Module Three - Electronic Information Searching Techniques

Introduction

Within the electronic environment, information is accessed through the Internet, online databases for journal articles and books. Users also access specialized databases that cover specific subject areas such as health, medicine and biomedical research.

Information available and accessible online is massive. To make maximum use of this information and to avoid frustration while looking for relevant information, the user should have search skills that include being familiar with search techniques. The use of search techniques and strategies aims at helping the user retrieve relevant and quality information.

The purpose of this module is to discuss information search strategies and search techniques. The importance of search preparation and the application of search techniques help the user to have successful and focused searches so as to, save time and effort while undertaking online information searches. The module provides the process of developing a search strategy; outlines the various search techniques; and provides examples on how to use the search techniques when searching for information through search tools such as bibliographic databases.

Learning Objectives

The student will learn about:-

1. The types of information searches
2. The importance of search preparation
3. The formulation of search strategies
4. The types of search techniques
5. The use of search techniques in information retrieval
6. The application of search techniques to various search tools

Learning Outcomes

On successful completion of the module, one should be able to:-

1. Distinguish between simple, advanced and meta searches
2. Plan for a search session
3. Formulate search strategies
4. Select the appropriate search tool for the required information
5. Identify and use various search techniques
6. Apply search techniques to various search tools

Summary of Content

	Content	Methods	Mode of assessment
4.1	Types of searches-Simple searching, advanced searching and Meta searching, Keywords, Search preparation.	Lectures Handouts PPT	Question and answer
4.2	Steps in developing search strategy, advantages of a search strategy	Lectures Handouts PPT	As Above
4.3	Search techniques: examples • Boolean Logic • Parenthesis • Phrase searching • Truncation • Wildcards • Field searching	Lectures Handouts PPT	Hands-on exercises
4.4	Application of search techniques • searching from deep web sources eg Medline/PubMed • searching from directories • searching from search engines • searching in subject portals eg Hinari	Lectures PPT Practice exercises	Hands-on exercises

Preparing the search

In our daily activities whether in learning, working or for personal reasons, information is vital. While looking for information, the starting point will depend on the type of information required. The user may be looking for scholarly information, practice guidelines, information on a certain disease condition such as diabetes or general information.

Depending on the information required, the user may require the services of general search engines such as Google or specialized search tools such as the Cochrane Library. A bibliographic database such as Medline/PubMed is an important starting point for any information related to biomedicine, and health sciences. For example a search relating to information on infectious diseases would yield good results if searched from Medline/PubMed

Types of searches

There are different search options depending on the level and amount of information that is of interest to the user. To search is to carefully look for something and effective searching requires planning. Good searches are planned not accidental.

- Simple search
- Advanced search
- Meta search

Simple search

A simple search is when the user uses some keywords to perform a quick information search from a database or from a search engine. A simple search may retrieve a huge amount of search output that may take time to sieve through for any relevant information item. In simple searches, browsing rather than focused searches is done. In simple searching one or two concepts can also be used. The user may use simple searches when not sure of the type of information required and when the topic is not focused on any area. A topic such as Malaria and Africa can cover any period, can affect adult or children, male or female and can be from English, French or Portuguese speaking Africa. This simple search can also retrieve information on Africa not related to malaria. The search results may be overwhelming and the user would be required to apply search techniques to focus the search for relevancy.

Advanced search

Advanced searching is the use of techniques that help to define the information that is being searched. In advancing searching, some filtering is done to reduce the amount of items retrieved. Filtering refines the search for relevancy. In advanced searching the user is able to apply multiple search fields that can help to broaden or narrow the search depending on the topic and the search strategy.
The use of advanced searching helps the user to:-

- Apply filtering
- Reduce number of items retrieved
- Apply multiple search fields

Advanced searching tools are available in most search tools such as Medline/PubMed.

Meta search

A Meta search is when the user uses a variety of search tools simultaneously. This is done with the use of Meta search engines such as Dogpile, Search.com; Metacrawler and Vivisimo. These Meta search engines searches many search tools such as Google, Yahoo, and MSN among others. Searching from a Meta search engine is conducted in the same way as in single search engines. A search can be a simple search or an advanced search. The only difference between

Meta search engines and single search engines is that the search results will come from different search engines simultaneously.

