Evidence-Based Information Retrieval and Evaluation

Elizabeth Bucciarelli,
Health Sciences Librarian
100-D Halle Library. EMU. ebucciare@emich.edu 734.487-2506
To him who devotes his life to science, nothing can give more happiness than increasing the number of discoveries, but his cup of joy is full when the results of his studies immediately find practical applications

- Louis Pasteur
As Opposed to...

- **Eminence-based medicine** – lack of, or radiance of, white hair

- **Vehemence-based medicine** – level of stridency
As Opposed to...

- **Eloquence-based medicine** – smoothness of tongue

- **Diffidence-based medicine** – level of gloom

Based on the article, and with apologies to, Davis Isaacs & Dominic Fitzgerald, *Seven Alternatives to Evidence Based Medicine*, BMJ, 319, 1999
Definition

Evidence-Based Medicine

- Abbreviated EBM

- “the conscientious, explicit and judicious use of current best evidence in making decisions about the individual patient. It means integrating individual clinical expertise with the best available external clinical evidence from systematic research”  (Sackett D, BMJ, 1996)
Definition
Evidence-Based Practice

- Abbreviated EBP

- “the formulation of treatment decisions by using the best available research and integrating this evidence with the practitioner’s skill and experience”

(Stedman’s Dictionary for the Health Professions and Nursing, 2012)
Types of Research Information

- **Primary Sources**
  Primary research articles report **new** findings & conclusions

- **Secondary Sources**

- **Tertiary Sources**
Recognizing a Research Article

Most research articles have the following sections:

• Abstract
• Introduction/Background
• Purpose of study
• Review of the Literature
• Methods
• Data Analysis
• Discussion
• Limits of the Study
• Suggestions for further research
• Conclusion
• References
THE identification of the breast-cancer-susceptibility genes BRCA1 and BRCA2 has evoked widespread interest in genetic testing among women at risk for a mutation in these genes. We found that 57 percent of women with breast cancer who had a 50 percent chance of carrying a BRCA1 or BRCA2 mutation requested genetic testing. This result indicates the need to determine the efficacy of the various options for reducing the risk of breast cancer and for early detection in women with a BRCA1 or BRCA2 mutation.

Women with a BRCA1 or BRCA2 mutation have a cumulative lifetime risk of invasive breast cancer (up to the age of 70 years) of 55 to 85 percent and of invasive epithelial ovarian cancer of 15 to 65 percent. In these women the risk of breast cancer begins to increase near the age of 25, and their overall survival once breast cancer does develop is similar to that of age-matched patients with sporadic cases of breast cancer; in both, the 10-year survival rate is about 50 percent.

Current risk-reduction strategies for women with a BRCA1 or BRCA2 mutation include regular surveillance, prophylactic mastectomy, oophorectomy, or both; and chemoprevention. In our experience, 50 percent of women who have a BRCA1 or BRCA2 mutation have chosen to undergo prophylactic bilateral mastectomy. Until now, however, there have been only retrospective studies of the efficacy of the procedure in women with an increased risk of breast can-
chrect on the basis of the family pedigree and not DNA testing.12

We investigated the efficacy of prophylactic mastectomy in women with a proven pathogenic BRCA1 or BRCA2 mutation. Because a randomized trial is impossible for ethical reasons, we performed a prospective cohort study of women at a single institution who chose either prophylactic mastectomy or regular surveillance.

METHODS

Study Subjects

Beginning on January 1, 1992, we studied all women with a BRCA1 or BRCA2 mutation who were being monitored for breast cancer because of familial clustering of breast cancer, ovarian cancer, or both at the Danloren Breast Cancer Center in Amsterdam, the Netherlands. We included all women who had been given a molecular diagnosis before January 1, 1992. Women with a BRCA1 or BRCA2 mutation in whom breast cancer developed before January 1, 1992, and one woman in whom breast cancer was detected at the first screening were excluded. The cut January 1, 1992, was chosen because at that time, a multidisciplinary team at our family cancer clinic took over the care of women at high risk for breast cancer. A total of 189 women fulfilled the criteria. Eventually, 76 of these women chose to undergo prophylactic bilateral mastectomy before the end of the follow-up period (March 1, 2001), whereas the other 65 women chose to remain under regular surveillance. In all but two women prophylactic mastectomy was performed after the molecular diagnosis was established.

