

ON-LINE BIOMEDICAL DATABASES—THE BEST SOURCE FOR QUICK SEARCH OF THE SCIENTIFIC INFORMATION IN THE BIOMEDICINE

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Editorial

SUMMARY

Most of medical journals now has its electronic version, available over public networks. Although there are parallel printed and electronic versions, and one other form need not to be simultaneously published. Electronic version of a journal can be published a few weeks before the printed form and must not has identical content. Electronic form of a journals may have an extension that does not contain a printed form, such as animation,

3D display, etc., or may have available full-text, mostly in PDF or XML format, or just the contents or a summary. Access to a full text is usually not free and can be achieved only if the institution (library or host) enters into an agreement on access. Many medical journals, however, provide free access for some articles, or after a certain time [after 6 months or a year] to complete content. The search for such journals provide the network archive as High Wire Press, Free Medical Journals.com. It is necessary to allocate PubMed and PubMed

Central, the first public digital archives unlimited collect journals of available medical literature, which operates in the system of the National Library of Medicine in Bethesda [USA]. There are so called on-line medical journals published only in electronic form. It could be searched over on-line databases. In this paper authors shortly described about 30 data bases and short instructions how to make access and search the published papers in indexed medical journals. Key words. medical journals, on-line databases.

1. INTRODUCTION

Medical Informatics is the science that studies the laws of creation, transmission, processing and use information, data and knowledge to solve medical problems (1, 2). Medical Informatics is now accepted as the basic medical science (2). The analogy with the other basic sciences is recognized in the use of previous experience and results, to structuring and encoding of subjective and objective medical findings, which makes them suitable for analysis, integration and further use (1, 2).

Information is the set of messages, data and knowledge that form the basis for decision making, then the medical information is the set of messages, data and knowledge needed to solve medical problems (1, 2). Health care is perhaps, unique example of the relationship of medical data and the very different levels of information complexity (2).

Medical information is usually classified according to content, meaning and place of origin, to: a) Primary (elementary); b) Secondary (operational); c) Tertiary (professional and scientific) (1). Generating information, any type, involves the operation of data processing, algorithm definition and selection of some of the methods for data processing. Data processing consists of various operations with the data of which are elementary: gathering, checking, sorting, editing, grouping, computing, storage, retrieval, copying and transferring (1). To produce information with a set of operations, is necessary to determine their choice and order of execution, which will be the final number of steps lead to solution-algorithm (2).

2. SOURCES OF SCIENTIFIC AND TECHNICAL INFORMATIONS

The source of scientific and tech-

nical information can only be manual - scientist, or expert whose scientific and professional work is creating knowledge about something (1). As information providers he creates documents that represent the materialized for of those informations.

The primary publications is the document that contains text with the primary informations in its original form, as they were prepared by the author. They can be roughly divided into: Magazines or Monographs (books, thesis, atlases, specialist papers, etc.) (2).

According to the matter which they cover, biomedical journals are divided into four groups (1):

- Narrowly specialized journals - processed material from the immediate area or a particular speciality. They are usually oriented to a segment of medicine, only rarely to an organ or disease. These magazines are mostly ar-

chival type, carefully prepared, rigorously reviewed and have high scientific value.

- General biomedical journals - are intended as a broad range users, and generally treat the broad issues in the field of biomedical and life sciences. Some of these journals publish important original articles from the different specialty with data of greater interest to the medical public.
- Classic magazines - treat the problem from only one of the biomedical field. Published once a month and are considered the predecessor of the first magazine.
- The primary scientific journals - part of scientific literature and main source of scientific information. These are serial in which the first published results of original research and review scientific articles.

A new era of compute science, allows scientists and experts from all fields of biomedical sciences, publishing their work in electronic form. Databases are the perfect and easy access for professionals, and also for the students, to all relevant informations, either for their work or research. Whether it is a full-text or abstract form, every serious editorial has it's place in the databases.

3. REVIEW OF MOST IMPORTANT BIOMEDICAL DATABASES

The database system is an organized set of data. It is consist of a records, identically defined and described. Each scientific paper is record in data written by rules recommended by several scientific associations and committees (1-13). Databases can contain information about the author (including bibliographic data and abstract) and the original work. Data set determines the type of base. The databases are processed best professional journals and publications, and the reliability and quality of information guarantees producers of databases. Most important databases are located in famous university/academic centers, like: Bethesda (NLM), Philadelphia (ISI), Amsterdam (Elsevier), Ipswich (EBSCO), Geneva (WHO),

Moscow (RAS), Shiraz (ISC), Warsaw (IC), etc. (14-30).

For all the databases are the same basic information: author (by name); title; magazine which is published; year of publication (1).

Generally, we can divide them into three categories (1, 2):

a) Bibliographic database

Contents bibliographic database refers to papers published in various journals and publications. They contain information such as author, title, source, abstract, year of publication, the institution from which the author comes, publication type, the original language of bibliographic databases, etc. Bibliographic database can vary depending on the area, scope and structure of bibliographic records that enable, a description of the works are very detailed and uniform. These databases are linked with other databases and the original version of published works (1).

b) Citation database

Citation database are also bibliographic databases. Since bibliographic databases differ in addition to the work themselves, processed and used references, the above quote by the author, at the end of work. With them we learn how the works are quoted and used to assess the quality of the cited work and estimated the impact of individual works by specifying the number of citations (1).

c) Full text databases

These are mainly collections of journals in electronic form, one or more publishers. Contains bibliographic information (as well as bibliographic databases), and numerous other data. It should be alert to the difference between databases with full text to the bibliographic, which have only indicated a connection (link) with the full text bases. Full text databases usually offered in HTML and/or PDF format (1).

3.1. THOMSON REUTERS

(Figure 1.) Thomson Reuters Corporation (NYSE: TRI) is a business data provider and was created by the Thomson Corporation's purchase of Reuters Group on 17 April 2008 (13, 14, 15). The Thomson Corporation acquired Reuters Group

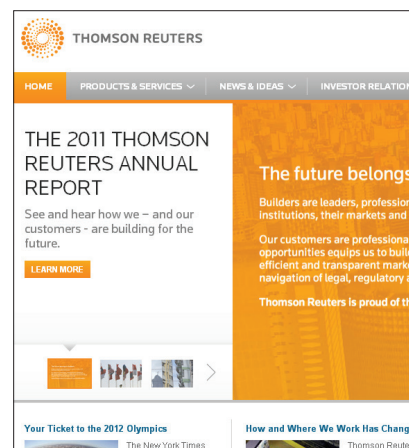


Figure 1. (<http://thomsonreuters.com/>, accessed 2012, April 12th)

PLC to form Thomson Reuters on April 17, 2008. Thomson Reuters operated under a dual-listed company ("DLC") structure and had two parent companies, both of which were publicly listed—Thomson Reuters Corporation and Thomson Reuters PLC. The Company is organized into two divisions:

Markets Division:

- Financial Professionals & Marketplaces;
- Enterprise Solutions;
- Media.