Use of Keywords

Keywords are the words and phrases that are used to closely describe the topic or subject by the author or through indexing. Keywords capture the ideas described in a document. In using keywords, it is important to consider related terms such teenager or adolescent, variations in word spelling such as American and English versions such as anemia or andemia, plural or singular versions, synonyms such as infant or newborn, or use of controlled vocabulary that gives alternative terminology to a word e.g. Cancer is referred to as 'neoplasm' in controlled vocabulary terminology.
The difference between the use of plural and singular in search terms can produce varying results as can be seen by this search
Malaria **infections** in children in Africa – Pubmed= 2,138   Google= 2,540,000
Malaria **infection** in children in Africa-   Pubmed= 1,586   Google= 253,000
The use of plural infections instead of singular infection has increased the amount of retrieved information significantly in two search tools, PubMed and Google.

Controlled vocabulary

The use of controlled vocabulary is to give uniformity and consistency to the indexing of the literature. The controlled vocabulary ensures consistency in presentation of information for related topics. It also tries to standardise the language used by authors. The Medical Subject Headings (MeSH) is a distinctive feature of MEDLINE- the foremost biomedical literature database. It is the most used controlled vocabulary or thesaurus for biomedical literature. It is used in the Medline database. MESH is used in the preparation of Medline and a search tool through PubMed. For more information on how to use MeSH for information retrieval, please refer to the following link http://www.nlm.nih.gov/bsd/disted/pubmed.html. Click on the video: searching with the Mesh database.

Through the use of controlled vocabulary, the user is likely to retrieve more relevant results. In Medline/Pubmed, only records that have gone through the indexing process are assigned MESH terms. Those records that are not Medline records may not have the MeSH terms and searching through MeSH will exclude such records.

Case sensitivity

Electronic information can be presented in upper and lower case. It is advisable to control the use of upper and lower case while searching for information. Some search terms such as names of people and places may require the use of capital letters. However, the use of uppercase will retrieve only those words that are presented in uppercase. Using lowercase at all times helps retrieve information whether the information is presented in capital letters or not. Users should know when to use upper and lowercase letters. The use of lowercase should be preferred to avoid missing out useful information**.**

Use of Abbreviations

Some search terms are commonly presented as abbreviations. For example the use of HIV instead of Human Immunodeficiency Virus may **affect the end results. The user has to be vigilant on the effect of such abbreviations on the outcome of the search.**

Steps in Developing Search Strategy

In search preparation, the search topic is sometimes presented as a question. It is only by coming up with the search topic that the user is able to come up with words that are important in the search. This is because most Search tools such as Google use keywords in searching for information. For example a search topic such as "What is the prevalence of HIV/AIDS in teenage girls in Kenya?" would break the topic in keywords such as (prevalence, HIV/AIDS, adolescents/teenage, girls, Kenya). The user may also decide the publication period to be covered by the search, the type of information required whether reviews, journal articles or any other information. The process of preparing for the search and coming up with a search plan is referred to as 'formulating a search strategy.'
The user should also be familiar with certain search tools in the area of subject interest

- **Use of Search strategies**

What is a search strategy? This is a plan that helps the user to articulate the type of information that is required. A search strategy is a plan that guides the user to answer some questions such as:

- What is the purpose of the information?
- Is there a time frame for the required information?
- Is the information required general or specific?
- What sources would best retrieve the required information, general or specific tools?
- Would the information be specific to a certain geographical location?

A search strategy relates to having good guidelines that will lead to a successful search output. Having a search strategy helps the user to:

- Define the topic e.g. Malaria treatment in infants in Africa.
- Break the topic into concepts or keywords such as: malaria, treatment, infants, Africa.
- Use search techniques such as Boolean operators to refine the search
- Try out the search strategy and refine it as necessary for better results
- Identify the appropriate search tool and search techniques
- Decide on whether to start with a general search engine such as Google or a specific tool such as Medline/Pubmed, or a more specialised database such as Cochrane
- Have alternative choices such as starting from print-based information sources such as reports or grey literature.

- **Advantages of search strategy**

- Saves time
- Helps retrieve relevant information
- Can be stored for later use.

