



# How to do literature search

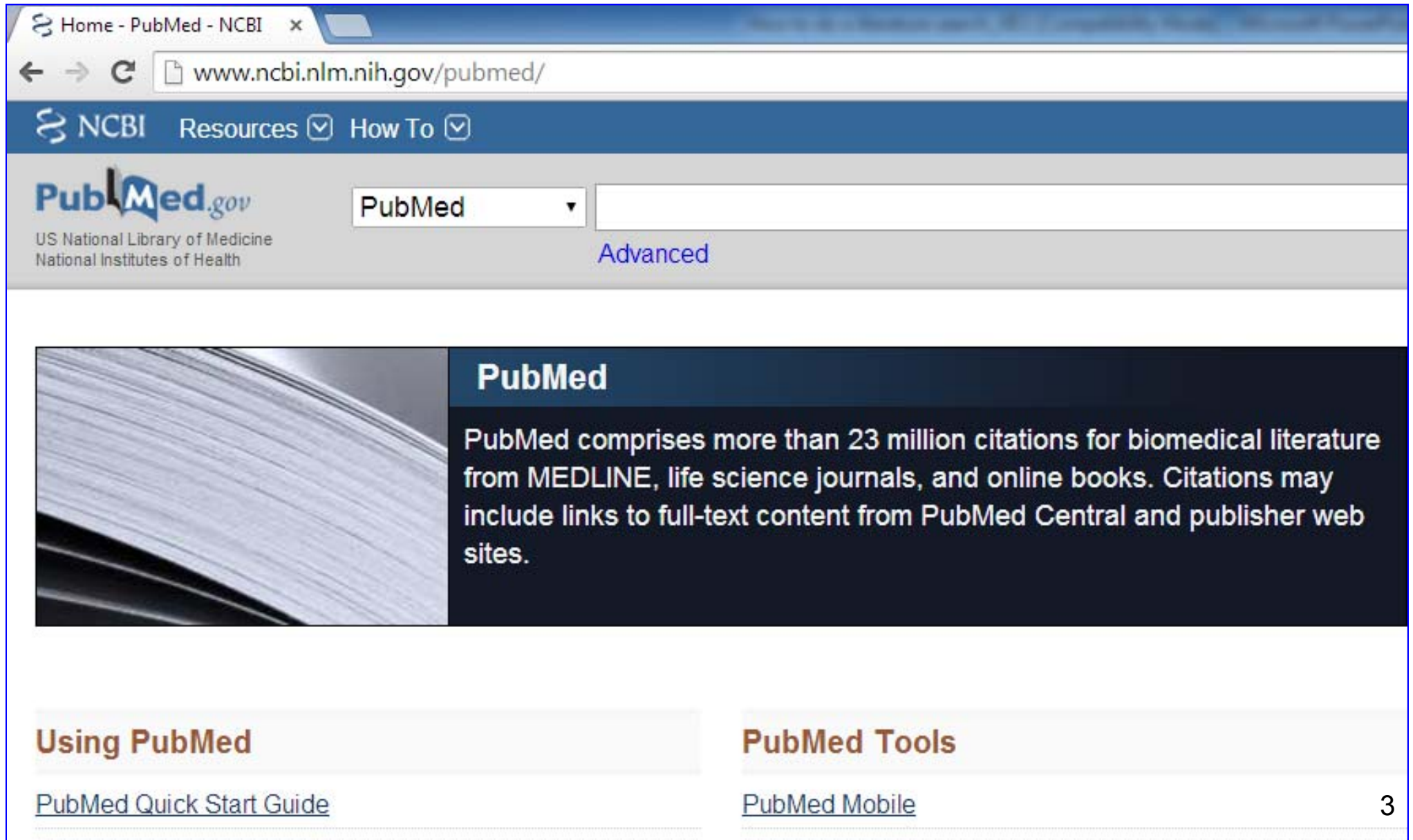
Vo Tuan Khoa

# What is practice of EBM?

1. Develop a focused clinical question
- 2. Search for the best evidence**
3. Critically appraise the evidence
4. Apply the evidence and evaluate the outcome

→ *The electronic databases*

# www.pubmed.com



The screenshot shows the PubMed website interface. At the top, there is a browser tab labeled "Home - PubMed - NCBI" and a search bar containing "www.ncbi.nlm.nih.gov/pubmed/". Below the search bar, the NCBI logo is visible, along with "Resources" and "How To" links. The PubMed logo is prominently displayed, with the text "US National Library of Medicine National Institutes of Health" underneath. A search dropdown menu is set to "PubMed" and is empty. To the right of the search bar, the word "Advanced" is written in blue. Below the search bar, there is a large banner with a background image of a stack of books. The banner contains the text "PubMed" in a large, bold font, followed by a paragraph: "PubMed comprises more than 23 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites." Below the banner, there are two columns of links. The left column is titled "Using PubMed" and contains a link to "PubMed Quick Start Guide". The right column is titled "PubMed Tools" and contains a link to "PubMed Mobile".

Home - PubMed - NCBI x

www.ncbi.nlm.nih.gov/pubmed/

NCBI Resources How To

**PubMed.gov**  
US National Library of Medicine  
National Institutes of Health

PubMed

Advanced

**PubMed**

PubMed comprises more than 23 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites.

