Evidence-Based Public Health

Learning Objectives

1. To plan an effective search strategy by identifying potential resources and appropriate search terms

2. To evaluate search results and individual studies

3. To recognize the value of systematic reviews and where to find them
What We’ll Cover

- Steps in conducting a literature review
- Organizing and summarizing the literature
- Understanding and using some of the best evidence: systematic reviews
- Questions

Avoiding Information Overload

Success of evidence-based public health rests largely on the ability to find credible, high quality evidence.

It is essential to follow a systematic approach when searching the scientific literature.

Search process is iterative.

Types of Literature

- Original research articles
- Review articles summarizing the existing literature
- Review articles with quantitative synthesis
- Practice guidelines
Step 1: Define the Search Question

Steps in Searching the Literature

1. Define the question
2. Select information sources
3. Identify key concepts and terms
4. Conduct search
5. Select documents for review
6. Abstract pertinent info from each document
7. Summarize the literature
Sample public health question:

Does exercise help teens stop smoking?

Step 2:
Select Information Resources
<table>
<thead>
<tr>
<th>Resource</th>
<th>Scope</th>
</tr>
</thead>
</table>
| PubMed  | • Premier biomedical literature citation database, comprising over 22 million citations indexed from 5,064 journals  
|         | • MeSH database  
|         | • Maintained by National Library of Medicine  
|         | • Availability of full text through PubMed Central |
| Google Scholar | Massive interdisciplinary search engine. |
| TRIP | Clinical search engine designed to allow users to quickly and easily find and use high-quality research evidence. |
| National Information Center on Health Services Research and Health Care Technology (NICHSR) | Portal to health services research databases and tools. |
| Lamar Soutter Library, Evidence-Based Practice for Public Health | Links to free public health databases, guidelines, systematic reviews, and best practices. |
| Partners in Information Access for the Public Health Workforce | Access to selected public health resources on the Internet. |

### Free Public Health Databases

- **AIDSinfo Library on Adolescence Health** - Bibliographic database that contains articles related to adolescence, produced by the Pan American Health Organization.
- **AIDS Information and Services (AIDSIS)** - Gateway to information about AIDS and HIV - its prevention, treatment, and management. It is updated hourly. It features links to daily news reports, fact sheets, and personal stories.
- **African Index Medicus** - International index to African health literature and information sources.
- **AGRICOLA** - The National Agricultural Library's free online catalog. Provides citations to agricultural literature.
- **Alcohol and Alcohol Problems Science Database (ETCH)** - From the National Institute on Alcohol Abuse and Alcoholism (NIAAA), a collection of links to databases, journals, and Web sites focused on alcohol research and related topics.
- **Alcohol Studies database** - Contains over 70,000 citations for journal articles, books, book chapters, dissertations, conference papers, and audio-visual materials.
- **Annual Review of Population Law**
- **BFRF Environmental Risk Factor Database** - Database for bibliographic information on environmental risk factors.
- **Behavioral Risk Factor Surveillance System (BRFSS) Bibliography** - Citation information for scientific publications that use data from the Behavioral Risk Factor Surveillance System (BRFSS), Centers for Disease Control and Prevention.
- **BiblioMed Health Promotion References** - The EPPI-Centre systematic reviews on several aspects of health promotion.
- **Cancer Resource Library** - A portal to sources of information on cancer produced by the U.S. Centers for Disease Control and Prevention.
- **CancerTrove** - Links from the National Cancer Institute to perform cancer-related searches in PubMed.
- **Catalog of U.S. Government Publications** - A searchable database of federal publications that includes descriptive records for historical and current publications and provides direct links to those that are available online.
Other Resources to Consider

• Grey literature
  – Government reports
  – White papers from non-profits
  – Conference proceedings

• Contacting experts
  – Researchers
  – Practitioners

Step 3:
Identify Search Terms
Identify Search Terms

- Words that describe the subject being reviewed
- Databases don’t always use terms that we use
- Use a mix of “controlled vocabulary” and keywords
- Get ideas by looking at an “on target” article to get ideas about terminology

Think of Synonyms

- Population = adolescents, teens, teenagers
- Intervention = exercise, leisure activities, physical fitness
- Outcome = tobacco cessation, smoking cessation
Step 4:
Conduct Search
Searching with Boolean