- **Requirements for a successful information retrieval**

- Defining the search problem
- Developing a search strategy
- Using search techniques
- Learning how to use a search tool e.g. PubMed
- Using correct spelling
- Considering other forms of information sources such as print and audio-visual
- Evaluating the retrieved information
- Using the information appropriately

Search techniques

Search techniques are ways of using search terms in finding required information from search tools. Search tools are many, e.g. Online Public Catalogues- OPAC, general search engines, search directories and portals as well as online databases or deep web.
To achieve good search results, it is necessary to use search techniques.
The following are some of the most common search techniques that are applicable to various searching tools.

- Boolean Logic
- Parenthesis
- Phrase searching
- Truncation
- Wildcards
- Field searching

Boolean Logic

Boolean logic is a logical relationship of search terms. It is named after the British mathematician George Boole (1815-64). Boolean logic is used to narrow or focus the search or to broaden the search depending on the information that the user wants to retrieve. Boolean logic helps the user to achieve relevancy in the search results and it also assists in quick retrieval of information. The logic uses the following operators AND, OR, NOT

- OR -   Broadens the search
- AND – Narrows the search
- NOT – excludes unwanted words or concepts to focus the search

Boolean Searching on the Internet

When a user searches the Internet using a search engine, the use of Boolean logic may be presented in the following ways:

1. Full Boolean logic with the use of the logical operators
2. Implied Boolean logic with keyword searching
3. Use of symbols
4. Boolean logic using search form terminology

- Full Boolean Operators.

Most search engines use Boolean logic operators, AND, OR, NOT. However it is important for the user to know how each search engine works so as to have effective searches.

- Implied logic

Most search engines use AND as a default. In PubMed, for example the search term *Malaria in Africa* will be searched as malaria AND Africa automatically, and there is no need to type the word AND. Other search engines may default to OR. It is therefore important to know how each search tool presents its information.

- Use of symbols

Some search engines uses symbols to describe the logical relationship of terms instead of words for example the use of:-
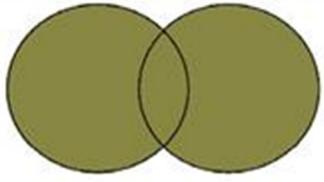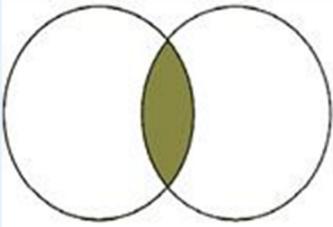
+ instead of AND
- implying NOT
It is advisable to check "help" pages in each search tool to understand the way information is searched.

- Boolean logic using search form terminology

Most search engines have an advanced search mode that helps the user to focus the search. In the advanced search mode a template is presented that guides the user in selecting the relationship of the terms – NOT, OR, AND

The use of Boolean logic can be used in various search engines. The user should however check with "help" in each search engine to understand how the Boolean operators are presented. They can be presented either in word format or symbol format. It is also important to keep in mind that most Search Engines require that Boolean operators be typed in Capital letters.

An example of a Boolean search

Search statement- Mosquitoes and malaria	Types of records retrieved	No of records Retrieved from PubMed
Mosquito OR Malaria	Documents that discuss either mosquitoes OR malaria. The OR operator searches the keywords simultaneously and independently of each other to broaden the search. The OR operator is most useful when a user wants to include words that represent the same concept. The OR operator broadens the search as the operator provides a wider selection of the search by retrieving records that have either of the keywords. This operator can be helpful when the user wants to look at a subject area comprehensively.	OR=81883
Mosquito AND Malaria	Documents that discuss both mosquito AND malaria. The use of AND helps in refining the search to reduce the number of results especially if a search term is too general.**AND** is useful when performing a search that is focused to specific keywords or phrases.	AND= 8557
Mosquito NOT Malaria	Documents that discuss mosquitoes as parasites but excludes malaria. This operator widens the search for better results. NOT should be used, when a search retrieves many items that are not related to the search topic. The use NOT may block relevant items from retrieval and it should be used with caution.	NOT =24430
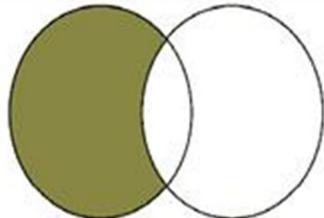
Search engines such as Google use keywords to query their databases and produce results. Results match the keywords. It can be seen that the use of Boolean logic or any other search technique depends on the type of information the user wants to retrieve.

