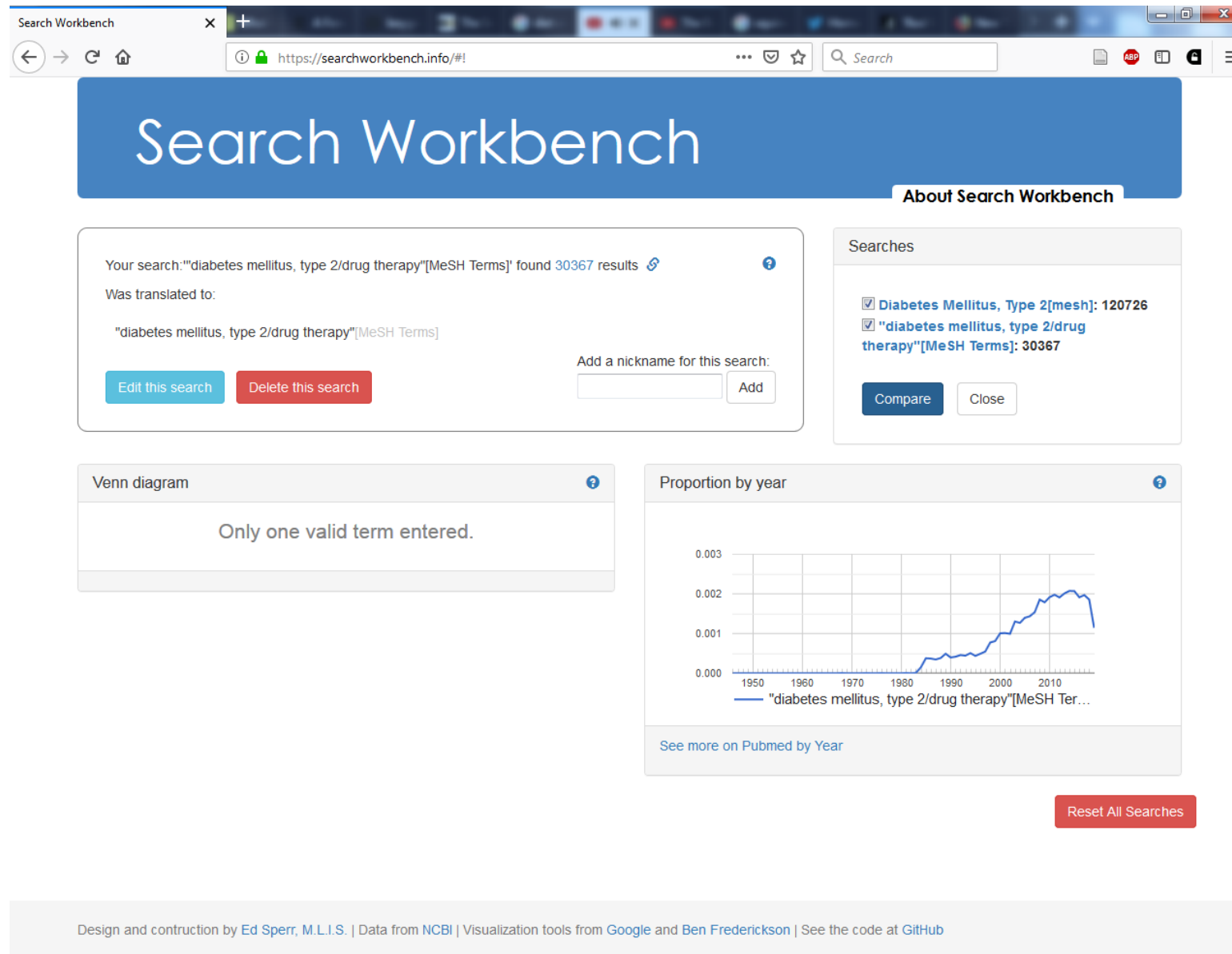
Venn diagram

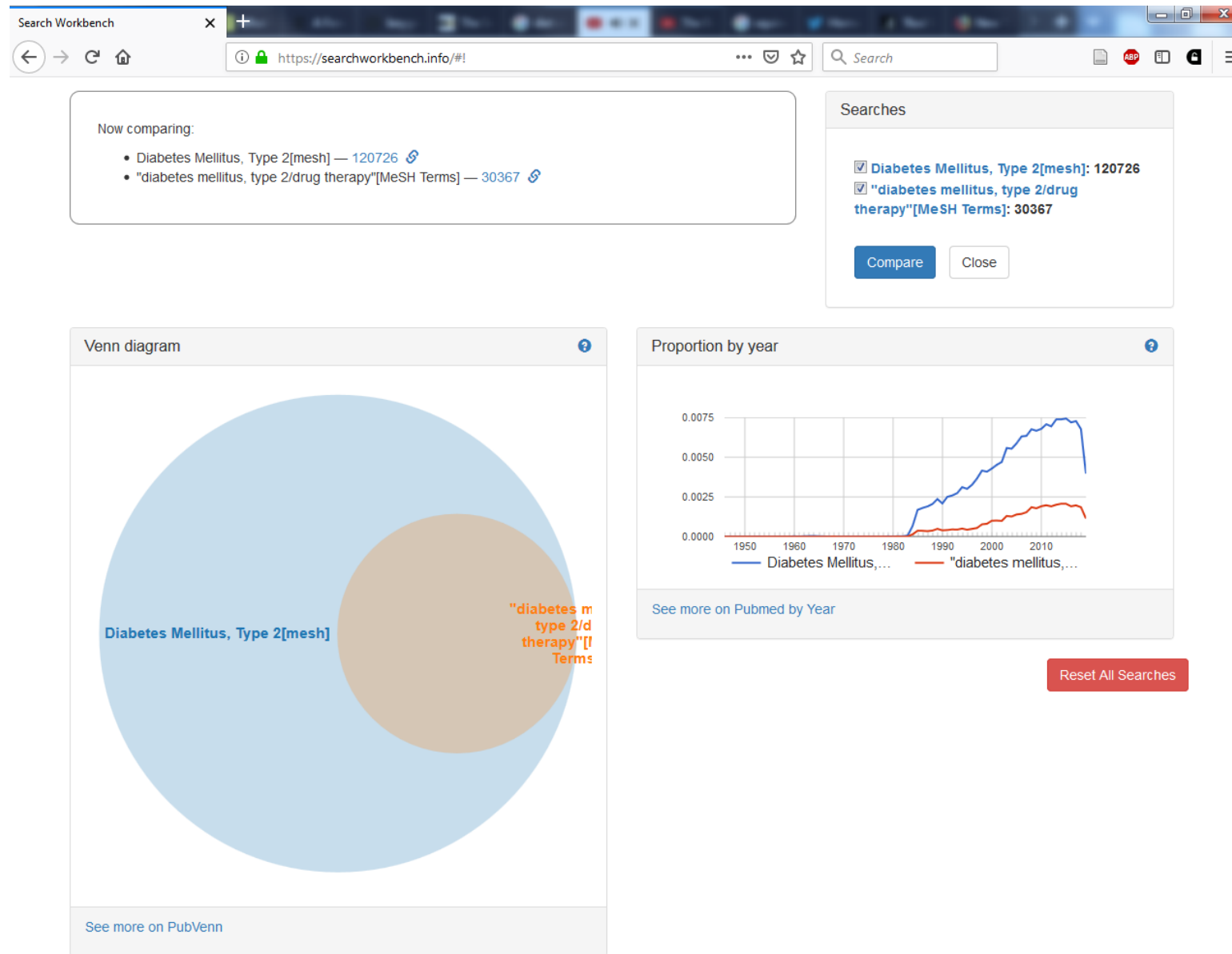
Only one valid term entered.

Proportion by year

See more on Pubmed by Year

Reset All Searches





Search Workbench

https://searchworkbench.info

# Search Workbench

About Search Workbench

Search

Searches

autism: 45801

Your search: 'autism' found 45801 results

Was translated to:

"autistic disorder"[MeSH Terms] OR ("autistic"[All Fields] AND "disorder"[All Fields]) OR "autistic disorder"[All Fields] OR "autism"[All Fields]