**Using PubMed**

[PubMed Quick Start Guide](#)

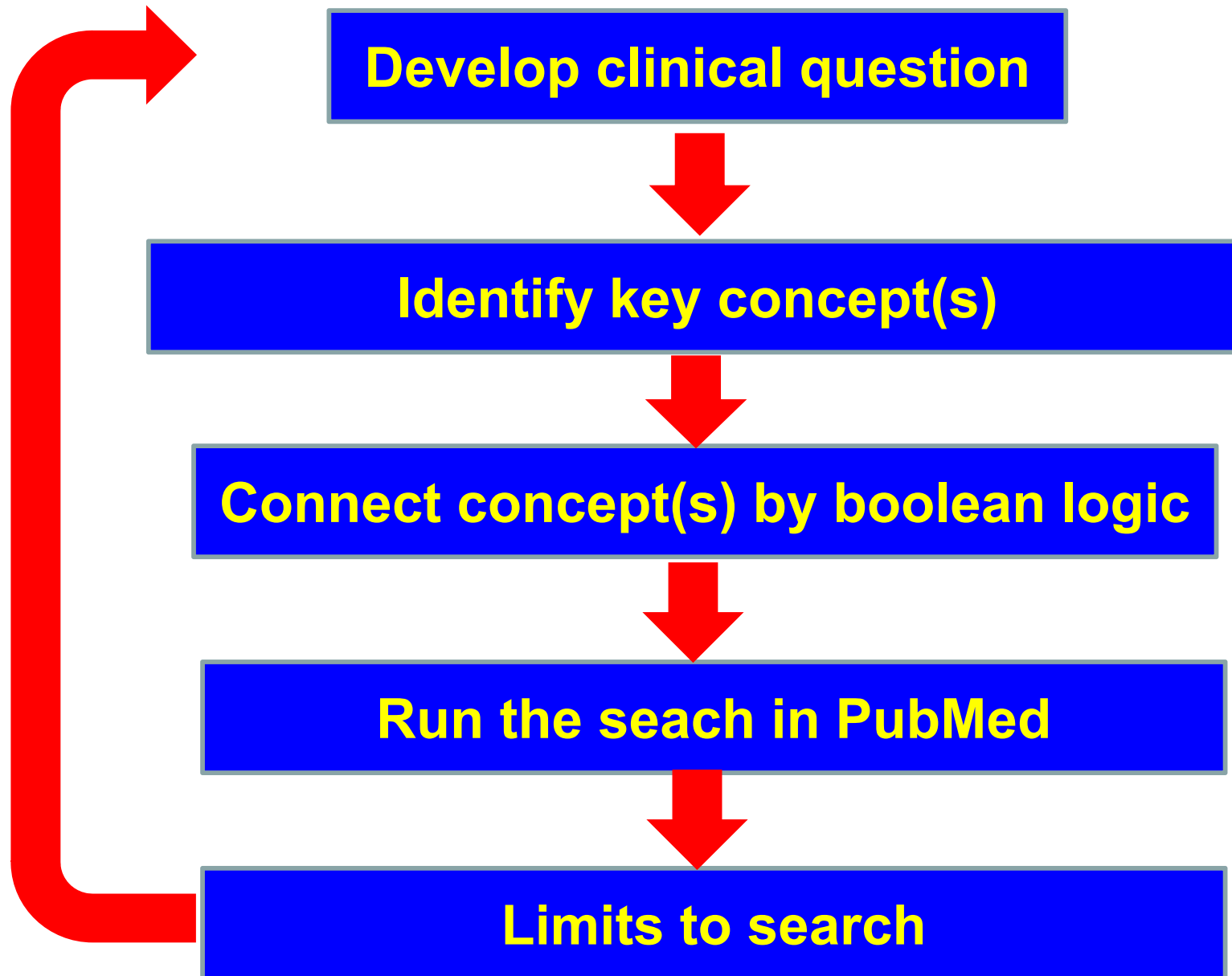
**PubMed Tools**

[PubMed Mobile](#)

