



Secondary drug information resources

Saja almazrou Msc

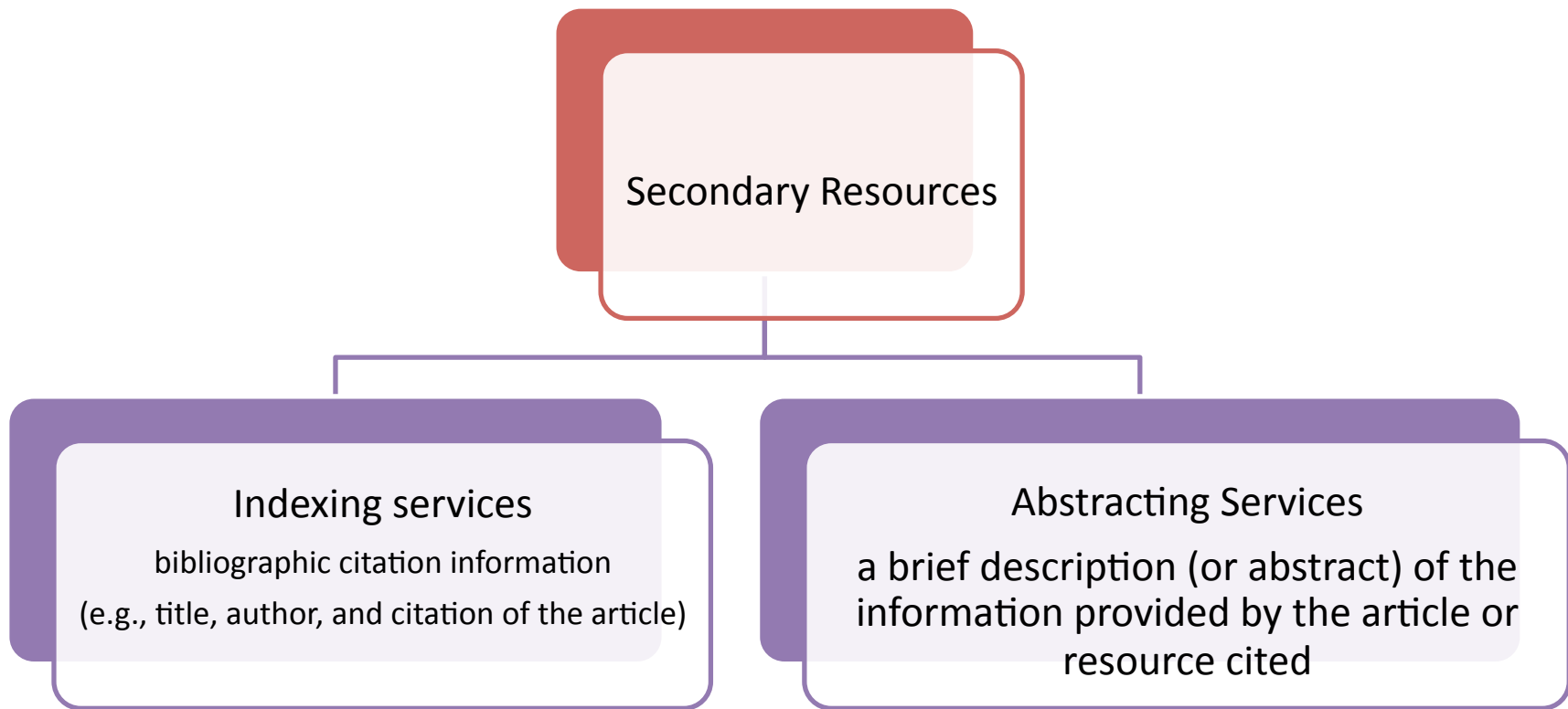
Learning objectives

- **Define** the secondary drug information resources ,types , advantages and disadvantages of each type.
- **Describe and Differentiate** between different examples of secondary drug information resources .
- **Learn** the search strategy in secondary drug information resources.

Secondary Information Resources

- The main purpose is to provide summaries of primary literature articles in addition to the citation for that article.
- generally include **indexing** and/or **abstracting** services.

Types Secondary Information Resources



Secondary Information format

	Print (paper)	Electronic
Advantages	<ol style="list-style-type: none">1. cheaper than electronic database.	<ol style="list-style-type: none">1. Fast retrieval.2. Frequently updated.
Disadvantages	<ol style="list-style-type: none">1. Require more time than electronic.2. Can be searched by only one user at a time.	<ol style="list-style-type: none">1. Require knowledge of search strategy2. Different systems use different indexing terms.3. Costly except for <u>PubMed</u>.

