Summarizing the Evidence

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Objectives

• Define a systematic review, meta-analysis
  – What they can and can’t do for you
• Explain terms of
  – Heterogeneity
  – Weighting
  – Effect Size/Summary Effect Size
  – Publication Bias
• Draw and interpret a Forest Plot
• Critically appraise a systematic review
• Find, critically appraise, and apply clinical practice guidelines
The Evidence Pyramid

Systematic Review/Meta-analysis

RCT

Observational Studies

Case-Control

Case Series

Unsystematic Clinical Experience
What is a Systematic Review?

- Answers 1 focused clinical question
- Summarizes evidence using methods to reduce bias
- The statistical method to combine data from different studies = meta-analysis
- Not all systematic reviews have meta-analysis (qualitative inferences only)
- Not all meta-analyses combine studies assembled through a systematic review
Audience Response:

How can you tell if an article is a “systematic review” rather than a “general review” article?

A. Top journals only publish systematic reviews
B. It will cover all known information about the topic (diagnosis, prognosis, treatment, etc)
C. It has a Methods Section
D. B and C
Audience Response:

From which types of studies is it possible to combine data (do a "meta-analysis")?

A. Randomized trials only
B. Randomized trials and cohort studies
C. Randomized trials, cohort studies, and case-control studies
D. Randomized trials, cohorts studies, case-control studies, and case series
Scenario: Grandmother and Ike
Time to vote: Audience Response

A = Orthopedic care on Surgical Ward

B = Routine Geriatric Consultation on Ortho Unit

C = Geriatrics Unit
What is the focused clinical question?

In older patients with hip fracture, does geriatric care (co-management or unit) improve mortality or functional outcomes compared to usual care?
Linus Pauling

"Science is the search for truth; it is not a game in which one tries to beat his opponent."
What systematic reviews can do for you

• Save time !!!
• Increase power to detect rare events
  – Obviate need for expensive mega-trials
  – Detect harm
• Increase the precision of the estimate of effect
• Enhance the generalizability of the results if samples from different populations are included
• Look for important differences in effectiveness among subgroups of patients
What systematic reviews can’t do for you
Confession Time:
Raise your hand if you…

• Always skip the methods section on a Systematic Review because it sounds scary
• Make your colleagues teach the systematic review session so you don’t look like an idiot
• Think a “Forest Plot” refers to Sarah Palin’s plans to allow oil drilling in the Alaskan Wilderness
Exercise – Creating a Mini Meta-Analysis
<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Population</th>
<th>N</th>
<th>Intervention and control</th>
<th>Outcome Measure(s)</th>
<th>Results</th>
<th>Type/Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cogan 2009</td>
<td>Ireland, consecutive hip fx patients</td>
<td>201</td>
<td>Consultation with geriatrics, IDT meetings vs. usual care pre-program</td>
<td>In-hospital mortality • 1-year mortality • d/c home • NHP 1 year • <strong>Katz Score</strong></td>
<td>RR mort 0.4 (0.2-0.9) • RR d/c home 2.25 • <strong>Katz Diff 4 pts (15)</strong></td>
<td>Pre-post retrospective chart review, no adjustment</td>
</tr>
<tr>
<td>Vidan 2005</td>
<td>Spain, hip fracture patients, excluding non-ambulatory and ADL=0</td>
<td>319</td>
<td>Geriatric team co-management on ortho ward vs. usual care</td>
<td>LOS • In-hospital mortality • Functional recovery • <strong>PPT Score</strong></td>
<td>LOS not diff • RR mort 0.1 (p&lt;0.05) • 3 month ADL recovery RR=1.3, (NS) • <strong>PPT Score Diff 7 pts (35)</strong></td>
<td>RCT, blinded outcomes assessment</td>
</tr>
<tr>
<td>Adunsky 2011</td>
<td>Israel, patients admitted to geri ward based on availability</td>
<td>3114</td>
<td>15 bed geriatric unit compared to regular ortho ward</td>
<td>Mortality 1 month, 3 month, 1 year • <strong>FAT Score</strong></td>
<td>HR 1 month 0.6 (0.3-1.1) • <strong>FAT Score Diff 16 (100)</strong></td>
<td>Prospective cohort, adjusted</td>
</tr>
</tbody>
</table>
Audience Response:

You should assess for heterogeneity between studies in a systematic review by:

A. Deciding whether it makes sense to combine them based on your clinical knowledge

B. Seeing if a statistical test for heterogeneity among the results of the studies is non-significant, or an $I^2$ statistic is <20%

C. Looking for overlapping confidence intervals on a forest plot

D. A, B and C
Audience Response:

“Weighting” refers to

A. Eating too many snacks during your EBM workshop
B. A mathematical adjustment which makes larger studies contribute more to the combined result than smaller ones
C. A mathematical adjustment which makes better quality studies contribute more to the combined result than smaller ones
D. B or C
Audience Response:

You would expect to see unit-less “summary effect sizes” for which of the following outcome measures?

