

Specialist Bibliographic Databases

Armen Yuri Gasparyan,¹
Marlen Yessirkepov,²
Alexander A. Voronov,³
Vladimir I. Trukhachev,⁴
Elena I. Kostyukova,⁵ Alexey N. Gerasimov,⁶
and George D. Kitas^{1,7}

¹Departments of Rheumatology and Research and Development, Dudley Group NHS Foundation Trust (Teaching Trust of the University of Birmingham, UK), Russells Hall Hospital, Dudley, West Midlands, UK; ²Department of Biochemistry, Biology and Microbiology, South Kazakhstan State Pharmaceutical Academy, Shymkent, Kazakhstan; ³Department of Marketing and Trade Deals, Kuban State University, Krasnodar, Russian Federation; ⁴Department of Technological Management, Stavropol State Agrarian University, Stavropol, Russian Federation; ⁵Faculty of Accounting and Finance, Department of Accounting Management, Stavropol State Agrarian University, Stavropol, Russian Federation; ⁶Department of Statistics and Econometrics, Stavropol State Agrarian University, Stavropol, Russian Federation; ⁷Arthritis Research UK Epidemiology Unit, University of Manchester, Manchester, UK

Received: 18 February 2016

Accepted: 18 February 2016

Address for Correspondence:

Armen Yuri Gasparyan, MD

Departments of Rheumatology and Research & Development, Dudley Group NHS Foundation Trust (Teaching Trust of the University of Birmingham, UK), Russells Hall Hospital, Dudley DY1 2HQ, West Midlands, UK
E-mail: a.gasparyan@gmail.com

Specialist bibliographic databases offer essential online tools for researchers and authors who work on specific subjects and perform comprehensive and systematic syntheses of evidence. This article presents examples of the established specialist databases, which may be of interest to those engaged in multidisciplinary science communication. Access to most specialist databases is through subscription schemes and membership in professional associations. Several aggregators of information and database vendors, such as EBSCOhost and ProQuest, facilitate advanced searches supported by specialist keyword thesauri. Searches of items through specialist databases are complementary to those through multidisciplinary research platforms, such as PubMed, Web of Science, and Google Scholar. Familiarizing with the functional characteristics of biomedical and nonbiomedical bibliographic search tools is mandatory for researchers, authors, editors, and publishers. The database users are offered updates of the indexed journal lists, abstracts, author profiles, and links to other metadata. Editors and publishers may find particularly useful source selection criteria and apply for coverage of their peer-reviewed journals and grey literature sources. These criteria are aimed at accepting relevant sources with established editorial policies and quality controls.

Keywords: Abstracting and Indexing as Topic; Editorial Policies; Periodicals as Topic; Publishing; Information Retrieval; Bibliographic Databases; Systematic Reviews

SEARCHING FOR SPECIFIC SCHOLARLY INFORMATION

Searching through bibliographic databases and retrieving relevant sources are essential for writing articles in an unbiased and systematic way. Systematic searches are becoming prerequisites of scientific authors' professional behavior in the current era of information deluge. Researchers and authors may improve their referencing and writing skills by securing access to reputable bibliographic databases, search platforms, directories, institutional repositories, and libraries. By cooperating with information facilitators, authors may advance their understanding of various search tools and be more selective with regards to a large amount of relevant available references (1,2).

Current search strategies depend on the scope of scholarly articles and covered subject categories. Evidence pointing to the most comprehensive and reliable databases for different disciplines is scarce. The guidance is largely based on empirical expert opinion and some of the recent analyses of search strategies presented in systematic reviews. The main principle of comprehensive searches is to avoid relying on any single, even highly reputable bibliographic database (3,4).

For most scientific, technical and medical disciplines, Scopus and Web of Science are often recommended as platforms for retrieving and analyzing quality items (5). Both are highly selective and well-organized multidisciplinary abstracting and citation-tracking databases characterized elsewhere (6). Google Scholar, the largest multidisciplinary platform, is frequently employed for initial searches by most authors, particularly for navigating to full-texts of journal articles and grey literature (7-10). However, some experts are critical of the Google approach because of its low specificity for locating relevant primary sources (11) and its low functionality for structured systematic searches (12).

Given the limitations of multidisciplinary databases and platforms, systematic and

comprehensive evidence syntheses are increasingly encompassing specialized bibliographic databases, which cover not just peer-reviewed sources, but also books, dissertations, technical documents, guidelines, and other grey literature items (13,14). MEDLINE, EMBASE, and the Cochrane Library are often referred as the main biomedical evidence-based search options (15,16). However, the current trend of multi-, cross-disciplinary, and multicenter research necessitates referring to services of a wide variety of global specialist bibliographic databases.

With the growing list of databases also comes a tendency of referring to irrelevant, or even erroneous, information that reveals the lack of understanding of the functionality of search tools. As a prime example, Directory of Open Access Journal (DOAJ) is sometimes listed in search strategies of reviews as a bibliographic search tool (17,18) although it is known as a white-list of open-access journals with incomplete links to papers (19).

The aim of this article is to overview some of the specialist databases employed by authors in their evidence-based articles and targeted by journal editors with interest in specialized fields of science.

MAIN FEATURES OF SPECIALIST DATABASES

Specialist databases are predominantly subscription-based online products that serve academic interests of professionals working in their narrow fields of science. Most of these databases are launched by reputable professional associations, such as the American Chemical Society (ACS), the American Psychological Association (APA), and the American Economic Association (AEA), among others. To better serve the interests of their users, specialist databases aim at indexing not only journals, but also online books, conference proceedings, dissertations, patents, government documents, and other grey literature items. Comprehensive coverage is perhaps the main difference between specialist and multidisciplinary databases. In line with this, relevant articles from general, non-specialized sources are selectively covered by narrow-specialized databases, such as the Modern Language Association (MLA) International Bibliography.

Citation-tracking is not available for most specialist databases since their main purpose, at least at present, is to distribute bibliographic information for professional communities. Although some of these communities are large enough for reliable citation analyses (e.g., chemical and economical societies), their professional databases are still developing and updating their coverage with delays. CitEc (Citations in Economics; <http://citec.repec.org/>) is a unique specialist endeavor with reliability depending on availability of reference lists and timely coverage of sources by related economic databases.

The main units of processed information at specialist databases are English-language titles, author names, affiliations,

abstracts, and keywords. Reference lists are also scanned, but their format, language, and visibility are not scrutinized in a way the global citation-tracking databases require. Full-texts of articles are archived by counterparts of some databases (e.g., CINAHL Plus with Full Text®). To help retrieve relevant sources, the databases are usually integrated with advanced search engines and organized vocabularies of professional keywords (e.g., Thesaurus of Psychological Index Terms, Engineering Index Thesaurus, GeoBase Subject Index). Some database vendors offer their own advanced search engines (e.g., EBSCOhost, ProQuest).

The main indexing criterion of specialist databases is relevance. Sources from all over the world are eligible for coverage. However, the selection of periodicals requires careful evaluation of the functionality of the journal websites, assigning of Digital Object Identifiers (DOI), quality control models (peer review), ethical editorial policies, copyright licenses, readability of English abstracts, and other attributes of the 'legitimate' scholarly sources. Introducing strict selection criteria for most specialist indexing services is gaining importance at the current time of proliferation of 'illegitimate', or 'predatory', journals, which aim to legitimize their practices by getting expanded indexing status (20). Fortunately, some of the specialist databases introduced strict selection criteria to cover selectively highly relevant quality periodicals (e.g., PsycINFO®). Well organized databases display publicly their lists of journals (Box 1), which give an impression of the scrutiny of the source evaluation and guide new source applicants.

CHEMISTRY

Chemical Abstracts Service (<https://www.cas.org/>)

Chemical Abstracts Service (CAS) is the bibliographic database of the American Chemical Society (ACS), which is available for searches through the STN (Scientific & Technical Information Network) and SciFinder platforms. It is one of the oldest scholarly information services. CAS indexes historic papers dating back to 1907, when it started as a print collection of abstracts in chemistry entitled Chemical Abstracts™. In 1956, the print index became a division of the ACS and changed its title to CAS.