Examples of secondary resources

- MEDLINE[®] \ PUBMED
- Iowa drug information system (IDIS)
- International pharmaceutical abstracts (IPA).
- EMBASE.
- CINHALL.
- Reactions weekly.
- Google scholar.

MEDLINE[®]

- The most popular, expansive and universally accepted secondary resource.
- MEDLINE is available through the National Library of Medicine (NLM) website
<http://www.nlm.nih.gov>.

MEDLINE[®]

- Coverage includes basic and clinical sciences as well as nursing, dentistry, veterinary medicine, and many other health care disciplines.
- Information comes from more than 3900 journals in 40 different languages.
- This database is available through a variety of services including PubMed.

MEDLINE®

NCBI

Resources

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National Center for
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diabetes

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Resource List (A-Z)

All Resources

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Data & Software

DNA & RNA

Domains & Structures

Genes & Expression

Genetics & Medicine

Genomes & Maps

Homology

Literature

Proteins

Sequence Analysis

Taxonomy

Training & Tutorials

Variation

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Genomic Structural Variation

dbVar archives large scale genomic variation data and associates defined variants with phenotypic information.

1

2

3


4

5

6

7

8



Popular Resources

[PubMed](#)

[Bookshelf](#)

[PubMed Central](#)

[PubMed Health](#)

[BLAST](#)

[Nucleotide](#)

[Genome](#)

[SNP](#)

[Gene](#)

[Protein](#)

[PubChem](#)

NCBI Announcements

BLAST+ v.2.2.26 is now available

08 Mar 2012

The new BLAST+ release contains a number of important changes and improvements, including the addition of

NIH/NCBI launches the Genetic Testing Registry (GTR)

29 Feb 2012

The GTR is a new resource for finding information about genetic tests and test

NCBI Discovery Workshop: A Practical Hands-On Course

24 Jan 2012

February 04-09, 2012 @ the NIH, Camp



Search across databases

diabetes

GO

Clear

Help

- Result counts displayed in gray indicate one or more terms not found

399312



PubMed: biomedical literature citations and abstracts



14685



Books: online books



163674



PubMed Central: free, full text journal articles



827



OMIM: online Mendelian Inheritance in Man



8



Site Search: NCBI web and FTP sites



123050



Nucleotide: Core subset of nucleotide sequence records



99634



dbGaP: genotype and phenotype



30568



EST: Expressed Sequence Tag records



27



UniGene: gene-oriented clusters of transcript sequences



696



GSS: Genome Survey Sequence records



56



CDD: conserved protein domain database



22753



Protein: sequence database



180233



Clone: integrated data for clone resources



12



Genome: whole genome sequences



269



UniSTS: markers and mapping data



810



Structure: three-dimensional macromolecular structures



33



PopSet: population study data sets



none



Taxonomy: organisms in GenBank



919135



GEO Profiles: expression and molecular abundance profiles



797



SNP: short genetic variations



3925



GEO DataSets: experimental sets of GEO data



182



dbVar: Genomic structural variation



51



Epigenomics: Epigenetic maps and data sets



3266



Gene: gene-centered information



10352



PubChem BioAssay: bioactivity screens of chemical substances



PubMed

- Provides **free access** to MEDLINE, NLM's database of citations and abstracts in the fields of medicine, nursing, dentistry, veterinary medicine, health care systems, and preclinical sciences.
- Links to full-text articles found in **PubMed Central** or at publisher web sites, and other related resources.

PubMed

- Provides Advanced search and Clinical Queries search filters
- the ability to save records, and filters for search results using "My NCBI".

<http://www.ncbi.nlm.nih.gov/sites/myncbi/>

- Includes a spell checker.

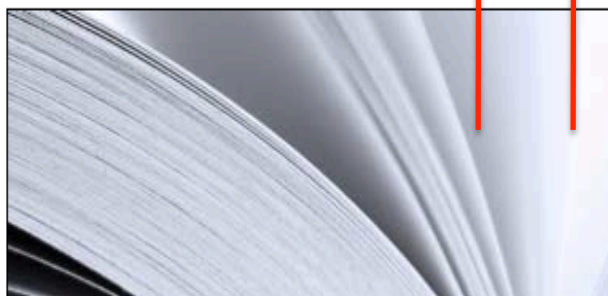
PubMed ▾

[Limits](#) [Advanced](#)

Use up and down arrows to choose an item from the autocomplete.