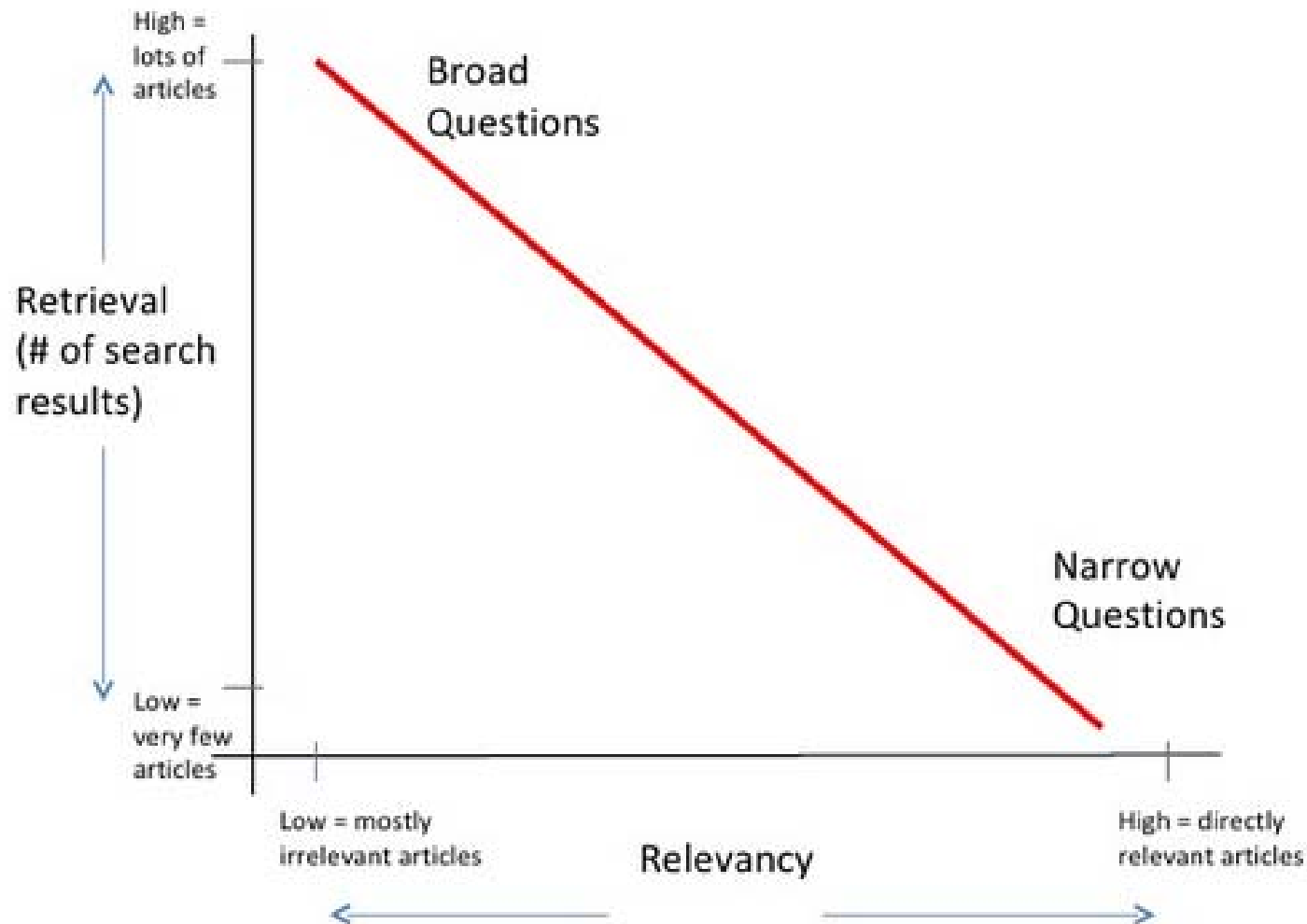
# Pubmed database

- Developed by National Center for Biotechnology Information (NCBI) at National Library of Medicine (NLM)
- Included MedLine, Old MedLine (1951 to 1965), some non-MedLine journals; published before selection for MedLine indexing, and 'selectively indexed' MedLine
- Search engine: receive a search request → compare it with an index → return the corresponding results.

# A search strategy



# How questions influences the search results?



# Possible question

Broad

- *What is the prevalence of sexual disorders in diabetes?*

Narrow

- *What is the risk of pancreas cancer for type 2 diabetes patients treated with DDP-IV inhibitors?*

Too narrow

- *What is the rate of unintended pregnancy for working women in HCM City between 2000 and 2010?*

# Key concept

- Medical term: high blood pressure → hypertension
- Acronym: MEN → Multiple Endocrine Neoplasm
- Variant: tumor or tumour
- PICO format
- MeSH (Medical Subject Headings) tools



# Develop a PICO format

- Population/patients

P

- Type 2 diabetes

- Intervention/exposure

I

- DPP-IV inhibitors

- Comparison

C

- (none)

- Outcome/endpoint

O

- Pancreas cancer

# Identify MeSH for concept(s)

What is the MeSH for these concepts?


- Type 2 diabetes
- Dipeptyl-Peptidase IV inhibitors or incretin?
- Pancreas cancer or pancreatic cancer?

- On PubMed screen, select MeSH Database link

How To

MeSH

Limits Advanced



## MeSH

MeSH (Medical Subject Headings) is the NLM controlled vocabulary for PubMed.

### More Resources

[E-Utilities](#)

[NLM MeSH Homepage](#)

Results: 1 to 20 of 100

&lt;&lt; First &lt; Prev Page 1 of 5 Next &gt; Last &gt;&gt;

 [Diabetes Mellitus](#)

1. A heterogeneous group of disorders characterized by HYPERGLYCEMIA and GLUCOSE INTOLERANCE.

 [Diabetes Insipidus](#)

2. A disease that is characterized by frequent urination, excretion of large amounts of dilute URINE, and excessive THIRST. Etiologies of **diabetes insipidus** include deficiency of antidiuretic hormone (also known as ADH or VASOPRESSIN) secreted by the NEUROHYPOPHYSIS, impaired KIDNEY response to ADH, and impaired hypothalamic regulation of thirst.

 [National Institute of Diabetes and Digestive and Kidney Diseases \(U.S.\)](#)

3. Component of the NATIONAL INSTITUTES OF HEALTH. It conducts and supports basic and applied research for a national program in **diabetes**, endocrinology, and metabolic diseases; digestive diseases and nutrition; and kidney, urologic, and hematologic diseases. It was established in 1948.

