

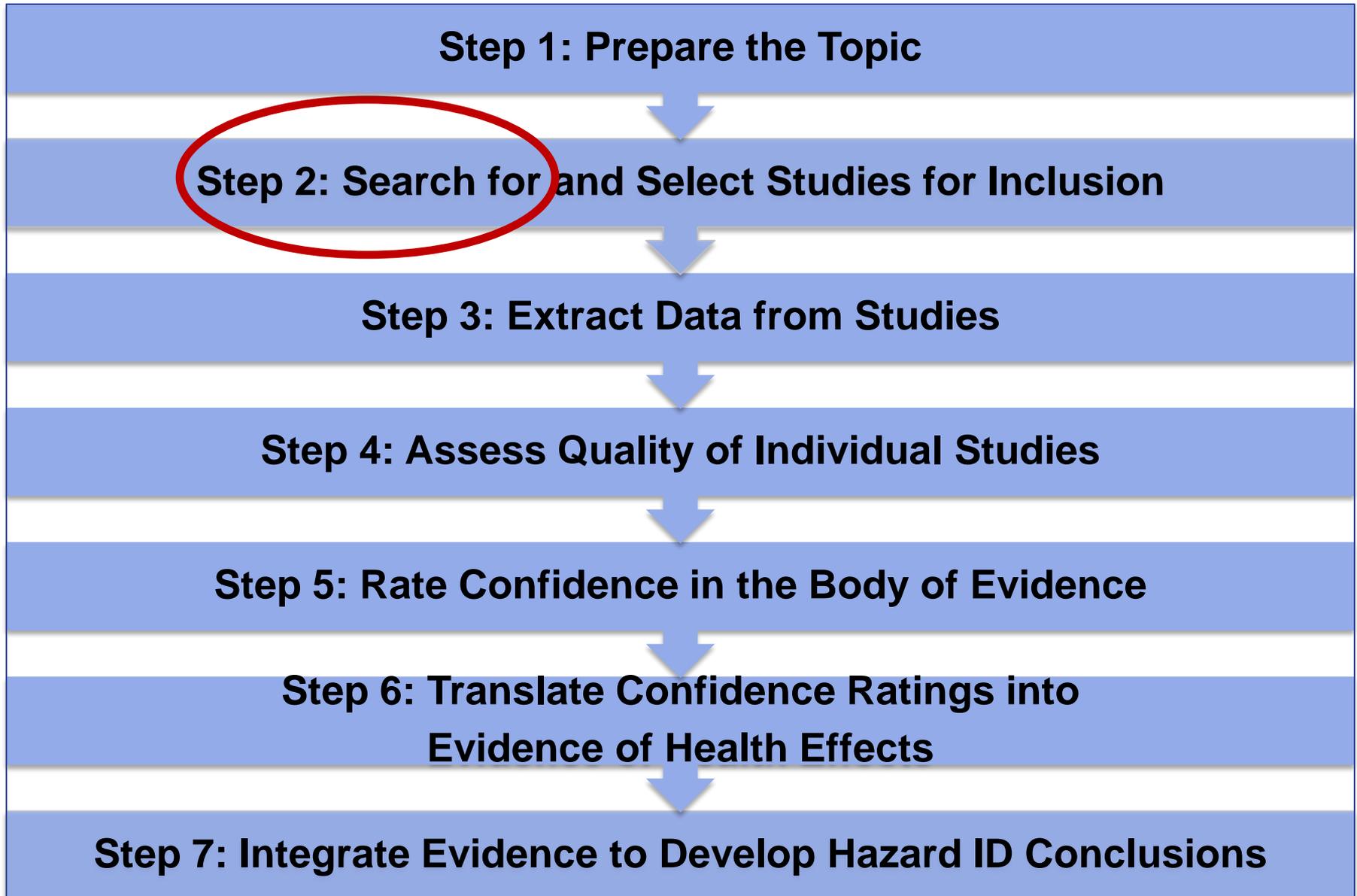
Systematically Searching the Literature

Stephanie Holmgren, MSLS, MBA
Office of Scientific Information Management
National Institute of Environmental Health Sciences