Edit this search Delete this search

Add a nickname for this search: Add

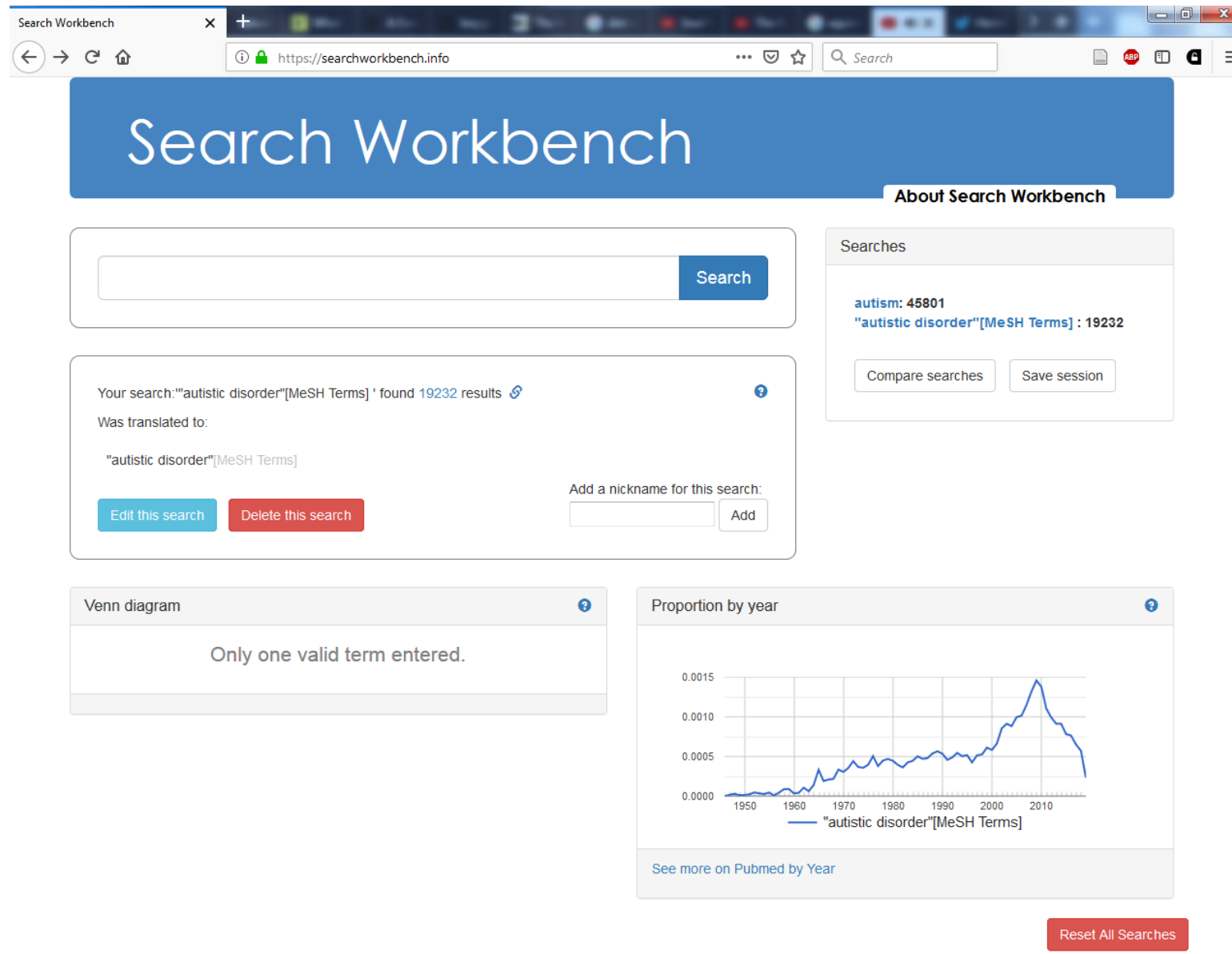
Venn diagram

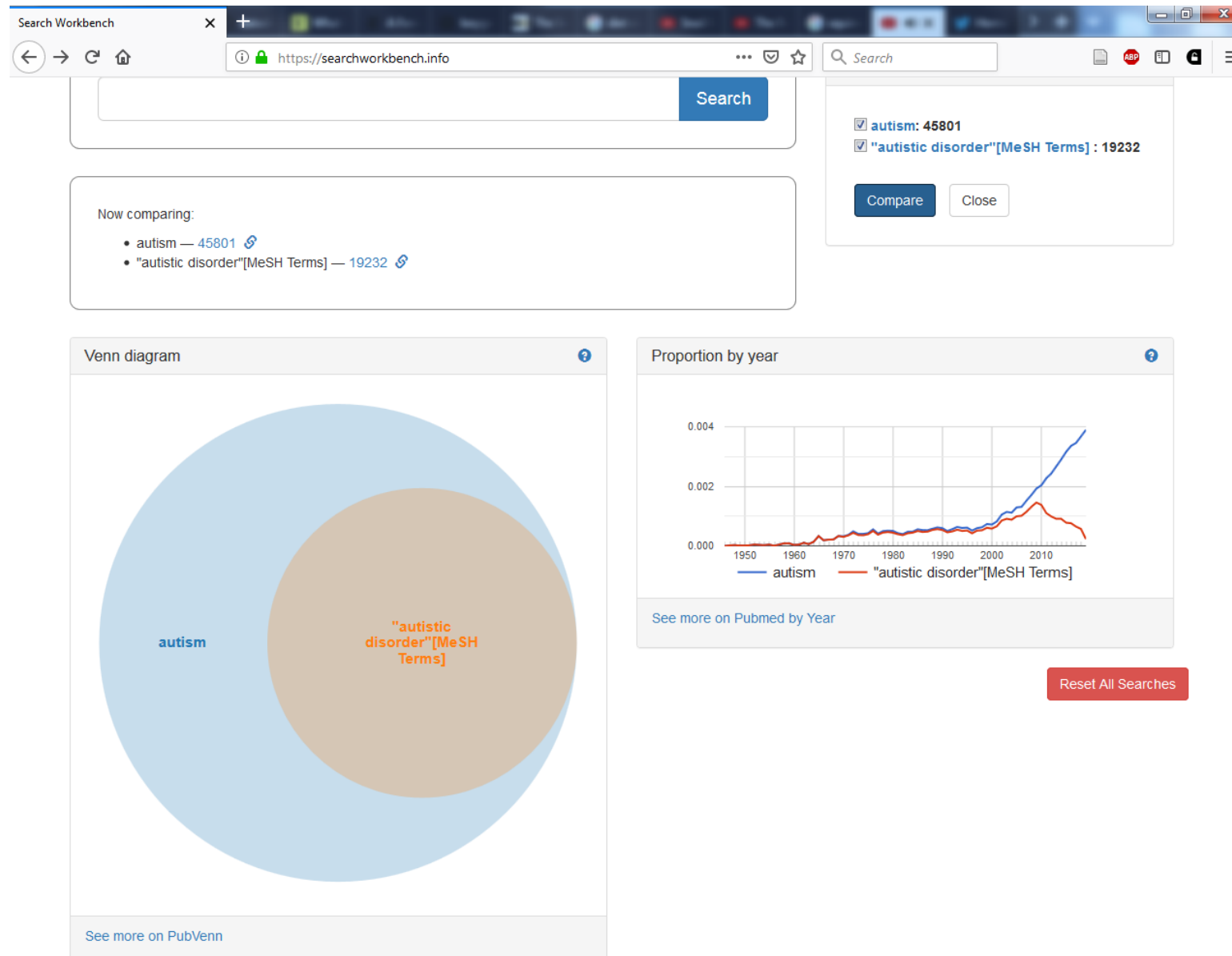
Only one valid term entered.

Proportion by year

See more on Pubmed by Year

Reset All Searches





Search Workbench PubMed Clinical Queries

https://www.ncbi.nlm.nih.gov/pubmed/clinical?term="diabetes mellitus."

NCBI Resources How To

## PubMed Clinical Queries

Results of searches on this page are limited to specific clinical research areas. For comprehensive searches, use [PubMed](#) directly.

"diabetes mellitus, type 2"[MeSH Terms] Search

### Clinical Study Categories

Category: Prognosis

Scope: Broad

### Systematic Reviews

### Medical Genetics

Topic: All

**Results: 5 of 23727**

In-hospital, short-term and long-term adverse clinical outcomes observed in patients with type 2 diabetes mellitus vs non-diabetes mellitus following percutaneous coronary intervention: A meta-analysis including 139,774 patients.

Zhuo X, Zhang C, Feng J, Ouyang S, Niu P, Dai Z. *Medicine (Baltimore)*. 2019 Feb; 98(8):e14669.

Metformin diminishes the unfavourable impact of Nrf2 in breast cancer patients with type 2 diabetes.

Urpilainen E, Kangaskokko J, Puistola U, Karihtala P. *Tumour Biol*. 2019 Jan; 41(1):1010428318815413.

Diabetes and premature death.

Sposito AC, Serrano C. *Rev Assoc Med Bras* (1992). 2019 Jan; 65(1):1-2.

Features of the clinics and treatment of patients with obesity and hypertension (according to the National register of arterial hypertension).

