

REPOZYTORIA ZASOBÓW MEDYCZNYCH, ICH INDEKSOWANIE I PRZESZUKIWANIE

Informatyka w Medycynie, 2017-2018

WPROWADZENIE

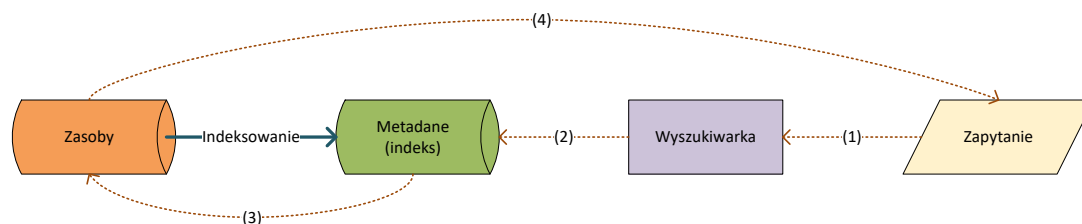
Wydobywanie informacji

Wydobywanie informacji (ang. *information retrieval, IR*) to dziedzina zajmująca się pozyskiwaniem (gromadzeniem), organizacją i wyszukiwaniem informacji bazującej na wiedzy

- Rodzaje informacji

- informacje związane z pacjentem (*patient specific*) – związane z procesem opieki nad danym pacjentem, przechowywane w systemach EPR/EHR
- informacje bazująca na wiedzy (*knowledge-based*) – wyniki i wnioski z eksperymentów i obserwacji, dostępne w książkach, czasopismach, ...
- „Tradycyjne” IR ograniczone do repozytoriów z publikacjami, obecnie rozszerzone na inne formaty (np. multimedia, ...)

Proces wydobywania informacji



- Indeksowanie – tworzenie metadanych związanych z (poszczególnymi) zasobami
- Wydobywanie – wyszukiwanie na podstawie metadanych zasobów odpowiadających zapytaniu użytkownika

Trochę historii...

- 1878 – Index Medicus
 - indeks artykułów medycznych
 - metadane: tytuł, autorzy, słowa kluczowe (*subject headings*)
- 1966 – MEDLARS (Medical Literature Analysis and Retrieval System), NLM
 - komputerowa wersja Index Medicus
 - metadane: podobne jak w wersji papierowej (ograniczenia techniczne)
 - wykorzystanie MeSH jako formalnego zestawu słów kluczowych
 - realizacja zapytań przesyłanych tradycyjną pocztą
- lata 90-te – udostępnienie przez WWW baz bibliograficznych prowadzonych przez NLM (→ MEDLINE/PubMed)

INFORMACJA BAZUJĄCA NA WIEDZY I EBM

Informacje bazująca na wiedzy

- Informacja podstawowa (ang. *primary*)
 - nowo odkryta wiedza kliniczna (wraz z powiązаныmi danymi)
 - oryginalne wyniki badań publikowane w literaturze (książki, czasopisma, raporty, ...)
- Informacja wtórna (ang. *secondary*)
 - przegląd, podsumowanie lub synteza literatury podstawowej
 - publikowana w różnych formach – artykuły przeglądowe, przeglądy systematyczne (ang. *systematic reviews*), wytyczne i algorytmy kliniczne
 - najczęściej stosowana w praktyce przez lekarzy (→ „bryk” do szybkiego przejrzania i/lub wykorzystania „przy pacjencie”)

Potrzeby informacyjne

- Różni użytkownicy i różne potrzeby dotyczące informacji → najwięcej badań dotyczących lekarzy
- Stany potrzeby informacyjnej
 1. nierozpoznana – „nie wiem, że czegoś nie wiem”
 2. rozpoznana – „wiem, że czegoś nie wiem”
 - ➔ 3. realizowana – „szukam informacji (nie wiem, czy znajdę)”
 4. wypełniona – „znalazłem potrzebną informację”

Nierozpoznane potrzeby informacyjne są podstawową przyczyną tego, że w praktyce oferowana opieka często nie odpowiada najnowszym zaleceniom czy wytycznym!

Potrzeby informacyjne w praktyce

- Średnio 3 pytania na 4 pacjentów (opieka podstawowa)
 - jaki lek podać? co powoduje dany symptom? jaki test wykonać?
- Poszukiwanie odpowiedzi w 12-36% przypadków
 - brak jawnego sformułowania pytania
 - odstąpienie od poszukiwania (→ zbyt duża czasochłonność, akceptowalny czas to ok. 2 min.)
 - podstawowe źródło informacji – współpracownicy lub podręczniki
- Integracja mechanizmów IR z systemami typu EMR/EHR w celu automatyzacji procesu wyszukiwania informacji

Timpka T, Arborelius E. The GP's dilemmas: a study of knowledge need and use during health care consultations. *Methods Inf Med.* 1990; 29(1):23-9.

Ely JW, Osheroff JA, Ebell MH, et al. Analysis of questions asked by family doctors regarding patient care. *BMJ* 1999;319:358-361.

Hersh WR, Crabtree MK, Hickam DH, et al. Factors associated with success in searching MEDLINE and applying evidence to answer clinical questions. *J Am Med Inform Assoc* 2002;9(3):283-93.

Evidence-based Medicine (EBM)

Rozumne, celowe, proste zastosowanie najnowszych i najbardziej rzetelnych danych naukowych w podejmowaniu decyzji dotyczących opieki zdrowotnej nad indywidualnym pacjentem.

- Połączenie doświadczenia lekarza z najbardziej aktualną informacją bazującą na wiedzy
 - doświadczenie pozwala na uwzględnienie specyfiki pacjenta
 - informacja pozwala na weryfikację i aktualizację doświadczenia
- Modelowy schemat postępowania
 1. Sformułowanie pytania klinicznego (na które można odpowiedzieć)
 2. Identyfikacja dowodów (informacji) zawierających odpowiedź na postawione pytanie
 3. Krytyczna ocena znalezionych dowodów – czy można je zastosować do konkretnego pacjenta?

Zapytania w EBM

- Klasy zapytań klinicznych

1. ogólne (ang. *background*) – dotyczą natury problemu (niezależne od pacjenta), odpowiedzi w podręcznikach
2. szczegółowe (ang. *foreground*) – dotyczą postępowania z pacjentem ze specyficznym problemem, typowe dla EBM

- Rodzaje zapytań szczegółowych

1. terapeutyczne – jaką terapię zastosować
2. diagnostyczne – jaki test diagnostyczny wybrać
3. prognostyczne – jak może się rozwijać stwierdzony problem
4. dotyczące szkodliwego wpływu (ang. *harm*) – jakie są efekty zastosowania danej terapii czy też ekspozycji na jakiś czynnik

Różne sposoby oceny “dowodów”
(→ preferowane RCT)

Najbardziej wartościowe dowody uzyskiwane na podstawie wyników randomizowanych badań klinicznych
(*randomized controlled trial, RCT*) → nie zawsze dostępne (np. ze względów etycznych)

REPOZYTORIA INFORMACJI BAZUJĄCEJ NA WIEDZY

Rodzaje repozytoriów

1. Bazy bibliograficzne

- podstawowa informacja o publikacjach, bez ich treści
- przykłady: MEDLINE/PubMed (NLM), EMBASE („europejski MEDLINE”), National Guidelines Clearinghouse (NGC) z wytycznymi klinicznymi

2. Bazy pełnotekstowe

- pełna treść publikacji, często odnośniki z baz bibliograficznych (np. PubMed → strona wydawcy)
- zazwyczaj utrzymywane przez wydawców komercyjnych, PubMed Central dla publikacji powstałych w ramach grantów NIH

Rodzaje repozytoriów

3. Bazy adnotowane (ang. *annotated*)

- zasoby przechowywana w specjalizowanych bazach danych (obrazowych, biologicznych, cytowań, dowodów EBM, ...)
- przykłady: Visible Human Project, PEIR, The Cochrane Library (Database of Systematic Reviews)

4. Bazy agregujące treści

- agregacja treści pochodzących z innych typów repozytoriów (kopie treści lub odnośniki do repozytoriów źródłowych)
- przykłady: MedlinePlus, Merck Manual

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New articles from highly accessed journals

Blood (2)

Cochrane Database Syst Rev (3)

J Biol Chem (16)

J Clin Oncol (2)

JAMA (29)

Methods Mol Biol (27)

N Engl J Med (18)

Nature (9)

PLoS One (86)

Proc Natl Acad Sci U S A (10)

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High-dimensional sin PD-1 immunotherapy Nat Med. 2018.

Antibodies to watch i MAbs. 2018.

A major chromatin re cells to T cell-mediati Science. 2018.

Tumor-Specific T-Cell Evasion Induce Clinic Hodgkin Lymphoma. J Clin Oncol. 2018.

See more

Format: Abstract

J Biomed Inform. 2013 Apr;46(2):341-53. doi: 10.1016/j.jbi.2013.01.002. Epub 2013 Jan 30.

Mitigation of adverse interactions in pairs of clinical practice guidelines using constraint logic programming.

Wilks S, Michalowski W, Michalowski M, Farion K, Hing MM, Mohapatra S.

Author information

Abstract

We propose a new method to mitigate (identify and address) adverse interactions (drug-drug or drug-disease) that occur when a patient with comorbid diseases is managed according to two concurrently applied clinical practice guidelines (CPGs). A lack of methods to facilitate the concurrent application of CPGs severely limits their use in clinical practice and the development of such methods is one of the grand challenges for clinical decision support. The proposed method responds to this challenge. We introduce and formally define logical models of CPGs and other related concepts, and develop the mitigation algorithm that operates on these concepts. In the algorithm we combine domain knowledge encoded as interaction and revision operators using the constraint logic programming (CLP) paradigm. The operators characterize adverse interactions and describe revisions to logical models required to address these interactions, while CLP allows us to efficiently solve the logical models - a solution represents a feasible therapy that may be safely applied to a patient. The mitigation algorithm accepts two CPGs and available (likely incomplete) patient information. It reports whether mitigation has been successful or not, and on success it gives a feasible therapy and points at identified interactions (if any) together with the revisions that address them. Thus, we consider the mitigation algorithm as an alerting tool to support a physician in the concurrent application of CPGs that can be implemented as a component of a clinical decision support system. We illustrate our method in the context of two clinical scenarios involving a patient with duodenal ulcer who experiences an episode of transient ischemic attack.