Professional Division:

- Legal—formerly North American Legal and Legal & Regulatory; including West, makers of Westlaw, and Carswell;
- IP & Science—formerly Thomson Healthcare and Thomson Scientific;
- Tax & Accounting—formerly Thomson Tax & Accounting.

3.1.1. Current contents

[http://thomsonreuters.com/products_services/science/science_products/a-z/current_contents/]

(Figure 2.) *Current Contents*® is a current awareness database that provides easy access to complete tables of contents, bibliographic information, and abstracts from the most recently published issues of leading scholarly journals (13, 14). Cover-to-cover, expert indexing provides accurate access to all the information available in journals, not just articles.

The web version, *Current Contents Connect*®, is part of the *Web of Knowledge* integrated solution, and

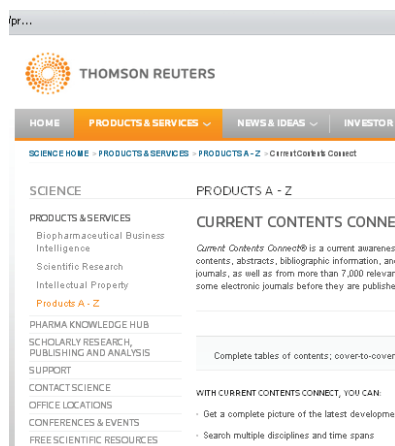


Figure 2. [http://thomsonreuters.com/products_services/science/science_products/a-z/current_contents_connect/, accessed 2012, April 12th]

offers daily updates and data from evaluated websites and documents.

Current Contents was first published in paper format, in a single edition devoted only to biology and medicine. Other subject editions were added later. Initially, it consisted simply of a reproduction of the title pages from several hundred major peer-reviewed scientific journals, and was published weekly, with the issues containing title pages from journal issues only a few weeks previously, a shorter time lag than any service then available. There was an author index and a crude keyword subject index only. Author addresses were provided so readers could send reprint requests for copies of the actual articles.

Still published in print, it is presently available as one of the databases included in Thomson's ISI Web of Knowledge with daily updates, and also through other database aggregators.

The following different editions exist:

- Current Contents Agricultural, Biological and Environmental Sciences;
- Current Contents Arts and Humanities;
- Current Contents Clinical Practice;
- Current Contents Engineering, Technology and Applied Sciences;
- Current Contents Life Sciences;
- Current Contents Physical Chemical and Earth Sciences;
- Current Contents Social & Behavioral Sciences.

3.1.2. ISI Web of Knowledge

[<http://wokinfo.com/about/whatitis/>]

(Figure 3.) Thomson Reuters Web of Knowledge SM is a research platform that gives you access to objective content and powerful tools to search, track, measure and collaborate in the sciences, social sciences, arts, and humanities (13, 15). This intelligent research platform provides access to the world's leading citation databases, including powerful cited reference searching, the Analyze Tool, and over 100 years of comprehensive backfile and citation data.

With *Thomson Reuters Web of Knowledge*, you choose the resources that you need—there's no need to subscribe to unnecessary or extraneous databases (13, 16). Combine renowned multidisciplinary databases with content-specific selections and tools for analysis and measurement to create the *Web of Knowledge* that turns raw data into the powerful knowledge you need.

Citations symbolize the association of scientific ideas. *Web of Knowledge* uniquely indexes both cited and citing works—which enables the user to make explicit links between current research and prior scientific works.

Use cited reference data to move both backward and forward in time to track and determine research influence.

Use citation analysis to find influential authors who are publishing high-impact research in your field, discover important author and/or institutional research collaborations, determine where the most im-

portant research is being published.

Analyze research from high-impact journals in the Sciences, Social Sciences, Arts, and Humanities, and seamlessly link to full-text articles

It is described as a unifying research tool which enables the user to acquire, analyze, and disseminate database information in a timely manner. This is accomplished because of the creation of a common vocabulary for varied search terms and varied data. Moreover, search terms generate related information across categories.

Acceptable content for the Web of Knowledge is determined by an evaluation and selection process based on the following criteria: impact, influence, timeliness, peer review, and geographic representation.

The database includes the following:

- 23,000 academic and science journals (Including Web of Science journal listings);
- 23,000,000 patents;
- 110,000 conference proceedings;
- 9,000 websites;
- Coverage from the year 1900 to present day (with Web of Science);
- Over 40 million source items;
- Integrated and simultaneous searching across multiple databases.

3.1.3. ISI Web of Science

[http://thomsonreuters.com/products_services/science/science_products/a-z/web_of_science/]

(Figure 4.) Web of Science is an online academic citation index provided by Thomson Reuters: It is designed for providing access to multiple databases, cross-disciplinary research, and in-depth exploration of specialized subfields within an academic or scientific discipline (13, 14). As a citation index, any cited paper will lead to any other literature (book, academic journal, proceedings, etc.) which currently, or in the past, cites this work. In addition, literature which shows the greatest impact in a field covered by Web of Science, or more than one discipline, can be selectively obtained. For example, a paper's influence can be determined by linking to all the papers that have cited it.

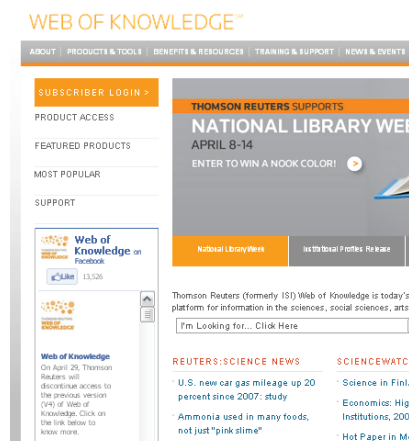


Figure 3. [<http://wokinfo.com/>, accessed 2012, April 12th]

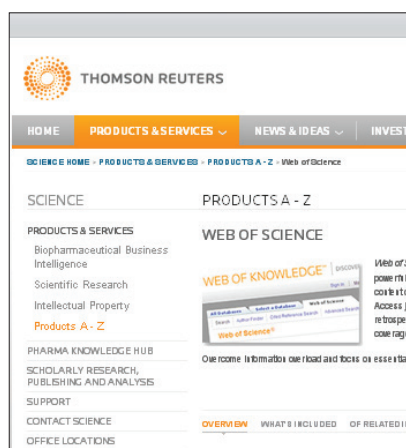


Figure 4. (http://thomsonreuters.com/products_services/science/science_products/a-z/web_of_science/, accessed 2012, April 12th)

In this way, current trends, patterns, and emerging fields of research can be assessed. Web of Science has indexing coverage from the year 1900 to the present.

Web of Science® provides researchers, administrators, faculty, and students with quick, powerful access to the world's leading citation databases. Authoritative, multidisciplinary content covers over 12,000 of the highest impact journals worldwide, including Open Access journals and over 150,000 conference proceedings. You'll find current and retrospective coverage in the sciences, social sciences, arts, and humanities, with coverage to 1900.