The CAS database covers chemistry and most chemistry-related disciplines, such as biochemistry, immunochemistry, pharmacology, and toxicology. It produces the following constituent sections: CAS Registry, which lists more than 106 million organic and inorganic chemicals and more than 66 million sequences; CAPIUS – more than 42 million bibliographic records from the CAS core journals and patents coverage lists; CASREACT – more than 71.2 million single- and multi-step chemical reactions; CHEMCATS – information about suppliers of chemical substances; CHEMLIST – regulated chemicals listing; CIN – Chemical Industry Notes; and MARPAT – database of chemical

substances listed in patents, with more than 1.1 million searchable Markush structures. All these products are searchable through the STN and SciFinder search engines.

Publishers interested in indexing their journals in CAS are advised to send first issues of their new periodicals or three recent issues of established ones to the Evaluation Department of the CAS headquarters in Columbus, State of Ohio, USA. Applications for online-only journals can be submitted through the online forms at: <http://web.cas.org/forms/journalform.html>.

The list of more than 1,500 core journals indexed by CAS is available at the CAlusSM website (<http://www.cas.org/content/references/corejournals>). The core coverage list includes *Chemistry Reviews*, one of the most authoritative sources in chemistry, *British Journal of Pharmacology*, *Circulation Research*, *Immunology*, *Journal of the Korean Chemical Society*, and many other periodicals of national chemistry associations.

Researchers, who are interested in analyzing drug interactions, supplement MEDLINE, TOXLINE, and EMBASE searches with those through the CAS databases (21). Searches through CAS can be particularly helpful for retrieving information about new drugs and drug development (22,23).

PSYCHOLOGY, PSYCHIATRY & NEUROLOGY

PsycINFO® (<http://apa.org/pubs/databases/psycinfo/index.aspx>)

PsycINFO® is a highly selective, evidence-based bibliographic database in the field of psychology, psychiatry, neurology, and behavioral sciences. It is maintained by the American Psychological Association (APA). Subscription access to the database is available through the APA PsycNet platform and third-party vendors (DIMDI [<http://www.dimdi.de>], EBSCOhost, OVID, ProQuest, ProQuest Dialog).

The database has strict selection criteria. These include, but are not limited to relevance, international scope, predominantly original and evidence-based contents, informative metadata, meticulous peer review, diversity of reviewers and authors, and archiving policy (<http://www.apa.org/pubs/databases/psycinfo/publishers/journals.aspx>). Currently, the list of indexed journals includes 2,568 sources (<http://www.apa.org/pubs/databases/psycinfo/coverage.aspx>). Examples of the listed journals are *Clinical Psychopharmacology and Neuroscience*, *Clinical Rehabilitation*, *The Lancet*, *The Lancet Neurology*, and *Psychology in Russia: State of the Art*. More than 110 journals, published by APA and affiliated organizations, are currently catalogued by PsycARTICLES®, the full-text counterpart of PsycINFO® (<http://www.apa.org/pubs/databases/psycarticles/coverage-list.aspx>).

The preferential coverage of quality and evidence-based literature allowed the recommendation of PsycINFO, along with MEDLINE, The Cochrane Library, EMBASE and CINAHL, as the best platforms for retrieving references for practice guide-

lines (24). Moreover, an analysis of Romanian mental health literature, published in English from 2000 to 2008, distinguished PsycINFO as the most comprehensive indexing database in the field, with 3,236 items retrieved from PsycINFO compared to 549 - by MEDLINE, and 139 - by EMBASE (25). Finally, PsycINFO is often employed for searches of trials and other evidence-based items at the interface of psychology, neurology, and other clinical disciplines (26,27).

NURSING & CARING SCIENCES

Cumulative Index to Nursing and Allied Health Literature (<https://www.ebscohost.com/nursing/products/cinahl-databases/the-cinahl-database>)

Cumulative Index to Nursing and Allied Health Literature (CINAHL®) is the main database of nursing literature, which is managed by EBSCO Publishing and exclusively available on the EBSCOhost platform. It indexes publications of the National League for Nursing (USA), the American Nurses Association (USA), other English sources, and some relevant periodicals in other languages of interest to nurses, nurse educators, and students. More than 3,100 journals are currently indexed by CINAHL (<https://www.ebscohost.com/titleLists/cin-coverage.pdf>). Additionally, the database offers access to healthcare books, nursing dissertations, conference proceedings, and standards of care. CINAHL along with MEDLINE, Science Citation Index, and Social Science Citation Index are highly recommended databases for searching and synthesizing information in nursing and caring science (28,29). Bibliographic services related to CINAHL are CINAHL Plus, CINAHL Plus with Full Text, CINAHL Complete, and Nursing Reference Center.

CINAHL Plus with Full Text® (<https://www.ebscohost.com/academic/cinahl-plus-with-full-text>) is a full-text counterpart of CINAHL. It covers journals, magazines, trade publications, and government documents in their entirety or selectively (<https://www.ebscohost.com/titleLists/rzh-coverage.pdf>). Indexed periodicals relate to health & medicine, social sciences & humanities, communication, education, religion & philosophy, business, technology, and other subject categories. Full texts of 736 indexed journals are available immediately after publication or with 12-18 months embargo (<https://www.ebscohost.com/titleLists/rzh-subject.pdf>). The database also indexes nursing dissertations, conference proceedings, full-texts of 133 evidence-based care sheets, 10 books/monographs, and selected book chapters. Advanced search engine is linked to the CINAHL Subject Headings thesaurus.

British Nursing Index (<http://www.proquest.co.uk/go/bni>)

British Nursing Index (BNI) is a smaller database covering more than 700 peer-reviewed British and international journals plus trade magazines and dissertations of interest to nurses, mid-

wives, and community health professionals (http://www.proquest.com/documents/Title_List_-_British_Nursing_Index.html). The coverage spans from 1985 to the present time. More than 150 influential journals, including 50 British sources, are uniquely indexed by BNI compared to CINAHL (30).

BNI-indexed journals are mostly published in the UK, USA, Canada, Australia, and New Zealand. The *British Journal of Nursing*, *Iranian Journal of Nursing and Midwifery Research*, *Musculoskeletal Care*, and *Nursing Ethics* are examples of sources in the core collection of BNI. Papers from allied health, medical, and managerial periodicals are indexed selectively. The *Lancet* and *BMJ* are prime examples of the selectively covered sources. The main database is now accompanied by its full-text counterpart, the British Nursing Index with Full Text. ProQuest accommodates both databases.

Searches through BNI are often employed to complement those by CINAHL, and particularly for processing information on British nursing and community research (31,32).

INJURIES & SAFETY

SafetyLit (<http://www.safetylit.org/>)

SafetyLit (Safety Literature) is a free updating and archiving service for researchers seeking peer-reviewed sources on injury prevention, safety promotion, environmental health, and healthcare. It is a project of the SafetyLit Foundation, San Diego State University College of Health and Human Services, and Department of Violence and Injury Prevention of the World Health Organization.

In the early 1990s, SafetyLit was an electronic updating service distributing abstracts from MEDLINE to a small group of correspondents. With the growing submission of abstracts from large publishers and expanding the mailing list from merely 20 in 1995 to more than 15,000 in 1999, the need to transform services from distributing newsletters (*SafetyLit Weekly Update Bulletin*) to providing advanced bibliographic searches through a website became apparent, and SafetyLit was established as a database in 2001. "Preventing injuries by providing information" is the motto of the service.

Emergency medicine, sports medicine, orthopedics, traumatology, and rheumatology sources are preferentially covered by the database. Indexed sources include more than 16,000 journals in the physical sciences, social sciences, engineering biology, and medicine (<http://www.safetylit.org/week/journals.php>). The database is still open to new journal applications in the field of injury prevention and safety promotion (<http://www.safetylit.org/definitions.htm>). From 2013, the database started accepting doctoral theses covering the issue of safety.

The SafetyLit database contains information about more than 488,000 journal articles, 25,000 books, doctoral theses, and technical reports (<http://www.safetylit.org/statistics.htm>). Searches

through the database are employed for narrative and systematic reviews of injury prevention and safety promotion (33-36). Advanced searches are supported by the SafetyLit Thesaurus, which is a hierarchy of anatomical terms, diseases and disorders, chemicals and drugs, food and beverages, information and communication, technology and industry, traffic characteristics, etc. New concepts and terms are added to the thesaurus regularly.