Parenthesis

This search technique is used to force the order of how information is retrieved. For example the retrieval of information related to diabetes prevention and control can be searched as –
Diabetes AND (Prevention OR control).

The keywords in the brackets will be searched first and then matched with the results of the keyword outside the bracket. In the absence of brackets all the keywords will be searched together from left to right. The use of brackets controls how the search is executed. Results returned through the use of parenthesis are more relevant. Parenthesis uses more than one Boolean operator and is used to perform complex searches.

A search in PubMed for *Diabetes AND (Prevention OR control)* returns104,519 records whileas a search without the use of parenthesis - Diabetes AND Prevention OR control-returns 2,374,036 records. There is a huge difference in the amount of records retrieved without the use of parenthesis.

Phrase searching

This technique surrounds the search keywords in quotes "…." It instructs the search engine to search only words that appear side by side inside the quotes. This method narrows search results significantly leading to more relevant results. An example of a phrase search "HIV/AIDS and tuberculosis" would only retrieve records focusing only on HIV/AIDS and tuberculosis together. In PubMed, the use of phrase searching is not recognised as it may lead to omission of relevant citations. This is due to the fact that PubMed performs automatic term matching, but when the search words are under quotation marks, the automatic term matching is not done.
 A search example from Google on "HIV/AIDS and tuberculosis" as a phrase retrieves about 2,580,000 results while as a search statement on HIV/AIDS and tuberculosis retrieves about 6,600,000 results. There is huge difference in the amount of records retrieved without the use of the quotation marks.
In PubMed, the search "HIV/AIDS and tuberculosis" retrieves 1057 records and the search HIV/AIDS and tuberculosis retrieves 1057 records.

Truncation

Truncation is the process of using an asterisk mark (*) while searching. The purpose of truncation is to broaden the search results. Through the use of truncation at the root of the word, the search tool searches all word variations after the asterisk eg. the use of * with Child* will retrieve child, children and childhood. In the example below,

- Child* retrieves 1,694,851records
- Children retrieves 1,649,662 records
- childhood retrieves 150,545 records

Depending on the root word and the place where the asterisk is placed, use of truncation can sometimes retrieve some irrelevant results. Each search tool treats the use of search techniques differently. The user is advised to check if the search tool in use allows the use of truncation.

Search topic	Truncation symbol	Search results	
		PubMed	Google
Malaria infection in child* in Africa	*	0 records	About 292,000 records
Malaria infection in child$ in Africa	$	1434 records	About 217,000 records.
Malaria infection in child! in Africa	!	1434 records	About 217,000 records.
Malaria infection in child# in Africa.	#	1434 records	About 217,000 records

- PubMed and Google uses the Truncation symbols $, ! and #

Wildcards- Special Symbols or "Wild Card"

Wildcards are characters that are used to assist in searching for information. Wildcards are used to represent one character or letter in a word. Wildcards are especially useful in situations when the user is not sure of the correct spelling of a word. In medicine, there are variations in the use of American and English word spelling for medical terms. Wildcards can be used when the user is not sure of the exact spelling of a certain word. It is advisable to check the wildcard symbols used by each search tool or search engine. The most commonly used wildcard is "?". Below is an example

- An?mia will retrieve all records that contain either anaemia or anemia
- Colo?r will retrieve all records that contain colour and color

However most search engines do not currently support the wildcard facility

Field Searching

An electronic record is presented as a field. Within a bibliographic database, there are data fields for the title, author, affiliation, journal or book title and language, among others. The user can use any of these fields to retrieve the required information.

As an example, a user can search for an article by a certain author on a specific topic such as teenage pregnancy in Africa by David Mukamba. This is a focused search through the author field. The user can also focus a search through the use of the title, subject or publication type such as journal article.

In most search tools, such as Pubmed, there is also the possibility of limiting the searches to such fields as year of publication, language, affiliation, review articles, age, gender or just the abstract of the article. Field searching, therefore, focuses on specific information that the user may require.

Field searching is mostly available through the advanced searching mode of most of the search tools. The use of field searching in Medline/PubMed will be shown within the search examples.