Titles of foreign-language publications are translated into English and so cannot be found by searches in the original language.

The following types of literature are indexed: peer reviewed journals, original research articles, reviews, editorials, chronologies, abstracts, as well as other areas. Disciplines included in this index are agriculture, biological sciences, engineering, medical and life sciences, physical and chemical sciences, anthropology, law, library sciences, architecture, dance, music, film, and theater. Six citation databases encompasses coverage of the above disciplines.

Web of Science has six available databases:

- Science Citation Index Expanded covers more than 7,100 notable journals encompassing 150 disciplines. Coverage is from the

year 1900 to the present day.

- Social Sciences Citation Index covers more than 2,470 journals encompassing 50 social science disciplines. Moreover, this index covers 3,500 notable scientific and technical journals. Range of coverage is from the year 1956 to the present day.
- Arts & Humanities Citation Index covers more than 1,395 arts and humanities journals, in addition to certain items from more than 6,000 scientific and social sciences journals.
- Conference Proceedings Citation Index covers more than 110,000 journals and book-based proceedings in two editions: Science and Social Science and Humanities, encompassing 256 disciplines.
- Index Chemicus indexes more than 2.6 million compounds. The range of coverage is from 1993 to present day.
- Current Chemical Reactions indexes over one million reactions, and the range of coverage is from 1986 to present day. The INPI archives from 1840 to 1985, are also indexed in this database.

3.2. NLM—NATIONAL LIBRARY OF MEDICINE DATABASES

(<http://www.nlm.nih.gov/pubs/factsheets/nlm.html>)

(Figure 5.) The National Library of Medicine (NLM), in Bethesda, Maryland, is a part of the National Institutes of Health, US Department of Health and Human Services (HHS) (16, 17, 18). Since its founding in 1836, NLM has played a pivot-

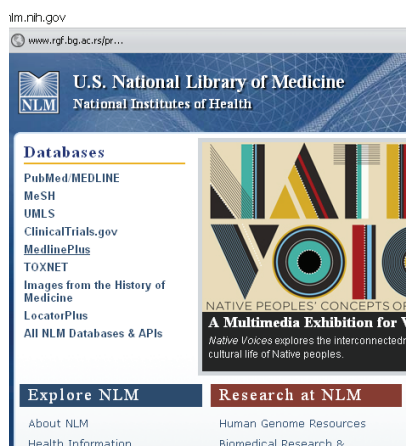


Figure 5. (<http://www.nlm.nih.gov/>, accessed 2012, April 12th)

al role in translating biomedical research into practice. It is the world's largest biomedical library and the developer of electronic information services that deliver trillions of bytes of data to millions of users every day. Scientists, health professionals, and the public in the US and around the globe search the Library's online information resources more than one billion times each year.

The Library is open to all and has many services and resources—for scientists, health professionals, historians, and the general public. NLM has nearly 12 million books, journals, manuscripts, audiovisuals, and other forms of medical information on its shelves, making it the largest health-science library in the world.

In today's increasingly digital world, NLM carries out its mission of enabling biomedical research, supporting health care and public health, and promoting healthy behavior by:

- Acquiring, organizing, and preserving the world's scholarly biomedical literature;
- Providing access to biomedical and health information across the country in partnership with the 5,600-member National Network of Libraries of Medicine (NN/LM®);
- Serving as a leading global resource for building, curating and providing sophisticated access to molecular biology and genomic information, including those from the Human Genome Project and NIH Roadmap;
- Creating high quality information services relevant to toxicology and environmental health, health services research, and public health;
- Conducting research and development on biomedical communications systems, methods, technologies, and networks and information dissemination and utilization among health professionals, patients, and the general public;
- Funding advanced biomedical informatics research and serving as the primary supporter of pre- and post-doctoral research train-

ing in biomedical informatics at 18 US universities.

Scientific Information Services: The most frequently consulted online scientific medical resource in the world is MEDLINE®/PubMed®, a publicly available database of over 18 million journal citations from 1948 to the present.

Another important part of NLM's vast online holdings is PubMed Central® (PMC), a Web-based repository of biomedical journal literature providing free, unrestricted access to more than 1.5 million full-text articles.

3.2.1. MEDLINE

[\[http://www.nlm.nih.gov/pubs/factsheets/medline.html\]](http://www.nlm.nih.gov/pubs/factsheets/medline.html)

(Figure 6.) MEDLINE is the U.S. National Library of Medicine's® (NLM) premier bibliographic database that contains over 19 million references to journal articles in life sciences with a concentration on biomedicine (16, 17). A distinctive feature of MEDLINE is that the records are indexed with NLM Medical Subject Headings (MeSH®).

The great majority of journals are selected for MEDLINE based on the recommendation of the Literature Selection Technical Review Committee (LSTRC), an NIH-chartered advisory committee of external experts analogous to the committees that review NIH grant applications. Some additional journals and newsletters are selected based on NLM-initiated reviews, e.g., history of medicine, health services research, AIDS, toxicology and environmental health, molecular biology, and complementary medicine, that are special priorities for NLM or other NIH components. These reviews generally also involve consultation with an array of NIH and outside experts or, in some cases, external organizations with which NLM has special collaborative arrangements.

MEDLINE is the primary component of PubMed®, part of the Entrez series of databases provided by the NLM National Center for Biotechnology Information (NCBI).

Time coverage: generally 1946 to the present, with some older material.



Figure 6. (<http://www.ncbi.nlm.nih.gov/pubmed/>, accessed 2012, April 12th)

Source: Currently, citations from approximately 5,600 worldwide journals in 39 languages; 60 languages for older journals. Citations for MEDLINE are created by the NLM, international partners, and collaborating organizations.

Updates: Since 2005, between 2,000–4,000 completed references are added each day, Tuesday through Saturday; nearly 700,000 total added in 2010. Updates are suspended for several weeks during November and December as NLM makes the transition to a new year of Medical Subject Headings (MeSH) vocabulary used to index the articles.

Broad subject coverage: The subject scope of MEDLINE is biomedicine and health, broadly defined to encompass those areas of the life sciences, behavioral sciences, chemical sciences, and bioengineering needed by health professionals and others engaged in basic research and clinical care, public health, health policy development, or related educational activities. MEDLINE also covers life sciences vital to biomedical practitioners, researchers, and educators, including aspects of biology, environmental science, marine biology, plant and animal science as well as biophysics and chemistry. Increased coverage of life sciences began in 2000.

The majority of the publications covered in MEDLINE are scholarly journals; a small number of newspapers, magazines, and newsletters considered useful to particular segments of the NLM broad user community are also included. For cita-

tions added from 2005–2009: about 45% are for cited articles published in the U.S., about 91% are published in English, and about 83% have English abstracts written by authors of the articles.