Search

[Help](#)



PubMed

PubMed comprises more than 21 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.

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NCBI INFORMATION

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Iowa Drug Information Service

- The IDIS database consists of full-text articles and an index of article citations selected **from 200 peer-reviewed English language journals.**
- The database is sold on a subscription basis. Full-text articles are available on CD-ROM and the web.



Iowa Drug Information Service

- IDIS index articles that pertain **to drug use in humans**, identifying the main drugs and diseases.
- Descriptors, such as type of article, routes of administration, side effects and pharmacokinetics, are used to help specify information contained in each article, facilitating easy retrieval of relevant articles



Iowa Drug Information Service

- IDIS is extremely beneficial to those practice sites without regular access to a health science library .
- However, because a lag time is involved in the indexing and selection of articles to be included in IDIS, it may not be as current as some of the other secondary resources available ,which may limit its utility.

History Clear Search



US National Library of Medicine
National Institutes of Health

v\



Iowa Drug Information Service

International pharmaceutical abstracts (IPA)

- American Society of Health-System Pharmacists (<http://www.ashp.org>).
- Coverage includes drug-related information, including drug use and development.
- The main focus of this database is pharmacy information, including pharmacy administration and clinical services, making it the **most comprehensive database for pharmacy-specific information.**

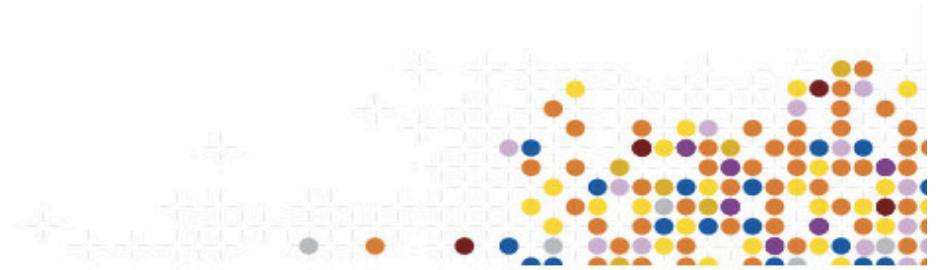
SUBJECT COVERAGE

- Adverse Drug Reactions.
- Bio-pharmaceutics.
- Drug Analysis.
- Drug Evaluations.
- Drug Interactions.
- Drug Metabolism.
- Drug Stability.
- Institutional Pharmacy Practice
- Investigational Drugs
- pharmacy Laws and Regulations
- Methodology and Drug Testing
- Pharmaceutical Chemistry.
- Pharmaceutical Technology.
- Pharmaceutics.
- Pharmacoeconomics.
- Pharmacognosy.
- Pharmacy Practice.
- Pharmacology.
- Toxicology.