SPORTS, PHYSICAL MEDICINE & REHABILITATION

SPORTDiscus™ (<https://www.ebscohost.com/academic/sportdiscus>)

SPORTDiscus™ is the most comprehensive bibliographic database that covers sports, sports rehabilitation, physical therapy and education, biomechanics, exercise physiology, occupational therapy, public health, nutrition, sport and exercise psychology, and more. It is produced by EBSCO Publishing, and covers more than 2 million records from journals, theses, conference proceedings, books, and book chapters. Coverage of some sources is going back to 1800. Contents are compiled by the Sport Information Research Centre (Ottawa, Canada; <http://sirc.ca/>), and inquiries about journal coverage can be emailed to info@sirc.ca. Searches through SPORTDiscus are available through the EBSCOhost interface, supported by the Sports Thesaurus.

Search strategies of recent systematic reviews in sports medicine, exercise physiology, orthopedics, podiatry, and allied subjects often include MEDLINE and SPORTDiscus (37-39). Also, SPORTDiscus indexes core literature in physical education (40).

SPORTDiscus with Full Text (<https://health.ebsco.com/products/sportdiscus-with-full-text>) provides access to full-texts of more than 1,300 peer-reviewed journals, magazines, video reports, dissertations, and books (<https://www.ebscohost.com/titleLists/s4h-coverage.pdf>). Examples of the indexed journals are the *Archives of Physical Medicine & Rehabilitation*, *British Journal of Health Psychology*, *British Journal of Sports Medicine*, *Bulletin of the Hospital for Joint Diseases*, and *Korean Journal of Sports Medicine*.

Physiotherapy Evidence Database (<http://www.pedro.org.au/>)

Physiotherapy Evidence Database (PEDro) is a freely available bibliographic database of more than 32,000 randomized trials, systematic reviews of clinical trials, and practice guidelines in physiotherapy published in English periodicals. It was established in 1999, and is maintained by the Centre for Evidence-Based Physiotherapy at the Musculoskeletal Division of the George Institute for Global Health (Sydney, Australia). As an initiative to distribute comprehensive information on the best available evidence in physiotherapy, it has a methodological quality ranking system of trials from 1/10 to 9/10 (the PEDro

scale) and separate search portals for professionals and consumers of services (41). The database's bibliographic records have been assembled from searches through MEDLINE, EMBASE, the Cochrane Database of Systematic Reviews, and the Cochrane Clinical Trials Register.

An analysis of trials indexed by PEDro helped distinguish the top 5 core journals publishing the best available evidence on the effects of physical therapy: *Archives of Physical Medicine and Rehabilitation*, *Clinical Rehabilitation*, *Spine*, *BMJ*, and *Chest* (42). Searches through the database are also employed in systematic reviews of disability, exercise therapy, and rehabilitation of patients with musculoskeletal disorders (43-45).

CIRRIE Database of International Rehabilitation Research (<http://cirrie.buffalo.edu/database/>)

The Center for International Rehabilitation Research Information & Exchange (CIRRIE) Database is a free platform for retrieving rehabilitation-related information on research conducted outside the USA. The database is produced by the School of Public Health and Health Professions of the University at Buffalo, State University of New York. It contains more than 165,000 records of international articles published from 1990 onward.

The searches are supported by the CIRRIE Thesaurus terms (<http://cirrie.buffalo.edu/database/thesaurus/>). Separate options are available for retrieving author profiles and links to the 25 most cited in Web of Science articles in various subject headings. The "arthritis" section, for example, lists articles published in *The Journal of Bone & Joint Surgery*, *Journal of Rehabilitation Medicine*, *Physical Therapy*, and other influential rehabilitation, orthopedics, and rheumatology journals. The complete list of covered journals is presented in alphabetical order at: <http://cirrie.buffalo.edu/database/journals/>. Editors and publishers interested in supplying bibliographic information to the CIRRIE may contact the information manager at: <http://cirrie.buffalo.edu/contact/>.

The CIRRIE Database of International Research is a companion to REHABDATA, which is produced by the National Rehabilitation Information (USA) as a database of rehabilitation research conducted in the United States (46). More than 80,000 items published from 1956 to the present are abstracted by REHABDATA (<http://www.naric.com/?q=en/REHABDATA>). Both rehabilitation databases, along with MEDLINE and CINAHL, comprehensively index current research on disabilities and rehabilitation. The retrieval of full-texts is currently available for some articles, which are indexed by REHABDATA.

GLOBAL HEALTH, AGRICULTURE, VETERINARY & ENVIRONMENTAL SCIENCES

CAB Abstracts and Global Health (www.cabdirect.org/)

The Centre for Agriculture and Bioscience International (CABI,

formerly known as the Commonwealth Agricultural Bureaux, UK) is an information provider that focuses on agricultural and environmental issues in the developing world. CABI is an official supporting organization of the Healthcare Information For All (HIFA), a global campaign aimed at improving the availability of healthcare information in low-income countries. The publishing division of CABI hosts two large bibliographic databases on its CAB Direct platform – CAB Abstracts and Global Health. Searches through these databases are supported by the CAB Thesaurus, which lists more than 250,000 descriptive terms related to agriculture, forestry, soil science, mycology, parasitology, veterinary medicine, environmental health, food science & nutrition, medicinal plants, pharmacology, and other branches of the applied life sciences.

CAB Abstracts is the most comprehensive database in the applied life sciences. Searches through the database are recommended for systematic evidence-based analyses in veterinary medicine, since 90% of the currently active journals with significant veterinary content are covered by CAB Abstracts (47). The database gives access to more than 8.1 million scientific records from 1973 onward. Relevant records are selected from more than 8,000 serials, books, and conference proceedings. Bulletins, newsletters, theses, handbooks, position statements, and other types of grey literature are also extensively covered. More than 220,000 full-texts of scholarly articles indexed by CAB Abstracts are currently available through the CABI Full Text repository.

Online applications for indexing are encouraged through the following links: <http://www.cabi.org/publishing-products/submit-journal> or journalreview@cabi.org.

Applications are evaluated monthly on the basis of relevance, geographic origin, and potential yield (<http://www.cabi.org/Uploads/CABI/publishing/authors/cabi-life-science-journal-submission.pdf>).

Global Health is the most reputed public health database, which contains more than 2.6 million records from 1973 onward. It is the most comprehensive reference for experts in sanitation, hygiene, tropical health, food safety, and health promotion. The database indexes full-texts of more than 64,000 journal articles and grey literature items. Furthermore, Global Health Archive contains more than 800,000 records from six printed abstract journals of CABI dating from 1910 to 1983. Covered biomedical disciplines are toxicology, pharmacology, microbiology, epidemiology, tropical medicine, and occupational & environmental health. The journal application platform is the same as for CAB Abstracts.

CABI abstracts of indexed items are distributed to narrow-specialized abstracting databases, such as the Abstracts on Hygiene & Communicable Diseases, Helminthological Abstracts, Parasitology Database, Nutrition & Food Sciences Database, and Tropical Disease Bulletin. These products of CABI are de-

livered on the CAB Direct and other platforms.

AGRICOLA (<http://agricola.nal.usda.gov/>)

AGRICOLA (AGRICultural OnLine Access) is the largest database of agricultural literature. It indexes collections of the National Agricultural Library (NAL, US), which is maintained by the U.S. Department of Agriculture. Collections include online journal articles, books, theses, audiovisual materials, and historic sources, some of which date back to the 15th century. Subjects cover agriculture, veterinary sciences, entomology, parasitology, agricultural biology and economics, food & nutrition, plants & crops, marketing & trade, earth & environmental sciences, and rural & community development.

AGRICOLA consists of the public section (NAL Public Access Catalog) and subscription-based abstracting service (Article Citation Database). The NAL platform, EBSCOhost, and ProQuest incorporate searches through the AGRICOLA bibliographic database. The PubAg search engine was launched in January 2015 to facilitate free retrieval of full-text journal articles, which are authored by researchers of the U.S. Department of Agriculture, and to search global agricultural items (<http://pubag.nal.usda.gov/pubag/home.xhtml>). PubAg already indexes more than 42,000 full-text journal articles and records more than 1 million global agricultural items. The retrieval of relevant items through PubAg is supported by the NAL Agricultural Thesaurus terms. There are more than 120,000 terms listed by the Thesaurus for 17 agriculture-related subject categories (<http://agclass.nal.usda.gov/>). A full-text counterpart of AGRICOLA is offered to subscribers by the ProQuest Agricultural Science Collection.