Year introduced: 2008

 [Diabetes Mellitus, Type 2](#) 

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

Year introduced: 2005 (1984)

## 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"/> epidemiology | <input type="checkbox"/> prevention and control |
| <input type="checkbox"/> anatomy and histology | <input type="checkbox"/> ethnology    | <input type="checkbox"/> psychology             |
| <input type="checkbox"/> blood                 | <input type="checkbox"/> etiology     | <input type="checkbox"/> radiography            |
| <input type="checkbox"/> cerebrospinal fluid   | <input type="checkbox"/> genetics     | <input type="checkbox"/> radionuclide imaging   |
| <input type="checkbox"/> chemically induced    | <input type="checkbox"/> history      | <input type="checkbox"/> radiotherapy           |
| <input type="checkbox"/> classification        | <input type="checkbox"/> immunology   | <input type="checkbox"/> rehabilitation         |

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

[All MeSH Categories](#)

[Diseases Category](#)

[Nutritional and Metabolic Diseases](#)

[Metabolic Diseases](#)

[Glucose Metabolism Disorders](#)

[Diabetes Mellitus](#)

**Diabetes Mellitus, Type 2**

[Diabetes Mellitus, Lipoatrophic](#)

[All MeSH Categories](#)

[Diseases Category](#)

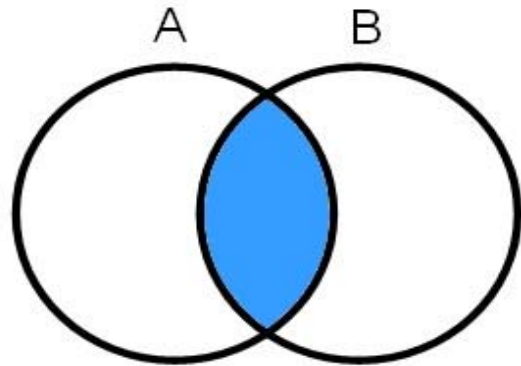
[Endocrine System Diseases](#)

[Diabetes Mellitus](#)

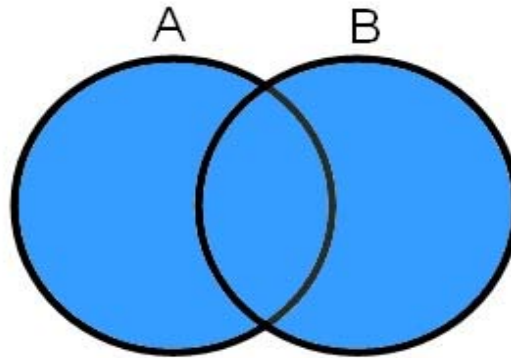
**Diabetes Mellitus, Type 2**

[Diabetes Mellitus, Lipoatrophic](#)

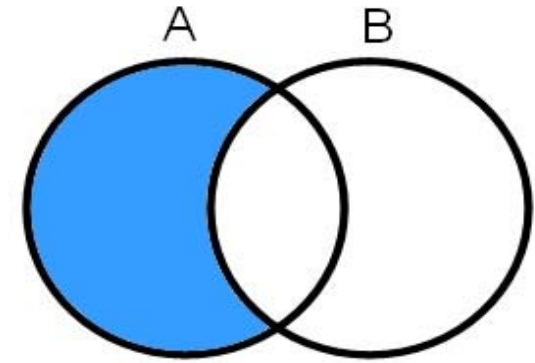
# Boolean operators



**A AND B**



**A OR B**



**A NOT B**

For PubMed search:

- Boolean connectors in a left-to-right sequence
- Must be entered in upper case

# Limits to search

- Publication date: the last 5 years
- Types of article: clinical trial, meta-analysis, systematic review
- Language: english
- Species: human
- Sex: specify
- Age: children or adult
- Field tags: title

[Show additional filters](#)

### Article types

Clinical Trial

Review

More ...

### Text availability

Abstract

Free full text

Full text

### PubMed

#### Commons

Reader comments

### Publication dates

5 years

10 years

Custom range...

### Species

Humans

**Display Settings:**  Summary, 20 per page, Sorted by Recently Added

**Results: 1 to 20 of 477885**

<< First < Prev Pa

- [Functional  \$\beta\$ -Adrenoceptors Are Important for Early Muscle Fiber Proliferation and Differentiation.](#)
1. [Effects on Myoblast Proliferation and Differentiation.](#)

Church JE, Trieu J, Sheorey R, Chee AY, Naim T, Baum DM, Lynch GS.

PLoS One. 2014 Jul 7;9(7):e101379. doi: 10.1371/journal.pone.0101379. e101379. PMID: 25000590 [PubMed - as supplied by publisher]

- [Evaluation of coronary sinus strain in patients with diastolic dysfunction.](#)
2. Akcay S, Turker Y, Kobat MA, Cetin N, Bilge AR, Tezcan UK.

Blood Press Monit. 2014 Jul 3. [Epub ahead of print]

PMID: 25000542 [PubMed - as supplied by publisher]

- [\$\alpha\$ 1-antitrypsin increases interleukin-1 receptor antagonist protein expression in islet graft transplantation.](#)
3. Abecassis A, Schuster R, Shahaf G, Ozeri E, Green R, Och

Cell Mol Immunol. 2014 Jul;11(4):277-286. doi: 10.1029/emi.2014.17. Epub



# Clinical scenario

- A 60 year-old female had type 2 diabetes for two years. She was treated with metformin and pioglitazone.
- Recently, she heard that pioglitazone treatment is associated with (hip) fracture
- What do you do?