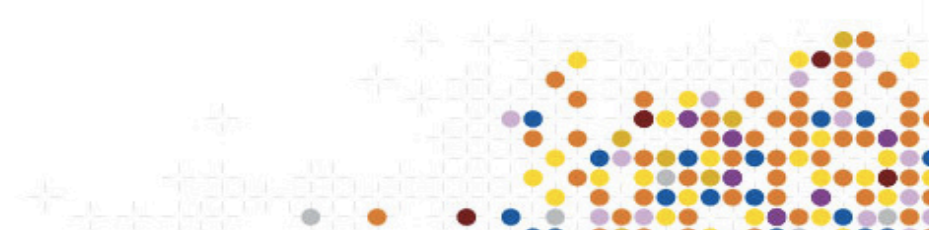
IPA

SAMPLE RECORD

	DIALOG(R) File 74: Int. Pharm. Abs (c) 2004 The Thomson Corporation. All rts. reserv.
AA= /TI	00076774 20-00205 STUDY ON THE DISSOLUTION AND BIOAVAILABILITY OF DIRECTLY COMPRESSED SALICYLAMIDE TABLETS
AU= CS= JN=,PY= CD=,SN=,LA=,SL= RT=	Sakr, A. M.; Aboutaleb, A. E.; Kassem, A. A.; Khidr, S. H. Dept. of Industrial Pharm., Assiut Univ., Assiut, Egypt Pharmazeutische Industrie (Germany), V42, (4), p412-415, 1980 CODEN: PHINAN ISSN: 0031-711X LANGUAGE: English SUMMARY LANGUAGE: German RECORD TYPE: Abstract
/AB	Salicylamide (I) tablet formulations directly compressed with microcrystalline cellulose (Avicel PH-101) or starch STA-Rx-1500) were evaluated with regard to their dissolution behavior and their availability in 6 subjects. It was shown that the type and concentration of the excipients can affect the disintegration time, dissolution rate, and availability. The absorption of total I was dissolution rate limited. It was possible to correlate the initial absorption and dissolution rates of the different formulations with their availability. Microcrystalline cellulose, at a concentration of 43%, proved to be the best tableting excipient. (17 references)
RN=,/NA, NA= /TN,TN= /DE	CAS REGISTRY NUMBERS: 65-45-2 (Salicylamide); 9005-25-8 (Starch); 9004-34-6 (Cellulose microcrystalline) CHEMICAL/BRAND NAMES: Avicel PH-101 ; STA-Rx-1500 DESCRIPTORS: Concentration -- cellulose microcrystalline, compression, direct, salicylamide tablets, effects, properties; Concentration -- starch, compression, direct, salicylamide tablets, effects, properties; Excipients -- cellulose microcrystalline, compression, direct, salicylamide, availability, humans; Excipients -- starch, compression, direct, salicylamide, availability, humans; Analgesics and antipyretics -- salicylamide, compression, direct, excipients, dissolution, availability, humans; Absorption -- salicylamide, tablets, direct compressed, relation, dissolution rates, humans; Dissolution rates -- salicylamide, tablets, direct compressed, relation, availability, humans; Disintegration -- salicylamide, tablets, direct compressed, relation, availability, humans; Drugs, availability -- salicylamide, tablets, direct compressed, relation, dissolution rates, humans
/SH,SH=,/PR /TC,TC=,AH=	SECTION HEADINGS: Biopharmaceutics (08); Pharmaceuticals (09) THERAPEUTIC CLASS: 28.08 (Analgesics and antipyretics)



- Elsevier, www.embase.com .
- EMBASE is a comprehensive abstracting service covering biomedical literature world wide.
- This database covers material similar to MEDLINE ,but with greater coverage of international (foreign) publications.
- EMBASE is useful when seeking information about dietary supplements or medications that may be available in **other countries**.



Welcome to Embase!

RECORD LIMITS

Clear

Search



Evidence Based Medicine: ?

Do Not Limit
Cochrane Review
Controlled Clinical Trial
Meta Analysis
Randomized Controlled Trial
Systematic Review

Publication Types: ?

Do Not Limit
Article
Conference Paper
Editorial
Erratum
Letter

Hold down the Shift, Ctrl, or "Apple" key to select multiple items.

Areas of Focus: ?

Do Not Limit
Anatomy and Development
Biochemistry
Cancer
Dermatology and Venereology
Genetics

Article Languages: ?

Do Not Limit
Afrikaans
Albanian
Arabic
Armenian
Azerbaijani

HUMAN LIMITS

Gender: ?

Do Not Limit
Male
Female

Age Groups: ?

Do Not Limit
Embryo: first trimester
Fetus: second/third trimester
Newborn: up to 1 month
Infant: 1 to 12 months
Preschool Child: 1 to 6 years

ANIMAL LIMITS

Animal Study Types: ?

Do Not Limit
Animal Cell
Animal Experiment
Animal Model
Animal Tissue

Clear

Search



Hide Limits ▲

CINHAL

- CINAHL Information Systems
(<http://www.cinahl.com>).
- This is an indexing service that covers primarily literature in the fields of nursing and allied health.
- This database is useful when seeking information about patient care from the perspective of allied health professionals.
- It is updated monthly

Reactions weekly

- Adis International (<http://www.adis.com>).
- A weekly indexing/abstracting service summarizing literature involving adverse events, drug interactions, drug dependence, and toxicology data.
- This resource is especially useful when seeking case reports of adverse reactions or other information on drug safety.

Google Scholar

- Google (<http://scholar.google.com>).
- An Internet search engine that is designed to target scholarly materials available online, in a variety of professional areas including health care.
- Information from a variety of scholarly journals and publications is able to be searched; however, in some cases the **searcher may not be able to access full-text versions** of articles or works due to password restrictions.

Scholar

Articles and patents ▾

anytime ▾

include citations ▾

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Results 1 - 10 of about 1,950,000. (0.10 sec)

[Office guide to diagnosis and classification of **diabetes** mellitus and other categories of glucose intolerance](#)[\[HTML\] from diabetesjournals.org](#)GD Mellitus, ED Care... - **Diabetes** care, 1990 - Am **Diabetes** Assoc

... Position Statements. Office Guide to Diagnosis and Classification of **Diabetes** Mellitus and Other Categories of Glucose Intolerance. **Diabetes** Care April 1992 15:3-4; doi:10.2337/diacare.15.2.3. Full Text (PDF). Gestational **Diabetes** Mellitus. ...