Searching from health information sources- Examples

'Invisible' or 'deep web' is a phrase used to describe information content that is usually found in searchable databases. This information is not accessible through general search engines such as Google. Information found in these databases is accessible through subscription to commercial databases such as EBSCO. Access is also possible through the use of user names and passwords. Information in the deep web can also be free, for example the Medline/PubMed database is free. However, the user should know the existence of such a database and how to use it for information retrieval. Databases such as Medline are easy to access information since the information is presented in a structured format through search fields such as title, author, and journal, year of publication, affiliation, and subject. The information content of the deep web is believed to be of high quality and covers a high percentage, about of all web based content.

Searching from Search Engines

Search engines are huge databases composed of Internet files collected by a computer program (sometimes called a crawler, robot, or spider). Search engines have no policies for selection of content. Search engines use the web browsers such as Internet Explorer to query the databases. Once information is retrieved, the computer programme indexes the information from the files into indexing terms such as title, author, URL, etc. Search engines use mostly keywords to search for information. An example of a search engine is Google.
 When to use search engines

- For general information
- When topic has many facets
- For current information

Information retrieved through the search engines may not be what is expected. This is due to the fact that search engines have no information selection and evaluation policies.
To improve on the search results, it is advisable to constantly check on "help" pages of each search tool. Each search tool provides some information on searching tips. Web technology is dynamic and changes all the time and searching tips provided last year may not work in the next year.

Use of Google Scholar

Google scholar is a useful search tool for academic information. This tool has scholarly material such as books, patents, journal articles and conference papers, among others. It has a search facility that links to the full text of an article and links to sites or databases that provide more information to the retrieved results including related or similar articles.

A search on Malaria +Africa gave results from a book and from journal articles. By clicking on the article "*Estimating mortality, morbidity and disability due to malaria among Africa's non-*

pregnant population, you will be taken to the PubMed database where the article will be displayed. To get a free full text version, click on the link described as free full text article in PubMed Central on the right hand side. When in Pubmed Central click on the pdf link for the free article.

From PubMed to Pubmed Central
PubMed Central Free full text access

A Link from an article in Google Scholar to PubMed and PubMed Central

http://www.ncbi.nlm.nih.gov/pubmed/10516785

Searching from a search directory

A subject directory is a service that offers a collection of links to Internet resources submitted by site creators or evaluators and organized into subject categories. Information in the directory services uses selection criteria for choosing links. The selection criteria vary from service to service, but most services provide information on the selection criteria that they have used. An example of a directory is Yahoo and virtual library. These directories are easy to use and they are also searchable.

A search from Yahoo for health information is as shown below. Clicking on Yahoo Health Guides A-Z leads to a page of health topics arranged in alphabetical order. Clicking on any disease or health topics leads to more information on that topic. For example, clicking on the topic or disease 'Asthma' will lead to a page with more links and information on Asthma, including related topics, health research and videos. Clicking on any topics of interest will lead to further information on the topic.

Searching from a search directory: Yahoo

http://dir.yahoo.com/health/

Searching from a search directory (Yahoo) on Asthma

http://health.yahoo.net/search?q1=asthma

- **Characteristics of search directories**
- Can be commercial or academic
- Breaks down information into general categories
- Uses human beings to index the information
- Requires minimal understanding of the topic to retrieve relevant information

- **Search directories: Advantages**
- Information is rated, annotated and categorised
- Contains fewer resources and therefore easy to scan
- High Likelihood of retrieving relevant results

- **Search directories: Disadvantages**
- Information updated less frequently
- Subjectivity in rating and annotating resources.

Searching MEDLINE/PubMed

MEDLINE is a bibliographic database. The database is created by the National Library of Medicine of the United States and is the world's largest biomedical library. It is searched through the use of a search engine called PubMed. It is a specialized database for Biomedical and related information sources. The database is freely available through the Internet.

PubMed is a service of the [U.S. National Library of Medicine](). It comprises more than 20 million citations for biomedical literature from MEDLINE, life science journals and online.[http://www.ncbi.nlm.nih.gov/pubmed](). Citations may include links to free full text content through PubMed Central and publisher web sites - [http://www.ncbi.nlm.nih.gov/pmc]() . PubMed has a variety of search modes that meet individual needs. There is a simple search and the user can use the advanced search to perform a complex search using Boolean commands. The user can also access information through the use of medical subject headings or MESH. There are other search options such as the use of 'Limits' to help narrow or refine a search according to the user's information needs. The search can be limited to records that were published in a particular year, that are specific to a certain subject, gender or age group. The use of Limits helps the user in narrowing the search results in accordance with information needs. PubMed also allows the user to refine the search through the use of Preview and the index search facility.