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OHAT Framework for Systematic Review





GOAL

Be comprehensive – retrieve as much of the relevant literature as possible

APPROACH

- Search a broad range of resources
- Craft a high recall search strategy



Precision vs. Recall

Precision

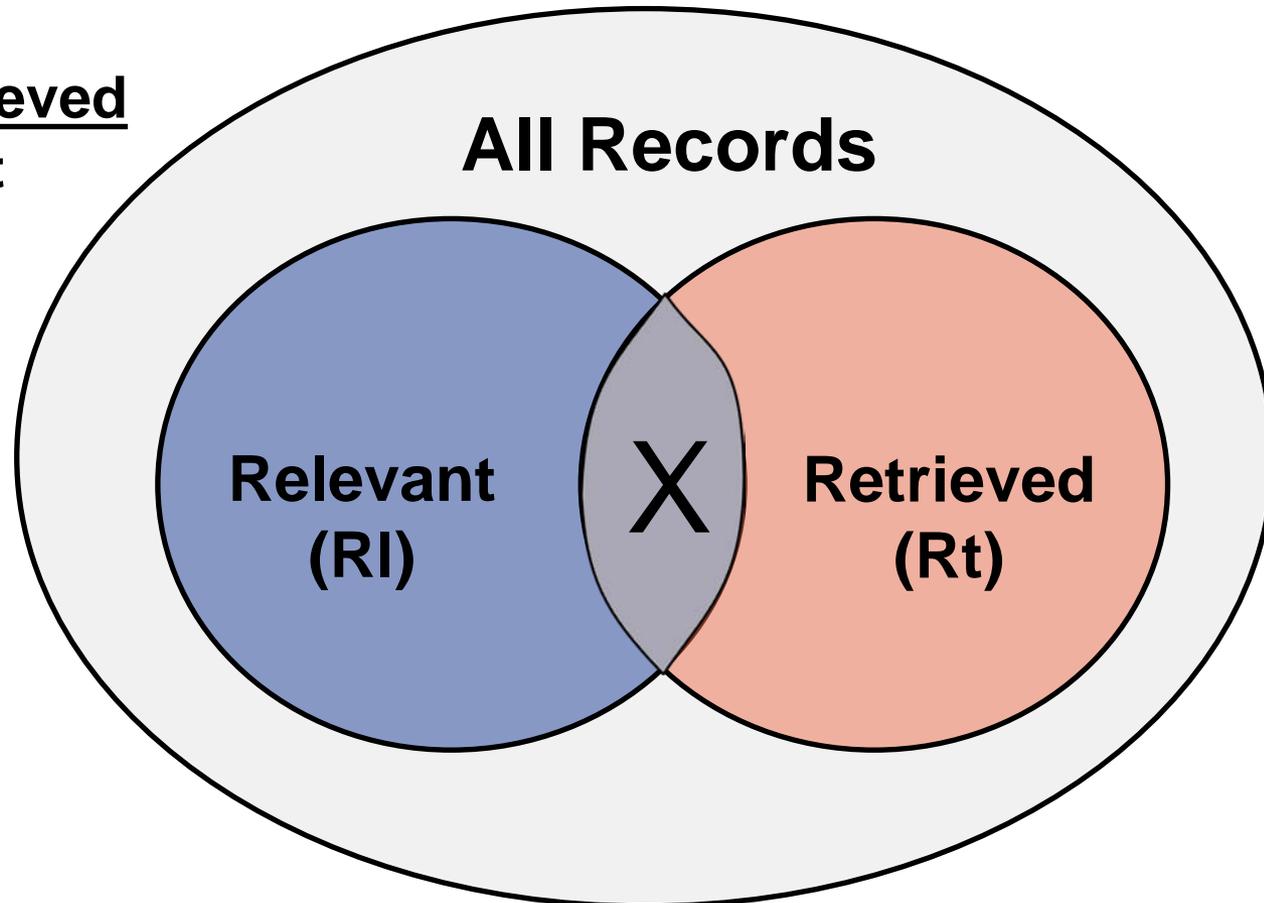
$X = \frac{\text{No. relevant retrieved}}{\text{No. total retrieved}}$