# How to run a search in PubMed

- Clinical queries
- MeSH tools
- PICO tools

# How to use **Clinical Queries**

1. [www.pubmed.com](http://www.pubmed.com), click on Clinical Queries link
2. Type key words on search engine

## PubMed Clinical Queries

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



### Clinical Study Categories

This column displays citations filtered to a specific clinical study category and scope. These search filters were developed by [Haynes RB et al.](#) See more [filter information](#).

### Systematic Reviews

This column displays citations for systematic reviews, meta-analyses, reviews of clinical trials, evidence-based medicine, consensus development conferences, and guidelines. See [filter information](#) or additional [related sources](#).

### Medical Genetics

This column displays citations genetics. See more [filter information](#).

# Results

## Clinical Study Categories

Category:

Scope:

### Results: 5 of 43

The skeletal effects of pioglitazone in type 2 diabetes or impaired glucose tolerance: a randomized controlled trial.

Grey A, Bolland M, Fenwick S, Home A, Gamble G, Drury PL, Reid IR.

Eur J Endocrinol. 2014 Feb; 170(2):255-62. Epub 2013 Dec 21.

Effects of pioglitazone on bone in postmenopausal women with impaired fasting glucose or impaired glucose tolerance: a randomized, double-blind, placebo-controlled study.

Bone HG, Lindsay R, McClung MR, Perez AT, Raanan MG, Spanheimer RG.

J Clin Endocrinol Metab. 2013 Dec; 98(12):4691-701. Epub 2013 Sep 20.

Comparing pioglitazone to insulin with respect to cancer, cardiovascular and bone fracture endpoints, using propensity score weights.

## Systematic Reviews

### Results: 5 of 7

AHRQ's comparative effectiveness research on oral medications for type 2 diabetes: a summary of the key findings.

Bennett WL, Balfe LM, Faysal JM.

J Manag Care Pharm. 2012 Jan-Feb; 18(1 Suppl A):1-22.

Comparative effectiveness and safety of medications for type 2 diabetes: an update including new drugs and 2-drug combinations.

Bennett WL, Maruthur NM, Singh S, Segal JB, Wilson LM, Chatterjee R, Marinopoulos SS, Puhan MA, Ranasinghe P, Block L, et al.

Ann Intern Med. 2011 May 3; 154(9):602-13. Epub 2011 Mar 14.

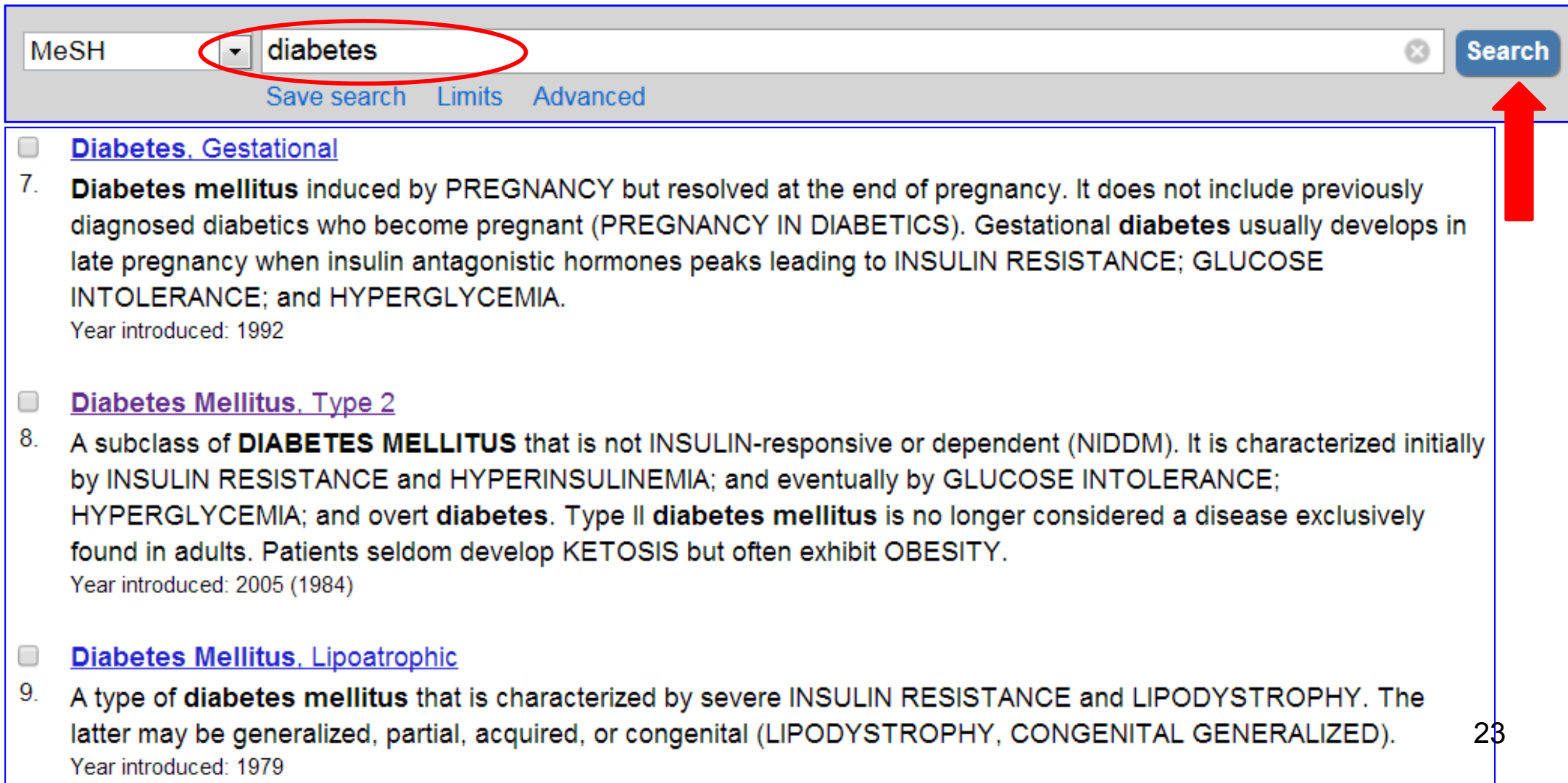
Thiazolidinediones and fractures: evidence from translating research into action for diabetes.