PubMed simple search
PubMed is searched by entering a search term or terms in the search box as shown below. The simple search can bring out a huge amount of search results that the user may find difficult to sieve through for relevancy. The search below on "Malaria in Africa" returned 12,096 records.

PubMed simple search

[http://www.ncbi.nlm.nih.gov/pubmed?term=malaria%20africa]()

PubMed: Use of Fields to refine searches

These search results can be refined through the use of fields. The following fields have been used

- age - Infants 1-23 months
- period of publication- 2years
- type of publication- review

The new search that has selected specific fields has retrieved 11 records

Results of search limited to 3 items

The use of field limits reduced the search results significantly from 2,223 to only 11. The user is, however cautioned not to limit the search to too many limit choices as the search may yield no results at all.

In PubMed, the Limits search function is selected from the screen. It is important to remove the Limits search function before another search is done as the search may be limited to the same fields that had been previously selected. PubMed records the limits selected when the results are retrieved to remind the user in case of doubt.

http://www.ncbi.nlm.nih.gov/pubmed/limits

PubMed Use of Boolean Operators

PubMed has an Advanced Search option that applies Boolean operators. This option helps the user to use the Search Builder feature to refine the search. The user has the option to select the field search such as author and with the use of the Boolean operators, AND, OR, NOT a search can be build. The advanced search page also shows the search history that can also be used to refine a search. Below is an example of an author search.

PubMed advanced search

This search facility enables the user to build the search through search fields and the use of Boolean operators

http://www.ncbi.nlm.nih.gov/pubmed/advanced

Practical Exercises *

- Select and open the **MeSH Database**.
- In this exercise we will look for a MeSH term for cancer
- Enter your search terms in the empty search query box- type in the following statement: **cancer.**
- Then click on the adjacent "*Go*" button.
- From the results found you can see that the MeSH term for cancer is "**neoplasms**".
- Click on the hyperlinked term to display more information.
- Look at the definition provided for neoplasms.

Searching from a Specialised Database: The Cochrane Library

The Cochrane Library is composed of many databases. It has the world's best medical studies in evidence-based healthcare.

The database has reliable evidence from

- Cochrane and other systematic reviews
- Clinical trials
- Method reviews
- Technology Assessments
- Economic evaluations

Simple searching in Cochrane
This is done through the use of a search screen and typing of keywords. Cochrane uses Boolean operators. A simple search for malaria AND pregnancy is shown below. The Cochrane library searches in all the databases and the total result from each database is displayed. The records from Cochrane reviews are displayed first. The Cochrane library has full text of the articles. Some of the articles can be very long, and it is advisable to check on the length before a decision to print is made.

Simple Search, Cochrane

http://www.thecochranelibrary.com/view/0/index.html

Advanced Search, Cochrane
The Cochrane library can also be searched through advanced searching. In advancing searching, the user is able to apply the Boolean operators to filter the search for more focused search results. In the advance searching page, the user is given search tips, especially how to use the Boolean operators, parenthesis and phrase searching to focus the search. The Cochrane library uses the AND as default, just like PubMed and Google. This implies that AND will automatically be added to search terms irrespective of proximity to each other.

Advanced Search, Cochrane

http://onlinelibrary.wiley.com/o/cochrane/cochrane_search_fs.html?newSearch=true

Practical Exercise 1*
Access Cochrane from HINARI

- From the **Full-text journals, databases and other resources** page, go to the **Reference Sources,** drop down menu, and click on **Cochrane Library.**
- In the **Title, Abstract or Keywords** search box, enter **malaria** and click on **Go**.
- What is the number of records found in the **Cochrane Database of Systematic Reviews**?
- Go back to the **Title, Abstract or Keywords** search box, enter **malaria AND pregnancy** and click on **Go**
- What is the number of records for this more precise keyword search?
- View the abstracts of the articles of interest to you.
- Complete one keyword search using a topic of interest to you in the **Title, Abstract or Keywords** search box and note the number of **Results**.