Rt No. total retrieved

Recall

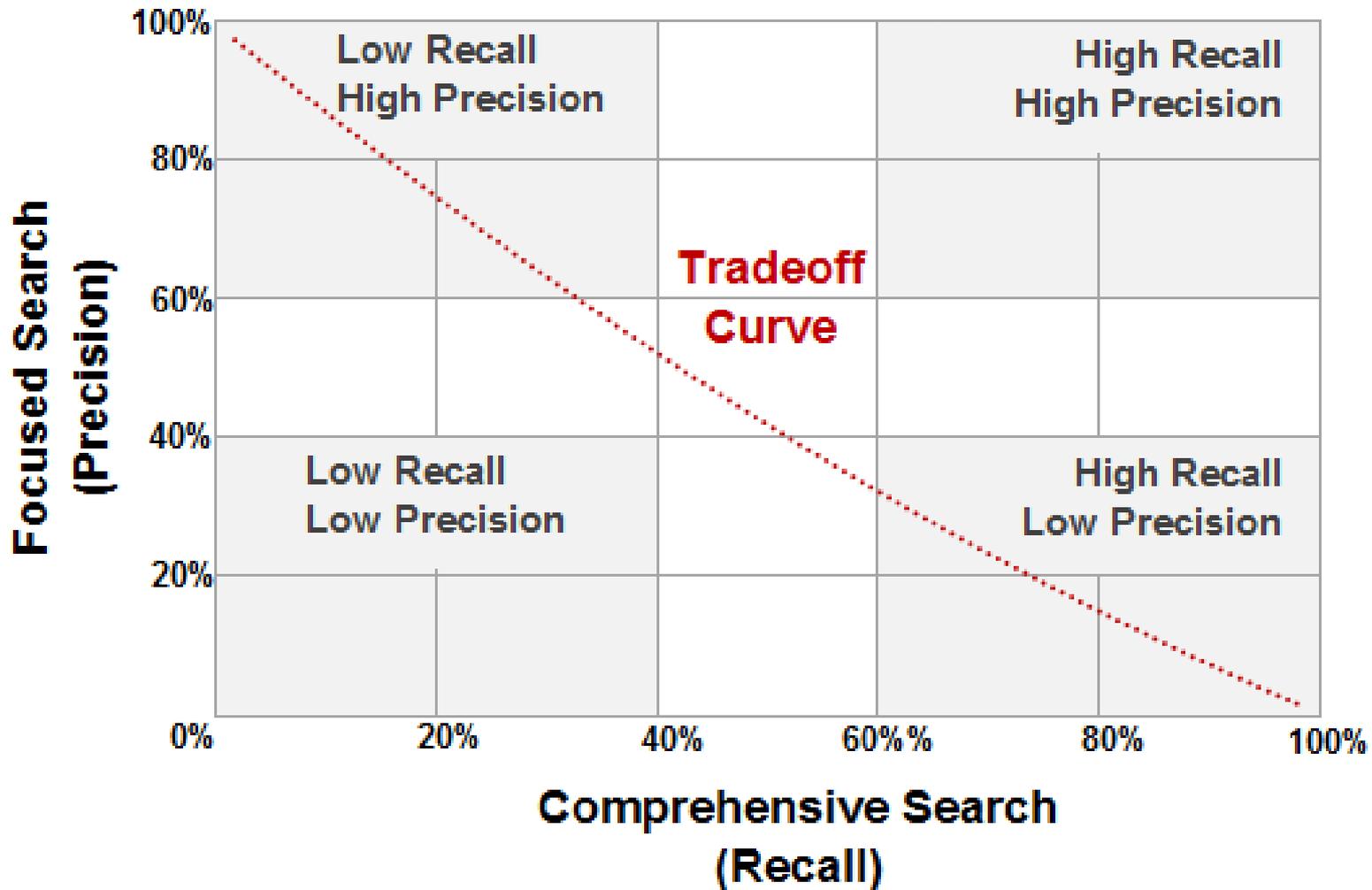
$X = \frac{\text{No. relevant retrieved}}{\text{No. total relevant}}$