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PMID: 23376273 DOI: 10.1016/j.jbi.2013.01.002

[PubMed - indexed for MEDLINE] Free full text

Publication Types, MeSH Terms

Publication Types

Research Support, Non-U.S. Gov't

MeSH Terms

Acute Disease

Algorithms*

Chronic Disease

Comorbidity

Decision Support Systems, Clinical*

Drug Interactions

Drug-Related Side Effects and Adverse Reactions/prevention & control*

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Reconciling pairs of concurrently used clinical practice guideline [AMIA Annu Symp Proc. 2011]

First-order logic theory for manipulating clinical practice guideline [AMIA Annu Symp Proc. 2014]

Review Context, automated decision support, and clinical practice guic [Int J Med Inform. 2007]

Review Synthesis of recommendations for the assessment and management of [Spine J. 2010]

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Cited by 5 PubMed Central articles

Expanding a First-Order Logic Mitigation Framework to Hai [AMIA Annu Symp Proc. 2015]

Critical factors influencing physicians' intention to use comp [BMC Med Inform Decis Mak. 2016]

First-order logic theory for manipulating clinical practice guideline [AMIA Annu Symp Proc. 2014]

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PubMed Clinical Queries

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acute abdominal pain in children

Clinical Study Categories

Category:

Scope:

Results: 5 of 796

Two cases of Kawasaki disease presented with acute febrile jaundice.

Kaman A, Aydin-Teke T, Gayretli-Aydin ZG, Öz FN, Metin-Akcan Ö, Eriş D, Tanir G.
Turk J Pediatr. 2017; 59(1):84-86.

Randomized, Double-Blind, Placebo-Controlled Acute Comparator Trials of Lisdexamfetamine and Extended-Release Methylphenidate in Adolescents With Attention-Deficit/Hyperactivity Disorder.

Newcorn JH, Nagy P, Childress AC, Frick G, Yan B, Pliszka S.
CNS Drugs. 2017 Nov; 31(11):999-1014.

Diagnostic Accuracy of MRI Versus CT for the Evaluation of Acute Appendicitis in Children and Young Adults.

Kinner S, Pichhardt PJ, Riedesel EL, Gill KG, Robbins JB, Kitchin DR, Ziemlewicz TJ, Haringa JB, Reeder SB, Reppinger MD.
AJR Am J Roentgenol. 2017 Oct; 209(4):911-919. Epub 2017 Aug 10.

Asparaginase-associated pancreatitis in childhood acute lymphoblastic leukaemia: an observational Ponte di Legno Toxicity Working Group study.

Wolthers BO, Frandsen TL, Baruchel A, Attarbaschi A, Barzilai S, Colombini A, Escherich G, Grell K, Inaba H, Kovacs G, et al.
Lancet Oncol. 2017 Sep; 18(9):1238-1248. Epub 2017 Jul 20.

Observational study on the palatability and tolerability of oral prednisolone and oral dexamethasone in children in Saudi Arabia and the UK.

Aljebab F, Alanazi M, Choonara I, Conroy S.
Arch Dis Child. 2018 Jan; 103(1):63-68. Epub 2017 Jul 22.

[See all \(796\)](#)

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

Results: 5 of 57

Herbal Medicines for Gastrointestinal Disorders in Children and Adolescents: A Systematic Review.

Anheyer D, Frawley J, Koch AK, Lauche R, Langhorst J, Dobos G, Cramer H.
Pediatrics. 2017 Jun; 139(6). Epub 2017 May 4.

Epidemiology of Cryptosporidium in Pediatric Diarrheal Illnesses.

Dabas A, Shah D, Bhatnagar S, Lodha R.
Indian Pediatr. 2017 Apr 15; 54(4):299-309.

Diagnostic Accuracy of History, Physical Examination, Laboratory Tests, and Point-of-care Ultrasound for Pediatric Acute Appendicitis in the Emergency Department: A Systematic Review and Meta-analysis.

Benabbas R, Hanna M, Shah J, Sinert R.
Acad Emerg Med. 2017 May; 24(5):523-551.

Nonpharmacologic Treatment of Pain.

Agoston AM, Sieberg CB.
Semin Pediatr Neurol. 2016 Aug; 23(3):220-223. Epub 2016 Oct 20.

High Variability in the Reported Management of Hepatic Veno-Occlusive Disease in Children after Hematopoietic Stem Cell Transplantation.

Skeens MA, McArthur J, Cheifetz IM, Duncan C, Randolph AG, Stanek J, Lehman L, Bajwa R. HSCCT subgroup of the Pediatric Acute Lung Injury & Sepsis Investigators (PALISI).
Biol Blood Marrow Transplant. 2016 Oct; 22(10):1823-1828. Epub 2016 Aug 2.

[See all \(57\)](#)

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

Topic:

Results: 5 of 136

Fulminant Type 1 Diabetes in Children: A Multicenter Study in China.

Gu Y, Wang Y, Li P, Wei H, Chen L, Liu Q, Liu Y, Yang Q, Cheng X, He L, et al.
J Diabetes Res. 2017; 2017:6924637. Epub 2017 Sep 26.

Initial Pain Management in Pediatric Acute Pancreatitis: Opioid vs. Non-Opioid.

Grover AS, Mitchell PD, Manzi SF, Fox VL.
J Pediatr Gastroenterol Nutr. 2017 Oct 27; . Epub 2017 Oct 27.

A Rare Cause of Recurrent Acute Pancreatitis in a Child: Isovaleric Acidemia with Novel Mutation.

Sag E, Cebi AH, Kaya G, Karaguzel G, Cakir M.
Pediatr Gastroenterol Hepatol Nutr. 2017 Mar; 20(1):61-64. Epub 2017 Mar 27.

What's unique about acute pancreatitis in children: risk factors, diagnosis and management.

Husain SZ, Srinath AI.
Nat Rev Gastroenterol Hepatol. 2017 Jun; 14(6):366-372. Epub 2017 Mar 15.

Development of a quantitative real-time PCR assay for sapovirus in children under 5-years-old in Regina Margherita Hospital of Turin, Italy.

Bergallo M, Galliano I, Montanari P, Brusin MR, Finotti S, Paderi G, Gabliano C.
Can J Microbiol. 2017 Apr; 63(4):296-302. Epub 2016 Dec 2.

[See all \(136\)](#)

This column displays citations pertaining to topics in medical genetics. See more [filter information](#).

Wsparcie dla EBM

Browse by Clinical Specialty

NGC currently offers 1,520 guideline summaries. [View All Guideline Summaries](#)

By Clinical Specialty

By MeSH Tag

By Organization

The following concepts classify the clinical specialties that might use the guideline professionally. For more information on each topic, view the [Glossary](#):

Allergy and Immunology (50)	Neurological Surgery (104)	Podiatry (21)
Anesthesiology (56)	Neurology (228)	Preventive Medicine (267)
Cardiology (158)	Nuclear Medicine (93)	Psychiatry (107)
Chiropractic (21)	Nursing (243)	Psychology (111)
Colon and Rectal Surgery (36)	Nutrition (92)	Pulmonary Medicine (140)
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Dentistry (25)	Oncology (377)	Radiology (313)
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Family Practice (907)	Otolaryngology (48)	Sports Medicine (30)
Gastroenterology (148)	Pathology (89)	Surgery (263)
Geriatrics (191)	Pediatrics (367)	Thoracic Surgery (75)
Hematology (110)	Pharmacology (80)	Urology (95)
Infectious Diseases (150)	Physical Medicine and Rehabilitation (112)	
Internal Medicine (892)		
Medical Genetics (68)		

Head injury. Triage, assessment, investigation and early management of head injury in children, young people and adults.

Developer

Source

Status

Classification

National Clinical Guideline Centre. Head injury. Triage, assessment, investigation and early management of head injury in children, young people and adults. London (UK): National Institute for Health and Care Excellence (NICE); 2014 Jan. 63 p. (Clinical guideline; no. 176).

[View the original guideline documentation](#)

Sections Download Share Cite Save

Regulatory Alert

Recommendations

Major Recommendations

Pre-hospital Assessment, Advice and Referral to Hospital

Public health literature and other non-medical sources of advice (for example, St John Ambulance, police officers) should encourage people who have any concerns following a head injury to themselves or to another person, regardless of the injury severity, to seek immediate medical advice. [2003]

Telephone Advice Services

Telephone advice services (for example, National Health Service [NHS] 111, emergency department helplines) should refer patients who have sustained a head injury to the emergency ambulance services (that is, 999) for emergency transport to the emergency department if they have experienced any of the following:

- Unconsciousness or lack of full consciousness (for example, problems keeping eyes open)
- Any focal neurological deficit since the injury
- Any suspicion of a skull fracture or penetrating head injury
- Any seizure ('convulsion' or 'fit') since the injury
- A high-energy head injury
- The injured person or their carer is incapable of transporting the injured person safely to the hospital emergency department without the use of ambulance services (providing any other risk

PubMed Central

The screenshot displays the PubMed Central interface. At the top, there are navigation links for 'NCBI Resources' and 'How To', along with a 'Sign in to NCBI' button. The main header features the 'PMC' logo, 'US National Library of Medicine National Institutes of Health', and a search bar with 'PMC' entered. Below the header, the page is divided into several sections:

- Left Sidebar:** Contains 'Get Started' (with links for Overview, Guide, List, FAQs, and Notice) and 'Other Resources' (with links for International, Text Mining, Developer, LitArch, Citation Search, and Accessibility).
- Top Navigation:** Includes 'Journal List', 'Advanced', and 'Journal list'.
- Article Header:** Displays 'AMIA Annual Symposium Proceedings Archive' with the AMIA logo and tagline 'INFORMATICS PROFESSIONALS. LEADING THE WAY.' Below this, the article title 'Expanding a First-Order Logic Mitigation Framework to Handle Multimorbid Patient Preferences' is shown, along with authors 'Martin Michalowski, Ph.D.,¹ Szymon Wilk, Ph.D.,² Daniela Rosu, Ph.D.,³ Mounira Kezadri, Ph.D.,³ Wojtek Michalowski, Ph.D.,³ and Marc Carrier, MD⁴' and the PMID 'PMC4765594'.
- Abstract Section:** Includes an 'Abstract' heading and a 'Go to:' dropdown. The text describes the challenge of managing multimorbidity and the proposed logic-based framework for mitigating adverse interactions.
- Introduction Section:** Includes an 'Introduction' heading and a 'Go to:' dropdown. The text discusses the importance of mitigating adverse interactions between clinical practice guidelines (CPGs) for multimorbid patients.
- Right Sidebar:** Features 'Formats' (Article, PubReader, ePub, PDF, Citation), 'Share' (Facebook, Twitter, Google+), 'Save items' (Add to Favorites), 'Similar articles in PubMed' (listing related articles), and 'Links' (PubMed).