Bilik D, McEwen LN, Brown MB, Pomeroy NE, Kim C, Asao K, Crosson JC, Duru OK, Ferrara A, Hsiao VC, et al.

# How to use **MeSH** tools

# Setting MeSH-1 and boolean logic

1. www.pubmed.com, click on MeSH link
2. type key words on box search



The screenshot shows the MeSH search interface. At the top, there is a search bar with 'MeSH' on the left and 'diabetes' in the center. A red oval highlights the search bar. To the right of the search bar is a 'Search' button, which is pointed to by a red arrow. Below the search bar are links for 'Save search', 'Limits', and 'Advanced'. The search results are listed below, each with a checkbox and a title:

- [Diabetes, Gestational](#)
- 7. **Diabetes mellitus** induced by PREGNANCY but resolved at the end of pregnancy. It does not include previously diagnosed diabetics who become pregnant (PREGNANCY IN DIABETICS). Gestational **diabetes** usually develops in late pregnancy when insulin antagonistic hormones peaks leading to INSULIN RESISTANCE; GLUCOSE INTOLERANCE; and HYPERGLYCEMIA.  
Year introduced: 1992
- [Diabetes Mellitus, Type 2](#)
- 8. 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)
- [Diabetes Mellitus, Lipoatrophic](#)
- 9. A type of **diabetes mellitus** that is characterized by severe INSULIN RESISTANCE and LIPODYSTROPHY. The latter may be generalized, partial, acquired, or congenital (LIPODYSTROPHY, CONGENITAL GENERALIZED).  
Year introduced: 1979

## 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 **OBESITY**. Type II **diabetes mellitus** is no longer considered a disease exclusively found in adults. Patients seldom develop **KIDNEY DISEASE** or **RETINOPATHY**. Patients seldom exhibit **OBESITY**.

Year introduced: 2005 (1984)

PubMed search builder options

Subheadings:

- |  |                                       |   |
|--|---------------------------------------|---|
| <input type="checkbox"/> blood                   | <input type="checkbox"/> ethnology    | <input type="checkbox"/> psychology           |
| <input type="checkbox"/> cerebrospinal fluid     | <input type="checkbox"/> etiology     | <input type="checkbox"/> radiography          |
| <input type="checkbox"/> chemically induced      | <input type="checkbox"/> genetics     | <input type="checkbox"/> radionuclide imaging |
| <input type="checkbox"/> classification          | <input type="checkbox"/> history      | <input type="checkbox"/> radiotherapy         |
| <input type="checkbox"/> complications           | <input type="checkbox"/> immunology   | <input type="checkbox"/> rehabilitation       |
| <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"/> diet therapy            | <input type="checkbox"/> mortality    | <input type="checkbox"/> transmission         |
| <input checked="" type="checkbox"/> drug therapy | <input type="checkbox"/> nursing      | <input type="checkbox"/> ultrasonography      |
| <input type="checkbox"/> economics               | <input type="checkbox"/> parasitology | <input type="checkbox"/> urine                |
| <input type="checkbox"/> embryology              | <input type="checkbox"/> pathology    | <input type="checkbox"/> veterinary           |

### PubMed search builder

"Diabetes Mellitus, Type 2/drug therapy"[Mesh]

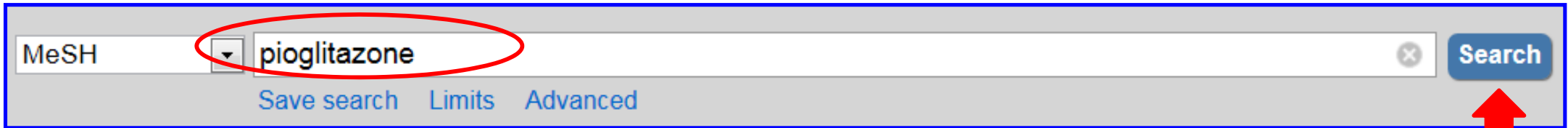
Add to search builder

AND ▾

Search PubMed



# Setting MeSH-2 and boolean logic



The image shows a search interface with a search bar containing the text "pioglitazone". The search bar is highlighted with a red oval. To the right of the search bar is a "Search" button, which is highlighted with a red arrow. Below the search bar are links for "Save search", "Limits", and "Advanced".