RI No. total relevant





Precision vs. Recall: a Tradeoff



Source: Modified from H5 Text REtrieval Conference - <http://www.h5.com/solutions/h5-trec-results>



A “High Recall” Search Strategy

| Search Terms | Advantages | Disadvantages |
|---|--|--|
| Controlled Vocabulary <i>neoplasms[mh]</i> | <ul style="list-style-type: none">• Increases precision• Reduces need to identify all synonyms• Describes content when abstract not available. | <ul style="list-style-type: none">• Not all databases use a controlled vocabulary• Not all content is yet indexed• Indexing is not always accurate or consistent• Concept of interest is mentioned in the abstract, but not a major topic |
| Text Words <i>cancer, cancerous lesion(s)</i> <i>metastases</i> <i>neoplasm(s)</i> <i>tumor, tumour*</i> | <ul style="list-style-type: none">• Increases recall | <ul style="list-style-type: none">• Low precision (terms are present, but not in desired context)• Unsure if all terms are captured that cover the concept |



Conducting the Literature Search

Step 1: Define Key Concepts



Step 2: Select Resources



Step 3: Identify Terminology



Step 4: Tailor Search Strategy



Step 5: Compile a Test Set



Step 6: Run, Analyze, Revise and Finalize Search



Step 7: Document Process



Step 1: Define Key Concepts

Developmental effects and pregnancy outcomes associated with cancer chemotherapy use during pregnancy

| <u>P</u>opulation | <u>E</u>xposure | <u>C</u>omparison | <u>O</u>utcomes |
|--------------------------|------------------------|--------------------------|--|
| Pregnant women | Chemotherapy | n/a | Birth and developmental effects |



Step 2: Selecting Resources

Core Databases

Embase (Elsevier)
PubMed (NLM)
Scopus (Elsevier)
Web of Science
(ThomsonReuters)

As needed

Chemical/Toxicology
Reprotox (NLM)
ExPub (EBSCO)
SciFinder (CAS)
Toxline (NLM)

Clinical

CenterWatch
ClinicalTrials.gov
Cochrane Library

Occupational Health
NIOSH TIC2



Step 2: Selecting Resources

| Database Feature | PubMed | Web of Science |
|------------------------------|--|--|
| Content Coverage | 1946-present 5600 journals Subject: Biomedical | 1900-present 8,500 scientific journals and 3,000 social science journals; 150,000 conference proceedings Subject: Multidisciplinary |
| Controlled Vocabulary | MeSH | None, must use text words |
| Search Functionality | All fields searchable | Unable to limit search to 'abstract' field only |
| Syntax | No proximity No wildcards | Near/n (endocrine near/3 disrupt*) Tumo\$r (tumor, tumour) Wom?n (woman, women) |



Step 3: Identify Search Terminology

| | <u>P</u> opulation | <u>E</u> xposure | <u>O</u> utcomes |
|------------------------------|--|--|---|
| | Pregnant women | Chemotherapy | Birth and developmental effects |
| Controlled vocabulary | pregnancy[mh] OR maternal fetal relations[mh] OR maternal fetal exchange[mh] | antineoplastic agents[mh] OR neoplasms/drug therapy[mh] OR chemotherapy, adjuvant[mh] OR [...] | congenital abnormalities[mh] OR embryonic and fetal development[mh] OR fetal death[mh] OR [...] |
| | pregnancy complications, neoplastic[mh] | | |
| Text words | Pregnan* OR gestation* OR “in utero” OR intrauterine OR f(o)etal OR [...] | chemotherap* OR antineoplastic OR adriamycin OR bleomyocin OR [...] | stillborn OR still-birth OR preterm OR embryotoxic* OR teratogen* OR [...] |
| Limits | Humans[mh] OR epidemiology[sh] OR women OR woman OR patient* OR [...] | | |