At the bottom of the page, a URL is provided: <https://www.ncbi.nlm.nih.gov/pmc/>

Visible Human Project

Home

The Visible Human Project®

Overview

The Visible Human Project® is an outgrowth of the NLM's 1986 Long-Range Plan. It is the creation of complete, anatomically detailed, three-dimensional representations of the normal male and female human bodies. Acquisition of transverse CT, MR and cryosection images of representative male and female cadavers has been completed. The male was sectioned at one millimeter intervals, the female at one-third of a millimeter intervals.

The long-term goal of the Visible Human Project® is to produce a system of knowledge structures that will transparently link visual knowledge forms to symbolic knowledge formats such as the names of body parts.

The National Library of Medicine thanks the men and the women who will their body to science, thereby enabling medical research and development.

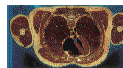
Further Information

• General Information

- A description of The Visible Human Project® [image data and how to obtain it](#) (includes [FAQ](#))
- The Visible Human Project® [FactSheet](#).
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• NLM Initiatives

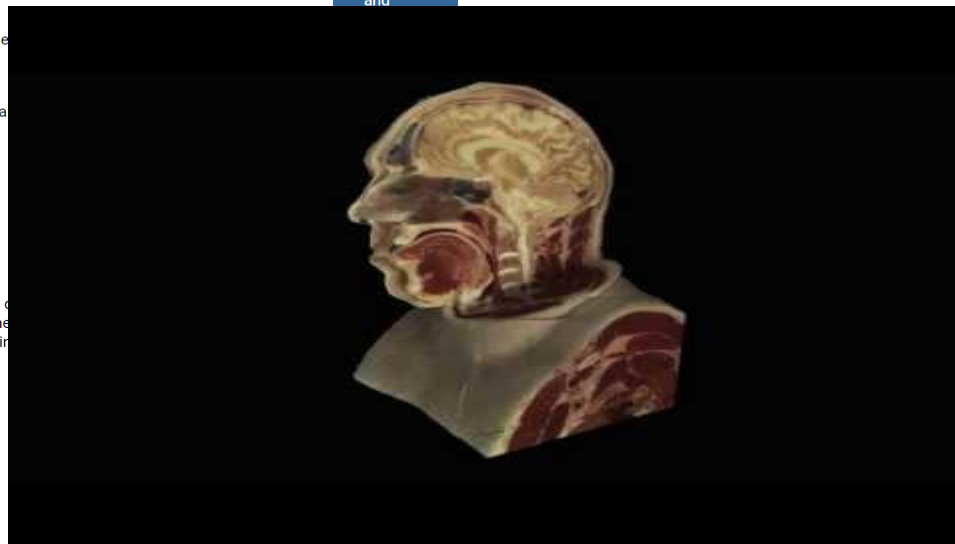
- Cryosection, MRI and CT image data of the head of a 72 year old male. Cryosections of the head were photographed at a resolution of 1056 x 1528 pixels. Work done at Brigham and Women's Hospital under contract to NLM. Available only to VHP license holders. These images can be found in the [Visible Human Project](#) to the NLM image server.



Projects
Based on the
Visible
Human Data
Set

Applications
for
viewing
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Sources
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PEIR (Pathology Information Educational Resource) Digital Library

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- PEIR Radiology [4732]
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- Vascular [365]
- PEIR Slice [16293]

33648 obrazów

Specjalne

- Najczęściej odwiedzane
- Najlepiej oceniane
- Najnowsze zdjęcia
- Najnowsze albumy
- Losowe zdjęcia
- Kalendarz

Linki

- PEIR Wiki
- IPLab
- Histologic
- Virtual Microscopy

Uprawnienia

- Zarejestruj
- Logowanie




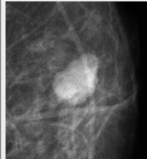

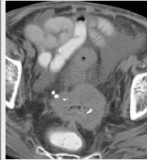
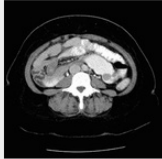

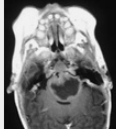
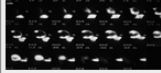
Logowanie

Użytkownik

Hasło

Strona główna / PEIR Radiology

A collection of over 4,000 curated radiology teaching images, from 1999 to the present. The images in this library are © University of Alabama at Birmingham, Department of Pathology. These digital images can be used by educators and institutions for non-profit educational activities but the University of Alabama at Birmingham Department of Pathology retains all copyrights. The University of Alabama at Birmingham Department of Pathology must be acknowledged as the source of images in any software, demonstration, or presentation utilizing these images.

 <p>Abdomen 521 obrazów</p>	 <p>Adrenal 66 obrazów</p>
 <p>Aorta 201 obrazów</p>	 <p>Breast 11 obrazów</p>
 <p>Chest 103 obrazów</p>	 <p>Female Reproductive 129 obrazów</p>
 <p>Gastrointestinal 821 obrazów</p>	 <p>Genitourinary 334 obrazów</p>
 <p>Head 103 obrazów</p>	 <p>Heart 13 obrazów</p>

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<input type="checkbox"/> Damage control surgery for abdominal trauma Roberto Cirocchi, Iosief Abraha, Alessandro Montedori, Eriberto Farinella, Isabella Bonacini, Ludovica Tagliabue, Francesco Sciannameo January 2010 Review			
<input type="checkbox"/> Audit filters for improving processes of care and clinical outcomes in trauma systems Christopher Evans, Daniel Howes, William Pickett, Luigi Dagnone October 2009 Review			
<input type="checkbox"/> Spinal immobilisation for trauma patients			

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Przegląd systematyczny

- Podsumowanie wyników z wielu publikacji podstawowych na wybrany i dobrze zdefiniowany temat
- Opracowywane i weryfikowane przez zespół recenzentów
- Stała struktura opracowania
 - część tekstowa z prezentacją problemu i podsumowaniem wyników
 - analiza dostępnych danych

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Przegląd systematyczny

PLAIN LANGUAGE SUMMARY

Family therapy for asthma in children

Psychological factors may have an effect on asthma in children, or its severity. As some children with families who are having problems have severe asthma, family therapy has been tried. The aim is to resolve any problems there might be in a family, in case they are causing the child stress and then making asthma worse. The review found some evidence from two trials that family therapy (in addition to standard asthma treatments) might help reduce a child's asthma symptoms, but more research is needed to be certain.

BACKGROUND

The incidence of childhood asthma has increased annually at a rapid rate over the last 20 years. A variety of factors have been implicated in the pathogenesis of bronchial asthma including allergies, infections, endocrinological disorders, genetic predisposition and, more recently, psychological elements. Although psychological factors are widely acknowledged to play a part both in precipitating episodes of asthma, and in the control of symptoms, pharmacological treatment alone continues to be the main treatment, and therefore the focus of most research. Recently, however, traditional medical models upholding a split between the "psyche" and the "soma" are being replaced by those which recognise the powerful influences of the mind on the body. Similarly, the need for integrated treatment models which consider behavioural or psychological interventions in addition to pharmacotherapy are well documented (Claus 1986; Lehrer 1992; Onnis 1984; Molinari 1994; Towns 1994)

Studies which do acknowledge psychosocial aspects to the disease range from cognitive behavioural approaches, to education programmes, relaxation techniques, autogenic therapy, and rational emotive behaviour modification as an adjunct to medication. However, such studies, although recognising that asthma has strong associations with emotional disturbances, have been conducted mainly with adults.

Of the few studies which examine psychological influences in childhood asthma, psychosocial and emotional factors are regarded as important in the most severely ill of asthmatic children (Gustafsson 1986; Lask 1979). A child's chronic illness can place psychological burdens on both child and family (Newacheck 1991; Pless 1991; Steinhauer 1974). In addition, Weil (Weil 1999) concluded that two psychological variables, child and carer mental health, were important predictors of subsequent asthma morbidity. The earliest research conducted in the 1970s indicated the presence of disturbed family relations in the families of children with severe asthma (Liebman 1974; Liebman 1976). This prompted a limited number of trials to be conducted in the area of family therapy.

The theoretical basis which underpins the systemic view of family therapy presupposes that "symptoms" can be the product of a dysfunctional family system. Therapeutic intervention is used to alter

the family system to its dysfunctional behaviours and to empower it to adaptively overcome the difficulties which give rise to the symptoms. The body of research undertaken so far has been based on a structural family therapy perspective which assumes that relationships between family members adhere to certain patterns, which are often maladaptive to the current life situation. Systemic theories regard phenomena in terms of circularity, rather than in the linear terms of cause and effect inherent to the medical model of illness. Therefore asthma is assumed to be both a symptom of the family dysfunction, and a contributor to it (Lask 1979). Family therapy has been used to decrease the symptoms and impact of asthma.

OBJECTIVES

The objective of this review is to test whether family therapy as an adjunct to traditional medication can be shown to have a significant effect in reducing the symptoms and impact of asthma in children.

METHODS

Criteria for considering studies for this review

Types of studies

Clinical trials included were randomised and controlled. Authors have been contacted to ascertain randomisation techniques. Trials included in this review compared family therapy + pharmacological intervention vs pharmacological intervention alone.

Types of participants

Chronically asthmatic children receiving medication who were treated at hospital outpatient departments or clinics, and their families.

Types of interventions

Any family therapy based on systemic theories which focus on the whole family and which aim to arrive at an understanding of

DATA AND ANALYSES

Comparison 1. FAMILY THERAPY & DRUG THERAPY vs DRUG THERAPY ALONE

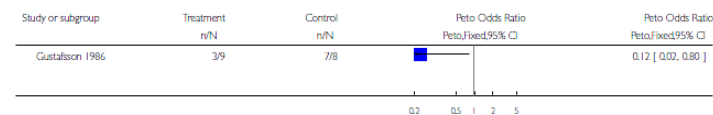
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 General paediatric assessment - no improvement			Peto Odds Ratio (Peto, Fixed, 95% CI)	Totals not selected
2 General paediatric assessment - deterioration			Peto Odds Ratio (Peto, Fixed, 95% CI)	Totals not selected
3 Functionally impaired days - no improvement			Peto Odds Ratio (Peto, Fixed, 95% CI)	Totals not selected
4 Functionally impaired days - deterioration			Peto Odds Ratio (Peto, Fixed, 95% CI)	Totals not selected
5 Nights B2 inhalers used - no improvement			Peto Odds Ratio (Peto, Fixed, 95% CI)	Totals not selected
6 Nights B2 inhalers used - deterioration			Peto Odds Ratio (Peto, Fixed, 95% CI)	Totals not selected
7 Peak expiratory flow rate - no improvement			Peto Odds Ratio (Peto, Fixed, 95% CI)	Totals not selected
8 Peak expiratory flow rate - deterioration			Peto Odds Ratio (Peto, Fixed, 95% CI)	Totals not selected
9 Peak expiratory flow rate - pre-medication, morning			Mean Difference (IV, Fixed, 95% CI)	Totals not selected
10 Peak expiratory flow rate - pre-medication, evening			Mean Difference (IV, Fixed, 95% CI)	Totals not selected
11 Forced expiratory volume - (in 0.75 seconds)			Mean Difference (IV, Fixed, 95% CI)	Totals not selected
12 Thoracic gas volume			Mean Difference (IV, Fixed, 95% CI)	Totals not selected
13 Day wheeze			Mean Difference (IV, Fixed, 95% CI)	Totals not selected
14 Activity			Mean Difference (IV, Fixed, 95% CI)	Totals not selected

Analysis 1.1. Comparison 1 FAMILY THERAPY & DRUG THERAPY vs DRUG THERAPY ALONE, Outcome 1 General paediatric assessment - no improvement.