Data Collection and Follow-up

Information on vital status and the occurrence of cancer was extracted from the women’s medical files. All women were regularly monitored at our clinic until March 1, 2001, and were enrolled in clinical research programs approved by our medical ethics committee (protocol 314/5, updated in 1995). We obtained pathology reports of all mastectomy specimens and of all breast biopsy specimens from the women who were being monitored. Information on oophorectomy performed for any reason (mainly in our clinic) was obtained from the women themselves and was verified by a review of all medical records. Monopenisectomy was defined as bilateral oophorectomy before the age of 56 years and was performed prophylactically for all women in the case of 99 women, for benign disease in the case of 1 woman, for ovarian cancer in the case of 7 women, and for cervical cancer in the case of 1 woman (Table 1). No women were lost to follow-up after prophylactic mastectomy. Of the women in the surveillance group, three died of ovarian cancer and two chose to be monitored at another hospital for practical reasons.

Surgical Techniques and Surveillance

In all cases a standard, bilateral, simple total mastectomy (including the nipple) was performed by a surgical oncologist at the Danloren Breast Cancer Center. In 76 of the 77 women, the breasts were reconstructed with silicone prostheses by a plastic surgeon in our clinic, followed later by a nipple reconstruction.

According to national guidelines, regular surveillance for breast cancer consists of a monthly breast self-examination, a clinical breast examination every six months, and yearly mammography. Since 1997, magnetic resonance imaging (MRI) has been an option for women with mammographically very dense tissue and

<table>
<thead>
<tr>
<th>TABLE 1. CHARACTERISTICS OF THE WOMEN.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>Age at entry</td>
</tr>
<tr>
<td>Median age</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>&lt;10 yr.</td>
</tr>
<tr>
<td>10–29 yr.</td>
</tr>
<tr>
<td>30–59 yr.</td>
</tr>
<tr>
<td>&gt;60 yr.</td>
</tr>
<tr>
<td>Premenopausal status</td>
</tr>
<tr>
<td>For gynecologic cancer</td>
</tr>
<tr>
<td>For benign gynecologic disease</td>
</tr>
<tr>
<td>Parity</td>
</tr>
<tr>
<td>Duration of follow-up before prophylactic mastectomy or start of surveillance</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>No. of women</td>
</tr>
<tr>
<td>No. of breast cancer</td>
</tr>
<tr>
<td>No. of cases of breast cancer after surgery</td>
</tr>
</tbody>
</table>

*Plus-minus values are mean ± SE. Premenopausal oophorectomy was defined as bilateral oophorectomy before the age of 56 years.

The age at entry in the mastectomy group is based on the date of prophylactic mastectomy, and the age at entry in the surveillance group is based on the date on which breast cancer was initiated.

The analysis of BRCA1 and BRCA2 mutations and histologic examination

DNA analysis was performed according to standard procedures.23 BRCA1 and BRCA2 linkage analysis was used until 1994 and 1995, respectively, to identify the presence of hereditary breast cancer; from 1994 to 2000 we used direct mutational analysis. All BRCA1 and BRCA2 mutations were pathogenic, since they resulted in a premature truncation of the BRCA1 or BRCA2 protein.

Surveillance mastectomy specimens were examined histologically to rule out the presence of occult breast cancer. From each quadrant of the specimen, microscopical sections from three random blocks were examined according to standard procedures.

Statistical Analysis

The age at entry in the mastectomy group is based on the date of prophylactic mastectomy, and the age at entry in the surveillance group is based on the date on which breast cancer was initiated.
Table 2. Characteristics of the Eight Women in the Surveillance Group in Whom Breast Cancer Developed.