Searches through the AGRICOLA database have been employed for synthesizing evidence on environmental contaminants in food, alternative and herbal medicines, probiotics, and antihelminthic drugs (48-52).

AGRICOLA accepts for coverage relevant peer-reviewed digitized journals with English titles, abstracts, and full bibliographic information (<http://www.nal.usda.gov/faq-how-to-get-journal-indexed-in-agricola>). Indexers give preference to English sources, but items in Western European, Slavic, Asian, and African languages are also accepted. Inquiries about indexing new journals and other sources can be submitted via the NAL platform (<http://www.nal.usda.gov/ask-question>) or emailed to: AGRICOLAPublishers@ars.usda.gov.

AGRIS (<http://agris.fao.org>)

AGRIS (International System for Agricultural Science and Technology) is a global agricultural bibliographic database, repository, and collaborative network of more than 150 institutions from 65 countries. Along with AGRICOLA and CAB Abstracts, it is regarded as the leading bibliographic database that increases the accessibility of agricultural research data and international

visibility of related publications from developing countries (53). It was set up as an initiative by the Food and Agriculture Organization of the United Nations in 1974 (54). It is now a part of the CIARD (Open Agriculture Knowledge for Development) initiative. The mission of AGRIS is to improve the accessibility of agricultural information worldwide. The database's search engine is enhanced by the AGROVOC (a portmanteau of AGRiculture and VOCabulary) multilingual thesaurus that lists more than 40,000 terms in 23 languages, including English, Japanese, Korean, Persian, and Russian. AGRIS contains more than 7.5 million records from journal articles, monographs, conference papers, technical reports, and dissertations in a wide range of subject categories related to economics, animal and plant production, food science, human nutrition, occupational diseases and hazards, and many other areas of agricultural research (AGRIS Subject Categories; <http://www.fao.org/scripts/agris/c-categ.htm>). Journal editors may apply for indexing at: <http://www.akstem.com/agris>.

Food Science and Technology Abstracts (<http://foodinfo.ifis.org/fsta>)

Food Science and Technology Abstracts (FSTA) is an abstracting database produced by the IFIS Publishing (International Food Information Service, UK). It covers a range of issues related to food, beverages and nutrition technologies, food safety, effects of food ingredients on health, etc. IFIS developed its own thesaurus of more than 10,700 food-related keywords that systematize searches through FSTA. More than 1,020 active journals are currently indexed by FSTA. The list of covered journals and information about indexing new sources can be received upon request from: <http://foodinfo.ifis.org/contact-us>. The FSTA database, alongside AGRIS, AGRICOLA and CABI, is often listed in search strategies of systematic reviews of the effects of food constituents on health and diseases, food microbial contamination, and related issues (55-57).

ECONOMICS

EconLit (<https://www.aeaweb.org/econlit/>)

EconLit (Economic Literature) is the most comprehensive and well-organized subscription database of abstracts in the field of economics. It is maintained by the American Economic Association (AEA), and accessed on the Association's website. EBSCOhost, ProQuest, and OVID also offer access to the database. More than 1,000 peer-reviewed English and non-English journals are indexed by EconLit (https://www.aeaweb.org/econlit/journal_list.php). All indexed items are tagged with the JEL (*Journal of Economic Literature*) Classification Codes, which were introduced to assign alphabetically listed subject categories from A – General Economics and Teaching, to I – Health, Education, Welfare, and Z – Other Special Topics (<https://www.aeaweb.org/>

jel/guide/jel.php). Searches through the EconLit database are employed in systematic reviews on economic evaluations (58-60). Applications for indexing relevant journals, books, and dissertations can be sent to newj@econlit.com and info@econlit.com (<https://www.aeaweb.org/jel/>).

EconLit with Full Text is a full-text counterpart of the main database, which is available on EBSCOhost. It archives more than 680 full-text journals and 16 books on capital markets, econometrics, environmental economics, agricultural economics, health economics, etc. Examples of the archived sources are the *Journal of Economic Literature*, *American Economic Review*, *Journal of the Korean Economy*, *Russian Economic Trends*, *Health Economics*, *Health Care Management Science*, and *Pharmacoeconomics*.

The EconLit database is enhanced by preprints and other archival items in economics received from RePEc (Research Papers in Economics). RePEc (<http://repec.org/>) is a voluntary service for researchers in economics and related scientific fields. More than 2 million journal articles, book chapters, and working papers archived by RePEc can be browsed and retrieved through the IDEAS platform. RePEc is maintained by the Research Division of the Federal Reserve Bank of St. Louis (USA), offering its search engine - IDEAS. Most large publishers, including Springer and Elsevier, submitted their collections in economics to RePEc. Academic and research departments from all over the world also contribute to RePEc, which has now access to more than 1,100 archives. Access to a large collection of working papers, journal articles, books, and software in economics is also available through the EconPapers platform (<http://econpapers.repec.org/>), a part of RePEc hosted by of the Örebro University Business School.

Interestingly, reference lists of the RePEc large archive and citing sources are currently processed by its CitEc service, or Citations in Economics project (<http://citec.repec.org/>). Citation data are available from 2001 onward. Although it is a unique service for a specialist bibliographic database, the reliability of the calculated citation indices is questionable since not all indexed items have reference lists and their availability is subjected to uncontrolled submissions by users (i.e., individual authors, departments, publishers).

ENGINEERING SCIENCES

Ei Compendex (<http://www.engineeringvillage.com/>)

Ei Compendex (Engineering Index COMPuterized Engineering inDEX) is the flagship engineering database, which is currently published by Elsevier, and is searchable on the Engineering Village platform. Historic publications are covered back to 1884. Major engineering fields are covered, including biotechnology, nanotechnology, food science and technology, engineering materials and technologies, and medical devices. The Engineering

Village platform, integrated with Scopus, enables searches through Compendex and 11 other engineering databases, such as GeoBase, Inspec, and GeoRef. The platform displays citation details and author profiles of the indexed items. The strict indexing criteria for Compendex are transparently presented by Elsevier (<https://www.elsevier.com/solutions/engineering-village/content/selection-criteria>). Relevant publications should meet a combination of qualitative and quantitative criteria to be eligible for indexing. These include original and validated content contributing to the engineering, quality website, transparent editorial and peer review policy, geographical diversity of editors and authors, informative and readable English abstracts, references in Roman script, citedness of journal articles, digital archiving policy, etc. The list of indexed journals and other serials (> 4,800) include *Acta Informatica*, *Journal of Biomedical Nanotechnologies*, *Materials Science*, *Sports Engineering* (<https://www.elsevier.com/solutions/engineering-village/content#databases>). Suggestions of new journals and conference proceedings for indexing by Ei Compendex and GeoBase are processed through the Elsevier platform at: www.engineeringvillage.com/title-suggestion. Current reviews of innovative health care and rehabilitation technologies often include searches through Ei Compendex (61-64).

GEOLOGY & EARTH SCIENCES

GeoBase (<http://www.engineeringvillage.com/>)

GeoBase is another engineering database, which is published by Elsevier and presented on the Engineering Village platform. It indexes more than 2.8 million bibliographic records on earth and environmental sciences, alternative energy sources, ecology, pollution, and human geography. Subsets of GeoBase are 7 print abstract journals, such as *Ecological Abstracts*, *Geographical Abstracts*, and *Geological Abstracts*. Items of interest to geoscientists are tagged with terms from the GeoTree thesaurus. More than 2,100 peer-reviewed are indexed by GeoBase (<https://www.elsevier.com/solutions/engineering-village/content#id03>). These include *Journal of Environmental Health*, *Journal of Agricultural and Environmental Ethics*, *Russian Journal of Ecology*, *Nature*, and *Science*. Representative reviews with searches through GeoBase relate to environmental health, meteorology, housing, and socio-economic conditions (65-67).

GeoRef (www.americangeosciences.org/georef)

GeoRef is a global specialist database of the American Geosciences Institute, which covers geology, geophysics, environmental geology, hydrogeology, and engineering geology. Issues related to climate change, earthquakes, tsunamis, and natural disasters are well represented at the database. Searches through GeoRef are supported by the GeoRef Thesaurus and are available on Engineering Village and through several vendors (e.g.,

EBSCOhost, ProQuest, OVID). The database indexes more than 3.7 million records from journals, books, theses, conference papers, maps, and reports of the U.S. Geological Survey. The list of more than 2,500 indexed journals (<http://www.americangeosciences.org/georef/serials-list>) includes the *International Journal of Circumpolar Health*, *Korean Journal of Hydrosociences*, *Nature*, and *Science*. The new journal applications are regularly evaluated by the GeoRef Advisory Committee (snt@agiweb.org). Biomedical reviews of issues at the interface of environmental science and epidemiology may employ searches through GeoRef (68).