Review: Family therapy for asthma in children

Comparison: 1 FAMILY THERAPY vs DRUG THERAPY ALONE

Outcome: 1 General paediatric assessment - no improvement



Merck Manual

The image shows two overlapping screenshots of the Merck Manual website. The top screenshot is the 'Professional Version' with a dark blue header. It features the Merck Manual logo, a search bar, and a navigation menu with 'Medical Topics' selected. A language dropdown is set to 'ENGLISH'. A button for 'VIEW CONSUMER VERSION' is visible. The bottom screenshot is the 'Consumer Version' with a white header and a red navigation bar. It includes the Merck Manual logo, a search bar, and a navigation menu with options: 'MEDICAL TOPICS', 'SYMPTOMS', 'EMERGENCIES', 'DRUG INFORMATION', 'NEWS & COMMENTARY', and 'RESOURCES'. A language dropdown is also set to 'ENGLISH'. A button for 'VIEW THE PROFESSIONAL VERSION FOR DOCTORS AND MEDICAL STUDENTS' is present. A portrait of a man is shown on the right. Below the navigation bar is another search bar and a featured articles section. The featured articles section includes a partial article on the left titled 'Shifting Guidelines Concerning Ho...' and two full articles on the right: '3 Signs Your Sniffles May be More Than a Cold—Commentary' (with an image of a woman sneezing) and 'Three Keys to Navigating Postpartum Health—Commentary' (with an image of a woman holding a baby). A third article, 'Compression Fractures of the Spine' (with an image of a spine diagram), is partially visible below.

<http://www.merckmanuals.com/>

MedlinePlus

NIH U.S. National Library of Medicine

MedlinePlus
Trusted Health Information for You

Search MedlinePlus MedlinePlus Connect accepts requests for information on **diagnoses (problem codes)**, **medications**, and **lab tests**, and returns related information from MedlinePlus.

About MedlinePlus

This API is available as a **Web application** or a **Web service**.

Health Topics Drugs & Supplements Videos & Tools

Health Topics
Find information on health, wellness, disorders and conditions

Drugs & Supplements
Learn about prescription drugs, over-the-counter medicines, herbs, and supplements

Videos & Tools
Discover tutorials, health and surgery videos, games, and quizzes

Lab Test Information
Learn why your doctor orders laboratory tests and what the results may mean

Medical Encyclopedia
Articles and images for diseases, symptoms, tests, treatments



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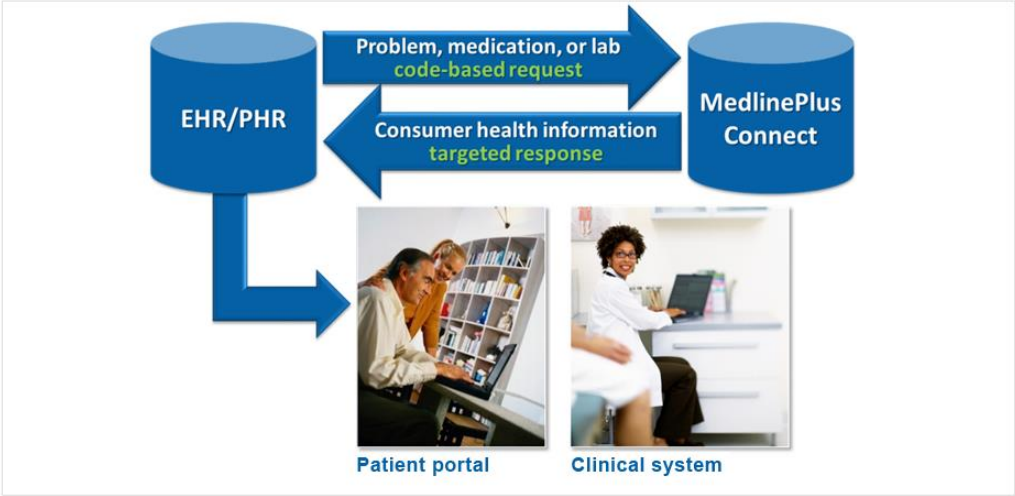
ClinicalTrials.gov
Search ClinicalTrials.gov for drug and treatment studies.

Easy-to-Read Materials

Organizations and Directories

Health Information in Multiple Languages

MedlinePlus Connect for EHRs



1. A patient portal, patient health record (PHR) system, or electronic health record (EHR) system sends a problem, medication, or lab code-based request to MedlinePlus Connect.
2. MedlinePlus Connect responds with targeted consumer health information for display in the patient portal or clinical system.

Akceptowane kody

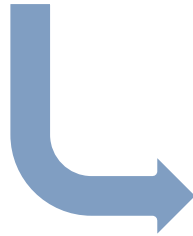
- diagnozy – ICD-9/10-CM, SNOMED-CT
- leki – RxNorm
- badania – LOINC

Także zapytanie tekstowe (po angielsku)
Wyniki w formacie JSON

MedLinePlus

Kod ICD-9-CM = 250.33

https://apps2.nlm.nih.gov/medlineplus/services/mpconnect_service.cfm?mainSearchCriteria.v.cs=2.16.840.1.113883.6.103&mainSearchCriteria.v.c=250.33&knowledge



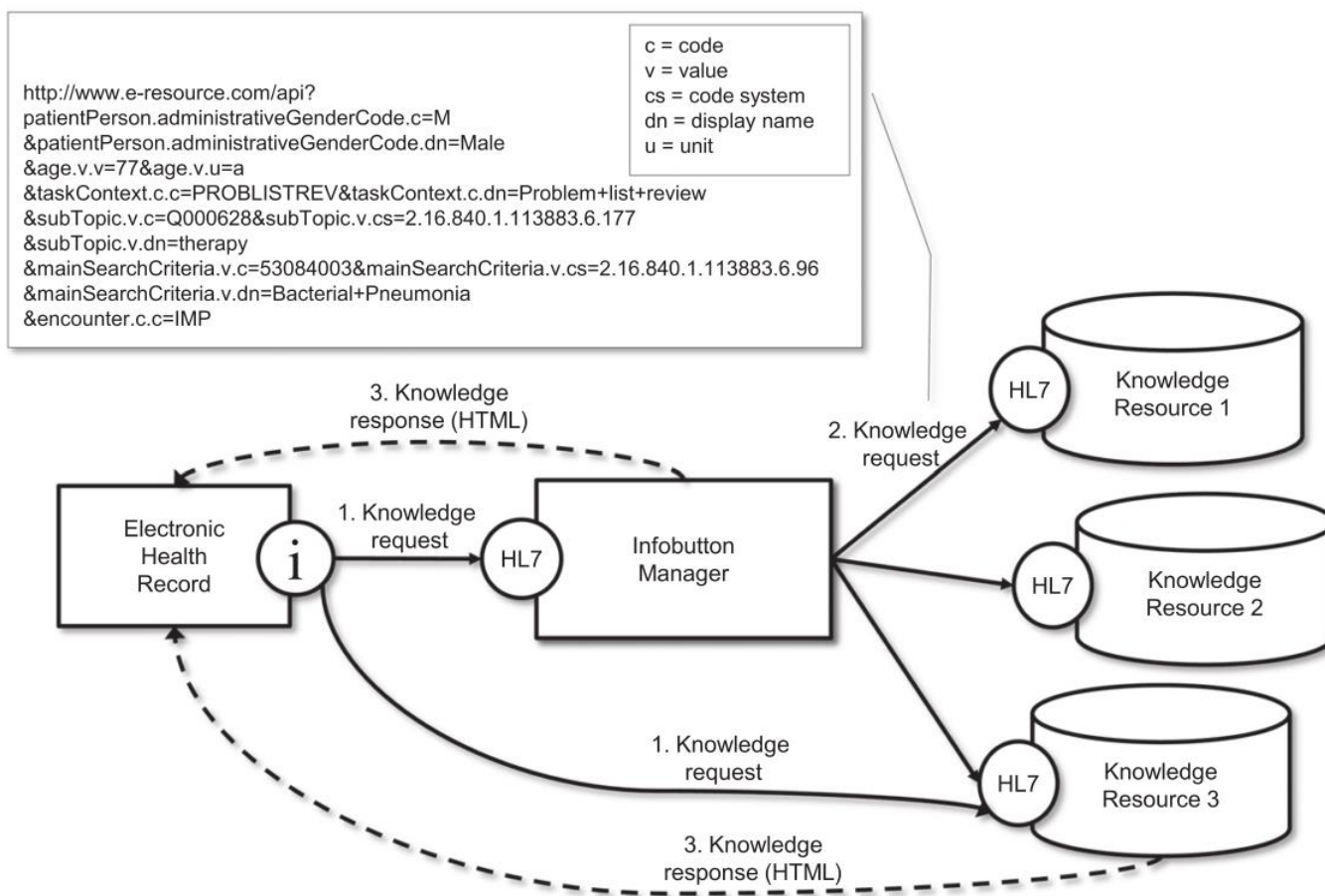
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      }
    ],
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    },
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    },
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      "type": "html"
    }
  }
],
```

INFOBUTTONS


Infobuttons

- Odnośniki z systemów typu EPR do potencjalnie interesujących informacji w zewnętrznych repozytoriach
- *Infobutton Manager* – dobór odpowiedniego źródła wiedzy w zależności od kontekstu (np. dane pacjenta, temat zapytania, odbiorca wyniku)
- Szczegółowa specyfikacja w ramach standardu HL7 (*context-aware information retrieval*)
 - wykorzystanie modelu HL7 RIM (→ HL7 V3)
 - zapytanie i jego kontekst jako RMIM
 - wywołanie poprzez URL, SOAP albo RESTful
- Dostępne otwarte implementacje infrastruktury

Infobutton Manager – schemat działania



Infobutton - kontekst

Open  nbutton

OpenInfobutton

*Server:

*Execution mode:

*Requesting Organization:

*Task context:

*Main search criteria: Code: Display name: Code system:

Age: Value: Unit:

Age group:

Gender:

Care setting:

Performer: language: discipline:

Information recipient: language: discipline:

Output (XML and JSON available only in the production server):