[Cited by 5072](#) - [Related articles](#) - [All 136 versions](#)[\[PDF\] **CanadianD**](#)[\[PDF\] from diabetes.ca](#)C **DIABETES** - J Med, 1993 - dev.diabetes.ca

Clinical hypoglycemia is defined as a state in which a patient with **diabetes** has a low plasma glucose (PG) level, experiences autonomic symptoms (trembling, palpitations, sweating, anxiety) and/or neuroglycopenic symptoms (difficulty concentrating, confusion, ...

[Cited by 11642](#) - [Related articles](#) - [View as HTML](#) - [All 14 versions](#)[Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 **diabetes**: UKPDS 38](#)

UKPDS Group - BMJ: British Medical Journal, 1998 - JSTOR

Objective: To determine whether tight control of blood pressure prevents macrovascular and microvascular complications in patients with type 2 **diabetes**. Design: Randomised controlled trial comparing tight control of blood pressure aiming at a blood pressure of < ...

[Cited by 4805](#) - [Related articles](#) - [All 5 versions](#)[Role of oxidative stress in development of complications in **diabetes**.](#)JW Baynes - **Diabetes**, 1991 - Am **Diabetes** Assoc

Abstract N epsilon-(carboxymethyl) lysine, N epsilon-(carboxymethyl) hydroxylysine, and the fluorescent cross-link pentosidine are formed by sequential glycation and oxidation reactions between reducing sugars and proteins. These compounds, termed glycoxidation ...

[Cited by 2528](#) - [Related articles](#) - [All 10 versions](#)[\[CITATION\] Classification and diagnosis of **diabetes** mellitus and other categories of glucose intolerance](#)National **Diabetes** Data Group - **Diabetes**, 1979[Cited by 4023](#) - [Related articles](#)

How to search in secondary
resource ?

Identify your keywords

- **Disease state**

diabetes, hypertension and depression.

- **Population**

pediatrics, neonates, adults and (geriatrics OR elderly).

- **Drugs**

Metformin, (Aspirin OR ASA) and Bisoprolol.

challenges in searching secondary database systems

- Systems do not index all terms the same, and so it is necessary to determine what terms a database is using in order to conduct a successful search.
- Therefore, Mesh database (Pubmed) and thesaurus (IDIS) are useful in indexing your keywords.

Indexing keywords in PubMed

(Mesh database)

NCBI Resources ▾ How To ▾

MeSH

[Save search](#) [Limits](#) [Advanced](#)

[Display Settings:](#) ☒ Summary, 20 per page [Send to:](#) ☐

Results: 9

- ☐ [Hemorrhage](#)
1. **Bleeding** or escape of blood from a vessel.
- ☐ [Bleeding Time](#)
2. Duration of blood flow after skin puncture. This test is used as a measure of capillary and platelet function.
Year introduced: 1991(1980)
- ☐ [Vitamin K Deficiency Bleeding](#)
3. **Hemorrhage** caused by vitamin K deficiency.
- ☐ [Metrorrhagia](#)
4. Abnormal uterine **bleeding** that is not related to MENSTRUATION, usually in females without regular MENSTRUAL CYCLE. The irregular and unpredictable **bleeding** usually comes from a dysfunctional ENDOMETRIUM.
Year introduced: 1963
- ☐ [Uterine Hemorrhage](#)
5. **Bleeding** from blood vessels in the UTERUS, sometimes manifested as vaginal **bleeding**.
- ☐ [LEFTY2 protein, human \[Supplementary Concept\]](#)

Indexing keywords in IDIS

- Thesaurus is the “dictionary” of controlled vocabulary terms.

Iowa Drug Information Service

File View Edit Tools Help

Global Drug Disease Descriptor Title Author Abstract Journal Volume Issue Page Year From: To: Article No. Seq. No.

And Word And Word Phrase And Word Phrase And Word Look Up And Word Phrase And Word Look Up And Word And Word And Word

History Clear Search

Main Search Thesaurus Journal Drug Hierarchy Disease Hierarchy Descriptors Index Notes

For Help: press F1

Record 2 of 204

Boolean operators

AND

will combine two terms, returning only citations containing both of those concepts or terms.

