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Systematic Searching of e-literature Databases

Structure of the session



- Principles of searching
 - Resources
- Search Strategy
 - Developing
 - Implementing
 - Saving



1st principal of searching



- Start with focused clinical question
 - Specifies
 - Population to which the question applies;
 - Intervention or Exposure
 - Control treatment/exposure
 - Outcome variable

Formulate the question



- Translate the clinical problem into a structured question and identify the key concepts
 - *Is there a role of resuscitative drugs in out-of-hospital cardiac arrest in addition to cardiopulmonary resuscitation*
 - *Does epinephrine reduces mortality among patients experiencing out of hospital cardiac arrests receiving CPR?*

PICO



- ❖ Does epinephrine reduces mortality among patients experiencing out of hospital cardiac arrests receiving CPR?

Patient or problem	
Intervention(s)	
Comparison(s)	
Outcome(s)	

2nd principle of searching



- Find as much as possible
 - Use multiple sources
 - Start with the sources with highest yield
 - Journal coverage
 - date coverage
 - Specialty coverage
 - Language coverage



Resources e-databases

- **MEDLINE** (online records of Index Medicus, 1966 - , free on PubMed-Entrez)
- **EMBASE** (online records of Excerpta Medica, 1974 - , subscription)
- **CDSR (*The Cochrane Library*)**
- **CENTRAL (*The Cochrane Library*)**
- **CRG specialist databases (Cochrane Reviewers)**
- **Chinese Biomedical Literature database**
- **CINAHL** (Nursing & Allied Health, 1982 - , subscription)
- **CancerLit** (Cancer) http://www.cancer.gov/search/cancer_literature/
- **AIDSLINE**
- **SciSearch**
- **LILACS** (Latin America & Caribbean med lit, Portuguese & Spanish language, free) <http://www.bireme.br>
- **Australasian Medical Index** (subscription)
- **JICST-E** (Japan)
- **Specialist CAM databases**

Use Google to find the latest web addresses



Chinese databases

Name (English)	Name (Chinese)	Journals	Articles	Start date	Free access
Chinese Biomedical Literature database (CBM)	中国生物医学文献数据库	1600+	3 000 000	1978	No
Chinese Medical Current Content (CMCC)	中文生物医学期刊数据库	1400+	2 700 000	1994	Citations + abstracts
China National Knowledge Infrastructure (CHKD-CNKI)	国家知识基础设施	1000+	145457	1979	Citations + abstracts
VIP information/Chinese Scientific journals database (CSJD-VIP)	维普信息/中文科技期刊数据库	1818	2 900 000+	1989	Citations + abstracts
WANFANG database (Chinese Medicine Premier)	万方数据/医药卫生专辑	963	Unclear	Unclear	Citations + abstracts

Other Resources



- References of relevant articles & reviews
- Conference Proceedings
- Hand-searching un-indexed journals
- Contact pharmaceutical & device manufacturers
- Contact experts in the field

3rd principle of Searching



- **Search Systematically**
- **Two step process:**

1. Identify search terms corresponding to the PICO concept
 1. MeSH* descriptors / terms (for MeSH search)
 2. free-text terms (for free-text search)
2. Retrieve relevant citations
 - Boolean operators
 - Database search interface

*MeSH = *Medical Subject Heading*

MeSH



- MeSH is the National Library of Medicine's controlled vocabulary thesaurus.
- It consists of sets of terms naming descriptors in a hierarchical structure that permits searching at various levels of specificity.