```
http://dev-service.oib.utah.edu:8080/infobutton-service/infoRequest?
representedOrganization.id.root=1.3.6.1.4.1.3768&xsItTransform=Infobutton_UI_VA&taskContext.c.c=MLREV&mainSearchCriteria.v.cs=2.16.840.1.113883.6.103&main
SearchCriteria.v.dn=warfarin&patientPerson.administrativeGenderCode.c=M&age.v.v=44&age.v.u=a&encounter.c.c=IMP&informationRecipient=PROV
```

<http://lite.bmi.utah.edu/InfobuttonQA.html>

Infobuttons – demo

Open **i**nfobutton

Electronic Health Record University of Utah Information audience Patient

Age 47 ↑

Gender F

Problem list

- Heart Failure **i**
- Post traumatic stress disorder **i**
- Gastroesophageal reflux **i**
- Diabetes mellitus type 2 **i**
- Migraine **i**
- Add problem Neurofibromatosis type 1 **i**

Medications

- Rosuvastatin (Crestor), 20 Mg, Tablet, Oral **i**
- Linagliptin (Tradjenta), 5 Mg, Tablet, Oral **i**
- Warfarin (Coumadin) 7.5Mg, Tablet, Oral **i**
- Clopidogrel 300 MG Oral Tablet **i**
- Amoxicillin 500 MG Oral Tablet **i**

Lab results

- Serum digoxin 1.5 mg/dl **N i**
- Total cholesterol 300 mg/dl **H i**
- K 2.8 mEq/L **L i**
- Na 127 mEq/L **L i**
- C Reactive Protein 555 ug/dl **H i**
- HbA1c 8.2% **H i**

INDEKSOWANIE I PRZESZUKIWANIE REPOZYTORIÓW

Indeksowanie zasobów

- Indeksowanie ręczne
 - wykonywane przez ludzi – ekspertów z danej dziedziny
 - zazwyczaj przy użyciu kontrolowanej terminologii i zgodnie z pewnym przyjętym protokołem (np. do rozwiązywania konfliktów)
 - stosowane w repozytoriach bibliograficznych i adnotowanych
- Indeksowanie automatyczne
 - z wykorzystaniem terminów z rozważanych zasobów i/lub kontrolowanej terminologii
 - stosowane w repozytoriach pełnotekstowych
- Podejścia hybrydowe → indeksy automatyczne „czyszczone” przez ekspertów (np. w MEDLINE)

Kontrolowane terminologie

Terminologia kontrolowana (ang. *controlled terminology*) to **zbiór terminów** (dla każdego wersja kanoniczna i alternatywy) oraz **relacji między nimi** (hierarchia, synonim, związek), który może zostać wykorzystany do **indeksowania zasobów** (a także do **kodowania informacji**).

- **MeSH (Medical Subject Heading)**
 - terminologia opracowana przez NLM (MEDLINE), I wydanie w 1960 r.
 - corocznie uaktualniane, poprawiane i rozszerzane: 5 700 terminów w pierwszym wydaniu, > 26 tys. w najnowszym)
 - typy terminów
 - deskryptor (*Main Heading*) → pojęcie biomedyczne
 - kwalifikator (*Subheading*) → doprecyzowanie znaczenia deskryptora
 - rekord uzupełniający (*Supplementary Concept Record*) → lek lub inna substancja chemiczna
- **EMTREE (dla EMBASE)**

MeSH – deskryptory i kwalifikatory

Liver MeSH Descriptor Data 2017

Details Qualifiers MeSH Tree Structures Concepts

MeSH Heading Liver
Tree Number(s) A03.620
Unique ID D008099
Annotation / blood supply: consider also LIVER CIRCULATION; / cytol: consider also HEPATOCYTES & KUPFFER CELLS; / surg: consider also HEPATECTOMY & LIVER TRANSPLANTATION; inflammation = HEPATITIS & its specifics; specialty is HEPATOLOGY see GASTROENTEROLOGY; do not confuse "hepatic" with "intrahepatic"; "intrahepatic" may refer to BILE DUCTS, INTRAHEPATIC & its diseases
Scope Note A large lobed glandular organ in the abdomen of vertebrates that is responsible for detoxification, metabolism, synthesis and storage of various substances.
Entry Term(s) Livers
See Also Hepatectomy
Consider Also consider also terms at HEPAT-
Public MeSH Note /cytology was LIVER CYTOLOGY 1964-65; /enzymology was LIVER ENZYMOLOGY 1964-65; /physiology was LIVER FUNCTION 1964-65
History Note /cytology was LIVER CYTOLOGY 1964-65; /enzymology was LIVER ENZYMOLOGY 1964-65; /physiology was LIVER FUNCTION 1964-65
Entry Combination transplantation:Liver Transplantation
Date of Entry 1999/01/01
Revision Date 2015/06/16

Liver MeSH Descriptor Data 2017

Details Qualifiers MeSH Tree Structures Concepts

Allowable Qualifiers abnormalities (AB)
anatomy & histology (AH)
blood supply (BS)
chemistry (CH)
cytology (CY)
diagnostic imaging (DG)
drug effects (DE)
embryology (EM)
enzymology (EN)
growth & development (GD)
immunology (IM)
injuries (IN)
innervation (IR)
metabolism (ME)
microbiology (MI)
parasitology (PS)
pathology (PA)
physiology (PH)
physiopathology (PP)
radiation effects (RE)
secretion (SE)
surgery (SU)
ultrastructure (JL)
virology (VI)

surgery MeSH Qualifier Data 2017

Details Concepts

MeSH Qualifier surgery
Unique ID Q000601
Annotation subhead only; includes "operation", "surgical therapy"; for tissue section or coagulation by laser; not for transplantation (= /transplantation); indexing policy: Manual 19.8.70; DF: /surg or /SU
Scope Note Used for operative procedures on organs, regions, or tissues in the treatment of diseases, including tissue section by lasers. It excludes transplantation, for which "transplantation" is used.
Entry Version SURG
Abbreviation SU
Entry Term(s) intraoperative procedures
invasive procedures
operations
operative procedures
operative therapy
perioperative procedures
peroperative procedures
preoperative procedures
Online Note search policy: Online Manual; use: main heading/SU or SU (SH) or SUBS APPLY SU
History Note 66; used with Category A, C & F 1966-74; A, C & F3 1975; A, B2, C & F3 1976-89; A1-10, A13-14, A16, B2, C & F3 1990 forward
Date of Entry 1973/12/27
Revision Date 2003/07/24

Organizacja deskryptorów

- Deskryptory podzielone na 16 kategorii
- Kategorie zorganizowane jako wielopoziomowe drzewa
 - od najbardziej ogólnych do najbardziej szczegółowych
 - do 13 poziomów w kategorii
- Deskryptor może wystąpić w więcej niż jednym drzewie

1. - Anatomy [A]

- [Body Regions \[A01\]](#) +
- [Musculoskeletal System \[A02\]](#) +
- [Digestive System \[A03\]](#) +
- [Respiratory System \[A04\]](#) +
- [Urogenital System \[A05\]](#) +
- [Endocrine System \[A06\]](#) +
- [Cardiovascular System \[A07\]](#) +
- [Nervous System \[A08\]](#) +
- [Sense Organs \[A09\]](#) +
- [Tissues \[A10\]](#) +
- [Cells \[A11\]](#) +
- [Fluids and Secretions \[A12\]](#) +
- [Animal Structures \[A13\]](#) +
- [Stomatognathic System \[A14\]](#) +
- [Hemic and Immune Systems \[A15\]](#) +
- [Embryonic Structures \[A16\]](#) +
- [Integumentary System \[A17\]](#) +

2. - Organisms [B]

- [Animals \[B01\]](#) +
- [Algae \[B02\]](#) +
- [Bacteria \[B03\]](#) +
- [Viruses \[B04\]](#) +
- [Fungi \[B05\]](#) +
- [Plants \[B06\]](#) +
- [Archaea \[B07\]](#) +
- [Mesomycetozoea \[B08\]](#) +

3. + Diseases [C]

- 4. + Chemicals and Drugs [D]
- 5. + Analytical, Diagnostic and Therapeutic
- 6. + Psychiatry and Psychology [F]
- 7. + Phenomena and Processes [G]
- 8. + Disciplines and Occupations [H]
- 9. + Anthropology, Education, Sociology
- 10. + Technology, Industry, Agriculture [J]
- 11. + Humanities [K]

[Virus Diseases \[C02\]](#)

[RNA Virus Infections \[C02.782\]](#)

[Orthomyxoviridae Infections \[C02.782.620\]](#)

▶ [Influenza, Human \[C02.782.620.365\]](#)

[Influenza in Birds \[C02.782.620.375\]](#)

[Respiratory Tract Diseases \[C08\]](#)

[Respiratory Tract Infections \[C08.730\]](#)

[Bovine Respiratory Disease Complex \[C08.730.085\]](#) +

[Bronchitis \[C08.730.099\]](#) +

[Common Cold \[C08.730.162\]](#)

[Empyema, Pleural \[C08.730.265\]](#) +

▶ [Influenza, Human \[C08.730.310\]](#)

[Laryngitis \[C08.730.368\]](#) +

[Legionellosis \[C08.730.382\]](#) +

[Lung Abscess \[C08.730.407\]](#)

[Lung Diseases, Fungal \[C08.730.435\]](#) +

UMLS (Unified Medical Language System)

- Zestaw zasobów i narzędzi wspomagających komputerowe przetwarzanie tekstów biomedycznych rozwijany przez NLM
- Metathesaurus
 - meta-słownik łącząca wiele istniejących słowników oraz terminologii
 - hierarchia i powiązania między pojęciami pochodzącymi z różnych źródeł i w różnych językach
- Semantic Network
 - hierarchia i powiązania między typami semantycznymi związanymi z poszczególnymi pojęciami z Metathesaurus-a
- API pozwalające na wykorzystanie funkcjonalności UMLS-a we własnych aplikacjach

Metathesaurus

Search **Tree** **Recent Searches**

Term CUI Code

clinical decision support system

Release: 2016AB

Search Type: Word

Source: All Sources
AIR
ALT
AOD
AOT

Search Results (2)

- [C0525070](#) Decision Support Systems, Clinical
- [C4035904](#) Clinical decision support (CDS) system

Basic View **Report View** **Raw View**

Concept: [C0525070] Decision Support Systems, Clinical

Semantic Type

- [Intellectual Product](#) [T170]

Definition

MSH/null - Computer-based information systems used to integrate clinical and patient information and provide support for decision-making in patient care.

MSHNOR/null - Datamaskinbaserte informasjonssystemer anvendt for å integrere klinisk informasjon med pasientinformasjon og gi støtte til avgjørelser innen pasientbehandlingen.

Synonyms (38)

- Bestillingsondersteunend systeme, klinisch
- Bestillingsondersteunende systemen, klinische
- Beslutsstødsystem, kliniska
- MSHSWE
- CLIN DECISION SUPPORT SYSTEMS
- Clinical Decision Support Systems
- DECISION SUPPORT SYSTEMS CLIN
- MSH
- Decision Support Systems, Clinical
- Entscheidungsunterstützende Systeme, klinische
- KLINICHESKIE RESHENIIA, KOMPIUTERNYE SISTEMY PODDERZHKI PRINIATIIA
- KLINICHESKIKH RESHENII SISTEMY PODDERZHKI
- MSHRUS

Search **Tree** **Recent Searches**

Term CUI Code

aspirin

Release: 2016AB

Search Type: Word

Source: All Sources
AIR
ALT
AOD
AOT

Search Results (1172)

[: 1 - 25 :]

- [C0004057](#) Aspirin
- [C1454756](#) N-acetyl-S-(alpha-methyl-4-(2-methylpropyl)-5-oxo-1H-imidazol-2-ylidene)benzoic acid
- [C3843719](#) Aspirin or aspirin-containing product
- [C0002370](#) Aluminum aspirin
- [C0004058](#) Aspirin allergy
- [C0004059](#) aspirin intolerance
- [C0004060](#) Poisoning by aspirin
- [C0050535](#) acetylsalicylic acid hydrolase
- [C0067608](#) N-3'a-propylphenazonyl-2-acetoxybenzar

Basic View **Report View** **Raw View**

Concept: [C0004057] Aspirin

Semantic Type

- [Organic Chemical](#) [T109]
- [Pharmacologic Substance](#) [T121]

Definition

Synonyms (92)

- 2-(ACETYLOXY)benzoic acid
- DRUGBANK
- 2-(Acetyloxy)benzoic Acid
- MSH
- NCI
- NDFRT
- PDQ
- 2-Acetoxybenzenecarboxylic acid
- 2-Acetoxybenzoic acid
- AAS
- ASA
- ASPIRIN

Semantic Network

The screenshot displays a web-based semantic network interface. It is divided into several main sections:

- Search Panel (Left):** Contains a search bar with the term "abdominal pain", a "Go" button, and a "Release" dropdown set to "2016AB". Below this is a "Search Type" dropdown set to "Word" and a "Source" dropdown with options: "All Sources", "AIR", "ALT", "AOD", and "AOT". A "Search Results (194)" list is shown below, with the first few items: "C0000737 Abdominal Pain", "C0423651 No abdominal pain", "C1394864 severe; abdominal pain, abdominal rigidity", "C0000727 Abdomen, Acute", "C0000729 Abdominal Cramps", "C0151263 nausea or abdominal pain", "C0232488 Abdominal colic", "C0232491 Chronic abdominal pain", "C0232492 Upper abdominal pain", "C0232493 Epigastric pain", "C0232495 Lower abdominal pain", "C0234246 Rebound tenderness", "C0235299 Right upper quadrant pain", "C0238548 abdominal pain radiating to back", "C0238551 Left lower quadrant pain", and "C0238552 Left upper quadrant pain".
- Basic View Panel (Top Center):** Shows details for the concept "Abdominal pain". It includes sections for "Semantic Type" (with "Sign or Symptom [T184]" selected and highlighted by an orange box), "Definition", and "Synonyms (193)". An orange arrow points from the "Sign or Symptom" selection to the relationship configuration panel below.
- Relationship Configuration Panel (Bottom Center):** Features a "2016AB" dropdown, a "List" button, and a "Tree" button. It contains two lists:
 - Select a Semantic Type:** A scrollable list with options: "Quantitative Concept", "Receptor", "Regulation or Law", "Reptile", "Research Activity", "Research Device", "Self-help or Relief Organization", and "Sign or Symptom".
 - Select a Relation Label:** A scrollable list with options: "adjacent_to", "affects", "analyzes", "assesses_effect_of", "associated_with", "branch_of", "brings_about", and "carries_out".
- Report Panel (Bottom Right):** Shows a "Report" view for the "Sign or Symptom" concept. It includes sections for "Definition", "Properties" (with "Unique Identifier: T184" and "Tree Number: A2.2.2"), "Parents" (with "Finding"), "Relations" (with "Sign or Symptom degree_of Sign or Symptom (D)", "Sign or Symptom isa Finding (D)", "Sign or Symptom diagnoses Pathologic Function (D)", "Sign or Symptom diagnoses Anatomical Abnormality (D)", and "Sign or Symptom diagnoses Injury or Poisoning (D)"), "Inverse Relations", "Inherited Relations", and "Inverse Inherited Relations".

MetaMap

- System do analizy tekstów biomedycznych w języku angielskim rozwijany przez NLM
- Wykorzystuje techniki przetwarzania języka naturalnego do wykrywania w tekstach terminów z UMLS Metathesaurus
- Podstawowy element systemu Medical Text Indexer (MTI) używanego przez NLM do automatycznego indeksowania publikacji medycznych
- Możliwość wykorzystania we własnych zastosowaniach (udostępniony darmowo jako *open source*)

MetaMap

Tylko MeSH