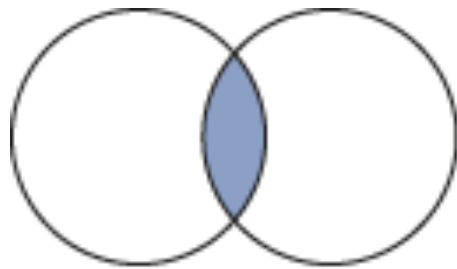
OR

will result in an equal or greater number of returns since it will include any citation where either term is used. Useful in searching a term with its synonyms and acronyms.

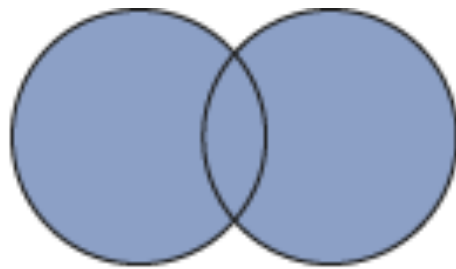
NOT

retrieve records that do not contain the term following it. the operator NOT would be helpful if you want to exclude certain topics.

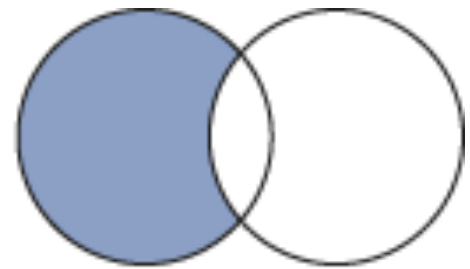
Boolean operators



AND



OR



NOT

Using AND

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

PubMed diabetes AND pregnancy Search

RSS Save search Limits Advanced Help

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

Send to: ▾ Filter your results:

Results: 1 to 20 of 20797

<< First < Prev Page 1 of 1040 Next > Last >>

☐ [Genotoxicity Evaluation in Severe or Mild Diabetic Pregnancy in Laboratory Animals.](#)

1. Lima PH, Sinzato YK, Gelaleti RB, Calderon IM, Rudge MV, Damasceno DC.
Exp Clin Endocrinol **Diabetes**. 2012 Mar 15. [Epub ahead of print]
PMID: 22421985 [PubMed - as supplied by publisher]
[Related citations](#)

☐ [Maternal and Fetal IGF-I and IGF-II Levels, Fetal Growth, and Gestational Diabetes.](#)

2. Luo ZC, Nuyt AM, Delvin E, Audibert F, Girard I, Shatenstein B, Cloutier A, Cousineau J, Djemli A, Deal C, Levy E, Wu Y, Julien P, Fraser WD.
J Clin Endocrinol Metab. 2012 Mar 14. [Epub ahead of print]
PMID: 22419731 [PubMed - as supplied by publisher]
[Related citations](#)

[Manage Filters](#)

Titles with your search terms

The Hyperglycemia and Adverse **Pregnancy** Outcome (HAPO) s [Am J Obstet Gynecol. 2010]

International association of **diabetes** and **pregnancy** study groups r [Diabetes Care. 2010]

Physical activity before and during **pregnancy** and risk of gestational **diat** [Diabetes Care. 2011]

See more...

Using OR

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

PubMed diabetes OR pregnancy Search

RSS Save search Limits Advanced Help

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

Send to: ▾ Filter your results:

Results: 1 to 20 of 1093445

<< First < Prev Page 1 of 54673 Next > Last >>

All (1093445)
[Free Full Text \(174186\)](#)
[Review \(123750\)](#)
[Manage Filters](#)

☐ [Clinical profiles and long-term outcomes of patients with pancreatic ductal adenocarcinoma and diabetes mellitus.](#)

1. Ben Q, Xu M, Jiang Y, Yuan Y, Wang K, Fang J, Li Z.
Diabetes Metab Res Rev. 2012 Feb;28(2):169-76.
PMID: 22423386 [PubMed - in process]
[Related citations](#)

☐ [Erratum to "Characterization of the regulatory roles of the SUMO.](#)

2. Hwang KW, Won TJ, Kim H, Chun HJ, Chun T, Park Y.
Diabetes Metab Res Rev. 2012 Feb;28(2):196-202.
PMID: 22423385 [PubMed - in process]
[Related citations](#)

☐ [Imipramine treatment reverses depressive-like behavior in alloxan-diabetic rats.](#)

3. Ceretta I B, Réus GZ, Stringari RB, Ribeiro KF, Zannellini G, Aquilar RW, Pfaffenseller B, Lersch C, Kanczinski F, Quevedo J.