Availability: MEDLINE is the primary component of PubMed (<http://pubmed.gov>); a link to PubMed is found on the NLM home page at <http://www.nlm.nih.gov>. The result of a MEDLINE/PubMed search is a list of citations (including authors, title, source, and often an abstract) to journal articles and an indication of free electronic full-text availability. Searching is free of charge and does not require registration.

A growing number of MEDLINE citations contain a link to the free full text of the article archived in PubMed Central® or to other sites. You can also link from many MEDLINE references to the Web site of the publisher or other full text provider to request or view the full article, depending upon the publisher's access requirements. For articles not freely available on the Web, the "Loansome Doc®" feature in PubMed provides an easy way to place an electronic order through the National Network of Libraries of Medicine® (NN/LM®) for the full-text copy of an article cited in MEDLINE. Registration is required and local fees may apply for this service.

Services/products providing access to MEDLINE data are also developed and made available by organizations that lease the database from NLM. Access to various MEDLINE services is often available from medical libraries, many public libraries, and commercial sources.

MedlinePlus®, another service offered by the NLM, provides consumer-oriented health information. Health consumers are encouraged to discuss search results with their health care provider.

3.2.2. PubMed Central

[\[http://www.ncbi.nlm.nih.gov/pmc/about/intro/\]](http://www.ncbi.nlm.nih.gov/pmc/about/intro/)

(Figure 7.) PubMed Central® (PMC) is a free archive of biomedical and life sciences journal literature at the U.S. National Institutes of Health's National Library of Med-

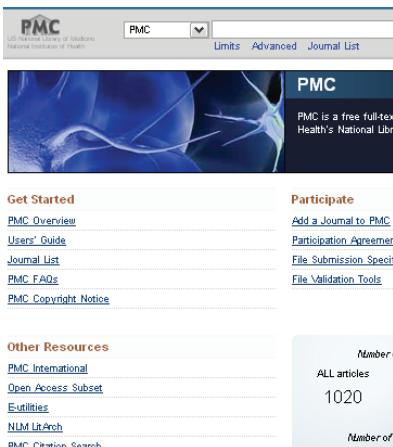


Figure 7. (<http://www.ncbi.nlm.nih.gov/pmc/>, accessed 2012, April 12th)

icine (NIH/NLM) (16, 18). In keeping with NLM's legislative mandate to collect and preserve the biomedical literature, PMC serves as a digital counterpart to NLM's extensive print journal collection. Launched in February 2000, PMC was developed and is managed by NLM's National Center for Biotechnology Information (NCBI).

As an archive, PMC is designed to provide permanent access to all of its content, even as technology evolves and current digital literature formats potentially become obsolete. NLM believes that the best way to ensure the accessibility and viability of digital material over time is through consistent and active use of the archive. For this reason, free access to all of its journal literature is a core principle of PMC.

The PubMed Central National Advisory Committee, established in 1999, provides independent advice on the content and operation of PubMed Central. The Committee is responsible for establishing criteria for groups submitting material to the system, and ensuring that PubMed Central remains responsive to the needs of researchers, publishers, librarians, and the general public. Members of the Committee are appointed by the Director of the National Institutes of Health from the biomedical and information communities as well as the general public.

PubMed Central began operating in February 2000 with content from two journals: *PNAS: Proceedings of the National Academy of Sciences* and *Molecular Biology of the Cell*.

The currency and age of material in PubMed Central varies by journal.

Many journals make their content available in PMC as soon as it is published. Others may delay release of content in PMC for anywhere from a few months to more than a year after publication. Most journals provide free access to full text in PMC within a year of publication.

NLM has digitized the earlier print issues of many of the PMC journals in order to provide online access to the complete run of issues of these journals. PMC has material dating back to mid- to late-1800s or early 1900s for some journals.

No. Journals that deposit their articles in PMC fall into one of three categories:

- For several hundred journals, PMC has the complete contents of each issue, starting with the first issue. For the older journals in this group, the back issues of a journal (generally, anything prior to the late 1990s) are available as digitized (scanned) copies of the original print journal.
- For a smaller group of journals, PMC has complete issues and volumes for recent years, but not for all the early years of the journal.
- For still other journals, PMC does not contain any complete issues, just a selection of articles, e.g., just those that are the result of NIH-funded research, or those that the journal has published as open access articles.

In all three categories, PMC contains a journal's final published version of the respective articles. The PMC Journal List includes information about what content is available from each journal, as well as links to that content.

In addition to the articles from these journals, PMC contains author manuscripts of selected articles from several thousand other journals. These manuscripts are accessible via a PMC search or a link from the corresponding PubMed abstract.

3.3. ELSEVIER as the host of databases

(http://www.elsevier.com/wps/find/intro.cws_home/atagance)

(Figure 8.) Elsevier, the modern publishing company, was founded

in 1880 (19, 20, 21, 22). It has evolved from a small Dutch publishing house devoted to classical scholarship into an international multimedia publishing company with over 20,000 products for educational and professional science and health-care communities worldwide. Elsevier takes its name from the original House of Elzevir, a Dutch family publishing house founded in 1580.



Figure 8. (http://www.elsevier.com/wps/find/homepage.cws_home, accessed 2012, April 12th)

Elsevier's history reflects a series of collaborations in the effort to advance science and health. These publishing collaborations with a group of scientific visionaries—ranging from Jules Verne to Stephen W. Hawking—created the foundation of scientific and medical publishing.

The efforts of the men and women dedicated to disseminating and using scientific and medical knowledge have been equally critical—the editors, printers, librarians, nurses, doctors, engineers, information specialists and business people at the center of scientific and health publishing.

Relationships with other great science publishers such as North Holland, Pergamon, Mosby, W.B. Saunders, Churchill Livingstone and Academic Press have also been integral to our success. These are just a few of the companies that are now part of the Elsevier family, bringing with them rich histories of their own. As the company moves forward, our founding motto remains apt: Non Solus—Not Alone.

As the world's leading provider of science and health information, Elsevier serves more than 30 million

scientists, students and health and information professionals worldwide.

3.3.1. EMBASE

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

(Figure 9.) With over 24 million indexed records and more than 7,600 currently indexed peer-reviewed journals, Embase is a highly versatile, multipurpose and up-to-date database covering the most important international biomedical literature from 1947 to the present day (19, 20). All MEDLINE records produced by the National Library of Medicine (NLM) are included, as well over 5 million records not covered on MEDLINE.

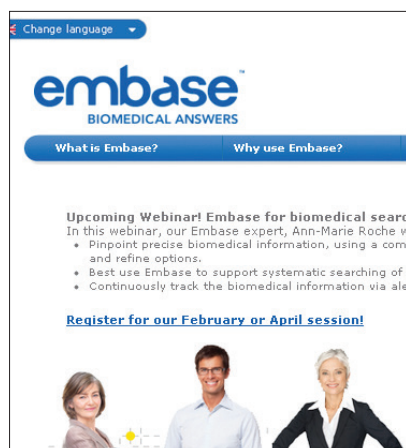


Figure 9. (<http://www.embase.com/>, accessed 2012, April 12th)

Core strengths of Embase include coverage and in-depth indexing of the drug-related and clinical literature, with a particular focus on comprehensive indexing of adverse drug reactions; emphasis on Evidence Based Medicine (EBM) indexing including systematic reviews, and coverage and indexing of journals and articles relevant to the development and use of medical devices.