PHYSICS, ELECTRONICS & COMPUTER SCIENCES

Information Services for Physics, Electronics, and Computing (<http://www.theiet.org/resources/inspec/>)

Information Services for Physics, Electronics, and Computing (Inspec) is a bibliographic database of abstracts in physics, technology, and engineering, which covers more than 15 million records in electrical engineering, geophysics, astronomy, acoustics, computer science, informatics, nanotechnology, environmental science, healthcare technology, and bioinformatics. It is published by the Institution of Engineering and Technology (IET, UK), which offers searches through its InspecDirect platform. Searches are supported by the Inspec Thesaurus and Classification scheme that lists more than 9,800 specialized terms.

The selection preference is given to English sources, but non-English journals with readable English titles, abstracts, and references in Roman script are also accepted for coverage. Numerous bulletins of prestigious academies, engineering and technology universities of Russia, Belarus, Kazakhstan, China, Korea, and Japan are represented in the updated journal list of the database (<http://www.theiet.org/resources/inspec/support/docs/index.cfm>). Biomedical journals focusing on radiology, nuclear medicine, physical rehabilitation, biomaterials, nanotechnologies, and informatics are also covered. Selected video items of reputable organizations are now a part of the Inspec database. Suggestions of potentially valuable new additions to the database can be sent to inspec@theiet.org. Inspec and Compendex have been employed in systematic searches of electronic and electromechanical devices used in medicine (69-71).

EDUCATION

Education Resources Information Center (<http://eric.ed.gov/>)

Education Resources Information Center (ERIC) is the largest bibliographic database and full-text digital library in the field of education, which is administered by the National Center for Education Evaluation and Regional Assistance of the Institute of Education Sciences of the U.S. Department of Education. It

covers American and other English peer-reviewed journals, as well as grey literature directly related to education research. More than 600 peer-reviewed journals are covered comprehensively, selectively, or occasionally. Academic journals at the interface of several disciplines are variably represented at the database. For example, two studies of resources in health education pointed to the fact that MEDLINE and Scopus offer the most comprehensive coverage in the field while ERIC – the least comprehensive (72,73). In January 2016, ERIC publicized its updated selection policy, where indexing of highly relevant, peer-reviewed sources in education research with available full-texts was prioritized (http://eric.ed.gov/pdf/ERIC_Selection_Policy.pdf). Full list of the indexed journals is posted on the database's website (<http://eric.ed.gov/?journals>). The list includes the *Health Education, Rehabilitation Research, Policy, and Education*, and other biomedical periodicals. Access to the ERIC database is available through several vendors, including EBSCOhost and ProQuest. The latter also offers the full-text counterpart of the database – ERIC PlusText, which incorporates the Thesaurus of ERIC Descriptors and full-texts of articles from ProQuest Education Journals™.

Searches through the ERIC databases have been employed in systematic reviews of mental health, disabilities, and medical education issues (74-77). Several other databases are also recommended for those seeking professional information on education: the British Education Index (<https://www.ebscohost.com/academic/the-british-education-index>), Current Education & Children's Services Research (CERUK; <http://www.ceruk.ac.uk/>), Australian Education Index (AEI; <https://www.acer.edu.au/library/australian-education-index-aei>), and Teacher Reference Center (www.teacherreference.com).

LIBRARY & INFORMATION SCIENCES

The landmark analysis of 2,625 items, published between 1982 and 2002 by American specialists, showed that there are 10 specialist and multidisciplinary databases that provide significant coverage of essential sources in the library & information sciences (78). Of these databases, Social Sciences Citation Index (SSCI), Library Literature & Information Science (LLIS), Library and Information Science Abstracts (LISA), Information Science & Technology Abstracts (ISTA), PASCAL, Inspec, and ERIC covered most items in the field. It was suggested to search through at least four databases to have comprehensive synthesis of the literature in related articles.

Library, Information Science & Technology Abstracts

Library, Information Science & Technology Abstracts (LISTA) is a database of abstracts in the fields of librarianship, information management, bibliometrics, etc. It is published by EBSCO Publishing and available for free searches on the EBSCOhost plat-

form (www.libraryresearch.com). LISTA offers author profiles and other bibliographic information from more than 580 core journals, 50 priority journals, and 120 selective journals since the mid-1960s (<https://www.ebscohost.com/titleLists/lxh-coverage.pdf>). The list of journals includes the *Journal of the American Medical Informatics Association*, *Informatics for Health & Social Care*, *Medical Reference Services Quarterly*, and *Scientometrics*. Full-texts of more than 330 journals are currently available from LISTA with Full Text, yet another product of EBSCO Publishing.

Library and Information Science Abstracts

Library and Information Science Abstracts (LISA) is a database for information facilitators, which is available on ProQuest (<http://www.proquest.com/products-services/lisa-set-c.html>). Its selection criteria are oriented toward accepting relevant peer-reviewed sources fulfilling quality publishing standards (<http://proquest.libguides.com/lisa>). Priority is given to journals covering emerging fields of science, such as distance learning. More than 440 active journals are currently indexed by LISA, including the *Health Information & Libraries Journal*, *Journal of the Medical Library Association*, *Journal of Information Ethics*, and *Scientometrics* (http://www.proquest.com/documents/Title_List_-_Library_and_Information_Science_Abstracts.html). Searches through the LISA database have been employed in reviews of reference management and electronic health information (79,80).

CONCLUSION

Bibliographic databases are universal tools for research at all stages of continuing professional development. Researchers and authors familiarizing with the functionality and resources of multidisciplinary and specialist databases increase their chances of systematic and comprehensive searches for writing articles, dissertations, practice guidelines, and other scholarly documents. Examples of online specialist databases are presented in Table 1. By regularly accessing the lists of journals at databases of interest, specialists delve into the journal ranking and evidence accumulation. Research managers and journal editors may guide them by recommending or providing access to the most relevant and user-friendly databases and research platforms (81). The selectivity is required when institutional subscription to the services of EBSCO Publishing, ProQuest, and other large vendors of bibliographic databases and content aggregators is discussed.

Publicly available databases and platforms, such as MEDLINE/PubMed and Google Scholar, are widely employed by researchers. However, many subscription databases contain additional information, not available elsewhere, which may add to the diversity of cited references. Current research is increas-

ingly multidisciplinary and multicenter, requiring access to various specialist sources. As such, searches through multiple databases can be viewed as the golden rule for research and systematic synthesis of evidence.

One of the principles of relevant referencing justifies reading not just retrieved abstracts, but also full-texts (1). In keeping with that principle and as a good service to the users, some multidisciplinary databases offer links to publicly available or subscription archives of full-texts (e.g., PubMed to the PubMed Central repository, Scopus to the ScienceDirect library). Many specialist databases have also launched full-text counterparts of their abstracting databases to enhance the functionality of their services (e.g., CINAHL Plus with Full Text, PsycARTICLES).

Most, if not all, specialist databases are produced and maintained by large professional societies and academic institutions that evaluate and select scholarly items. Although their declared selection criteria are strict, not all the databases build up their catalogs with quality peer-reviewed sources. The nonselective approach opens gates for 'predatory' journals that abuse their indexing status and publish large amounts of poorly edited or unchecked articles. Apparently, current authors need additional tools for judging the 'quality' of the retrieved bibliographic information. Scopus, for example, introduced an option to notify the users about listing of open-access periodicals by DOAJ and opted for delisting indexed sources failing to meet the selection criteria. The PEDro database employed the methodological quality ranking system of trials to inform about 'power' of evidence of the indexed items. But most specialist databases still lack similar tools and policies to mark and delist low quality and poorly validated periodicals.

Citation-tracking is not a priority for specialist databases, especially for small ones and those indexing peer-reviewed along with nonreviewed and grey literature references. Nonetheless, the example of ranking highly-cited articles by the CIRRIE International Rehabilitation Database, processing citations from the Web of Science database, may be a precedent for other specialist databases with growing reference coverage.