**Next few slides:
Not for Literature Searching!**

Exploring MeSH



<http://www.nlm.nih.gov/cgi/mesh/2011/MB.cgi>

A screenshot of the MeSH Tree Browser interface. The title bar says "MeSH Tree Browser - 2011". Below the title, there's a search bar with placeholder text "Search MeSH Tree". On the left, there's a tree view of MeSH categories. The root node "All MeSH Terms" is expanded, showing its children: "Anatomy [300]", "Physiology [270]", "Pharmacology [170]", "Chemicals and Drugs [370]", "Actions and Use [300]", "Actions of Drugs and Biologicals [300]", "Pharmacokinetics [270]", "Therapeutics and Hypothesis [300]", "Pathophysiology and Organization [300]", "Pathophysiology, Education, Technology and Tools [300]", "Technology, Software, Applications [300]", "Interventions [300]", "Interventions [300]", "Interventions [300]", "Interventions [300]", "Health Care [300]", "Public Health [300]", and "Epidemiology [300]".

MeSH Tree Browser - 2011

Search MeSH Tree

- All MeSH Terms
 - Anatomy [300]
 - Physiology [270]
 - Pharmacology [170]
 - Chemicals and Drugs [370]
 - Actions and Use [300]
 - Actions of Drugs and Biologicals [300]
 - Pharmacokinetics [270]
 - Therapeutics and Hypothesis [300]
 - Pathophysiology and Organization [300]
 - Pathophysiology, Education, Technology and Tools [300]
 - Technology, Software, Applications [300]
 - Interventions [300]
 - Interventions [300]
 - Interventions [300]
 - Interventions [300]
 - Interventions [300]
 - Health Care [300]
 - Public Health [300]
 - Epidemiology [300]



Exploring MeSH

1. Anatomy [A]
2. Organisms [B]
3. Diseases [C]
 - o [Bacterial Infections and Mycoses \[C01\]](#) +
 - o [Virus Diseases \[C02\]](#) +
 - o [Parasitic Diseases \[C03\]](#) +
 - o [Neoplasms \[C04\]](#) +
 - o [Musculoskeletal Diseases \[C05\]](#) +
 - o [Digestive System Diseases \[C06\]](#) +
 - o [Stomatognathic Diseases \[C07\]](#) +
 - o [Respiratory Tract Diseases \[C08\]](#) +
 - o [Otorhinolaryngologic Diseases \[C09\]](#) +
 - o [Nervous System Diseases \[C10\]](#) +
 - o [Eye Diseases \[C11\]](#) +
 - o [Male Urogenital Diseases \[C12\]](#) +
 - o [Female Urogenital Diseases and Pregnancy Complications \[C13\]](#) +
 - o [Cardiovascular Diseases \[C14\]](#) +
 - o [Hemic and Lymphatic Diseases \[C15\]](#) +
 - o [Congenital, Hereditary, and Neonatal Diseases and Abnormalities \[C16\]](#) +
 - o [Skin and Connective Tissue Diseases \[C17\]](#) +
 - o [Nutritional and Metabolic Diseases \[C18\]](#) +
 - o [Endocrine System Diseases \[C19\]](#) +
 - o [Immune System Diseases \[C20\]](#) +
 - o [Disorders of Environmental Origin \[C21\]](#) +
 - o [Animal Diseases \[C22\]](#) +
 - o [Pathological Conditions, Signs and Symptoms \[C23\]](#) +
 - o [Occupational Diseases \[C24\]](#) +
 - o [Substance-Related Disorders \[C25\]](#) +
 - o [Wounds and Injuries \[C26\]](#) +
4. Chemicals and Drugs [D]
5. Analytical, Diagnostic and Therapeutic Techniques and Equipment [E]



Exploring MeSH terms

► Cardiovascular Diseases [C14]

Cardiovascular Abnormalities [C14.240] +

Cardiovascular Infections [C14.260] +

Heart Diseases [C14.280] +

Arrhythmias, Cardiac [C14.280.067] +

Carcinoid Heart Disease [C14.280.104]

Cardiac Output, High [C14.280.142]

Cardiac Output, Low [C14.280.148]

Cardiac Tamponade [C14.280.155]

Cardiomegaly [C14.280.195] +

Cardiomyopathies [C14.280.238] +

Endocarditis [C14.280.282] +

Heart Aneurysm [C14.280.358]