If you are searching for answers to your questions or simply need reliable, peer-reviewed information on topics such as drug development or use, toxicology, drug safety/adverse drug reactions, clinical trials, evidence based medicine, medical devices, pharmacoeconomics, pre-clinical reports, basic biomedical science or regulatory affairs, then Embase is the solution you are looking for.

3.3.2. Scopus

<http://www.info.sciverse.com/scopus/scopus-in-detail/facts>

(Figure 10.) Scopus is the largest abstract and citation database of peer-reviewed literature with smart tools to track, analyze and visualize research. It's designed to find the information scientists need. Quick, easy and comprehensive, Scopus provides superior support of the literature research process.

SciVerse Scopus, some facts: Contains 46 million records, 70% with abstracts; Nearly 19,500 titles from 5,000 publishers worldwide; Includes over 4.6 million conference papers; Provides 100% Medline coverage; Interoperability with Engineering Village; Interoperability with Reaxys, a unique chemistry workflow solution; Offers sophisticated tools to track, analyze and visualize research

Scopus, launched in November 2004, is the largest abstract and citation database containing both peer-reviewed research literature and quality web sources. With over 19,000 titles from more than 5,000 international publishers, SciVerse Scopus offers researchers a quick, easy and comprehensive resource to support their research needs in the scientific, technical, medical and social sciences fields and, more recently, also in the arts and humanities.

SciVerse Scopus at a glance July 2011:

- More than 19,500 titles: 18,500 peer-reviewed journals (including 1,800 Open Access journals); 425 trade publications; 325 book series, 250 conference proceedings.
- 46 million records: 25 million records with references back to 1996 (of which 78% include references); 21 million records pre-1996 which go back as far as 1823; 4.8 million conference papers from proceedings and jour-

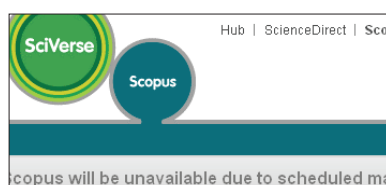


Figure 10. (<http://www.scopus.com/home.url>, accessed 2012, April 12th)

nals; “Articles-in-Press” from over 3,850 journals.

Features and functionality designed to support and improve researchers' workflow, including:

- A simple and intuitive interface;
- Linking to full-text articles and other library resources;
- Author Identifier to automatically match an author's published research including the h-index;
- Citation Tracker to simply find, check and track citations in real-time;
- Affiliation Identifier to automatically identify and match an organization with all its research output;
- Journal Analyzer provides a quick insight into journal performance;
- Alerts, RSS and HTML feeds to stay up-to-date;
- Document Download Manager to easily download and organize multiple full-text articles simultaneously;
- Interoperability with SciVerse ScienceDirect, Reaxis and ProQuest's CSA Illumina;
- Data export via bibliographic managers such as RefWorks, EndNote and BibTeX.

3.3.3. Scirus

http://www.elsevier.com/wps/find/electronicproductdescription.cws_home/672920/description#description

(Figure 11.) Scirus (<http://www.scirus.com>) is a free web search engine developed especially for scientists, researchers and students. It enables anyone searching for scientific information to pinpoint the information they need—including peer-reviewed articles, patent information, author home pages and university web sites—quickly and easily. Scirus offers both Basic and Advanced search options—with the Advanced search, you can be more specific with what you are looking—(selecting a subject area or content source for instance) before searching.

Locating scientific information on the Web is easy with Scirus because it:

- targets scientific information only

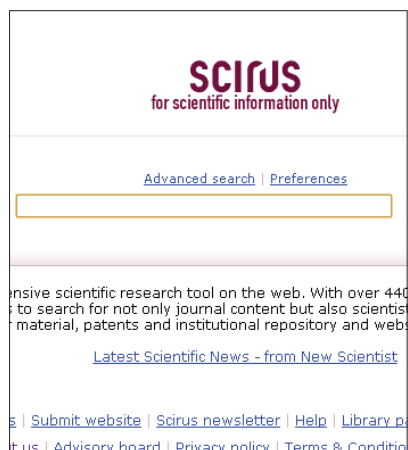


Figure 11. (<http://www.scirus.com/>, accessed 2012, April 12th)

- Scirus offers an advantage over other Web search engines because it only finds scientific content, so you don't have to wade through pages of irrelevant results to find the information you are looking for.
- covers over 480 million science-related pages
- Scirus reveals a wealth of scientific information from Web sources (e.g. university sites, author homepages, company homepages, open access journals), and databases (e.g. articles from 14 scientific publishers (including Elsevier's ScienceDirect and Nature Publishing Group), MEDLINE abstracts, the five largest patent offices (USPTO, JPO, EPO, WIPO/PCT and UKIPO), institutional and subject repositories (e.g. ArXiv, RePEc, NASA), illuminating your research with unique sources of scientific content..
- finds the most peer-reviewed articles
- By delving deep into major databases, Scirus finds more peer-reviewed articles than any other search engine, giving you greater access to key sources of information.
- offers unique features designed specially for scientists
- Scirus was specifically developed for researchers in scientific, technical and medical fields. As well as unrivalled content, Scirus has unique features and functionalities that make it easy for you to find the most relevant research information.

- Scirus has outperformed Google in Usability testing and won several Search Engine Watch Awards.

3.4. EBSCO

(<http://www.ebscohost.com/about-us>)

(Figure 12.) Established in 1944, EBSCO is the world's leading information agent providing consultative services and cutting-edge technology for managing and accessing quality content, including print and e-journals, e-packages, research databases, e-books and more (23). Now more than ever libraries and research organizations are looking for new ways to manage their collections more efficiently. EBSCO Information Services has developed "e" discovery solutions, including EBSCO A-to-Z[®] and LinkSource[®], as well as management solutions such as EBSCONET[®], EBSCONET[®] ERM Essentials[®] and EBSCO MARC Updates. These services offer unparalleled integration to help librarians save time and money while empowering their users.

EBSCO's leading online full-text databases include access to full-text articles from peer-reviewed journals published by the world's most prestigious academic publishers. This content supplements existing library journal subscriptions, expanding access to important publications already in the library's print or e-journal collection. It also provides new access to many highly-valuable full-text resources previously unavailable to users.