```
Phrase: "Posterior wall fractures"
>>>> Phrase
posterior wall fractures
<<<< Phrase
>>>> Mappings
Meta Mapping (827):
  827 Fractures (Fractures, Bone) [Injury or Poisoning]
<<<< Mappings

Phrase: "are"
>>>> Phrase
<<<< Phrase

Phrase: "the most common acetabular fractures"
>>>> Phrase
most common acetabular fractures
<<<< Phrase
>>>> Mappings
Meta Mapping (704):
  574 Acetabulum [Body Part, Organ, or Organ Component]
  812 Fractures (Fractures, Bone) [Injury or Poisoning]
<<<< Mappings

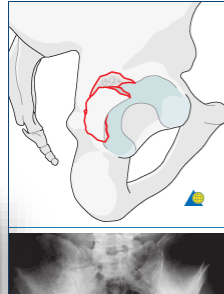
Phrase: "and"
>>>> Phrase
<<<< Phrase

Phrase: "account"
>>>> Phrase
account
<<<< Phrase
>>>> Mappings
Meta Mapping (900):
  900 Accountability [Idea or Concept]
<<<< Mappings

Phrase: "for approximately 24%"
>>>> Phrase
approximately 24
<<<< Phrase

Phrase: "of acetabular fractures."
>>>> Phrase
acetabular fractures
<<<< Phrase
>>>> Mappings
Meta Mapping (843):
  623 Acetabulum [Body Part, Organ, or Organ Component]
  861 Fractures (Fractures, Bone) [Injury or Poisoning]
<<<< Mappings
```

1. Introduction and epidemiology



Posterior wall fractures are the most common acetabular fractures and account for approximately 24% of acetabular fractures.

They typically involve the rim of the acetabulum, a portion of the retroacetabular surface, and a variable segment of the articular cartilage.

The fracture line leaves undisturbed the major portion of the posterior column. A posterior dislocation is usually associated.

Posterior wall fractures are partial fractures of the posterior column.

Wszystkie
dostępne słowniki



```
Phrase: "Posterior wall fractures"
>>>> Phrase
posterior wall fractures
<<<< Phrase
>>>> Mappings
Meta Mapping (981):
  981 Posterior wall fracture [Intellectual Product]
<<<< Mappings

Phrase: "are"
>>>> Phrase
<<<< Phrase

Phrase: "the most common acetabular fractures"
>>>> Phrase
most common acetabular fractures
<<<< Phrase
>>>> Mappings
Meta Mapping (815):
  645 Common (Common (qualifier value)) [Quantitative Concept]
  842 Acetabular Fracture [Injury or Poisoning]
Meta Mapping (815):
  645 Common (shared attribute) [Functional Concept]
  842 Acetabular Fracture [Injury or Poisoning]
<<<< Mappings

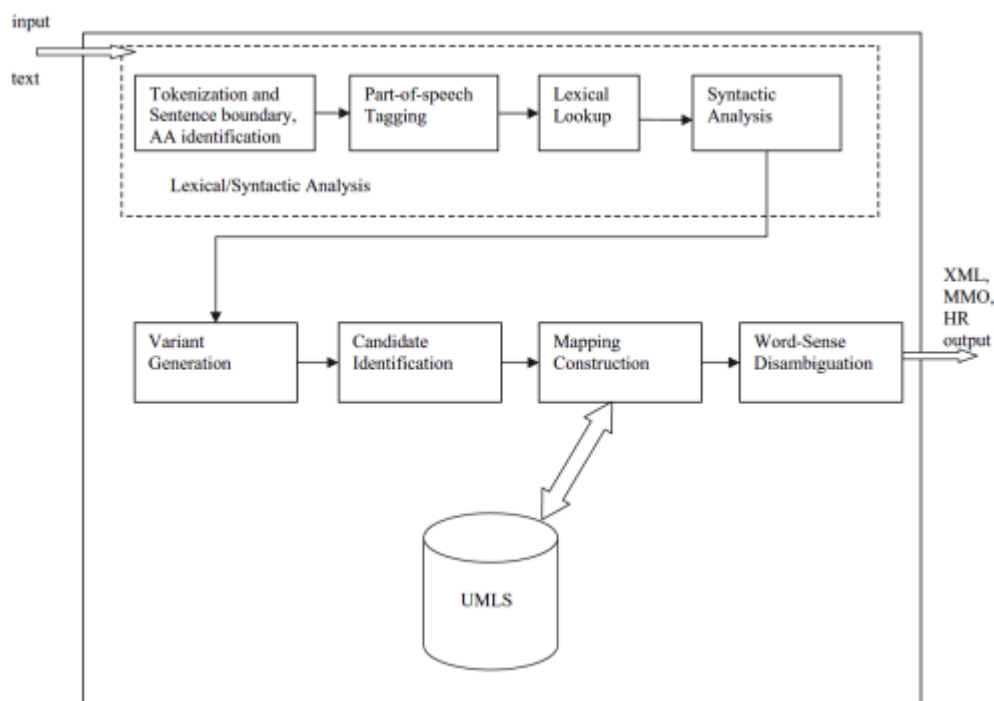
Phrase: "and"
>>>> Phrase
<<<< Phrase

Phrase: "account"
>>>> Phrase
account
<<<< Phrase
>>>> Mappings
Meta Mapping (1000):
  1000 Account # (Account number:Identifier:Point in time:~Patient:Nominal) [Clinical Attribute]
Meta Mapping (1000):
  1000 account (account - ActClass) [Idea or Concept]
<<<< Mappings