► Heart Arrest [C14.280.383]

Death, Sudden, Cardiac [C14.280.383.220]

Out-of-Hospital Cardiac Arrest [C14.280.383.610]

Heart Defects, Congenital [C14.280.400] +

Heart Failure [C14.280.434] +

- Principles of searching ✓
- Resources ✓
- Search Strategy
 - Developing ✓
 - Implementing
 - Saving



Developing search strategy



- Identify closest matching MeSH descriptors (terms)
 - search the MeSH thesaurus
 - select MeSH term
- List relevant free-text terms
 - list all known synonyms
 - *cardiac arrest* → heart arrest, cardiopulmonary arrest
 - use truncation (*)
 - heart arrest* → heart arrests etc
- Do bibliographic search with free-text term(s)
 - “Out of hospital heart arrest”



1. Terms for key concepts

Item	Mesh term	Free text term
P	Out-of-hospital cardiac arrest	Out of hospital heart arrest, Out of hospital cardiac arrest, OHCA
P	Cardiopulmonary Resuscitation	CPR
I	Epinephrine	Adrenaline, adrenalin*
C	No preventive treatment	[Not recommended]
O	Mortality	[Not recommended]



2. Combining search terms

- Boolean operators
 - OR
 - Broadens the search
 - AND
 - Narrows the search
 - NOT
 - Refines the search



Search for P using OR

Patient/Problem (MeSH terms OR Free-text search)

Out-of-hospital
Cardiac Arrest
(Mesh term)

OR

Out of
hospital
cardiac
arrest
(Free text)

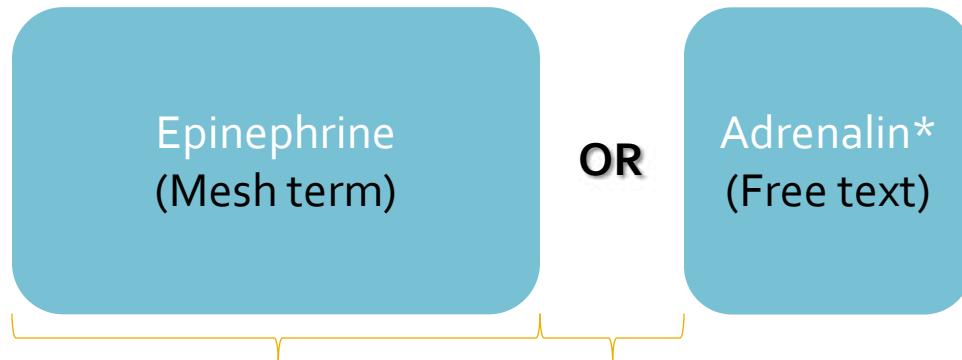
Combined search for
all MeSH & free-text
searches for the
Patient/Problem key
concept

NB: **OR** is used in the inclusive sense i.e. A or B or both

Search for I using OR



Intervention (MeSH terms OR Free-text search)



Combined search for all MeSH & free-text searches for the Intervention key concept



Combining P AND I searches

Out-of-hospital
Cardiac Arrest

OR

Out of hospital cardiac
arrest

(P)