## pioglitazone [Supplementary Concept]

structure given in first source; PPAR agonist used for type II diabetes

Date introduced: October 2, 1989

Registry Number: 111025-46-8

Heading Mapped to:

- [Thiazolidinediones](#)

Entry Terms:

- 5-(4-(2-(5-ethyl-2-pyridyl)ethoxy)benzyl)-2,4-thiazolidinedione
- U 72107A
- U72,107A

### PubMed search builder

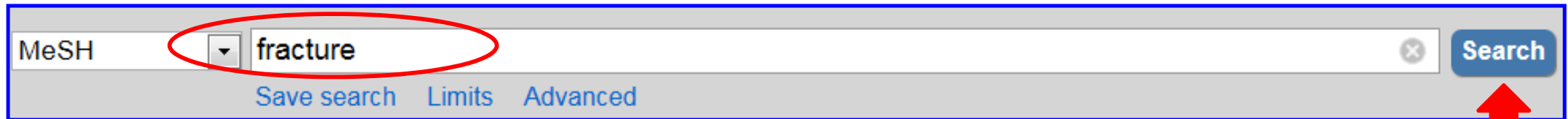
```
("Diabetes Mellitus, Type  
2/drug therapy"[Mesh])  
AND "pioglitazone"  
[Supplementary Concept]
```

Add to search builder

AND

Search PubMed

# Setting MeSH-3 and Boolean logic



The image shows a search interface for MeSH. On the left, the text "MeSH" is displayed. To its right is a search input field containing the word "fracture". A red oval highlights the search field. Below the search field are three links: "Save search", "Limits", and "Advanced". On the far right of the search bar is a blue "Search" button. A red arrow points upwards to the "Search" button.

Results: 1 to 20 of 40 Selected: 1

Fractures, Bone

1. Breaks in bones.  
Year introduced: 2006

Fracture Fixation, Internal

2. The use of internal devices (metal plates, nails, rods, etc.) to  
Year introduced: 1972(1970)

PubMed search builder

```
(( "Diabetes Mellitus, Type 2/drug therapy" [Mesh] )  
AND "pioglitazone"  
[Supplementary Concept] )  
AND "Fractures, Bone" [Mesh]
```

Add to search builder

AND ▾

Search PubMed

# Select **Search Pubmed** of menu **Pubmed search builder**

PubMed search builder

```
(("Diabetes Mellitus, Type 2/drug therapy"[Mesh])  
AND "pioglitazone"  
[Supplementary Concept])  
AND "Fractures, Bone"[Mesh]
```

Add to search builder AND

Search PubMed

# Primary results

## Results: 18

- [The skeletal effects of pioglitazone in type 2 diabetes or impaired glucose tolerance: a randomized controlled trial.](#)
  1. [The skeletal effects of pioglitazone in type 2 diabetes or impaired glucose tolerance: a randomized controlled trial.](#)

Grey A, Bolland M, Fenwick S, Horne A, Gamble G, Drury PL, Reid IR.  
Eur J Endocrinol. 2013 Dec 21;170(2):255-62. doi: 10.1530/EJE-13-0793. Print 2014 Feb.  
PMID: 24217934 [PubMed - indexed for MEDLINE]  
[Related citations](#)
  
- [Effect of pioglitazone on body composition and bone density in subjects with prediabetes in the ACT NOW trial.](#)
  2. [Effect of pioglitazone on body composition and bone density in subjects with prediabetes in the ACT NOW trial.](#)

Bray GA, Smith SR, Banerji MA, Tripathy D, Clement SC, Buchanan TA, Henry RR, Kitabchi AE, Mudaliar S, Musi N, Ratner RE, Schwenke DC, Stentz FB, Reaven PD, DeFronzo RA.  
Diabetes Obes Metab. 2013 Oct;15(10):931-7. doi: 10.1111/dom.12099. Epub 2013 May 7.  
PMID: 23551856 [PubMed - indexed for MEDLINE]  
[Related citations](#)
  
- [Pioglitazone--do we really need it to manage type 2 diabetes?](#)
  3. [Pioglitazone--do we really need it to manage type 2 diabetes?](#)

Sinha B, Ghosal S.  
Diabetes Metab Syndr. 2013 Jan-Mar;7(1):52-5. doi: 10.1016/j.dsx.2013.02.033. Epub 2013 Mar 13.  
PMID: 23517798 [PubMed - indexed for MEDLINE]