OR = More results
Combine Synonyms

Tobacco OR smoking

AND = Specific
Combine different Concepts

tobacco AND exercise

Using PubMed
- PubMed Quick Start Guide
- Fat Text Articles
- PubMed FAQs
- PubMed Tutorials
- New and Noteworthy

PubMed Tools
- PubMed Mobile
- Single Citation Matcher
- Batch Citation Matcher
- Clinical Queries
- Topic-Specific Queries

More Resources
- MedR Database
- Journals in NCBI Databases
- Clinical Tools
- E-Utilities
- LinkOut
Evaluating Your Results

- Scanning search results is just the first step
- Even well crafted searches retrieve irrelevant articles
- Refine your search as needed

Appraising the Studies

- What are the results?
- Are the results valid?
- How can the results be applied to public health practice and interventions?
Types of Evidence

Step 5:
Selecting and Organizing Documents for Review

Selecting and Organizing

• Organize by publication type, *e.g.*, original research, review articles, guidelines

• Enter document information into citation management tool (*e.g.*, EndNote, RefWorks, Zotero, Mendeley)

• Store articles alphabetically by author’s name

• No perfect way to organize

Step 6: Abstract Information from Each Document
### Methodology

<table>
<thead>
<tr>
<th>Lead author, journal citation</th>
<th>Year</th>
<th>Study Design</th>
<th>Study Population</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luepker AJPH 1994;84: 1383-1393</td>
<td>1994</td>
<td>quasi-exp (pre-test / post-test design with control group)</td>
<td>six communities matched on size, type &amp; within 250 miles to Minneapolis</td>
<td>18,062 adults (25-74 yrs) from x-sectional sample completed survey center protocol</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4,762 from above followed for 6-7 years</td>
</tr>
</tbody>
</table>

### Intervention Results

- % reporting regular physical activity only higher for intervention (vs. control) group at 7 yrs follow-up
- small increase in kilocalories / day for intervention group in early years, but less during later yrs
- more heavier-intensity activities for intervention group, but slight decrease at 7 yrs follow-up
Extracting and Abstracting Information

<table>
<thead>
<tr>
<th>Conclusions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed differences between intervention &amp; control groups were less than postulated</td>
<td>Other outcomes measured: blood cholesterol, smoking, systolic/diastolic blood pressure, BMI, &amp; coronary heart disease risk</td>
</tr>
<tr>
<td>• Net improvements in health promotion activities &amp; individual risk factors were modest, of limited duration, &amp; within chance levels</td>
<td></td>
</tr>
<tr>
<td>• Strong, favorable secular trends of increasing health promotion activities &amp; declining risk factors for CHD in all study communities</td>
<td></td>
</tr>
</tbody>
</table>

Step 7: Summarize for Literature Review
Summarize the Literature

• Information can be used for various purposes
  • Support new or existing health policies
  • Support new budget item presented to administrators
  • Prepare grant application for external support of new or existing program

Systematic Reviews

A systematic review is a review of scientific studies on a specific topic. It uses a formal process to:

• Identify all relevant studies
• Assess their quality
• Summarize the evidence

Definition from The Community Guide:
http://www.thecommunityguide.org/about/methods.html
Systematic Reviews

Purpose:
- Inform public health practice and policy
- Help select proven interventions
- Provide direction for innovations into unknown frontiers of knowledge

Common Steps in Systematic Reviews

1. Selecting topics
2. Convening a systematic review team
3. Developing a conceptual model for each topic and intervention
4. Defining and selecting interventions for review
5. Conducting a search for relevant scientific information
6. Evaluating the quality of, and abstracting data from, included studies
7. Summarizing information on:
   - Effectiveness,
   - Applicability of the effectiveness results,
   - Other effects (side benefits and harms),
   - Cost and cost effectiveness, and
   - Barriers to implementation.
Community Guide “Basics”

- Recommendations based on systematic reviews
- DHHS initiative
- CDC coordination
- Independent, non-federal oversight
- Follows systematic approach for review of evidence

Community Guide vs. Clinical Guide Reviews?