AND

Epinephrine

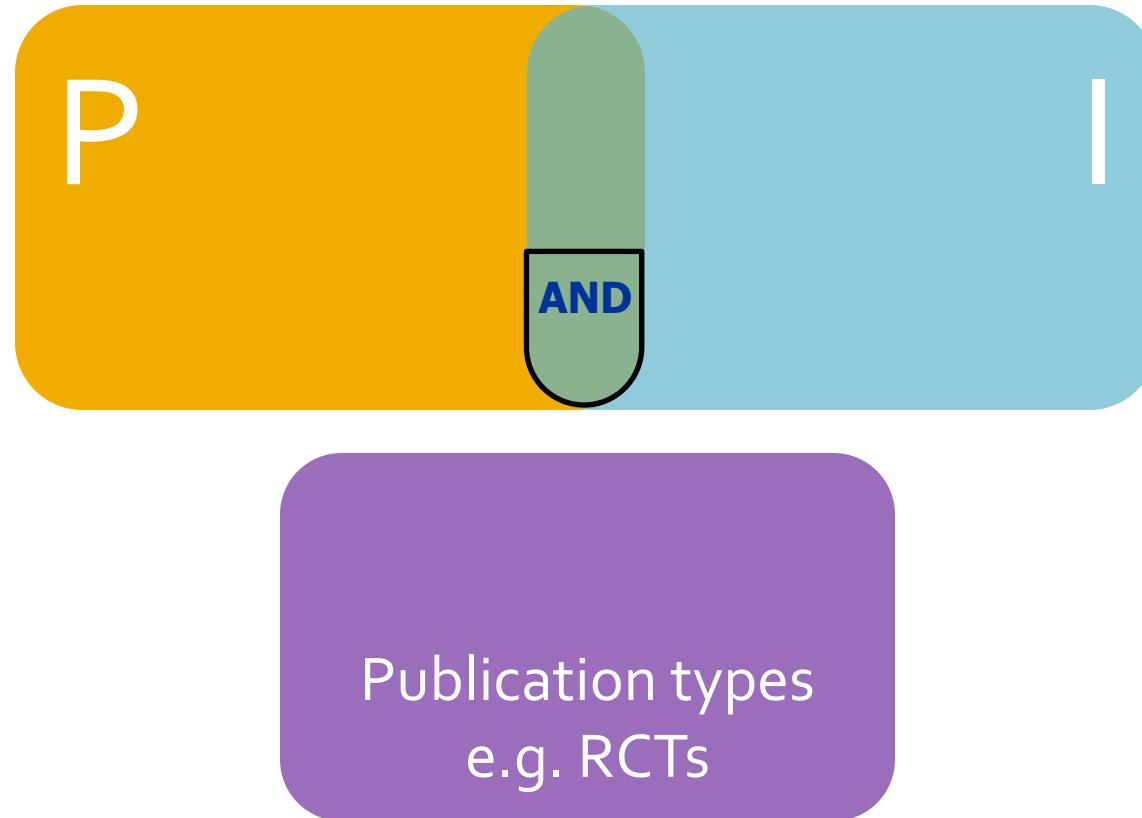
OR

Adrenalin*

(I)



Limit: by study design



- Principles of searching ✓
- Resources ✓
- Search Strategy
 - Developing ✓
 - Implementing ✓
 - Saving



MeSH thesaurus search in MEDLINE (PubMed)



www.ncbi.nlm.nih.gov or search 'PubMed' through Google®



Identifying MeSH term

A screenshot of a library search interface. At the top, there is a navigation bar with tabs like "Search", "Help", and "Logout". Below the navigation bar, there is a search bar with the placeholder text "Search the catalog...". A large, semi-transparent image of a forest scene serves as the background for the search results area. On the left side, there is a sidebar with various links and categories. The main search results area has a dark header with the text "MeSH" in white. Below the header, there are several search results listed in a grid format. A blue circle highlights the search bar at the top of the interface. A blue line points from the text below to the highlighted search bar.

To start a search of the *MeSH Thesaurus* (not a search of the MEDLINE bibliographic database)

Selecting MeSH term



A screenshot of a library search interface, likely from the PAROS system. On the left, a search bar contains the query "Out-of-Hospital Cardiac Arrest". Below the search bar, a list of search results is displayed. A red circle highlights the first result, "Out-of-Hospital Cardiac Arrest", which is also circled in red. A yellow arrow points from the text "Search Results" to this highlighted term. To the right of the search results, a detailed view of the selected term is shown in a separate window. This window displays the full search query: "'Out-of-Hospital Cardiac Arrest' [Mejr]". Two yellow arrows point from the main search results area towards this detailed view window.