Titles with your search terms

Effects of combination lipid therapy in type 2 **diabetes mellitus.** [N Engl J Med. 2010]

Effects of intensive blood-pressure control in type 2 **diabetes mellitus.** [N Engl J Med. 2010]

Newer agents for blood glucose control in type 2 **diabetes: system** [Health Technol Assess. 2010]

See more...

Using NOT

NCBI Resources ▾ How To ▾ My NCBI Sign In

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US National Library of Medicine
National Institutes of Health

PubMed diabetes NOT pregnancy Search

RSS Save search Limits Advanced Help

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

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Results: 1 to 20 of 378978

<< First < Prev Page 1 of 18949 Next > Last >>

All (378978)
[Free Full Text \(76192\)](#)
[Review \(54211\)](#)
[Manage Filters](#)

☐ [Clinical profiles and long-term outcomes of patients with pancreatic ductal adenocarcinoma and diabetes mellitus.](#)

1. Ben Q, Xu M, Jiang Y, Yuan Y, Wang K, Fang J, Li Z.
Diabetes Metab Res Rev. 2012 Feb;28(2):169-76.
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[Related citations](#)

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Effects of intensive blood-pressure control in type 2 **diabetes** mellitus. [N Engl J Med. 2010]

Newer agents for blood glucose control in type 2 **diabetes**: system [Health Technol Assess. 2010]

Limits

- Some databases allow searches to be limited. There are a variety of factors that can be used to limit a search:
 - including language of publication
 - year of publication
 - type of article (e.g., human study, review, and case report)
 - type of journal where publication is found.
- This is most helpful when the initial search terms return a large number of possible matches.

Before Limits

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

PubMed ▾ diabetes AND pregnancy Search

RSS Save search Limits Advanced

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

Send to: ▾ Filter your results:

Results: 1 to 20 of 20797

<< First < Prev Page 1 of 1040 Next > Last >>

All (20797)
Free Full Text (3030)
Review (3524)
Manage Filters

☐ [Genotoxicity Evaluation in Severe or Mild Diabetic Pregnancy in Laboratory Animals.](#)

1. Lima PH, Sinzato YK, Gelaleti RB, Calderon IM, Rudge MV, Damasceno DC.
Exp Clin Endocrinol Diabetes. 2012 Mar 15. [Epub ahead of print]
PMID: 22421985 [PubMed - as supplied by publisher]
[Related citations](#)

☐ [Maternal and Fetal IGF-I and IGF-II Levels, Fetal Growth, and Gestational Diabetes.](#)

2. Luo ZC, Nuyt AM, Delvin E, Audibert F, Girard I, Shatenstein B, Cloutier A, Cousineau J, Djemli A, Deal C, Levy E, Wu Y, Julien P, Fraser WD.
J Clin Endocrinol Metab. 2012 Mar 14. [Epub ahead of print]
PMID: 22419731 [PubMed - as supplied by publisher]
[Related citations](#)

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International association of diabetes and pregnancy study groups r [Diabetes Care. 2010]
Physical activity before and during pregnancy and risk of gestational dial [Diabetes Care. 2011]
See more...

Limits

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

PubMed ▾ diabetes AND pregnancy × **Search**

[Advanced](#) [Help](#)

Limits

Dates

Published in the Last ▾

- Any date
- 30 days
- 60 days
- 90 days
- 180 days
- 1 year
- 2 years
- 3 years**
- 5 years
- 10 years
- Specify date range

Type of Article

- ☐ Clinical Trial
- ☐ Editorial
- ☐ Letter
- ☐ Meta-Analysis
- ☐ Practice Guideline

Species

- ☒ Humans
- ☐ Animals

Subsets

- ☐ AIDS
- ☐ Bioethics
- ☐ Cancer
- ☐ Complementary Medicine
- ☐ Core clinical journals

Text Options

- ☐ Links to full text
- ☐ Links to free full text
- ☐ Abstracts

Languages

- ☒ English
- ☐ French
- ☐ German
- ☐ Italian
- ☐ Japanese

Sex

- ☐ Male
- ☐ Female

Ages

- ☐ All Infant: birth-23 months
- ☐ All Child: 0-18 years
- ☒ All Adult: 19+ years
- ☐ Newborn: birth-1 month
- ☐ Infant: 1-23 months

Search Field Tags

Field:

After limits

NCBI Resources How To My NCBI Sign In

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

PubMed diabetes AND pregnancy Search

RSS Save search Limits Advanced Help

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

Send to: Filter your results:

Limits Activated: Humans, English, All Adult: 19+ years Change Remove

Results: 1 to 20 of 7154

<< First < Prev Page 1 of 358 Next > Last >>

Manage Filters

Number of articles reduced by 13,000 after limits

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Physical activity before and during pregnancy and risk of gestational diabetes mellitus: a meta-analysis.