Phrase: "for approximately 24%"
>>>> Phrase
approximately 24
<<<< Phrase
>>>> Mappings
Meta Mapping (861):
  861 Approximately (Approximate) [Qualitative Concept]
<<<< Mappings

Phrase: "of acetabular fractures."
>>>> Phrase
acetabular fractures
<<<< Phrase
>>>> Mappings
Meta Mapping (981):
  981 Acetabular Fracture [Injury or Poisoning]
<<<< Mappings
```

Przetwarzanie tekstu w MetaMap



1. Podział na tokeny, wykrywanie skrótów
2. Oznaczanie części mowy
3. Uzyskanie informacji leksykalnej z leksykonu SPECIALIST (UMLS)
4. Analiza składniowa – wykrywanie fraz
5. Generowanie wariantów fraz
6. Identyfikacja kandydatów do mapowań
7. Konstrukcja mapowań (przez łączenie kandydatów)
8. Usuwanie zanegowanych mapowań
9. Wybór mapowań najlepiej dopasowanych do otaczającego tekstu

Indeksowanie automatyczne

- Wstępne przetwarzanie dokumentu
 - podział tekstu na słowa/tokeny (tokenizacja)
 - usuwanie „nieznaczących” słów (tzn. stopwords)
 - normalizacja – ujednoczenie zapisu (np. tylko małe litery)
 - transformacja słów do formy kanonicznej (termów) – *stemming* (wspólna część) lub *lematyzacja* (forma podstawowa)

stemming: car, cars, car's → car
lematyzacja: am, are, is → be

- Reprezentacja w formie **worka słów** (ang. *bag of words*), czyli zbioru termów występujących w dokumencie
 - wykorzystanie bezpośrednio do budowy indeksu
 - budowa dodatkowych metryk na podstawie tej reprezentacji (TF-IDF)

Reprezentacja TF-IDF

TF = *term frequency*
IDF = *inverse document frequency*

- Każdy dokument reprezentowany jako wektor w przestrzeni m -wymiarowej (m – liczba termów)
- Poszczególne elementy wektora zdefiniowane jako

$$TFIDF(t, d) = TF(t, d) \times IDF(t)$$

$TF(t, d)$ = liczba wystąpień termu t w dokumencie d

$$IDF(t) = \log \left(\frac{\text{liczba wszystkich dokumentow}}{\text{liczba dokumentow z termem } t} \right)$$

- Połączenie perspektywy „lokalnej” (TF) oraz „globalnej” (IDF) przy ocenie poszczególnych termów i dokumentów

Problemy z indeksowaniem automatycznym

- Synonimy – różne termy, takie samo znaczenie
- Polisemia – takie same termy, różne znaczenie
- Znalezione termy mogą nie być adekwatne do głównego tematu dokumentu („dygresje”)
- Znaczenie termów zależne od sąsiedztwa (np. wysokie ciśnienie) – konieczność rozważania większego kontekstu
- Różna „granularność” indeksowanych dokumentów i zapytań – zapytanie dotyczy antybiotyków jako klasy leków, a dokumenty dotyczą konkretnych substancji

Mechanizmy rozszerzania indeksu albo zapytań w celu rozwiązania (części) powyższych problemów

Przeszukiwanie repozytoriów

- Dwa podejścia do dopasowywania dokumentów i zapytań
 - dopasowanie dokładne (*exact match*) – zapytania w formie wyrażeń logicznych (AND, OR , NOT) → wymagane pełne dopasowanie dokumentu i zapytania
 - dopasowanie częściowe (*partial match*) – wykorzystanie różnych miar dopasowania, wybór dokumentów najlepiej (także częściowo) dopasowanych do zapytania (→ *relevance ranking*)
- Dopasowanie dokładne dla indeksów stworzonych ręcznie (bazy bibliograficzne i adnotowane), dopasowanie częściowe dla indeksów automatycznych (repozytoria pełnotekstowe)

Dopasowanie dokładne preferowane przez zaawansowanych użytkowników (wrażenie lepszej kontroli), ale w praktyce brak znaczących różnic w uzyskiwanych wynikach

Wyznaczanie dopasowania częściowego

- Miara Jaccarda – dla reprezentacji *bag of words*
(→ dokument jako zbiór słów)

$$\text{sim}(d_i, d_j) = \frac{|d_i \cap d_j|}{|d_i \cup d_j|}$$

- Miara **cosinusowa** – dla reprezentacji TFIDF
(→ dokument jako wektor liczbowy)

$$\text{sim}(d_i, d_j) = \frac{d_i \cdot d_j}{\|d_i\| \times \|d_j\|} = \frac{\sum_t \text{TFIDF}(t, d_i) \times \text{TFIDF}(t, d_j)}{\|d_i\| \times \|d_j\|}$$

W przypadku obliczania podobieństwa między dokumentem a zapytaniem, czynnik TF jest obliczany na podstawie zapytania, a IDF – na podstawie zbioru dokumentów.

Miary oceny systemów IR

- Ocena bezpośrednia (*system-oriented evaluation*)
- Precyzja (*precision*) i przywołanie (*recall*)

$$precision(q) = \frac{|wyszukane_q \cap istotne_q|}{|wyszukane_q|}$$

$$recall(q) = \frac{|wyszukane_q \cap istotne_q|}{|istotne_q|}$$

- *Precision@k* – precyzja wyznaczona na podstawie k -pierwszych odszukanych dokumentów
- *Average precision* (uwzględniająca kolejność zwracanych dokumentów) i *mean average precision* (dla zbioru zapytań)

Problem ze oceną bezpośrednią

- Ocena za pomocą „złotego standardu” (albo *ground truth*)
- Konieczność określenia dokumentów istotnych z punktu widzenia danego zapytania (→ ogromna pracochłonność)
- Znaczące różnice w ocenach ekspertów wskazujących dokumenty istotne dla zapytania
 - Kolekcja OHSUMED – kappa = 0.41
 - Nasz eksperyment – kappa = 0.30



słaba zgodność ocen

Nasz eksperyment...

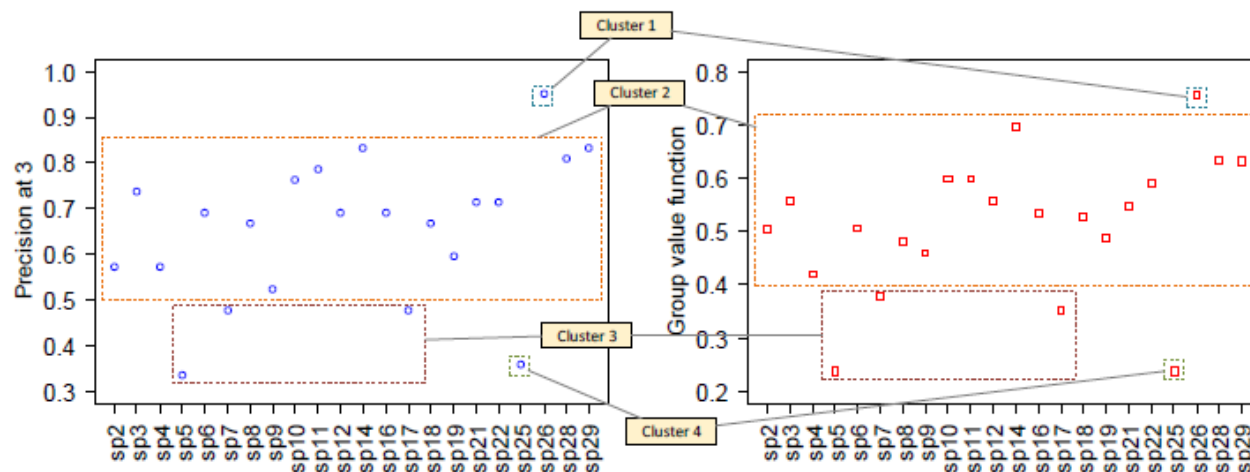
Appendix 3. Coded triples representing relevance evaluations by physicians

Participant	1	2	3
sp2	XXX	XXX	YX
sp3	XNN	XXX	XN
sp4	NNY	XXX	NX
sp5	XXX	XXX	XX
sp6	XNX	YXN	XX
sp7	XXN	XXX	XX
sp8	XXX	NXN	XY
sp9	NNY	YXX	XX
sp10	NNY	YXN	NX
sp11	NNY	YXN	NX
sp12	NNN	XXX	NX
sp14	NYN	YXX	NN
sp16	NNN	YXX	XX
sp17	XXN	NXX	XX
sp18	NYN	XXX	NN
sp19	XYN	XXX	YX
sp21	NXN	YXX	XX
sp22	NNN	XNN	NN
sp25	NNX	XXX	NX
sp26	YYY	YNN	NN
sp28	YNN	YNN	NN
sp29	NNY	NXN	NX

There are major differences in evaluations across vignettes. For example, physician sp5 (considered all of them to be relevant) and sp25 (considered all of them not relevant).

Vignette

Appendix 6. Selected clustering of physicians in the context of precision at 3 and group value function



Physician sp5 from cluster 3 and sp25 from cluster 4 are very similar in terms of these two measures. However, a closer look at their coded triples (Appendix 3) reveals differences in evaluations across vignettes. For example, reviews retrieved for vignette 1 were evaluated as *XXX* by sp5 and as *NNX* by sp25, while for vignette 10 the evaluations were *NNX* for sp5 and *XXX* for sp25. While these differences were compensated after averaging values of both measures over all vignettes, they were captured by the kappa coefficient (that indicated the lack of agreement between sp5 and sp25) and resulted in placing these two physicians in two different clusters.

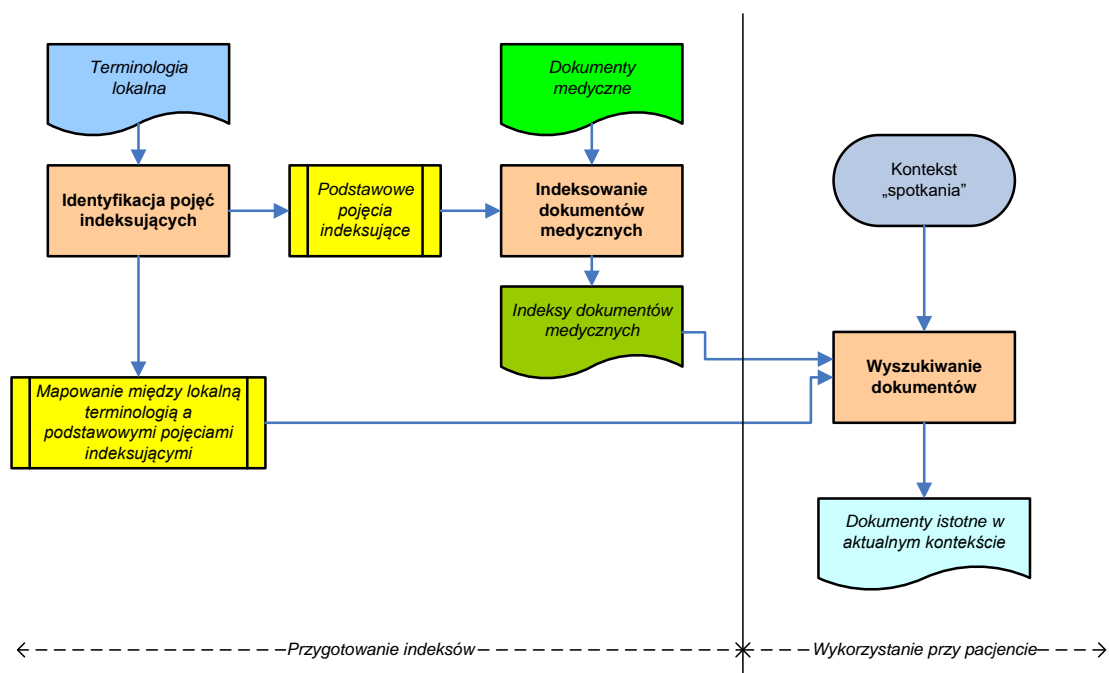
Inne podejścia do oceny

- Ocena pośrednia – wpływ użycia systemu na jakość zadań wykonywanych przez użytkowników (*user-oriented evaluation*)
- Częsty scenariusz – odpowiedzi na pytania przed i po użyciu systemu IR do wyszukania informacji
 - w eksperymentach brak różnic między różnymi podejściami do formułowania zapytań (→ dopasowanie dokładne i częściowe)
 - różny przyrost trafności w zależności od kategorii użytkowników (większy dla pielęgniarek, mniejszy dla lekarzy), ale porównywalny efekt końcowy

ROZSZERZANIE INDEKSÓW I ZAPYTAŃ

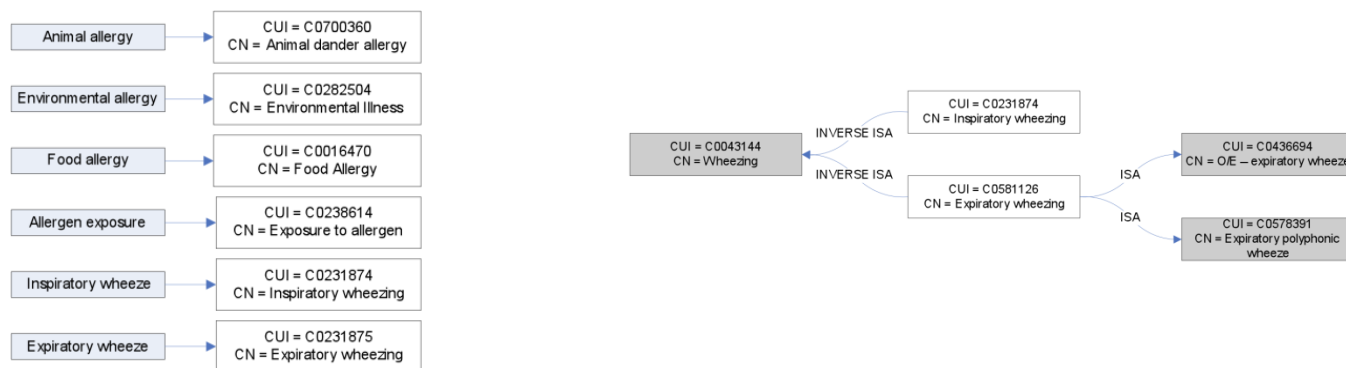
Rozszerzanie indeksów

- Automataczne wyszukiwanie przeglądów systematycznych „dopasowanych” do aktualnego pacjenta
- Uwzględnienie lokalnej terminologii w indeksowaniu i wyszukiwaniu dokumentów



Identyfikacja terminów indeksujących

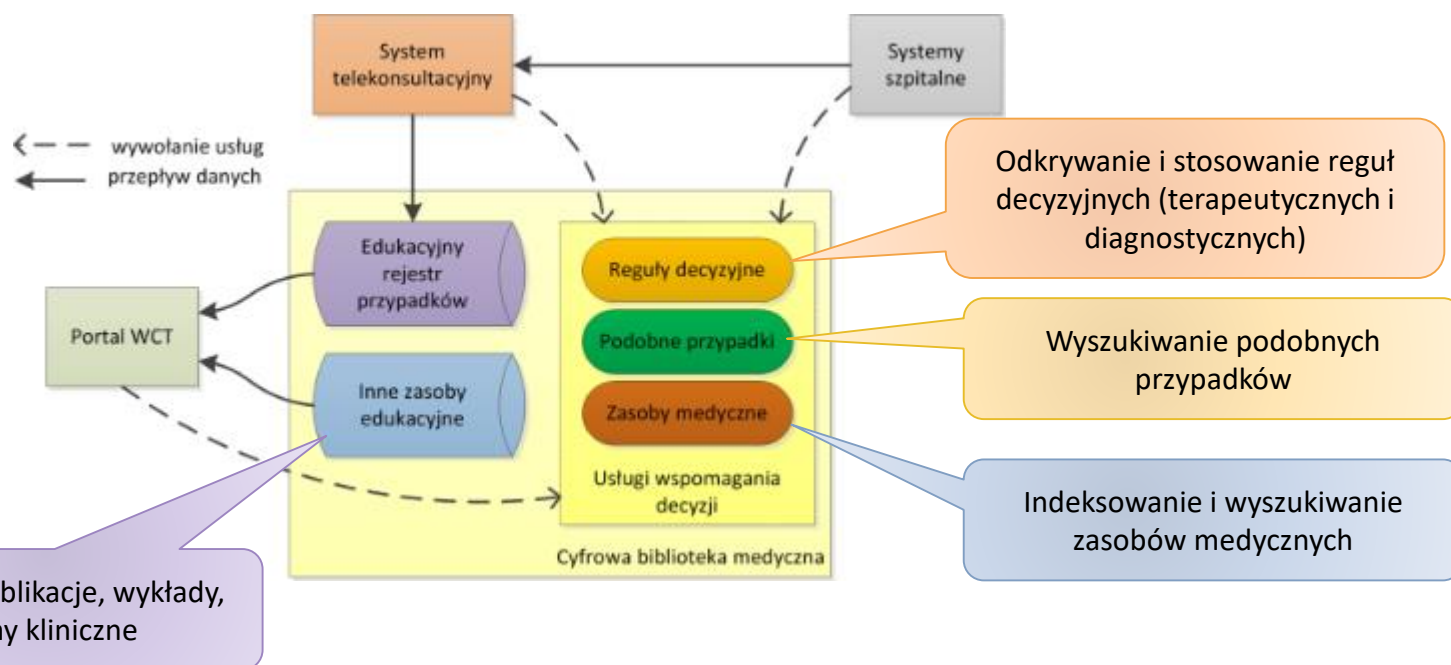
- Podstawowe terminy indeksujące (Metathesaurus)
- Rozszerzone terminy indeksujące – synonimy, hypernimy i hyponimy dla terminów podstawowych (Metathesaurus)



- Wyszukiwanie terminów rozszerzonych w dokumentach (MetaMap) i mapowanie do terminów podstawowych

Rozszerzanie zapytań

- Wyszukiwanie zasobów w wybranych serwisach (usługa w ramach Wielkopolskiego Centrum Telemedycyny)
- Indeksowanie zasobów za pomocą terminów MeSH



Rozszerzanie zapytań

- Tłumaczenie zapytań tekstowych użytkownika (PL) na ciąg terminów MeSH – *stemming* i wybór najlepszego dopasowania
- Rozszerzenie wewnętrznego zapytania poprzez dodanie bardziej szczegółowych terminów z mniejszą wagą

„Wounds, Penetrating”