From MeSh to Free Text



A screenshot of a library catalog search results page. The results are displayed in a grid format. Two specific items are highlighted with red circles: one in the top row and another in the middle row. The highlighted items appear to be related to "MeSH terms" or "free text" search results. The background shows other search results and library interface elements.

Free-text terms search



A screenshot of a library search interface. At the top, there is a blue header bar with various icons and text. Below it is a search form with a large input field labeled "Search terms" containing the text "Social media". To the right of the input field are several small colored buttons (blue, red, green, yellow) and a magnifying glass icon. A yellow arrow points down to the magnifying glass icon. Below the search form is a list of search results, each consisting of a thumbnail image, a title, and a brief description. A yellow arrow points up to the second result in the list.

Free-text terms search



A screenshot of a web-based search interface. At the top, there's a navigation bar with tabs like "Search", "Browse", "Help", and "Logout". Below the navigation is a search form with fields for "Search term" and "Search type" (set to "Full text"). To the right of the search form is a "Search" button. The main area shows a grid of search results, each with a thumbnail image, a title, and some descriptive text. On the left side, there's a sidebar with sections for "Recent searches" and "Saved searches". On the right side, there are two columns of links labeled "New Books" and "New Journals".

Combining terms using 'OR'



A screenshot of a search interface, likely a library catalog or academic database. The search bar at the top contains the query "AIDS OR HIV". Below the search bar, there are several search results listed in a grid format. One result in the bottom right corner is circled in blue, highlighting it. The results include various document types such as books, articles, and reports, with titles like "AIDS and HIV/AIDS in Africa" and "HIV/AIDS in Africa".



Searching fruther...

A screenshot of a search interface, likely a web-based library catalog or database. The search term "Panama" has been entered into the search bar at the top. Below the search bar, there are several search results listed in a grid format. Each result includes a thumbnail image, the title, and some descriptive text. The results appear to be from various sources, possibly books or articles. The interface has a clean, modern design with a light gray background and blue header elements.

Searching for I



A screenshot of a search interface, likely a library catalog or digital collection. The search term "I" is entered in the search bar at the top. The results list shows numerous items, many of which are highlighted with yellow boxes. A large yellow circle with a white letter "I" is overlaid on the screen, centered over the search results list. The background shows various search filters and result details.

Searching for P

A screenshot of a web-based search interface. The top navigation bar includes "Search", "Advanced Search", "Help", and "Logout". Below this is a search bar with placeholder text "Search e-literature" and a "Search" button. A "Results View" dropdown menu is open, showing options like "List view", "Table view", "Map view", and "Timeline view". The main content area displays a list of search results. On the left, there's a sidebar with a tree view of categories, some of which are highlighted with orange arrows pointing to specific results in the list. A large yellow circle with a white letter "P" is overlaid on the screen, centered over one of the search results. The results list includes items such as "Pan American Health Organization", and "Pan American Health Organization".

P

Getting search finalized



A screenshot of a search interface, likely from the PAROS system. The interface includes a header with a logo, a search bar, and various filter and search options. The main area shows a list of search results. Three yellow circles with letters are overlaid on the interface: 'I' is at the bottom center, 'P' is to its right, and 'F' and 'I' are stacked together further down on the right side. A yellow arrow points from the 'F' and 'I' circles towards the right edge of the screen.

Results





Applying Limits

A screenshot of a search results interface, likely from a digital library or academic platform. The results are presented in a grid format with numerous items. A specific button in the top right corner of the search bar is highlighted with a cyan circle. This button is labeled "Limit" and has a small downward-pointing arrow, indicating it is a dropdown menu for applying search filters. The overall interface is clean with a white background and a light gray header bar.

