Critical Appraisal of the Literature: Part 1

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Objectives

- At the end of this module you will have:
  - Learned the steps in Evidence Based Public Health
  - Developed an understanding of the levels of evidence
  - Become familiar with the key concepts for searching and evaluating the public health literature
  - Learned about key EBPHN databases for finding the primary literature

What is Evidence Based Public Health?

- The process of systematically finding, appraising, and using contemporaneous clinical and community research findings as the basis for decisions in public health

Steps in the Evidence Based Public Health Process

- State your question
  - Identify key concepts and terms
- Search the literature
- Appraise the evidence
- Select the best evidence
- Link evidence with the public health experience and practice
- Implement findings into practice and programs
- Evaluate Results

Levels of Evidence

In order of Best to Worst

- Systematic Reviews or Meta-Analysis
- Randomized Controlled Trials (for therapy)
- Clinical Trial, Controlled Clinical Trials
- Cohort Studies, Longitudinal Studies, Retrospective Studies
- Practice Guidelines
- Case Studies, Case Reports
- Expert Opinion

The First Steps

1) Clearly state your public health problem in the form of a question
   - Our community problem
     - Teenage Smoking
   - Question: Do school health programs prevent teenage smoking?

- Key search terms – school health services, teenage smoking
Step 2: Search the Literature

- Search the appropriate literature
  - Evidence Based Public Health Resources
    - PubMed (using MeSH Terms or Clinical Queries)
    - Health Services Research Queries
    - PHPartners 2010 Filters
    - Cochrane Database
    - Evidence Based Journals
    - Practice Guidelines

EBPH Resources

- There are several EBPH Resources that are excellent places to start to search for clinically relevant information.
- Some EBPH Resources already contain critically evaluated information so that you don’t need to do this.
- Some EBPH Resources require that you evaluate the material you find before you consider using it as an intervention in your community.

EBM Databases – Your Critical Appraisal Required

- Searching Medical databases for relevant articles may be one place to start when looking for findings to help you with a decision.
- Example databases include
  - PubMed
  - Cinahl
- These databases need to be searched using methodology terms or clinical filters in order to retrieve optimal clinically relevant results.
- Once an article is found in one of these databases, you need to critically evaluate it before deciding if you should apply it in practice.
PubMed

- PubMed
  - Use MeSH terms to target results
  - i.e. epidemiologic studies
    - narrower mesh terms included: cohort studies, longitudinal studies, retrospective studies
  - i.e. health promotion
- Search Terms:
  - Epidemiologic studies [mesh] and smoking [mesh] AND school health services [mesh] AND adolescents [mesh]

PubMed Search

www.pubmed.gov

PubMed – Clinical Queries

- A smaller clinical segment of PubMed can be searched using a feature called Clinical Queries
- Clinical Queries automatically adds terms to your search, depending on the filter you selected, to limit the results to evidence based literature
- These filters are: therapy, diagnosis, etiology, and harm
- You can also limit your search to systematic reviews
Health Services Research Queries

- The National Information Center on Health Services Research and Health Care Technology (NICHSR) has created filters for searching PubMed that may have more direct applications to public health questions.
- These filters are: appropriateness, process assessment, outcomes assessment, clinical practice guidelines, and cost.
Partners in Information Access for the Public Health WorkForce

- An HP2010 Information Access Project has also created pre-existing searches with evidence-based filters for finding published literature related to the Healthy People 2010 focus areas.
- You just have to click the topic of interest to get to the results
- http://phpartners.org/hp/

HP2010 topics
http://phpartners.org/hp/

Our Community Problem

- Research has shown the use of helmets reduced the risk of head injuries in bicyclers. Before asking for funding to develop a prevention program to prevent head injuries you would like to find out if there are any proven methods for promoting helmet use. You have heard that offering free helmets might be an effective intervention, but before you ask for money for this program, you want to find out if there is evidence to support this.
- Step 1: Question – Is there an effective method to promote helmet use in bicyclers
- Step 2: Search the literature
Final Steps in the EBPH Process

- Once you have done a search— you need to select appropriate documents for review
- The abstracts should contain relevant information to determine if further examination of the article would be valuable and applicable
- Evaluating the selected literature is a very important part of the evidence based process
- The following slides contain questions you may want to ask as you go through your articles

What are the results?

- Were the results similar from study to study?
- What are the overall results?
- How precise were the results?
- Can a causal relationship be inferred from the data
Using social marketing to increase the use of helmets among bicyclists.

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In this study, the authors investigated a social marketing intervention to increase the use of bicycle helmets on a university campus in the southeastern United States. Focus groups of students developed a bicycle helmet program with inclusive design (i.e., "The Helmet Club"). The students tested student facilitators who already used helmets (n=11) as peer agents. Three agents provided bicycle helmet information and asked fellow bicyclists to sign pledge cards to wear a helmet. They gave a coupon for a free helmet to those who pledged to wear a helmet. The observers received a total of 3% pledge cards and distributed 259 helmets. bicycle helmet use rose from a baseline mean of 27.6% to a mean of 49.9% by the last week of the intervention.

Non-legislative interventions for the promotion of cycle helmet wearing by children.