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Age at Diagnosis</th>
<th>Mutation/Marker</th>
<th>Prior Orthorectomy</th>
<th>Follow-up After Diagnosis</th>
<th>Current Status*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23</td>
<td>4284delAG in BRCA1</td>
<td>No</td>
<td>15</td>
<td>NED</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>19512-164del16185 in BRCA1 (a 3.8 kb deletion affecting exon 13)</td>
<td>No</td>
<td>41</td>
<td>Died of breast cancer</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>4284delAG in BRCA1</td>
<td>No</td>
<td>18</td>
<td>NED</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>1304delAAA in BRCA1</td>
<td>No</td>
<td>31</td>
<td>NED</td>
</tr>
<tr>
<td>5</td>
<td>43</td>
<td>19512-164del16185 in BRCA1 (a 3.8 kb deletion affecting exon 13)</td>
<td>No</td>
<td>97</td>
<td>NED</td>
</tr>
<tr>
<td>6</td>
<td>44</td>
<td>1130delA in BRCA1</td>
<td>No</td>
<td>25</td>
<td>NED</td>
</tr>
<tr>
<td>7</td>
<td>49</td>
<td>1668delA+G1669 in BRCA1</td>
<td>Yes</td>
<td>14</td>
<td>NED</td>
</tr>
<tr>
<td>8</td>
<td>53</td>
<td>19521-36del15 in BRCA1 (a 2 kb deletion affecting exon 22)</td>
<td>Yes</td>
<td>19</td>
<td>NED</td>
</tr>
</tbody>
</table>

* NED denotes no evidence of disease.


Breast Cancer After Prophylactic Bilateral Mastectomy in Women With a BRCA1 or BRCA2 Mutation


<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Tumor Size</th>
<th>No. of Positive Nodes/Total No. Assessed</th>
<th>Histologic Type</th>
<th>Stage</th>
<th>ER/PR Status</th>
<th>Screening and Preventive Measures</th>
<th>Interval from First Screening to Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25, 13</td>
<td>1/15</td>
<td>Ductal</td>
<td>III</td>
<td>Negative</td>
<td>3</td>
<td>SC SC PB SC</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>2/13</td>
<td>Ductal</td>
<td>III</td>
<td>Negative</td>
<td>12</td>
<td>SC SC PB ND</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
<td>0/1 sentinel node</td>
<td>Ductal</td>
<td>III</td>
<td>Negative</td>
<td>31</td>
<td>NA SC NA SC</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>0/21</td>
<td>Ductal</td>
<td>III</td>
<td>Negative</td>
<td>10</td>
<td>SC SC SC ND</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td>6/18</td>
<td>Ductal</td>
<td>III</td>
<td>Negative</td>
<td>23</td>
<td>NA SC PB SC</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>0/10</td>
<td>Ductal</td>
<td>III</td>
<td>Negative</td>
<td>38</td>
<td>SC SC PB SC</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>0/1 sentinel node</td>
<td>Ductal</td>
<td>II</td>
<td>Negative</td>
<td>41</td>
<td>NA NA NA SC</td>
</tr>
<tr>
<td>8</td>
<td>15</td>
<td>0/1 sentinel node</td>
<td>Ductal</td>
<td>III</td>
<td>Positive</td>
<td>21</td>
<td>NA NA SC SC</td>
</tr>
</tbody>
</table>

* BSE denotes breast self-examination, CBE clinical breast examination, MRI magnetic resonance imaging, SC suspicion of cancer, PB high probability of a benign lesion, ND not done, and NA no abnormalities.
Results

Characteristics of the Women

Table 1 lists the general characteristics of the women who chose to undergo prophylactic mastectomy and those who opted for surveillance. Significantly more women in the mastectomy group than in the surveillance group had undergone a premenopausal oophorectomy (44 vs. 24 [58 percent vs. 38 percent], P = 0.03). All gynecologic cancers occurred before the age of 56 years, the two such cases in the mastectomy group were ovarian cancers, stage IC. There were no significant differences between the two groups with respect to age, average duration of follow-up after entry into the study, follow-up after premenopausal oophorectomy, and type of mutation. The 26 distinct mutations — 23 in BRCA1 and 3 in BRCA2 — were distributed in a similar fashion in the two groups. The 139 women were from a total of 70 families; the number of women from each family ranged from 1 to 5.