Applying limits



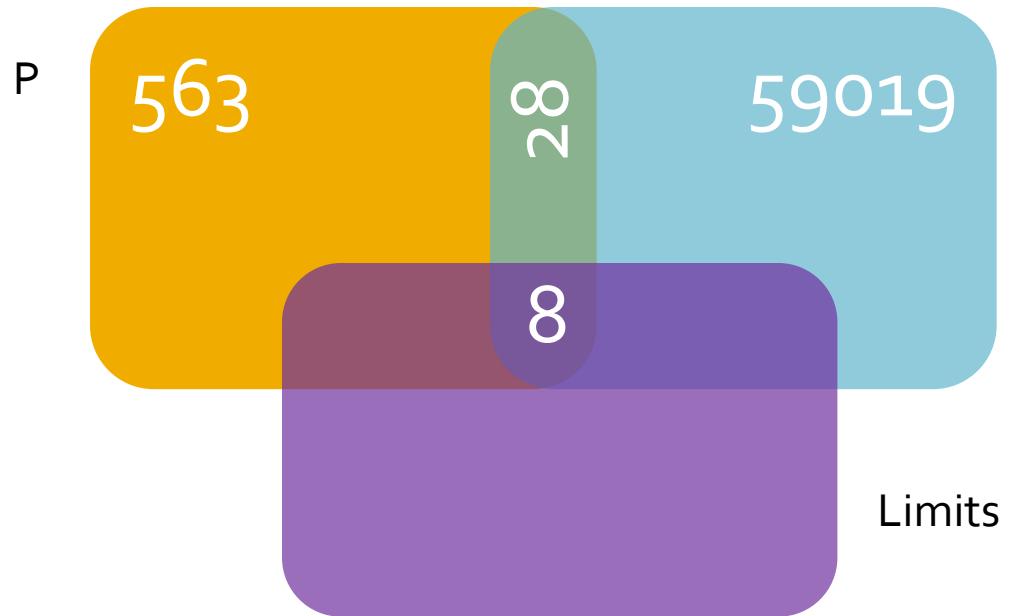
A screenshot of a search interface, likely from the PAROS system. The interface shows a list of search results on the left and a detailed view of a selected result on the right. Two specific items in the list view are highlighted with blue circles. A yellow arrow points to a small button or link at the bottom center of the screen, which is likely used to apply filters or limits to the current search results.

Result of limit search



A screenshot of a search results page from the PAROS platform. The interface includes a header with a search bar and navigation links, followed by a grid of search results. Two specific results are highlighted with blue circles: one on the left side and one on the right side. The highlighted results appear to be from a digital library or archive, showing thumbnail images and detailed metadata. The overall layout is clean and modern, typical of academic search engines.

Combining P, I & Limits



Parameter	Value	Unit	Description
P	563	---	Proportional gain
I	28	---	Integral gain
Limits	8	---	Output limit
Sample Time	0.01	seconds	Sampling period
Discrete-time model	no	---	Continuous-time model
Input delay	0	seconds	Input delay
Initial condition	0	---	Initial condition
State-space form	no	---	State-space representation
Block diagram	no	---	Block diagram representation
Linearization	no	---	Linearization
Model properties	no	---	Model properties
Report	no	---	Report



Additional points

- no right time to stop searching; be guided by returns and resources
- ideas for search terms from citations you know of; try them and check returns
- use a referencing database to manage citations

Minimize bias



- Don't limit search on
 - language
 - source (which journal, database etc)
 - publication status (full article, conference abstract, unpublished etc)
 - publication date



Saving your results!