```
„Wounds, Penetrating”^1.0  
„Decapitation”^0.5  
„Eye Injuries, Penetrating” ^0.5  
„Head Injuries, Penetrating”^0.5  
„Wounds, Gunshot”^0.5  
„Wounds, Stab”^0.5  
„Needlestick Injuries”^0.33
```

- Poprawa wyników (MAP@10, przywołanie) dla rozszerzonych zapytań, ale pogorszenie precyzji (akceptowalne w praktyce)

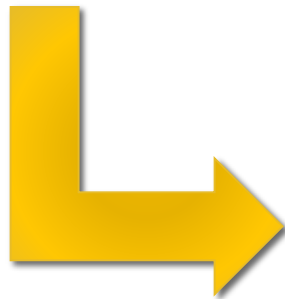
PODSUMOWANIE

Wpływ EBM i systemów IR na podejmowane decyzje

Table 3 Nine observational studies reporting cognitive impact of clinical information-retrieval technology on physicians (sorted by frequency of searches for information with positive impact)

Reference number	Searches with positive impact (%)	Number of searches	Number of participants	Recall	Design	Platform
Hayward et al. [28]	20	20	9	Up to 1 month	Cross-sectional	Multiple databases on CD-ROM
Jousimaa et al. [21]	36	2036	102	None	Cohort	Finnish guidelines on CD-ROM
Lindberg et al. [29]	36	1158	552	CIT ^a : Up to 12 months	Cross-sectional	Bibliographic database on CD-ROM
Swinglehurst et al. [30]	39	60	22	Up to 1 month	Case series	Multiple databases (device not reported)
Haynes et al. [20]	41	280	158	Up to 8 months	Cohort	Bibliographic database on the internet
Gorman et al. [14]	51	60	48	Up to 14 months	Cross-sectional	Bibliographic database on the internet
Veenstra [31]	59	261	30	Up to 12 months	Cross-sectional	Bibliographic database on the internet
Schwartz et al. [17]	70	92	3	Not specified	Cohort	Multiple databases on the internet
Crowley et al. [27]	82	625	82	None	Cohort	Multiple databases on the internet

^a CIT: critical incident technique. This technique is known to be reliable and valid, and may reduce recall bias.



Changed patient management
 Information influenced decision
 An impact on clinical problem solving
 Increased understanding/knowledge or provided reassurance
 Would have had an impact on doctors or their practice
 Had an impact
 Would affect the treatment of future patients
 Confirmed patient care decisions or changed patient management

Podsumowanie

- Znaczenie klinicznych systemów IR
 - potrzeby informacyjne personelu medycznego
 - medycyna oparta na dowodach (EBM)
- Różne podejścia do indeksowania i wyszukiwania (dopasowania) zasobów medycznych
- Ocena systemów IR i problemy z „tradycyjnymi” podejściami → zorientowanie na użytkowników i ich zadania
- Integracja systemów IR z EPR → *infobuttons* jako standard HL7 i jego praktyczne wykorzystanie