The mean (±SE) duration of follow-up was 2.9 ± 1.4 years (219 woman-years) in the mastectomy group and 3.0 ± 1.5 years (191 woman-years) in the surveillance group (Table 1). The total number of woman-years of surveillance increased from 190 to 318 when the 128 woman-years of surveillance before prophylactic mastectomy was added.

Incidence of Breast Cancer

After prophylactic mastectomy no case of invasive breast cancer was observed in any of the 76 women during 219 woman-years at risk (Fig. 1). In the surveillance group eight invasive breast cancers were detected during 318 woman-years at risk, for a yearly incidence of 2.5 percent. The ratio of observed cases to expected cases was 1.2 (8 vs. 6.7, 95 percent confidence interval,
Discussion of Results

0.4 to 3.7, P=0.80). All the affected women were from different families. The actuarial mean five-year incidence of breast cancer in the women in the surveillance group (Fig 1) was 17±7 percent, but the number of women at risk at five years was only eight. To obtain a more stable estimate with longer periods of follow-up, we calculated cumulative incidence probabilities with the use of an exponential model in which the hazard rate was assumed to be constant. According to this model, the yearly incidence of breast cancer was 2.5 percent, and the five-year cumulative incidence was 12 percent (95 percent confidence interval, 6 to 23 percent) (Fig 1). Disregarding the years of surveillance before prophylactic mastectomy and thus restricting the actuarial analysis to the 63 women in the surveillance group, we estimated that the five-year risk of breast cancer was 24±9 percent.

Cox proportional-hazards analysis showed that mastectomy significantly (P=0.003) decreased the incidence of breast cancer (hazard ratio: 0.95; 95 percent confidence interval: 0.63 to 0.96). After adjustment for the change in menopausal status, the protective effect of mastectomy remained statistically significant (P=0.01).

Outcome in the Women with Breast Cancer

None of the eight patients in the surveillance group in whom breast cancer developed had been scheduled to undergo prophylactic mastectomy at the time of the diagnosis. The characteristics of the women and the tumors are described in Tables 2 and 3, respectively. Patients 7 and 8 underwent bilateral oophorectomy 14 and 12 months, respectively, before the diagnosis of breast cancer. Of the eight cancers, four (in Patients 1, 2, 4, and 6) were detected between screening sessions (so-called interval cancers). In these four cases the interval from screening to diagnosis was two to five months. The cancers in the other four patients (Patients 3, 5, 7, and 8) were detected during a screening session. Patient 1 became symptomatic eight weeks after her first clinical breast-cancer screening, the results of which were negative. In four of the eight patients, breast cancer was detected before the molecular diagnosis was made.

Histologic Findings in the Mastectomy Group

Invasive cancer was not detected in any of the specimens obtained at the time of prophylactic mastectomy. One 44-year-old woman with a \textit{BRCA1} mutation had lobular carcinoma in situ.

DISCUSSION

In this prospective study we assessed the incidence of breast cancer in 139 women with a \textit{BRCA1} or \textit{BRCA2} mutation who chose to undergo either prophylactic mastectomy or regular surveillance. Whereas breast cancer developed in 8 of 63 women in the surveillance group, no cases of breast cancer occurred among the 76 women who underwent prophylactic mastectomy. The observed number of breast cancers in the group under surveillance is comparable with the reported incidence of breast cancer in women with a \textit{BRCA1} or \textit{BRCA2} mutation. As compared with the incidence in the surveillance group, the incidence of breast cancer in the prophylactic-mastectomy group was significantly reduced (P=0.003), but the mean follow-up of three years calls for a cautious interpretation of our results.

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Age at Diagnoses</th>
<th>Mutation</th>
<th>Mastectomy</th>
<th>Follow-up after Diagnoses</th>
<th>Current Status*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>21</td>
<td>4189delUS in \textit{BRCA1}</td>
<td>No</td>
<td>1.5</td>
<td>NED</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>IVS12-1G to G in \textit{BRCA1}</td>
<td>No</td>
<td>1.5</td>
<td>Died of breast cancer</td>
</tr>
<tr>
<td>3</td>
<td>39</td>
<td>4189delUS in \textit{BRCA1}</td>
<td>No</td>
<td>1.8</td>
<td>NED</td>
</tr>
<tr>
<td>4</td>
<td>39</td>
<td>4189delUS in \textit{BRCA1}</td>
<td>No</td>
<td>1.8</td>
<td>NED</td>
</tr>
<tr>
<td>5</td>
<td>41</td>
<td>IVS12-1G to G in \textit{BRCA1}</td>
<td>No</td>
<td>97</td>
<td>NED</td>
</tr>
</tbody>
</table>
Conclusion

Limits of the Study & Further Research

...
the risk of breast cancer by about 88 percent, but the use of tamoxifen as a preventive agent has been questioned in view of its long-term side effects.