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BACKGROUND helmet wearing is to be encouraged and final measures for the helmet laws in all areas of the UK. We used a randomized, controlled trial with a pre-/post-test to assess the effectiveness of an intervention in increasing helmet wearing among children. A random sample of 23 schools was invited to participate. The aim of this study was to evaluate the impact of a social marketing intervention to promote helmet wearing among children. METHODS: Schools were randomized into intervention and control groups. The intervention group received a social marketing campaign including posters, leaflets, and an incentive to promote helmet wearing. RESULTS: The intervention group had a significant increase in helmet wearing compared to the control group (p<0.05). CONCLUSIONS: Non-legislative interventions are effective in increasing helmet wearing among children. Further research is needed to evaluate the long-term impact of social marketing interventions on helmet wearing.

Cycle helmet ownership and use: a cluster randomized controlled trial in primary school children in deprived areas.

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AIM: To assess the effectiveness of two different educational interventions plus three cycle helmets, in increasing cycle helmet ownership and use. METHODS: A cluster randomized controlled trial was carried out in 23 primary schools in deprived areas of Nottingham, involving 1234 year 5 school children (age 9 and 10). Children received either a helmet + educational pack (educational pack and guide for free cycle helmet) or a helmet + modified educational pack (educational pack, under 12 free cycle helmet, school newsletter, designed to cycle helmet education, and an invitation to a school-based cycling event). RESULTS: The helmet + educational pack was as effective as the helmet + modified educational pack in terms of helmet ownership (OR 1.51, 95% CI 0.80 to 2.85) and wearing (OR 0.86, 95% CI 0.57 to 1.30). CONCLUSIONS: Helmet ownership significantly increased from baseline without additional measures, and wearing significantly increased from baseline with the helmet + educational pack. The interventions reduced the number of helmet ownership and use, reducing inequalities in helmet ownership among children in deprived areas. Further work is needed to determine the impact of longer-term educational interventions.
Police enforcement as part of a comprehensive bicycle helmet program.

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BACKGROUND: Bicycle-related deaths among school-aged children are among the most preventable. Although bicycle helmets are highly effective against head injuries, only 14% of US children regularly wear one. Georgia implemented a bicycle helmet law for children over age 5 in 1997. During this time, a large metropolitan community passed an ordinance requiring police to enforce the bicycle helmet law. We evaluated the effectiveness of police enforcement of this mandate, resulting in a helmet law and education program. METHODOLOGY: During April 1997, approximately 40% of children in kindergartens through grade 8 were required to wear helmets. Data were collected using a questionnaire administered to parents. RESULTS: Before the program began, none of the observed children wore a helmet. During the next 8 months, helmet use among 318 observed children increased 40% (95% CI: 33%-47%), a significant increase across all age and gender groups. In contrast, children not required to wear helmets showed no significant changes. Children reported that bicycle helmets improved their safety and helped them be better at riding bikes.

Effect of a bicycle safety program and free bicycle helmet distribution on the use of bicycle helmets by elementary school children.

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OBJECTIVE: To determine whether free bicycle helmets provided to low-income children by a bicycle safety program and free bicycle helmet distribution in a low-income community could increase helmet use. METHODOLOGY: A questionnaire was administered to students in two elementary schools (n=458). Results were based on both before and after the administration of the bicycle safety program and the distribution of bicycle helmets. RESULTS: After the program, the percentage of children who reported wearing bicycle helmets increased significantly (p=0.001). The number of children who reported wearing bicycle helmets increased from 3% to 15% (p=0.001). Children who reported wearing bicycle helmets after the program were significantly more likely to wear them regularly (81%) than those who already wore helmets (41%) (p=0.001). Children who attended the school at which bicycle helmets were distributed had a significantly greater increase in helmet use (p=0.001). CONCLUSION: The results of this study suggest that bicycle safety programs and free bicycle helmet distribution may increase the consistent use of helmets by elementary school children.

Does sharing the cost of a bicycle helmet help promote helmet use?

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OBJECTIVE: To determine whether asking for a 50% donation for bicycle helmets, compared with distribution free of charge, would affect helmet use among children receiving helmets and an educational low-income public health class. METHODOLOGY: A public health class of 138 students was divided into two groups. One group was asked to donate 50% of the cost of bicycle helmets to the program, while the other group was given the helmets free of charge. RESULTS: 82% of children whose parents were asked for a contribution were 50% more likely to wear helmets compared with those who received helmets free of charge (p=0.02). The children who received helmets free of charge were significantly more likely to wear helmets than those who received helmets with a 50% contribution (p=0.001). The children who received helmets with a 50% contribution were significantly more likely to wear helmets than those who received helmets free of charge (p=0.001). CONCLUSION: The results of this study suggest that asking for a contribution, while providing helmets free of charge, may increase helmet use among elementary school children.
Are the Results Valid?
- Does this article explicitly address our public health question?
- Was the search for our article detailed and exhaustive? Is it likely that important, relevant studies were missed?
- Does the study selected appear to be of high methodological quality?
- Do you feel the study selected is reproducible?

How can the results be applied to public health practice and intervention?
- How can the results be interpreted and applied to public health?
- Were all important public health outcomes considered?
- Are the benefits worth the costs and potential risks?

Final Steps
- Once you have the evidence to support your decisions, you need to
  - Apply the evidence to the community
  - Evaluate the intervention
- Develop an action plan
  - A program is developed for elementary schools that will give free helmets to all students who ride bikes following a bicycle safety program