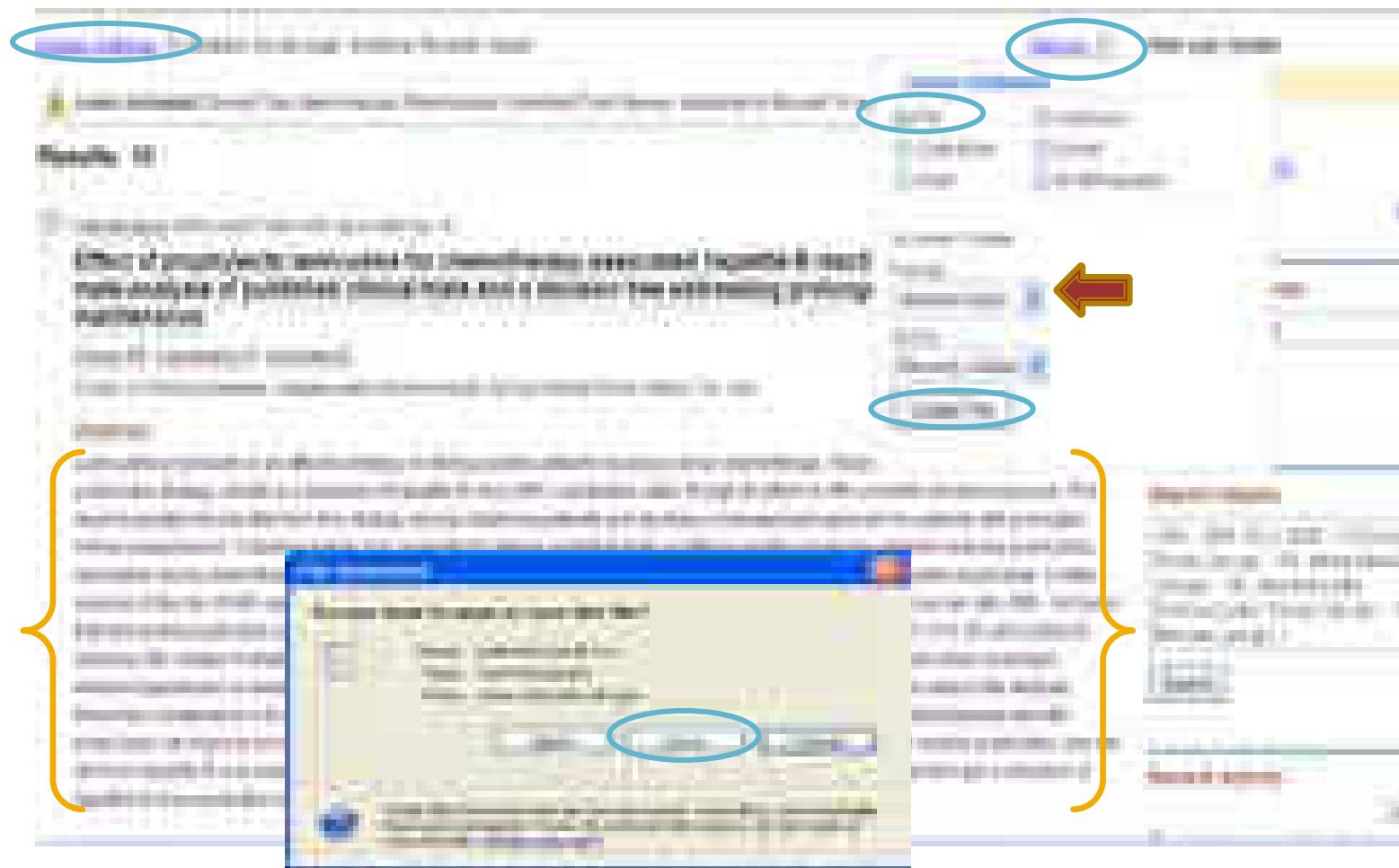


Changing the record Display...