Prophylactic mastectomy is a highly personal decision. In counseling high-risk women, the potential benefits and risks of prophylactic mastectomy must be weighed against possible surgical complications and psychological problems. Up to 80 percent of the women who undergo the procedure will have surgical complications, depending on the type of surgery and the length of follow-up. A long-term study of prophylactic mastectomy reported an uncomplicated repeated operation in 49 percent of women, but these results may not be applicable to prophylactic mastectomy as it is currently performed. Psychological studies of women who have undergone a prophylactic mastectomy have shown that overall, the procedure had detrimental effects on body image and self-esteem.

In conclusion, we and those of Hartmann et al. indicate that prophylactic bilateral total mastectomy substantially reduces the incidence of breast cancer among women with a BRCA1 or BRCA2 mutation. Nevertheless, longer follow-up studies of more patients are required to establish the prophylactic effect and determine the long-term complications of this procedure.

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REFERENCES

Steps in the Evidence-Based Practice Process

- A clinical problem arises
- Develop the clinical question
- Select appropriate resources**
- Evaluate the evidence**
- Integrate and apply the evidence
- Evaluate your performance with the patient

**Where the library and research skills come into the picture
Steps in Evidence-Based Care

- Form the question
- Seek the evidence
- Assess the evidence
- **What resources do you need? (new)**
- Make the decision and carry it out
- **Who will make the implementation work? (new)**
- Assess the process and repeat the cycle if needed

Paul Glasziou, 2006?
Paula Boddington, 2012?
Definitions

RCTs & Practice Guidelines

- **Randomized Control Trial (RCT)** — study in which a group of clients are randomly allocated into either
  - an experimental group
  - a control group

- **Practice Guideline** — a description of a process of patient care management that facilitates the improvement or maintenance of health status

  - Purpose is to:
    - Identify preferred treatment
    - Describe treatment alternatives

  - Published by subspecialty or disease-specific experts from authoritative national & international societies & organizations, e.g., American Heart Association (AHA), American Academy of Pediatrics (AAP)

  - Not all based on experimental studies
Definition

Review Article (narrative)

- Also called a narrative review
- In the health and medical literature, this type of article refers to an article which comprehensively scrutinizes a topic over a period of time
- Provides a broad overview of a topic
- The studies included are selected through an implicit process
- May include practical, real-life clinical experiences
- Frequently contains a long list of references in the bibliography
Definition

Systematic Review

- Summarize large bodies of evidence
- Help to explain differences among studies on the same question
- Apply scientific strategies that limit bias to the selection, critical appraisal and synthesis of all pertinent studies that address a specific clinical question (Cook, Mulrow, Haynes, 1997)

In a systematic review:
- Studies are selected through an *explicit* process
- Methods of the studies are appraised
- Results are summarized
- Key finding presented
- Limitations of the current knowledge-base on a specific topic are acknowledged
### Differences Between Narrative and a Systematic Reviews

#### Narrative Review

- **Clinical Question** - seldom reported, or addresses several general questions
- **Search for Primary Articles**— seldom reported; if reported, not comprehensive
- **Selection of Primary Articles**— seldom reported; if reported, often biased sample of studies
- **Evaluation of Quality of Primary Articles**— seldom reported; if reported, not usually systematic
- **Summary of Results of Primary Studies**- usually qualitative nonsystematic summary

#### Systematic Review

- **Clinical Question** - focused question specifying population, intervention, and outcome
- **Search for Primary Articles** – comprehensive search of several evidence sources
- **Selection of Primary Articles** – explicit inclusion and exclusion criteria for primary studies
- **Evaluation of Quality of Primary Articles** – methodologic quality of primary articles is addressed
- **Summary of Results of Primary Studies**- synthesis is systematic (if quantitative, often referred to as meta analysis)