Step 4: Tailor the Search Strategy

PubMed

“Neoplasms/drug therapy”[mh] OR “antineoplastic protocols”[mh] OR
“chemotherapy, adjuvant”[mh] OR “antineoplastic agents”[mh] OR
“antineoplastic agents”[pharmacological action][tiab] OR (neoplasms[mh]
AND pregnancy[mh] AND "combined modality therapy"[mh]) OR
chemotherap*[tiab] OR antineoplastic[tiab] OR "anti tumor"[tiab] OR "anti
tumour"[tiab] "5 fluorouracil"[tiab] OR adriamycin[tiab] OR bevacizumab[tiab]
OR bleomycin[tiab]

AND

Pregnancy[mh] OR “maternal fetal relations”[mh] OR “maternal fetal
exchange”[mh] OR pregnan*[tiab] OR gestation*[tiab] OR “in utero”[tiab] OR
intrauterine[tiab] OR fetal[tiab] OR foetal[tiab] OR fetus[tiab] OR foetus[tiab]
OR embryo*[tiab] OR neonat*[tiab] OR prenatal[tiab]

AND

“pregnancy complications”[mh] OR "pregnancy outcome"[tiab] OR “prenatal
exposure delayed effects”[mh] OR “congenital abnormalities”[mh] OR
“embryonic and fetal development”[mh] OR “fetal death”[mh] OR
complication*[tiab] OR outcome*[tiab] OR stillborn[tiab] OR "still birth"[tiab]
OR “congenital abnormalities”[tiab] OR “congenital anomalies”[tiab] OR
teratogen*[tiab] OR embryotoxic*[tiab] OR premature[tiab] OR "birth
weight"[tiab] OR preterm[tiab]

AND

humans[mh] OR epidemiology[sh] OR epidemiologic studies[mh] OR
Women[tiab] OR woman[tiab] OR patient*[tiab]



Step 5: Compile a Test Set

Test Library

Test Set



| Year | Author | Title | Journal/Secondary Title |
|------|-----------------------|--|-------------------------------|
| 2009 | Abellar, R. G.; Pe... | Effects of chemotherapy during pregn... | Pediatr Dev Pathol |
| 2000 | Achtari, C.; Hohlf... | Cardiotoxic transplacental effect of id... | Am J Obstet Gynecol |
| 1965 | Acosta-Sison, H. | Normal term delivery after methotre... | Philipp J Surg Surg Spec |
| 2004 | Al Bahar, S.; Pan... | Pregnancy in chronic myeloid leukemi... | Int J Gynaecol Obstet |
| 1982 | Alegre, A.; Chun... | Successful pregnancy in acute promye... | Cancer |
| 2009 | Ali, R.; Ozkalemk... | Imatinib use during pregnancy and bre... | Arch Gynecol Obstet |
| 2009 | Ali, R.; Ozkalemk... | Pregnancy in chronic lymphocytic leuk... | Leuk Res |
| 2005 | Ali, R.; Ozkalemk... | Pregnancy under treatment of imatini... | Leuk Res |
| 2003 | Ali, R.; Ozkalemk... | Maternal and fetal outcomes in pregn... | Leuk Res |
| 2003 | Ali, R.; Ozkalemk... | Maternal and fetal outcomes in pregnan... | Leuk Res |
| 2006 | Ali, R.; Ozkalemk... | Imatinib and pregnancy | J Clin Oncol |
| 2005 | AlKindi, S.; Denn... | Imatinib in pregnancy | Eur J Haematol |
| 2010 | Amant, F.; Brepo... | Gynaecologic cancer complicating pre... | Best Pract Res Clin Obstet... |
| 2009 | Amant, F.; Van C... | Gynecologic cancers in pregnancy: gui... | Int J Gynecol Cancer |