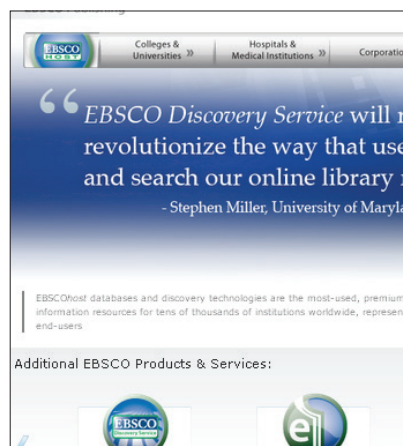


Figure 12. (<http://www.ebscohost.com/>, accessed 2012, April 12th)

As the leading database and eBook provider for libraries and other institutions—more than 375 full-text and secondary research databases and more than 300,000 eBooks and audiobooks available via the EBSCOhost platform—EBSCO provides unparalleled access to world-renowned content in all subject areas including magazine and journal articles available via EBSCOhost[®] and H.W. Wilson, eBooks and audiobooks, EBSCO's content services the research needs of tens of thousands of customers representing millions of end users from K-12 students to public library patrons, from academic, corporate and medical researchers to clinicians and governments around the world.

EBSCOhost, stands as one of the most-used for-fee sites on the Internet serving upwards of 100 million daily page views. EBSCOhost also powers resources such as *DynaMed*[™], an evidence-based clinical reference tool as well as other Clinical Point-of-Care Resources designed to inform the clinical workflow for hospitals and other medical institutions. EBSCO's NoveList division provides Readers' Advisory and Library Services Resources—a variety of services to help empower libraries, engage readers and connect communities. Corporations and government agencies also benefit from EBSCO's content specifically in the areas of Corporate Learning, Sustainability, Chemical Hazard Information, Employee Wellness and Pharmaceutical Resources.

EBSCO is also the provider of services designed to enable libraries and other institutions to better serve students and other researchers. EBSCO Discovery Service[™] (EDS) provides a unified index of an institution's resources within a single, customizable search box approach allowing researchers fast, simple access to the library's full text content plus deeper indexing and more full-text searching of a higher number of journals and magazines than any other discovery service.

Bringing together premium content that is not available anywhere else online with the innovative services libraries and other institutions

need to deliver that content continues to drive EBSCO toward the next innovation.

3.5. Ulrich's Periodical Directory

(Figure 13.) Ulrich's Periodicals Directory is the standard library directory and database providing information about popular and academic magazines, scientific journals, newspapers and other serial publications (24).

The print version has been published since 1932, and was founded by Carolyn Ulrich, chief of the periodicals division of the New York Public Library, as Periodicals Directory: A Classified Guide to a Selected List of Current Periodicals Foreign and Domestic.

It is now also supplied on-line as



Figure 13. (<http://ulrichsweb.serialsolutions.com/login>, accessed 2012, April 12th)

Ulrichsweb, which provides web-based and Z39.50 linking to library catalogs. The online version includes over 300,000 active and current periodicals.

Coverage is international, with some emphasis on English-language publications. The information is derived from the publishers and verified by the journal. It includes

- ISSN;
- Title and previous titles;
- Starting date, place of publication, and publisher;
- Cost, availability of electronic versions, subscription terms, and approximate circulation as estimated by the publisher;
- Subject information, searchable as subject terms or approximate Dewey Classification, special features, and indexing information;
- Indications of whether the publication is available on open access;
- Indication of whether the publication is peer-reviewed, which is taken to include professional magazines with equivalent edi-

torial control of quality.

Earlier published by R.R. Bowker, it moved to CSA, a fellow subsidiary of Cambridge Information Group, in 2006. Following the merger of CSA and ProQuest, Ulrich's moved to ProQuest subsidiary Serials Solutions.

3.6. WHO AS A HOST OF DATABASES

3.6.1. HINARI

(<http://www.who.int/hinari/about/en/>)

(Figure 14.) HINARI Programme set up by WHO together with major publishers, enables developing countries to gain access to one of the world's largest collections of biomedical and health literature (25). More than 8,500 journals and 7000 e-books (in 30 different languages) are now available to health institutions in more than 100 countries, areas and territories benefiting many thousands of health workers and researchers, and in turn, contributing to improve world health.

HINARI Access to Research in Health Programme provides free or very low cost online access to the major journals in biomedical and related social sciences to local, not-for-profit institutions in developing countries.

HINARI was launched in January 2002, with some 1500 journals from 6 major publishers: Blackwell, Elsevier Science, the Harcourt Worldwide STM Group, Wolters Kluwer International Health & Science, Springer Verlag and John Wiley, following the principles in a Statement of Intent signed in July



Figure 14. (<http://www.who.int/hinari/en/>, accessed 2012, April 12th)

2001. Since that time, the numbers of participating publishers and of journals and other full-text resources has grown continuously. Today more than 150 publisher partners are offering more than 15,000 information resources in HINARI and many others are joining the programme.

3.6.2. GENEVA FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH—GFMER

(http://www.gfmer.ch/000_Homepage_En.htm)

(Figure 15.) Established in 2002, the Geneva Foundation for Medical Education and Research (GFMER) is a non-profit organization that aims to provide health education and research training, creating pro-



Figure 15. (http://www.gfmer.ch/000_Homepage_En.htm, accessed 2012, April 12th)



Figure 15. (http://www.gfmer.ch/000_Homepage_En.htm, accessed 2012, April 12th)

grammes that can be applied by developing countries and countries in economic transition (26). It also works to establish collaboration between entities from the public and private sectors. GFMER is supported by the Department of Health of the Canton of Geneva, the Department of Social Affairs of the City of Geneva, the Faculty of Medicine of the University of Geneva, and the Geneva Medical Association. GFMER is a WHO Collaborating Centre in Education and Research in Human Reproduction.

Areas of interest:

- medical education;
- medical research;
- training programmes in research methodology, epidemiology, reproductive and sexual health.

Health-related activities

The activities of GFMER range from training in medical research, to research implementation, research synthesis, research management and guideline development. GFMER runs workshops and training courses in, among other things, reproductive and sexual health research. A Postgraduate Training Network for Research in Reproductive Health has been established in 2003. Clinical training activities in the field of Obstetric Fistula are regularly held with partner institutions in resource-constrained countries.

3.7. CABI

[\[http://www.cabi.org/default.aspx?site=170&page=1016&pid=125\]](http://www.cabi.org/default.aspx?site=170&page=1016&pid=125)

(Figure 16.) The most comprehensive database of its kind, *CAB Abstracts* gives researchers instant access to over 6.3 million records from 1973 onwards, with over 300,000 abstracts added each year (27). Its coverage of the applied life sciences includes agriculture, environment, veterinary sciences, applied economics, food science and nutrition.



Figure 16. [<http://www.cabi.org/default.aspx?site=170&page=1016&pid=125>, accessed 2012, April 12th]

Our excellent international coverage sets *CAB Abstracts* apart from other databases. We process all relevant publications, including less well-known and non-English journals and those published by independent and learned publishers. With publications from over 116 countries in 50 languages, including English abstracts for most articles, researchers get the fullest global picture for any subject.

Global Health is the only specialist bibliographic, abstracting and indexing database dedicated to public health research and practice.