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Abstract

OBJECTIVE: Gestational diabetes mellitus (GDM) is one of the most common complications of pregnancy and is associated with a substantially elevated risk of adverse health outcomes for both mothers and offspring. Physical activity may contribute to the prevention of GDM and thus is crucial for dissecting the vicious circle involving GDM, childhood obesity, and adulthood obesity, and diabetes. Therefore, we aimed to systematically review and synthesize the current evidence on the relation between physical activity and the development of GDM.

RESEARCH DESIGN AND METHODS: Medline, EMBASE, and Cochrane Reviews were searched from inception to 31 March 2010. Studies assessing the relationship between physical activity and subsequent development of GDM were included. Characteristics including study design, country, GDM diagnostic criteria, ascertainment of physical activity, timing of exposure (prepregnancy or early pregnancy), adjusted relative risks, CIs, and statistical methods were extracted independently by two reviewers.

RESULTS: Our search identified seven prepregnancy and five early pregnancy studies, including five prospective cohorts, two retrospective case-control studies, and two cross-sectional study designs. Prepregnancy physical activity was assessed in 34,929 total participants, which included 2,813 cases of GDM, giving a pooled odds ratio (OR) of 0.45 (95% CI 0.28-0.75) when the highest versus lowest categories were compared. Exercise in early pregnancy was assessed in 4,401 total participants, which included 361 cases of GDM, and was also significantly protective (0.76 [95% CI 0.70-0.83]).

CONCLUSIONS: Higher levels of physical activity before pregnancy or in early pregnancy are associated with a significantly lower risk of developing GDM.

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Physical Activity Before and During Pregnancy and Risk of Gestational Diabetes Mellitus

A meta-analysis

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META-ANALYSIS

Physical Activity Before and During Pregnancy and Risk of Gestational Diabetes Mellitus

A meta-analysis

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OBJECTIVE — Gestational diabetes mellitus (GDM) is one of the most common complications of pregnancy and is associated with a substantially elevated risk of adverse health outcomes for both mothers and offspring. Physical activity may contribute to the prevention of GDM and thus is crucial for dissecting the vicious circle involving GDM, childhood obesity, and adulthood obesity, and diabetes. Therefore, we aimed to systematically review and synthesize the current evidence on the relation between physical activity and the development of GDM.

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CONCLUSIONS — Higher levels of physical activity before pregnancy or in early pregnancy are associated with a significantly lower risk of developing GDM.

Diabetes Care 34:223–229, 2011

Gestational diabetes mellitus (GDM) is one of the most common complications of pregnancy, affecting ~7% of all pregnancies in the U.S. (i.e., >200,000 cases annually) (1), and this number is increasing as the prevalence of obesity among women at reproductive

age escalates (2–4). GDM is associated with a significantly elevated risk for short-term and long-term complications for both mothers and offspring. Women with GDM have an increased risk for perinatal morbidity and impaired glucose tolerance and type 2 diabetes in the years after preg-

nancy (5,6). Children of women with GDM are more likely to be obese and have impaired glucose tolerance and diabetes in childhood and early adulthood (1). In a recent meta-analysis of randomized trials on the effect of treatment for GDM, various interventions for blood glucose control, including diet, glucose monitoring, insulin use, and pharmaceutical interventions, did not significantly reduce the risk for adverse perinatal and neonatal end points, including cesarean section and perinatal or neonatal death (7). Collectively, these data indicate that prevention of GDM altogether could be crucial for avoiding its associated adverse health outcomes.

Physical activity has long been known for its role in improving glucose homeostasis through its direct or indirect impact on insulin sensitivity via several mechanisms. For instance, physical activity has independent effects on glucose disposal by increasing both insulin-mediated and non-insulin-mediated glucose disposal (8,9). Physical activity can also exert long-term effects on improvement in insulin sensitivity through increased fat-free mass (10). Furthermore, the benefits of preventing or delaying the onset of type 2 diabetes among non-pregnant individuals have been reported repeatedly (11,12). Therefore, physical activity may have the potential for preventing GDM and related adverse health outcomes. However, evidence for its impact on GDM has not been systematically synthesized. The aim of this systematic review and meta-analysis was to assemble the current evidence for the relationship between physical activity and the development of GDM.

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