Editors and publishers, who aim to increase visibility and citability of their journals, continuously target various specialist databases, full-text repositories, and scholarly networking platforms (82). The implications of such a tactic are two-fold – better visibility of the authors and enhanced contents of the databases. Even journals that are already tracked by prestigious global databases, such as MEDLINE and Scopus, may benefit from additional, core-content or selective indexing by specialist databases. General medical journals, for example, may choose to apply for indexing by economic or agricultural databases if relevant items are part of their declared scope of interests.

Despite the availability of a number of specialist databases, many emerging scientific fields still remain uncovered. Professional information distributed by current databases is mostly

Table 1. Examples of specialist databases (as of February 2016)

Discipline	Database	Owner	Access providers	Coverage	Dates	Thesaurus
Nursing, complementary and alternative medicine, rehabilitation, consumer health	Cumulative Index to Nursing and Allied Health Literature (CINAHL)	EBSCO Publishing	EBSCOhost	3.4+ million records, indexing for 3,100+ journals, conference proceedings, dissertations	1937–present	CINAHL Subject Headings
Psychology, psychiatry, neurosciences, behavioral and social sciences	PsycINFO	American Psychological Association (APA)	APA PsycNET, DIMDI, EBSCOhost, OVID, ProQuest	4+ million records, 2,560+ journals, books, theses	1806–present; historic papers - back to the 17th century	Thesaurus of Psychological Index Terms
Chemistry, biochemistry, pharmacy, pharmacology, immunology, toxicology, agrobiography	Chemical Abstracts Service (CAS)	American Chemical Society (ACS)	STN International (Scientific & Technical Information Network), SciFinder	~8,000 journals, including 1,500+ key journals in chemistry	1907–present	
Agriculture, veterinary sciences, entomology, plant sciences, agricultural economics, food and human nutrition, earth and environmental sciences	AGRICOLA (Agricultural OnLine Access)	National Agricultural Library (NAL) of the U.S. Department of Agriculture	NAL Catalog platform, EBSCOhost, ProQuest Dialog	5.2+ million records of journal articles, book chapters, theses, patents	15th century–present	NAL Agricultural Thesaurus
Agriculture, economics, natural resources, food & human nutrition, occupational & environmental sciences	AGRIS (International System for Agricultural Science and Technology)	Food and Agriculture Organization (FAO) of the U.N.	AGRS platform	7.5+ million records from journals, monographs and grey literature	1974–present	AGROVOC thesaurus
Food, beverages and nutrition technologies, food economics and safety	Food Science and Technology Abstracts (FSTA)	IFIS Publishing (International Food Information Service, UK)	EBSCOhost, ProQuest Dialog, OVID, STN, Web of Science	1.2+ million records from 5,300+ journals, books, conference proceedings	1969–present	IFIS' Thesaurus
Agriculture, public health, veterinary medicine, applied life sciences	CAB Abstracts, Global Health	CABI (Centre for Agriculture and Bioscience International, UK)	CAB Direct, Dialog, Dimdi, EBSCOhost, OVID, Web of Science, STN International	CABI contains 8.8+ million records	1973–present	CAB Thesaurus
Economics, accounting, entrepreneurship, business, agriculture, food science, health economics	EconLit	American Economic Association (AEA)	EBSCOhost, ProQuest, OVID	1.2+ million records from 1,000+ journals plus books, dissertations, conference proceedings	1886–present	<i>J Econom Lit</i> Codes Guide
Engineering, materials, bioengineering, biotechnology, nanotechnology, nuclear sciences, computers, optics, applied physics	Ei Compendex (Engineering Index Computerized Engineering inDEX)	Elsevier	Engineering Village Platform	18+ million records from 3,800+ journals, 117 magazines, 80+ book series, 80,000+ conference proceedings	1884–present	Engineering Index Thesaurus
Engineering, physics, technology, nanotechnologies, information for business, acoustics, sensors, bioinformatics	Inspec (Information Services for Physics, Electronics, and Computing)	Institution of Engineering Technology (IET)	EBSCOhost, Engineering Village, OVID, ProQuest Dialog, STN, Thomson Innovation, Web of Science	15+ million records from journals, conference proceedings, trade magazines	1969–present	Inspection Thesaurus and Classification Codes
Geosciences, environmental geology, geophysics, hydrology, mineralogy, paleontology	GeoRef	American Geosciences Institute (AGI)	Engineering Village, EBSCOhost, ProQuest, OVID, STN, GeoScience World	3.7+ million records, 3,500+ journals, maps, conference papers, books	1933–present (selectively back to 1669)	GeoRef Thesaurus
Librarianship, information science, information management, bibliometrics	Library, Information Science & Technology Abstracts (LISTA)	EBSCO Publishing	EBSCOhost	580+ core journals, 50 top priority journals, 125 selective journals plus books, research reports, conference proceedings	1965–present	LISTA Thesaurus
Librarianship, information science, informatics	Library and Information Science Abstracts (LISA)	ProQuest	ProQuest platform	440+ periodicals	1969–present	
Education	Education Resources Information Center (ERIC)	Institute of Education Sciences, U.S. Department of Education	EBSCOhost, ProQuest, Online Computer Library Center (OCLC), Cambridge Scientific Abstracts (CSA)	1.5+ million records, including full-texts of grey literature	1966–present	Thesaurus of ERIC Descriptors
Statistics	Current Index to Statistics (CIS)	American Statistical Association (ASA) and Institute of Mathematical Statistics (IMS)	ASA and IMS websites	1,200+ journals, 160+ core journals, ~11,000 books	1975–present	
Modern languages, linguistics, humanities, publishing	Modern Language Association (MLA) International Bibliography	MLA (USA)	EBSCOhost, Gale Group, ProQuest	2.3+ million records, selective articles from 4,400+ journals	1926–present	MLA Thesaurus

intended for researchers, research managers, information facilitators, and students while interests of nonprofessional users, and particularly patients, are too often overlooked. PEDro is perhaps the only specialist database that offer search options for professionals and consumers of health services. The discussed challenges make obvious the requirement for more efforts and investments to expand the scope of the current and/or create new international and regional bibliographic services.

DISCLOSURE

The authors have no conflicts of interest to disclose.

AUTHOR CONTRIBUTION

Data collection: Gasparyan AY, Yessirkepov M, Voronov AA, Trukhachev VI, Kostyukova EI, Gerasimov AN, Kitash GD. Data Interpretation: Gasparyan AY, Yessirkepov M, Voronov AA, Trukhachev VI, Kostyukova EI, Gerasimov AN, Kitash GD. Manuscript drafting: Gasparyan AY, Yessirkepov M, Voronov AA, Trukhachev VI, Kostyukova EI, Gerasimov AN, Kitash GD. Approval of final manuscript: all authors.

ORCID

Armen Yuri Gasparyan <http://orcid.org/0000-0001-8749-6018>
 Marlen Yessirkepov <http://orcid.org/0000-0003-2511-6918>
 Alexander A. Voronov <http://orcid.org/0000-0001-8505-7345>
 Alexey N. Gerasimov <http://orcid.org/0000-0002-1244-4755>
 Elena I. Kostyukova <http://orcid.org/0000-0002-8393-6001>
 Vladimir I. Trukhachev <http://orcid.org/0000-0003-4676-5407>
 George D. Kitash <http://orcid.org/0000-0002-0828-6176>