Derived from over 3500 journals, plus reports, books and conferences, Global Health contains over 1.2 million scientific records from 1973 to the present. Over 90,000 records are added each year, and over 95% of these records include an abstract. Publications from over 158 countries in 50 languages are abstracted, and all relevant non-English-language papers are translated to give access to research not available through any other database. The database's open serials policy and coverage of international and grey literature means that 40% of material contained in Global Health is unique to the database. Everything from proceedings, patents, theses, electronic only publications and other difficult-to-obtain sources are included. Each record has been hand-selected by our subject specialists from over 7,500 serials*, books and conference proceedings, ensuring unparalleled coverage. As a result, we have been shown to include information from more agricultural serials than any other database (don't just take our word for it – click here for an excerpt from an independent study published in *Issues in Science and Technology Librarianship*)

3.8. DIMDI – Medical Knowledge Online

[\[http://www.dimdi.de/static/en/index.html\]](http://www.dimdi.de/static/en/index.html)

(Figure 17.) High quality information for all health care areas: DIMDI is the publisher of official medical classifications such as ICD-10-GM and OPS (German procedure classification) and maintains medical terminologies, thesauri, nomenclatures and catalogues (e.g. MeSH, UMDNS, Alpha-ID, LOINC, OID) that are important for health telematics and other applications (28).

DIMDI develops and operates database-supported information systems for drugs and medical devices and is responsible for a programme of health technology assessment (HTA). The information systems are



Figure 17. [<http://www.dimdi.de/static/de/index.html>, accessed 2012, April 12th]

amended by many medical databases which you can search for articles and facts throughout medicine.

Health Technology Assessment (HTA)

- describes the systematic evaluation of health-relevant procedures and methods (vaccinations, medical treatments, preventative measures etc.);
- examines the effectiveness, safety and economic viability of a health intervention, as well as its social, ethical, legal and organisational effects;
- serves as the basis for decisions in the health system: e.g. in policy or in terms of treatment by a doctor.

The German Agency of Health Technology Assessment (DAHTA) of the German Institute of Medical Documentation and Information (DIMDI) publishes HTA reports. These cover different topics in the area of prevention, diagnosis, therapy, rehabilitation, nursing and methodology.

3.9. Russian Academy of Sciences as a host of VINITI

3.9.1. VINITI database of RAS

(Figure 18.) For many years Russia has had an excellent track record for world-class scientific research conducted in research institutes under the umbrella of the Academy of Sciences of the USSR (now the Russian Academy of Sciences–RAS) (24). Today there are about 400 research institutes under the auspice of the Russian Academy of Sciences (RAS), among them the All Russian



Figure 18. (http://www2.viniti.ru/index.php?option=com_content&task=view&id=23&Itemid=52, accessed 2012, April 12th)

Institute for Scientific and Technical Information (VINITI) occupies a special place as a leading agency in information processing domain.

Due to VINITI's mission to process all literature relating to basic and applied science published in the Russian language, its staff has a different approach for the selection of domestic and foreign journals. Editors performing journal evaluation have an educational background in various foreign languages and in library science. They also have to consult editors with an educational background in a specified field of science if a new journal could be useful for JA

(Journal Abstracts) on a specific discipline (as an example, for processing of JA on Physics or JA on Genetics or JA on Medicine, etc.). Due to non-existence of the special information agency on medical sciences. VINITI took the responsibility to fill the gap and to collect and process literature on medical science since 1998.

VINITI offers the largest Data-Bank (DBn) in Russia via web server (<http://www.viniti.ru>), with back-year data available to 1981. The total number of records is about 30 million; annual addition to DBn is about 1 million records. VINITI has a special group that performs bibliographic control of records. On the VINITI web server (www.viniti.ru) the DEMO database for demonstration is available. The search is available twenty-four hours a day, seven days a week. There are approximate-

ly one thousand requests per day.

VINITI developed its own classification scheme (Rubricator) for universal coverage on subject categories on natural and technical disciplines reflected in the VINITI Journal Abstract. The Rubricator of VINITI is based on the deepening of the State Classification (Rubricator) of S&T literature (SRSTI) up to level nine—according to a need of specific area of industry. Rubricator contains: subject heading in English and Russian languages; list of keywords indicating the frequency of their use based on the five-years file of databases and experts' evaluation; links of subject headings to other classifications.

3.10. GESDAV/ScopeMed

<http://www.scopemed.org/index.php?page=about>

(Figure 19.) ScopeMed is a free of charge online journal/Article management system, that can enable all of the operations of the editorial functions of a journal (29). It is also known as open access indexing and online manuscript submission, review and tracking system. ScopeMed is supported by GESDAV, a non-profit foundation concerning education, health, social help and contribution between alumni of Gulhane Medical faculty.

Advantages of ScopeMed:

- Open/Free access for peer reviewed medical journals;
- Online Submission of manuscripts;
- Automatic production of PDF file of submitted manuscripts for

reviewers;

- Online review of articles;
- Editors could manage articles online;
- ScopeMed also provide a static web page for Journals that using Scopemed article management system (sample: Sample Journal Web Page).
- Basic rules for using ScopeMed.

3.11. Google Scholar

<http://scholar.google.com/>

(Figure 20.) Google Scholar is a freely accessible web search engine that indexes the full text of scholarly literature across an array of publishing formats and disciplines (30). Released in beta in November 2004, the Google Scholar index includes most peer-reviewed online journals of Europe and America's largest scholarly publishers, plus scholarly books other non-peer reviewed journals. It is similar in function to the freely available Scirus from Elsevier, CiteSeerX, and getCITED. It is also similar to the subscription-based tools, Elsevier's Scopus and Thomson ISI's Web of Science. Its advertising words—"Stand on the shoulders of giants"—is a nod to the scholars who have contributed to their fields over the centuries, providing the foundation for new intellectual achievements.

Google Scholar allows users to search for digital or physical copies of articles, whether online or in libraries. "Scholarly" searches will appear using the references from "full-text journal articles, technical reports, preprints, theses, books, and other documents, including selected Web pages that are deemed to be "scholarly." Google Scholar is as easy to use as with the regular Google web search, especially with the helpfulness of the "advanced search" option, which can automatically narrow search results to a specific journal or article. Using its "group of" feature, it shows the available links to journal articles. In the 2005 version, this feature provided a link to both subscription-access versions of an article and to free full-text versions of articles; for most of 2006, it provided links to only the publishers' versions. Since December 2006, it has provided



Figure 19. (<http://www.scopemed.org/>, accessed 2012, April 12th)



Figure 20. (<http://scholar.google.com/>, accessed 2012, April 12th)

links to both published versions and major open access repositories, but still does not cover those posted on individual faculty web pages access to such self-archived non-subscription versions is now provided by a link to Google, where one can find such open access articles.