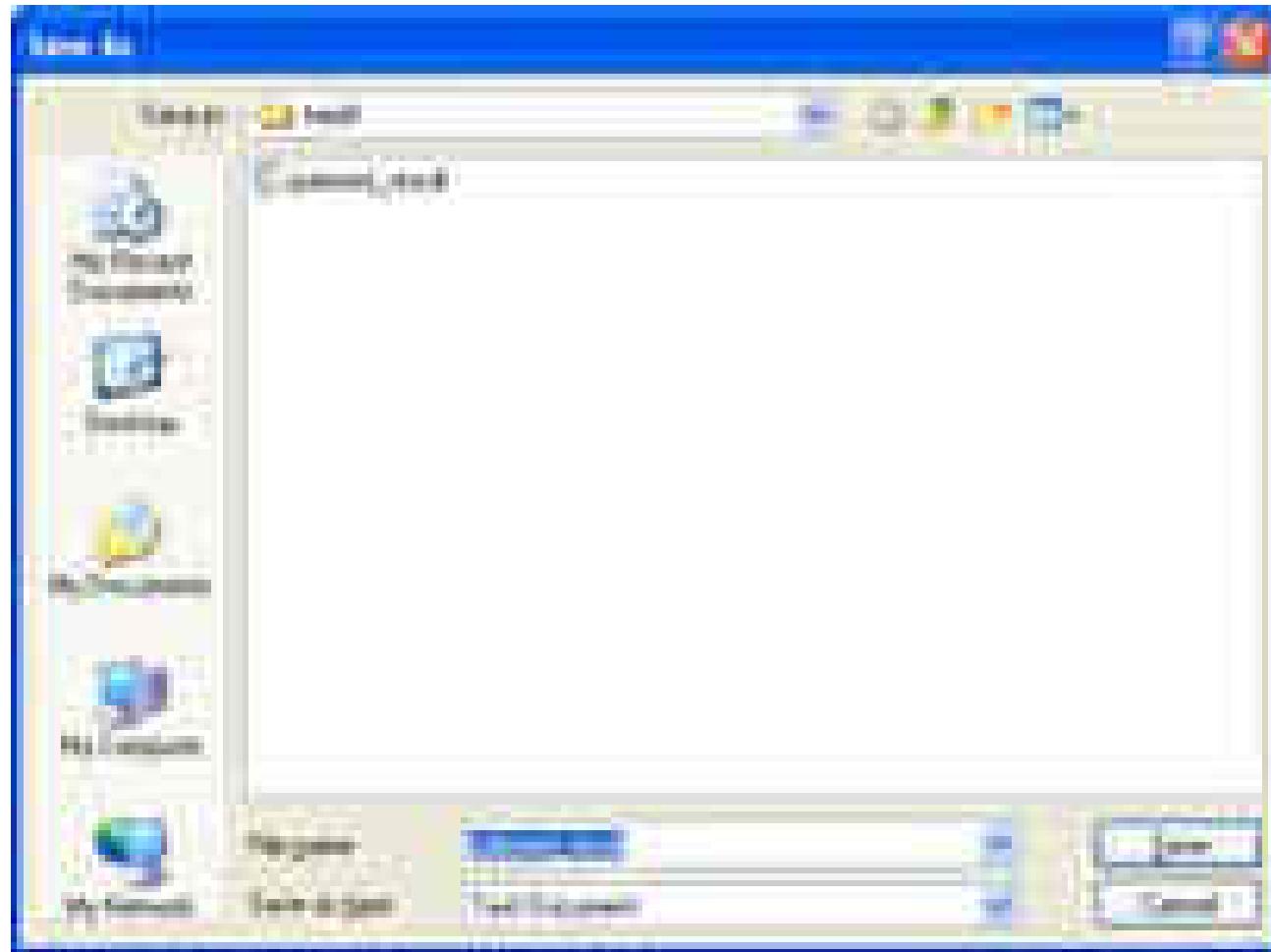


A screenshot of a library catalog interface, likely Pubmed, showing a search results page. The results are displayed in a grid format. A teal circle highlights a small, dark square icon located at the bottom left of the first result's preview area. This icon is typically used to indicate a thumbnail or preview mode for the record.

Send to file



SAVE



Saved Results

A screenshot of a computer screen showing a search results interface. The window has a blue title bar with the text "Saved Results" and a magnifying glass icon. The main area contains several lines of text, which are mostly illegible due to blurring. At the bottom of the window, there is a toolbar with various icons, including a magnifying glass, a folder, and a refresh symbol.

Thank You!