Oshchepkova EV, Lazareva NV, Chazova IE. *Ter Arkh*. 2018 Sep 20; 90(9):8-14.

Machine Learning for the Prediction of New-Onset Diabetes Mellitus during 5-Year Follow-up in Non-Diabetic Patients with Cardiovascular Risks.

Choi BG, Rha SW, Kim SW, Kang JH, Park JY, Noh YK. *Yonsei Med J*. 2019 Feb; 60(2):191-199.

[See all \(23727\)](#)

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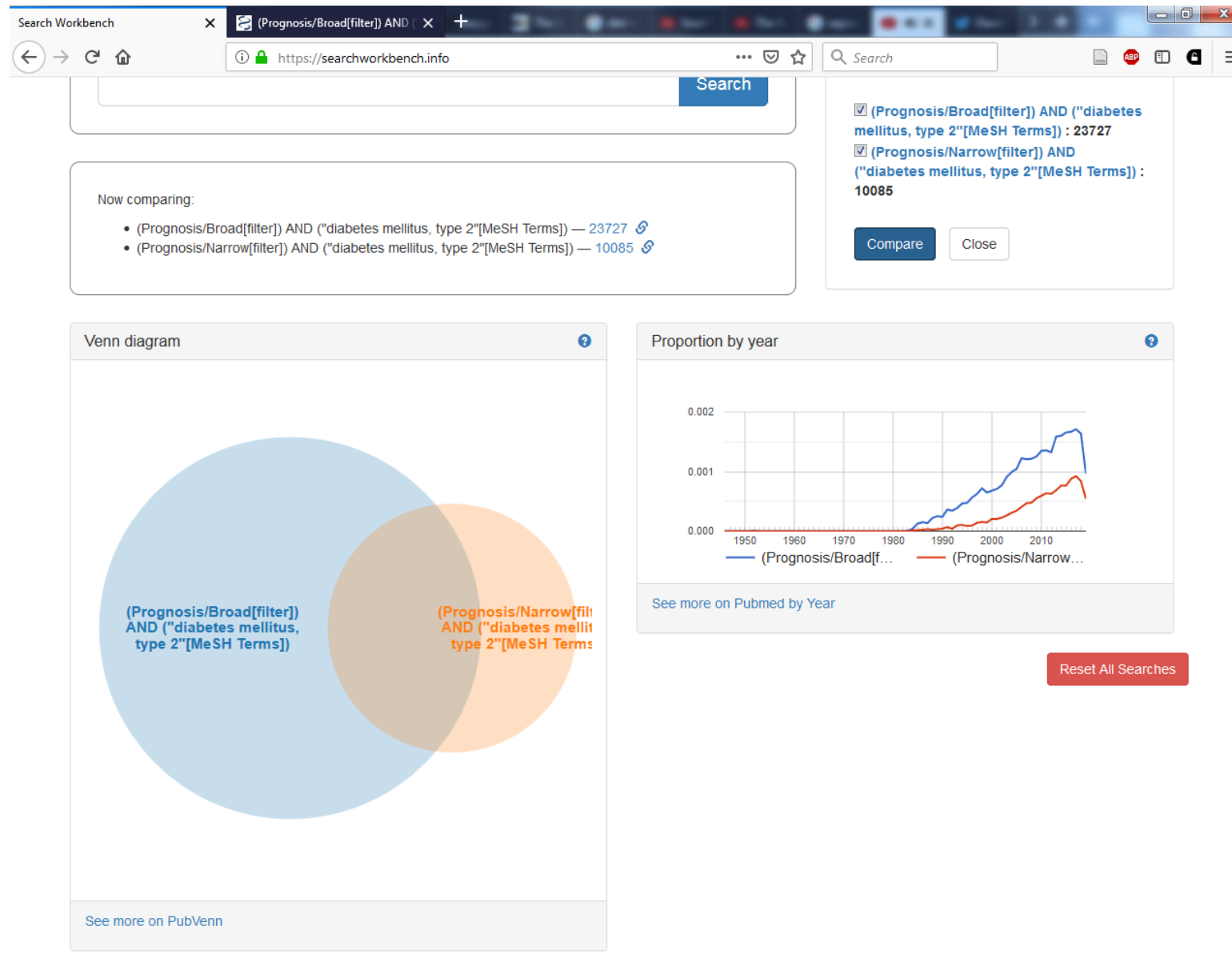
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