REFERENCES

- Gasparyan AY, Yessirkepov M, Voronov AA, Gerasimov AN, Kostyukova EI, Kitash GD. Preserving the integrity of citations and references by all stakeholders of science communication. *J Korean Med Sci* 2015; 30: 1545-52.
- Rathbone J, Carter M, Hoffmann T, Glasziou P. Better duplicate detection for systematic reviewers: evaluation of systematic review assistant-deduplication module. *Syst Rev* 2015; 4: 6.
- Niel G, Boyrie F, Virieux D. Chemical bibliographic databases: The influence of term indexing policies on topic searches. *New J Chem* 2015; 39: 8807-17.
- Ellegaard O, Wallin JA. Identification of environmentally relevant chemicals in bibliographic databases: a comparative analysis. *Springerplus* 2013; 2: 255.
- Cavacini A. What is the best database for computer science journal articles? *Scientometrics* 2015; 102: 2059-71.
- Gasparyan AY, Ayvazyan L, Kitash GD. Multidisciplinary bibliographic databases. *J Korean Med Sci* 2013; 28: 1270-5.
- Nourbakhsh E, Nugent R, Wang H, Cevik C, Nugent K. Medical literature searches: a comparison of PubMed and Google Scholar. *Health Info Libr J* 2012; 29: 214-22.
- Shariff SZ, Bejimal SA, Sontrop JM, Iansavichus AV, Haynes RB, Weir MA, Garg AX. Retrieving clinical evidence: a comparison of PubMed and Google Scholar for quick clinical searches. *J Med Internet Res* 2013; 15: e164.
- Jamali HR, Nabavi M. Open access and sources of full-text articles in Google Scholar in different subject fields. *Scientometrics* 2015; 105: 1635-51.
- Haddaway NR, Collins AM, Coughlin D, Kirk S. The role of Google Scholar in evidence reviews and its applicability to grey literature searching. *PLoS One* 2015; 10: e0138237.
- Freeman MK, Lauderdale SA, Kendrach MG, Woolley TW. Google Scholar versus PubMed in locating primary literature to answer drug-related questions. *Ann Pharmacother* 2009; 43: 478-84.
- Boeker M, Vach W, Motschall E. Google Scholar as replacement for systematic literature searches: good relative recall and precision are not enough. *BMC Med Res Methodol* 2013; 13: 131.
- Wright JM, Cottrell DJ, Mir G. Searching for religion and mental health studies required health, social science, and grey literature databases. *J Clin Epidemiol* 2014; 67: 800-10.
- Saleh AA, Ratajeski MA, Bertolet M. Grey literature searching for health sciences systematic reviews: a prospective study of time spent and resources utilized. *Evid Based Libr Inf Pract* 2014; 9: 28-50.
- Metzendorf MI, Schulz M, Braun V. All information is not equal: using the literature databases PubMed and the Cochrane Library for identifying the evidence on granulocyte transfusion therapy. *Transfus Med Hemother* 2014; 41: 364-74.
- Vassar M, Carr B, Kash-Holley M, DeWitt E, Koller C, Day J, Day K, Herrmann D, Holzmann M. Database choices in endocrine systematic reviews. *J Med Libr Assoc* 2015; 103: 189-92.
- Emami-Naini A, Roomizadeh P, Baradaran A, Abedini A, Abtahi M. Ramadan fasting and patients with renal diseases: a mini review of the literature. *J Res Med Sci* 2013; 18: 711-6.
- Martin-Valero R, De La Casa Almeida M, Casuso-Holgado MJ, Heredia-Madrado A. Systematic review of inspiratory muscle training after cerebrovascular accident. *Respir Care* 2015; 60: 1652-9.
- Liljekvist MS, Andresen K, Pommergaard HC, Rosenberg J. For 481 biomedical open access journals, articles are not searchable in the Directory of Open Access Journals nor in conventional biomedical databases. *PeerJ* 2015; 3: e972.
- Gasparyan AY, Yessirkepov M, Diyanova SN, Kitash GD. Publishing ethics and predatory practices: a dilemma for all stakeholders of science communication. *J Korean Med Sci* 2015; 30: 1010-6.
- Barillot MJ, Sarrut B, Doreau CG. Evaluation of drug interaction document citation in nine on-line bibliographic databases. *Ann Pharmacother* 1997; 31: 45-9.
- Rogers TL, Wallick D. Reviewing the use of ethylcellulose, methylcellulose and hypromellose in microencapsulation. Part 1: materials used to formulate microcapsules. *Drug Dev Ind Pharm* 2012; 38: 129-57.
- Gasparini R, Amicizia D, Lai PL, Bragazzi NL, Panatto D. Compounds with anti-influenza activity: present and future of strategies for the optimal treatment and management of influenza. Part II: Future compounds against influenza virus. *J Prev Med Hyg* 2014; 55: 109-29.
- Deurenberg R, Vlayen J, Guillo S, Oliver TK, Fervers B, Burgers J; SEARCH Group. Standardization of search methods for guideline development:

- an international survey of evidence-based guideline development groups. *Health Info Libr J* 2008; 25: 23-30.
25. Bucur M, Adams C. Romanian psychiatric literature: analysis of accessibility and nature of Romanian psychiatric articles. *Health Info Libr J* 2010; 27: 140-7.
 26. Smith TO, Purdy R, Latham SK, Kingsbury SR, Mulley G, Conaghan PG. The prevalence, impact and management of musculoskeletal disorders in older people living in care homes: a systematic review. *Rheumatol Int* 2016; 36: 55-64.
 27. Matcham F, Rayner L, Steer S, Hotopf M. The prevalence of depression in rheumatoid arthritis: a systematic review and meta-analysis. *Rheumatology (Oxford)* 2013; 52: 2136-48.
 28. Allen MP, Allison MM, Stevens S. Mapping the literature of nursing education. *J Med Libr Assoc* 2006; 94: E122-7.
 29. Shams ML, Dixon LS. Mapping selected general literature of international nursing. *J Med Libr Assoc* 2007; 95: e1-5.
 30. Briscoe S, Cooper C. The British Nursing Index and CINAHL: a comparison of journal title coverage and the implications for information professionals. *Health Info Libr J* 2014; 31: 195-203.
 31. Lee MS, Pittler MH, Ernst E. Tai chi for rheumatoid arthritis: systematic review. *Rheumatology (Oxford)* 2007; 46: 1648-51.
 32. Baker PR, Francis DP, Soares J, Weightman AL, Foster C. Community wide interventions for increasing physical activity. *Cochrane Database Syst Rev* 2015; 1: CD008366.
 33. Lawrence DW, Laflamme L. Using online databases to find journal articles on injury prevention and safety promotion research: key journals and the databases that index them. *Inj Prev* 2008; 14: 91-5.
 34. Farrow A, Reynolds F. Health and safety of the older worker. *Occup Med (Lond)* 2012; 62: 4-11.
 35. Polinder S, Segui-Gomez M, Toet H, Belt E, Sethi D, Racioppi F, van Beeck EF. Systematic review and quality assessment of economic evaluation studies of injury prevention. *Accid Anal Prev* 2012; 45: 211-21.
 36. Kennedy AJ, Maple MJ, McKay K, Brumby SA. Suicide and accidental death in Australia's rural farming communities: a review of the literature. *Rural Remote Health* 2014; 14: 2517.
 37. Gouttebargue V, Inklaar H, Backx F, Kerkhoffs G. Prevalence of osteoarthritis in former elite athletes: a systematic overview of the recent literature. *Rheumatol Int* 2015; 35: 405-18.
 38. Carroll M, Dalbeth N, Boockvar M, Rome K. The assessment of lesions of the Achilles tendon by ultrasound imaging in inflammatory arthritis: a systematic review and meta-analysis. *Semin Arthritis Rheum* 2015; 45: 103-14.
 39. Outermans J, van de Port I, Wittink H, de Groot J, Kwakkel G. How strongly is aerobic capacity correlated with walking speed and distance after stroke? Systematic review and meta-analysis. *Phys Ther* 2015; 95: 835-53.
 40. Delwiche FA, Hall EF. Mapping the literature of athletic training. *J Med Libr Assoc* 2007; 95: 195-201.
 41. Sherrington C, Herbert RD, Maher CG, Moseley AM. PEDro. A database of randomized trials and systematic reviews in physiotherapy. *Man Ther* 2000; 5: 223-6.
 42. Costa LO, Moseley AM, Sherrington C, Maher CG, Herbert RD, Elkins MR. Core journals that publish clinical trials of physical therapy interventions. *Phys Ther* 2010; 90: 1631-40.
 43. O'Dwyer T, O'Shea F, Wilson F. Exercise therapy for spondyloarthritis: a systematic review. *Rheumatol Int* 2014; 34: 887-902.
 44. Daffada PJ, Walsh N, McCabe CS, Palmer S. The impact of cortical remapping interventions on pain and disability in chronic low back pain: a systematic review. *Physiotherapy* 2015; 101: 25-33.
 45. O'Dwyer T, O'Shea F, Wilson F. Physical activity in spondyloarthritis: a systematic review. *Rheumatol Int* 2015; 35: 393-404.
 46. Schaefer N. Disability search tips and resources. *Med Ref Serv Q* 2015; 34: 60-74.
 47. Grindlay DJ, Brennan ML, Dean RS. Searching the veterinary literature: a comparison of the coverage of veterinary journals by nine bibliographic databases. *J Vet Med Educ* 2012; 39: 404-12.
 48. Chan HM, Ing A. A database for environmental contaminants in traditional food in northern Canada. *Int J Circumpolar Health* 1998; 57 Suppl 1: 567-71.
 49. McPartland JM, Pruitt PL. Side effects of pharmaceuticals not elicited by comparable herbal medicines: the case of tetrahydrocannabinol and marijuana. *Altern Ther Health Med* 1999; 5: 57-62.
 50. Stabler SN, Tejani AM, Huynh F, Fowkes C. Garlic for the prevention of cardiovascular morbidity and mortality in hypertensive patients. *Cochrane Database Syst Rev* 2012; 8: CD007653.
 51. Hempel S, Newberry SJ, Maher AR, Wang Z, Miles JN, Shanman R, Johnsen B, Shekelle PG. Probiotics for the prevention and treatment of antibiotic-associated diarrhea: a systematic review and meta-analysis. *JAMA* 2012; 307: 1959-69.
 52. Falzon LC, O'Neill TJ, Menzies PI, Peregrine AS, Jones-Bitton A, vanLeeuwen J, Mederos A. A systematic review and meta-analysis of factors associated with anthelmintic resistance in sheep. *Prev Vet Med* 2014; 117: 388-402.
 53. Bartol T. Assessment of classification and indexing of an agricultural journal based on metadata in AGRIS and CAB Abstracts databases. *Int J Metadata Semant Ontol* 2009; 4: 4-12.
 54. Celli F, Malapela T, Wegner K, Subirats I, Kokoliou E, Keizer J. AGRIS: providing access to agricultural research data exploiting open data on the web. *F1000 Res* 2015; 4: 110.
 55. Venn BJ, Mann JI. Cereal grains, legumes and diabetes. *Eur J Clin Nutr* 2004; 58: 1443-61.
 56. Park S, Szonyi B, Gautam R, Nightingale K, Anciso J, Ivanek R. Risk factors for microbial contamination in fruits and vegetables at the preharvest level: a systematic review. *J Food Prot* 2012; 75: 2055-81.
 57. Peluso I, Raguzzini A, Serafini M. Effect of flavonoids on circulating levels of TNF- α and IL-6 in humans: a systematic review and meta-analysis. *Mol Nutr Food Res* 2013; 57: 784-801.
 58. Bansback N, Ara R, Karnon J, Anis A. Economic evaluations in rheumatoid arthritis: a critical review of measures used to define health states. *Pharmacoeconomics* 2008; 26: 395-408.
 59. Demarré L, Van Lancker A, Van Hecke A, Verhaeghe S, Grypdonck M, Lemey J, Annemans L, Beeckman D. The cost of prevention and treatment of pressure ulcers: a systematic review. *Int J Nurs Stud* 2015; 52: 1754-74.
 60. Rashidian A, Omidvari AH, Vali Y, Sturm H, Oxman AD. Pharmaceutical policies: effects of financial incentives for prescribers. *Cochrane Database Syst Rev* 2015; 8: CD006731.
 61. Wolbring G, Lashewicz B. Home care technology through an ability expectation lens. *J Med Internet Res* 2014; 16: e155.
 62. Hawley-Hague H, Boulton E, Hall A, Pfeiffer K, Todd C. Older adults' perceptions of technologies aimed at falls prevention, detection or monitoring: a systematic review. *Int J Med Inform* 2014; 83: 416-26.