# How to use **PICO** tools

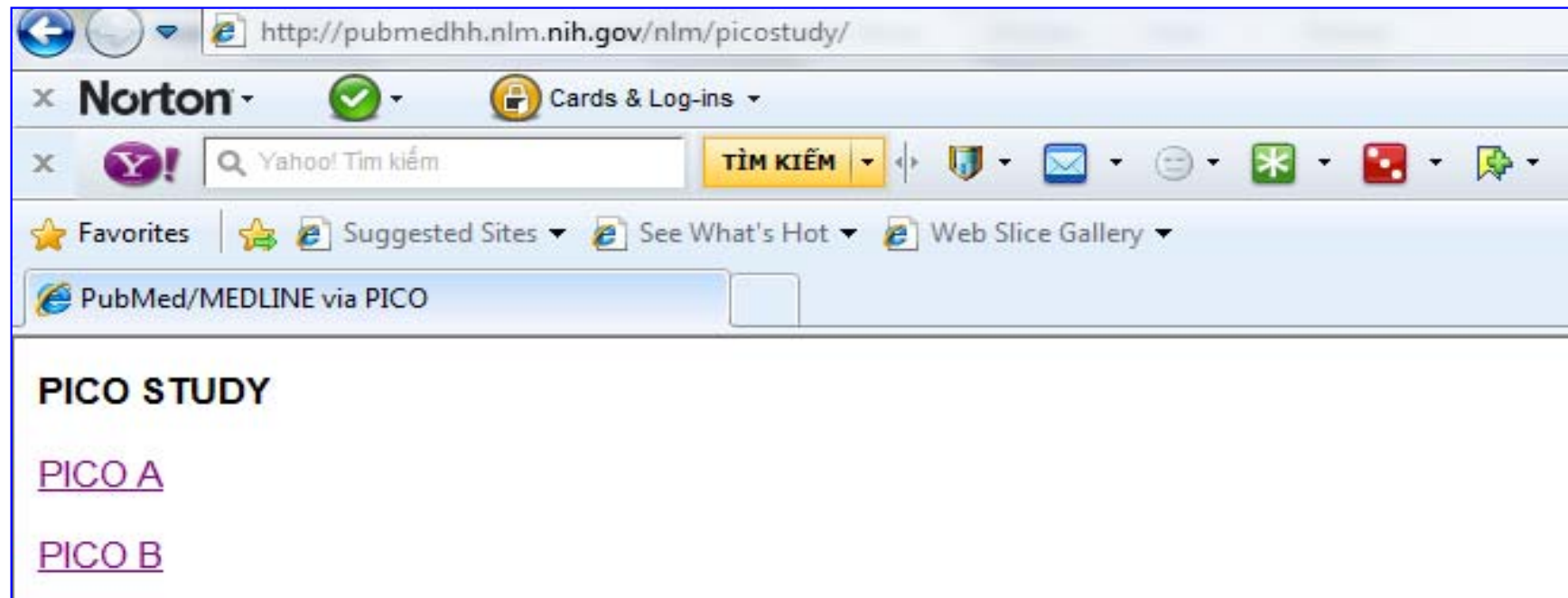
# Setting PICO

- P: type 2 diabetes
- I: pioglitazone or thiazolidindione
- C: none
- O: fracture



Log on to:

<http://pubmedhh.nlm.nih.gov/nlm/picostudy/>



# Click on one of two links

**Search MEDLINE/PubMed via PICO**

---

Patient/Problem:

Intervention:

Compare to (leave blank if none):

Outcome (optional):

---

Age Group:

Gender:

Select Publication type:

---

**PICO A**

**Search MEDLINE/PubMed via PICO**

---

Patient/Problem:

Intervention:

Compare to (leave blank if none):

Outcome (optional):

---

Age Group:

Gender:

---

**Type of question:**

therapy  diagnosis  etiology  prognosis  
 specific search (narrow)  sensitive search (broad)

**OR**

**Systematic Reviews**

**OR**

**NO filters**

**PICO B**

# Type key words

**Search MEDLINE/PubMed via PICO**

---

**Patient/Problem:**

**Intervention:**

**Compare to (leave blank if none):**

**Outcome (optional):**

---

**Age Group:**

**Gender:**

**Select Publication type:**

---

# Results

## PubMed for Handhelds

U.S. National Library of Medicine

Results: 16 items

- 1. The skeletal effects of pioglitazone in type 2 diabetes or impaired glucose tolerance: a randomized controlled trial.  
Grey A, Bolland M, Fenwick S, Horne A, Gamble G, Drury PL, Reid IR.  
Eur J Endocrinol; 2014 Feb ; 170(2):255-62. PubMed ID:  
[No Abstract] [\[Full Text\]](#) [\[Related\]](#)
- 2. Comparing pioglitazone to insulin with respect to cancer, cardiovascular and bone fracture endpoints, using propensity score weights.  
Vallarino C, Perez A, Fusco G, Liang H, Bron M, Manne S, Joseph G, Yu S.  
Clin Drug Investig; 2013 Sep ; 33(9):621-31. PubMed ID:  
[No Abstract] [\[Full Text\]](#) [\[Related\]](#)
- 3. Effect of pioglitazone on body composition and bone density in subjects with prediabetes in the ACT NOW trial.  
Bray GA, Smith SR, Banerji MA, Tripathy D, Clement SC, Buchanan TA, Henry RR, Kitabchi AE, Mudaliar S, Musi N, Ratner RE, Schw  
Diabetes Obes Metab; 2013 Oct ; 15(10):931-7. PubMed ID:  
[No Abstract] [\[Full Text\]](#) [\[Related\]](#)
- 4. Hospitalised hip fracture risk with rosiglitazone and pioglitazone use compared with other glucose-lowering drugs.  
Colhoun HM, Livingstone SJ, Looker HC, Morris AD, Wild SH, Lindsay RS, Reed C, Donnan PT, Guthrie B, Leese GP, McKnight J, Pea  
Scottish Diabetes Research Network Epidemiology Group .  
Diabetologia; 2012 Nov ; 55(11):2929-37. PubMed ID:  
[No Abstract] [\[Full Text\]](#) [\[Related\]](#)

# Summary

- Searching literature is very important
- 3 methods
  - MeSH tool → academic users
  - Clinical queries → busy users
  - PICO → advanced users
- Do practice...practice again...practice more and more