Step 6: Run, Analyze, Revise and Finalize

Draft Database Results



Test Library

| | | | |
|------|-----------------------|--|------------------------------|
| 2006 | Leiserowitz, G. S. | Managing ovarian masses during pregnancy | Obstetrical and Gynecolo... |
| 1992 | Zemlickis, D.; Lis... | Maternal and fetal outcome after breast cancer in pre... | American Journal of Obst... |
| 2003 | Ali, R.; Ozkalemk... | Maternal and fetal outcomes in pregnancy complicate... | Leuk Res |
| 2003 | Ali, R.; Ozkalemk... | Maternal and fetal outcomes in pregnancy complicated ... | Leuk Res |
| 1989 | Kim, D. S.; Park, ... | Maternal and fetal survival following surgery and che... | Obstet Gynecol 73:503-5... |
| 1992 | Lishner, M.; Zem... | Maternal and foetal outcome following Hodgkin's dis... | Br J Cancer |
| 2004 | Maxwell, C.; Bar... | Maternal and neonatal outcomes in pregnancies comp... | Obstet Gynecol |
| 2004 | Maxwell, C.; Bar... | Maternal and neonatal outcomes in pregnancies comp... | Obstet Gynecol |
| 1995 | Caron, P.; Gerbe... | Maternal-fetal transfer of octreotide | N Engl J Med |
| 1986 | Beckman, D. A.; ... | Mechanism of known environmental teratogens: dru... | Clin Perinatol |
| 1965 | Moya, F. | Mechanisms of drug transfer across the placenta with... | Antimicrobial Agents and ... |



Step 6: Run, Analyze, Revise and Finalize

Final Database Results



Final Library

| | | | |
|------|-----------------------|--|------------------------------|
| 2006 | Leiserowitz, G. S. | Managing ovarian masses during pregnancy | Obstetrical and Gynecolo... |
| 1992 | Zemlickis, D.; Lis... | Maternal and fetal outcome after breast cancer in pre... | American Journal of Obst... |
| 2003 | Ali, R.; Ozkalemk... | Maternal and fetal outcomes in pregnancy complicate... | Leuk Res |
| 2003 | Ali, R.; Ozkalemk... | Maternal and fetal outcomes in pregnancy complicated ... | Leuk Res |
| 1989 | Kim, D. S.; Park, ... | Maternal and fetal survival following surgery and che... | Obstet Gynecol 73:503-5... |
| 1992 | Lishner, M.; Zem... | Maternal and foetal outcome following Hodgkin's dis... | Br J Cancer |
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| 1986 | Beckman, D. A.; ... | Mechanism of known environmental teratogens: dru... | Clin Perinatol |
| 1965 | Moya, F. | Mechanisms of drug transfer across the placenta with... | Antimicrobial Agents and ... |



Step 7: Document the Search Process

| Report Element | |
|------------------------------------|--|
| Name of Database | PubMed |
| Name of Host | National Library of Medicine |
| Date Coverage | 1945-Present |
| Date Searched | Initial: April 9, 2010 Update: May 15, 2012 |
| Number of Records Retrieved | 5,334 |
| Search Limits | Restricted to humans |
| Search Notes | none |
| Search Strategy | [enter search string used] |



- A methodical and thorough literature search generates an unbiased and comprehensive literature base for evaluation.
- The nature of the topic under review influences how each step in the literature search process is conducted.
- Comprehensiveness is achieved through
 - Searching multiple databases appropriate to the topic
 - Identifying all pertinent terminology
 - Tailoring the search strategy to leverage each database
 - Repeatedly testing and refining the search strategy



Questions ?