63. Booth V, Masud T, Connell L, Bath-Hextall F. The effectiveness of virtual reality interventions in improving balance in adults with impaired balance compared with standard or no treatment: a systematic review and meta-analysis. *Clin Rehabil* 2014; 28: 419-31.
64. Farmer SE, Durairaj V, Swain I, Pandyan AD. Assistive technologies: can they contribute to rehabilitation of the upper limb after stroke? *Arch Phys Med Rehabil* 2014; 95: 968-85.
65. Bhaskaran K, Hajat S, Haines A, Herrett E, Wilkinson P, Smeeth L. Effects of ambient temperature on the incidence of myocardial infarction. *Heart* 2009; 95: 1760-9.
66. Charreire H, Casey R, Salze P, Simon C, Chaix B, Banos A, Badariotti D, Weber C, Oppert JM. Measuring the food environment using geographical information systems: a methodological review. *Public Health Nutr* 2010; 13: 1773-85.
67. Thomson H, Thomas S, Sellstrom E, Petticrew M. Housing improvements for health and associated socio-economic outcomes. *Cochrane Database Syst Rev* 2013; 2: CD008657.
68. Cann KF, Thomas DR, Salmon RL, Wyn-Jones AP, Kay D. Extreme water-related weather events and waterborne disease. *Epidemiol Infect* 2013; 141: 671-86.
69. McKenna C, Wade R, Faria R, Yang H, Stirk L, Gummerson N, Sculpher M, Woolacott N. EOS 2D/3D X-ray imaging system: a systematic review and economic evaluation. *Health Technol Assess* 2012; 16: 1-188.
70. Mehrholz J, Elsner B, Werner C, Kugler J, Pohl M. Electromechanical-assisted training for walking after stroke. *Cochrane Database Syst Rev* 2013; 7: CD006185.
71. Marcano Belisario JS, Huckvale K, Greenfield G, Car J, Gunn LH. Smartphone and tablet self management apps for asthma. *Cochrane Database Syst Rev* 2013; 11: CD010013.
72. Schloman BF. Mapping the literature of health education. *Bull Med Libr Assoc* 1997; 85: 278-83.
73. Burtis AT, Taylor MK. Mapping the literature of health education: 2006-2008. *J Med Libr Assoc* 2010; 98: 293-9.
74. Dray J, Bowman J, Wolfenden L, Campbell E, Freund M, Hodder R, Wiggers J. Systematic review of universal resilience interventions targeting child and adolescent mental health in the school setting: review protocol. *Syst Rev* 2015; 4: 186.
75. Alkhateeb JM, Hadidi MS, Alkhateeb AJ. Inclusion of children with developmental disabilities in Arab countries: a review of the research literature from 1990 to 2014. *Res Dev Disabil* 2016; 49-50: 60-75.
76. Piromchai P, Avery A, Laopaiboon M, Kennedy G, O'Leary S. Virtual reality training for improving the skills needed for performing surgery of the ear, nose or throat. *Cochrane Database Syst Rev* 2015; 9: CD010198.
77. Edwards D, Hawker C, Carrier J, Rees C. A systematic review of the effectiveness of strategies and interventions to improve the transition from student to newly qualified nurse. *Int J Nurs Stud* 2015; 52: 1254-68.
78. Meho LI, Spurgin KM. Ranking the research productivity of library and information science faculty and schools: an evaluation of data sources and research methods. *J Am Soc Inf Sci Technol* 2005; 56: 1314-31.
79. Horsley T, Dingwall O, Sampson M. Checking reference lists to find additional studies for systematic reviews. *Cochrane Database Syst Rev* 2011; MR000026.
80. Fiander M, McGowan J, Grad R, Pluye P, Hannes K, Labrecque M, Roberts NW, Salzwedel DM, Welch V, Tugwell P. Interventions to increase the use of electronic health information by healthcare practitioners to improve clinical practice and patient outcomes. *Cochrane Database Syst Rev* 2015; 3: CD004749.
81. Gasparyan AY, Ayvazyan L, Blackmore H, Kitas GD. Writing a narrative biomedical review: considerations for authors, peer reviewers, and editors. *Rheumatol Int* 2011; 31: 1409-17.
82. Hicks R, Pierson CA. Author and journal responsibilities postpublication: the relationship continues. *J Am Assoc Nurse Pract* 2014; 26: 463-4.

Box 1. Features of highly functional specialist bibliographic databases

- Transparent indexing criteria
- Focus on specific subject categories and disciplines
- Expanded coverage of allied fields of science
- Displayed lists of core and selective collections of periodicals
- Availability of expert teams for evaluating new source applications
- English and/or multilingual platform
- Capacity to cover a range of items (articles, books, conference proceedings, theses, technical documents, audiovisual materials, web resources)
- Advanced online search engine
- Expanded coverage of historic publications
- Integration of search engine with an organized thesaurus of specialist keywords
- Availability at vendors' platform (e.g., EBSCOhost, ProQuest)
- Integration with a digital archive or repository (full-text counterpart)
- Capacity to process reference lists and track citations