Searching HINARI

HINARI is Health InterNetwork Access to Research Initiative set up by the World Health Organisation (WHO) together with major publishers. It enables users from developing countries to gain access to one of the world's largest collections of biomedical and health literature. HINARI is targeted to health workers, researchers and policy makers and in turn, contributes to improved world health.
Currently access to HINARI is through the use of an Institutional username and password. The

Institutional library or any other institutional department that is mandated to do so by HINARI has the user name and password information.

HINARI: Log In

http://hinari-gw.who.int/

HINARI is a tool for finding information journal articles and books available in publisher websites or from Medline/PubMed. Information in HINARI can be searched by subject, language or through a list of journal titles (A-Z). HINARI provides access to online databases such as the Cochrane Library, a specialised database in evidence based medicine. Other information resources available through HINARI are reference sources and free medical information resources such as Biomed central, Highwire and Bioline International.
a) Search by journal title
Once logged into HINARI, a journal can be searched through its title. Looking at the A-Z list, the user can click on any letter when the journal title is known. A user looking for the *Tropical Journal of Pharmaceutical Research* will click on the letter T and then scroll down through all the journal titles until the required title is found. Clicking on the required journal title will bring the user to the website of that journal as shown below. From the journal webpage, the user can search for the needed information. The journal web page also gives the user the opportunity to register for journal alerts. These journal alerts are a service to users for current awareness on a subject of their choice.
This is simple searching through the field technique.

HINARI journal search through the title

Click on the letter "T" scroll down and select

http://extranet.who.int/hinari/en/journals.php

- Tropical Journal of Pharmaceutical Research ~ Pharmacotherapy Group, Faculty of Pharmacy, University of Benin, Benin City, Nigeria **(Bioline International) v. 1 (2002) - current issue**

b) Advanced searching in HINARI
In Hinari advanced searching is made through the use of PubMed. From the HINARI search page, click on search 'HINARI journal articles through PubMed/Medline' link. Clicking on this link will lead to the PubMed Homepage. At the PubMed home page the user can search for journal articles as will be shown below. After the search, the results page will show the number of records available and the number of journals that have full- text access through HINARI. The user should note that the PubMed database displays search results in summary format, but other display formats such as abstract can be selected as the user may choose. Searching directly from PubMed will not show journals that are available through HINARI. The user may have to access HINARI to get the full text article if the article is not free from PubMed or PubMed Central. It is,

therefore advisable to access PubMed through HINARI as the user has an advantage of the filtered HINARI journals. A search in PubMed on "Malaria in Africa" through HINARI retrieves 12277 but will show that 4,852 records are in HINARI. This means that the user has access to 4,852 free full-text results. PubMed has also filtered other results indicated as free full text (4195) that are freely available to all users irrespective of access through HINARI.

Advanced searching in HINARI

http://extranet.who.int/hinari/en/journals.php

Clicking on the link Search HINARI journal articles through PubMed (Medline) will lead to the Pubmed database .

In the HINARI search page there is a link to Other Free Collections. These resources are freely accessible without having to use the Institutional user name and password. In searching for relevant articles, the user should remember to apply the search strategies as well as search techniques

Practical Exercise

- Log in to HINARI
- From the HINARI find journals by title - select the letter 'T'
- Find Tropical Journal of Pharmaceutical Research
- Select it from the list by clicking on the title.
- Select an article from the latest issue available to you and open the full text.
- If the article is of relevance to your area of interest, save it for later use

Practical Exercise

Finding journal titles by subject in HINARI website

- From the HINARI Full-text journals, databases and other resources page, go to Find journals by subject.
- Find Infectious diseases by clicking on the Drop Down menu.
- Select Journal of Infectious Diseases from the list by following the hyperlinked title.
- Journal of Infectious Diseases will open on the publisher's website.
- Select an article from the latest issue available to you and open the full text.
- What is the title and author of the full-text article you viewed?
- Go back to the drop down menu of subjects. Choose a subject that is of interest to you.
- Which subject did you choose? Name three journals that are of particular interest to you.
- When you have finished, return to the HINARI Full-text journals, databases and other resources page.

* Exercises adopted from HINARI

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