3.12. INDEX COPERNICUS – IC

(Figure 21.) The aim of this web-based communication platform is to offer a set of essential tools for global scientists networking and international research collaboration, providing scientists with:

- integration of different sources of information: literature, grants and patents and the personalised delivery thereof based on scientists profiles
- effective communication and exchange of information between scientists
- worldwide scientists networking based on research profiles

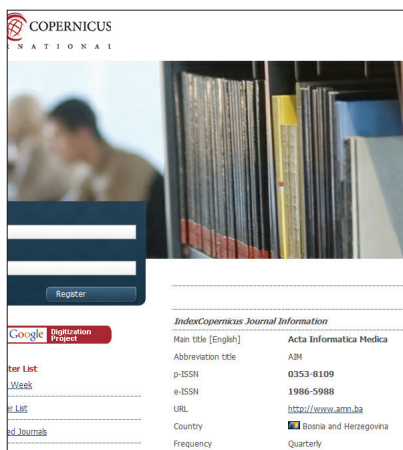


Figure 21. (<http://journals.indexcopernicus.com/passport.php?id=3652>, accessed 2012, April 12th)

- web-based infrastructure for management of multi-centre research projects
- notification of scientific/professional job vacancies on a personal basis
- multi-parameter career evaluation system which analyses research potential, innovation index, teaching potential and administration experience

Easily join or start your own on-line research projects, find collaborators with desirable research skills and access to key equipment for your research or search worldwide for scientists operating in your area of expertise and compare your professional career with those of others. Monitor literature, case reports, conferences, patents and available grant opportunities. IC saves you time effectively filtering available information so you receive exactly what you need right on your IC home panel.

4. BIH JOURNALS INCLUDED IN WORLD'S BIOMEDICAL DATABASES

There are fourteen indexed journals from Bosnia and Herzegovina currently present in world's biomedical scientific databases (1, 2).

After searching the world's 28 databases that included a review of indexation of these B&H biomedical journals, revealed the following:

“**Medical Archives**”, ISSN 0350-199x, the oldest medical journal (first published in 1947) in the area of Bosnia and Herzegovina is a journal that is indexed in the database of the world's highest, and 24, namely: PubMed /MedLine, NLM Catalog, EMBASE, Scopus, Scirus, EBSCO, Index Copernicus, CABI, Global Health, GFMER, VINITI of RAS, HINARI, Ulrich's Periodical Directory, ProQuest, NewJour, SCImago Journal and Country Rank, ISC Master Journal List, Genamics Journal Seek, World Cat, Research Gate, GESDAV/ScopeMed, Google Scholar, CIRRIE, Kubon Sagner and OPAC;

“**Acta Informatica Medica**”, ISSN 0353-8109, journal is indexed in 19 international databases, such as: the NLM Catalog, Scopus, EBSCO, Index Copernicus, CABI,

Global Health, GFMER, VINITI of RAS, HINARI, Ulrich's Periodical Directory, ProQuest, CrossRef, NewJour, ISC Master Journal List, Genamics Journal Seek, World Cat, GESDAV/ScopeMed, Google Scholar, Kubon Sagner and OPAC;

“**Materia Socio Medica**”, ISSN 1512-7689, indexed in 18 international databases, such as: the NLM Catalog, EMBASE, Scopus, Scirus, EBSCO, Index Copernicus, GFMER, VINITI of RAS, HINARI, Ulrich's Periodical Directory, ProQuest, CrossRef, NewJour, ISI Master Journal List, Genamics Journal Seek, World Cat, GESDAV/ScopeMed, Google Scholar;

“**Bosnian Journal of Basic Medical Sciences**”, ISSN 1840-4812, journal is indexed in 16 international databases, such as: Web of Science, PubMed/MedLine, EMBASE, Scopus, EBSCO, Index Copernicus, CABI, Ulrich's Periodical Directory, NewJour, SCImago Journal and Country Rank, Genamics Journal Seek, World Cat, Research Gate, Google Scholar, CIRRIE, Kubon Sagner and OPAC;

“**Medicinski Glasnik**”, ISSN 1840-0132, is indexed in 14 international databases, such as: Web of Science, PubMed/MedLine, EMBASE, Scopus, Scirus, EBSCO, Ulrich's Periodical Directory, NewJour, Genamics Journal Seek, World Cat, Research Gate, Google Scholar, CIRRIE, Kubon Sagner and OPAC;

“**Acta Medica Saliniana**”, ISSN 0350-364x, journal is indexed in 12 international databases, including: EMBASE, Scopus, EBSCO, Index Copernicus, GFMER, Ulrich's Periodical Directory, NewJour, SCImago Journal and Country Rank, World Cat, Research Gate, Google Scholar, Kubon Sagner and OPAC;

“**HealthMed**”, ISSN 1840-2291, journal is indexed in 10 international databases, such as: Web of Science, EMBASE, Scopus, EBSCO, Index Copernicus, SCImago Journal and Country Rank, Genamics, Journal Seek, World Cat, Research Gate, and Sagner Kubon OPAC;

“**Medicinski žurnal**”, ISSN 1512-5866, journal indexed in 9 international databases, such as: the NLM Catalog, Scopus, Scirus, EBSCO,

Index Copernicus, Ulrich's Periodical Directory, World Cat, Google Scholar, Sagner Kubon and OPAC;

“**Acta Medica Academica**”, ISSN 1840-1848, journal indexed in 7 international databases, such as: Scopus, EBSCO, Index Copernicus, CABI, Ulrich's Periodical Directory, World Cat, Google Scholar;

“**Pedijatrija Danas**”, ISSN 1840-2968, journal is indexed in 4 world databases, as follows: EBSCO, Index Copernicus, CABI, World Cat;

“**BH Surgery**”, ISSN 2233-0135, is indexed EBSCO and Index Copernicus databases;

“**Folia Medica Facultatis Medicinae Saraeviensis**”, ISSN 0352-9630, a journal indexed in the EBSCO database;

“**Journal of Health Sciences**”, ISSN 2232-7576, a journal indexed in the Index Copernicus database;

“**Scripta Medica**”, ISSN 0350-8218, a journal indexed in the Index Copernicus database.

If we take into account that Bosnia and Herzegovina over and passes a difficult time of economic crisis, war and post-war time, the consequences of which are reflected in all segments, especially in the education system at all levels, including higher education, Bosnian medical “scientific image” is a relatively good in relation to the conditions that medical scientists have when it comes to science and research in this area. The question is when will it get better conditions for greater and better scientific publishing in the field of medical sciences. Asked about the quality of published scientific articles and other Bosnian medical scientists with regard to the citations of papers published in 14 of these indexed medical journals currently published in Bosnia and Herzegovina is relatively low. There are many reasons for this situation and prospects is questionable to what

to improve any time soon. The interest of companies and organizations that are involved in the development of science and education in Bosnia and Herzegovina is very low. Current journals are generally being self-financing and subsist in its continuity issue.

Conflict of interest: none declared.

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- <http://www.cabi.org/default.aspx?site=170&page=1016&pid=125>
- <http://www.dimdi.de/static/en/index.html>, accessed 2012, April 12th
- <http://www.scopemed.org/index.php?page=about>, accessed 2012, April 12th
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