Integrative Review

- Summarizes past experimental & non-experimental research in order to provide a comprehensive understanding of a problem or phenomenon
- Allows for varied perspectives to be represented
- The body of literature includes all studies that address related or identical hypotheses
- Present the state of science, contribute to theory development, & apply to practice and policy
- May be tagged as systematic reviews (CINAHL) or Reviews (PubMed)
### Definitions

**Meta-Analysis & Meta-Synthesis**

- **Meta-Analysis** - a type of systematic review that uses statistical methods to combine and summarize the results of several primary studies  
  
  (Cook, Mulrow, Haynes, 1997)

- **Meta-Synthesis** – assembles qualitative data to form a new interpretation of the research topic
  
  Sometimes called a *qualitative systematic review*
Adaptation of the Evidence Pyramid Diagram developed by the Medical Research Library of Brooklyn, SUNY Downstate Medical Center
Levels of Research Evidence

- **Level I**: Systematic reviews (e.g., Cochrane reviews)
  - Meta-analysis of all relevant randomized clinical trials (RCTs)
  - Evidence-based clinical practice guidelines based on systematic reviews of RCTs
  - Three or more RCTs of good quality that have similar results

- **Level II**: One or two well-designed RCTs

- **Level III**: One or more well-designed controlled trials without randomization

- **Level IV**: One or more well-designed case control or cohort studies

- **Level V**: Systematic reviews of descriptive and qualitative studies (meta-synthesis)

- **Level VI**: Single descriptive or qualitative study

- **Level VII**: Opinions of authorities and/or reports of expert committees

*Additions by E.R. Bucciarelli, 2015*

*Meta-synthesis*

*Integrative Review*
Sladen Library
Pyramid of EBP Resources

TRIP Database
searches these simultaneously

quality of evidence

Systematic Reviews

Critically-Appraised Topics
[Evidence Syntheses]

Critically-Appraised Individual Articles [Article Synopses]

Randomized Controlled Trials (RCTs)

Cohort Studies

Case-Controlled Studies
Case Series / Reports

Background Information / Expert Opinion

FILTERED INFORMATION

UNFILTERED INFORMATION
Locating EBP Information

- NURS 372 Class Research Guide –
- *ACP Smart Medicine* in STAT!Ref database
- Agency for Healthcare Research and Quality
- CINAHL and PubMed/Medline
- Clinicaltrials.gov
- Cochrane Library
- Dissertations & Theses Full-Text
- Guide to Clinical Preventive Services
- Guidelines International Network
- National Guideline Clearinghouse
- PubMed Health
- Worldviews on Evidence-based Nursing
Retrieving EBP Information from CINAHL

- Check the box in front of Evidence-Based Practice on the Limit your results: section
- In the Publication Type menu, limit to:
  - Clinical Trial
  - Meta Analysis
  - Meta Synthesis
  - Practice Guideline
  - Randomized Controlled Trial
  - Research
  - Systematic Review
- **Clinical Queries** - a pre-set search that limits to specific clinical research areas
- **And** into your search:
  - qualitative studies – MW Word in Subject Heading
  - quantitative studies - MW Word in Subject Heading
- Check the box for Research Article
- See short video series at:
Retrieving EBP Information from PubMed

- Run your search
- Off the left-hand frame, see Article Types
- Click on more…
- Under that menu, select
  - Clinical Trial
  - Meta Analysis
  - Practice Guideline
  - Randomized Controlled Trial
  - Review
  - Systematic Review
- PubMed Clinical Queries – a pre-set search that limits to specific clinical research areas
“April Fool’s Day is the one day of the year that people critically evaluate news articles before accepting them as true”

www.tickld.com
Appraising Evidence

- A3BCD
  - A-Authority
  - A-Accuracy
  - A-Audience
  - B-Bias/Objectivity
  - C-Currency
  - D-Design
  - Functionality
  - Format & appearance

http://www.emich.edu/library/help/a3bcd/index.php