- The Community Guide may potentially address interventions that
  - Occur outside of clinical settings to impact community health -or-
  - Are delivered to groups rather than individuals -or-
  - Are delivered by persons other than healthcare providers
Assessment of Study Quality in Community Guide

- Description of intervention and study population
- Sampling procedures
- Exposure and outcome measurements
- Approach to data analysis
- Interpretation of results
  - Follow-up
  - Confounding
  - Other bias
- Other issues

Sample public health question:

What are effective interventions for reducing use of tobacco?
20.5% of the adult population (aged 18+ years)—over 1,557,000 individuals—are current cigarette smokers.

Among adults aged 35+ years, over 14,500 died as a result of tobacco use per year, on average, during 2000–2004. This represents a smoking-attributable mortality rate of 281.9/100,000.


Smoking Statistics in Michigan

Restricting Minors’ Access to Tobacco Products

These interventions seek to prevent or reduce the number of young people who begin smoking by making it harder for them to purchase tobacco products.

Task Force Recommendations & Findings

This table lists interventions reviewed by the Community Guide, with Task Force findings for each (definitions of findings). Click on an underlined intervention title for a summary of the review.
Decreasing Tobacco Use Among Workers

Publications

- Governments through testimony, petitions, letters, and phone calls, also occurred.
- Interventions were conducted in a variety of settings and populations, including urban, suburban, and rural communities in the United States and Australia. In the United States, interventions were implemented in communities that included predominantly African-American, Hispanic or white populations.

These findings were based on a systematic review of all available studies, conducted on behalf of the Task Force by a team of specialists in systematic review methods, and in research, practice and policy related to tobacco use.

Supporting Materials

- Evidence gaps
  - Summary evidence tables (PDF: 1.06MB)
  - Included studies

Publications


More Community Guide publications about Tobacco Use

Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC.

Restricting Minors’ Access to Tobacco Products

Summary Evidence Tables

Stronger Sales Laws Directed at Retailers

| Author & year (study period) Design suitability (design) Quality of execution (at Evaluation setting) | Intervention and comparison elements | Study population description | Effect measure | Reported baseline | Reported effect | Value used in summary | Follow-up time |
|---|---|---|---|---|---|---|---|---|
| Biden 2003 (1994-1997) Controlled group randomized Non (2 limitations) Community-wide | Location: 3 communities in Santa Barbara County, CA Design: Balanced cohort comparison Intervention: Local enforcement banning self-service tobacco display Comparison: No ban or restriction | Retailers selling tobacco products in study communities n=302 | Proportion of retailers selling tobacco to youth test purchase attempts (post any concurrent compliance) | 18.6% | 14.3% | 3.2 po points | 15 mo |
| | | | No ban or restriction on the basis of age | 60.4% | 45.3% | 13.2 po points | 9 mo |
| | | | No ban or restriction on the basis of age by community | 45.3% | 40.9% | 0% | 40.9 po points | 2.9 yrs |
| | | | No ban or restriction on the basis of age by community and gender restriction | 14.3% | 11.1% | 3.2 po points | 2.9 yrs |

Active Enforcement of Sales Laws Directed at Retailers

| Author & year (study period) Design suitability (design) Quality of execution (at Evaluation setting) | Intervention and comparison elements | Study population description | Effect measure | Reported baseline | Reported effect | Value used in summary | Follow-up time |
|---|---|---|---|---|---|---|---|---|
| Dannen 1999 (2000-2004) Controlled group randomized Non (5 limitations) Community-wide | Location: 5 communities in New York City Design: Intervention (year 2 reward) Active enforcement Comparison: No evaluation or enforcement (usual care) | Licensed tobacco-selling retailers in the community N=191 at EL N=102 at FI | Proportion of retailers selling tobacco to youth test purchase attempts | 40% | 44.8% | 40.7 po points | 12 mo |
| | | | Enforcement group Comparison group | 94.1% | 94.1% | 0% | 94.1 po points | 12 mo |
Applying Community Guide Findings

How does context and/or population affect the reach of interventions?

Other Systematic Review Resources

Cochrane Public Health Group
http://www.ph.cochrane.org/

Center for Reviews and Dissemination
http://www.york.ac.uk/inst/crd/index.htm

Campbell Collaboration
http://www.campbellcollaboration.org/

Guide to Clinical Preventive Services
http://www.ahrq.gov/clinic/prevenix.htm
References


Thank you!

Questions?