A. 30 day mortality
B. Re-hospitalization rates
C. Depressive symptoms
D. Composite endpoint of stroke, MI, or need for re-intervention at 6 months
Systematic Reviews: Validity

1. Did the review explicitly address a sensible clinical question?

care.\textsuperscript{9-11} This systematic review and meta-analysis was performed to determine if orthogeriatric models improve patient outcomes and to identify if 1 model in particular is associated with improved outcomes. It was hypothesized that the increase in these programs would demonstrate a net benefit for patients about length of stay, mortality, and cost.
Systematic Reviews: Validity

2. Was the search for relevant studies detailed and exhaustive?
   - “Publication Bias”
   - “Funnel Plots”
What is a Funnel Plot Anyway?

A.K.A, “Increasing Sample Size”

A.K.A, “The Results”

Line of Truth
What is a Funnel Plot Anyway?

A.K.A. “Increasing Sample Size”

A.K.A. “The Results”
## Publication Bias

### TABLE 2. Meta-Analysis Results

<table>
<thead>
<tr>
<th></th>
<th>In-hospital Mortality</th>
<th>Long-term Mortality</th>
<th>Length of Stay</th>
<th>Time to Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RR (95% CI)</td>
<td>RR (95% CI)</td>
<td>SMD (95% CI)</td>
<td>SMD (95% CI)</td>
</tr>
<tr>
<td></td>
<td>$I^2$, $P$</td>
<td>$I^2$, $P$</td>
<td>$I^2$, $P$</td>
<td>$I^2$, $P$</td>
</tr>
<tr>
<td>All 3 models combined</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$n$</td>
<td>9</td>
<td>11</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>RR</td>
<td>0.60 (0.43–0.84)</td>
<td>0.83 (0.74–0.94)</td>
<td>-0.25 (-0.44 to -0.05)*</td>
<td>-0.10 (-0.22 to 0.02)</td>
</tr>
<tr>
<td>$I^2$, $P$</td>
<td>28.4%, $P = 0.19$</td>
<td>0.0%, $P = 0.72$</td>
<td>96.3%, $P = 0.00$</td>
<td>79.9%, $P = 0.00$</td>
</tr>
<tr>
<td>Routine geriatric consultation (model 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$n$</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>RR</td>
<td>0.51 (0.38–0.69)</td>
<td>0.78 (0.65–0.95)</td>
<td>-0.03 (-0.20 to 0.14)</td>
<td>-0.13 (-0.23 to -0.03)</td>
</tr>
<tr>
<td>$I^2$, $P$</td>
<td>0.0%, $P = 0.86$</td>
<td>0.0%, $P = 0.55$</td>
<td>88.4%, $P = 0.00$</td>
<td>0.0%, $P = 0.50$</td>
</tr>
<tr>
<td>Geriatric ward (model 2)</td>
<td>N/A</td>
<td>N/A</td>
<td>-0.33 (-1.06 to 0.41)</td>
<td>N/A</td>
</tr>
<tr>
<td>$n$</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>RR</td>
<td>-0.03 (0.42–2.28)</td>
<td>N/A</td>
<td>N/A</td>
<td>97.7%, $P = 0.00$</td>
</tr>
<tr>
<td>$I^2$, $P$</td>
<td>64.3%, $P = 0.06$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared care (model 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$n$</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>RR</td>
<td>0.61 (0.16–2.28)</td>
<td>N/A</td>
<td>-0.61 (-0.95 to -0.28)</td>
<td>-0.15 (-0.44 to 0.15)*</td>
</tr>
<tr>
<td>$I^2$, $P$</td>
<td>64.3%, $P = 0.06$</td>
<td></td>
<td>93.9%, $P = 0.00$</td>
<td></td>
</tr>
</tbody>
</table>

*There may be evidence of publication bias in these analyses.*
Systematic Reviews: Validity

3. Were the primary studies of high methodologic quality?
   - Garbage in = Garbage out
   - Data Table

Methodological Quality Assessment

Studies were assessed for quality based on the type of study, the matching of intervention and control groups, and the detail of intervention that was described. Using the criteria of the United States Preventative Services Task Force, studies were graded as either good, fair, or poor.
### TABLE 1. Included Studies: Model of Care and Reported Outcomes

<table>
<thead>
<tr>
<th>Model</th>
<th>Author (Year)</th>
<th>Study Design</th>
<th>Quality</th>
<th>n (Intervention)</th>
<th>n (Control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Deschodt\textsuperscript{21,33} (2012)</td>
<td>CT</td>
<td>G</td>
<td>94</td>
<td>77</td>
</tr>
<tr>
<td>1</td>
<td>Leung\textsuperscript{32} (2011)</td>
<td>RCR</td>
<td>F</td>
<td>278</td>
<td>270</td>
</tr>
<tr>
<td>1</td>
<td>Cogan\textsuperscript{27} (2010)</td>
<td>RCR</td>
<td>F</td>
<td>98</td>
<td>103</td>
</tr>
<tr>
<td>1</td>
<td>Fisher\textsuperscript{25} (2006)</td>
<td>PCRC</td>
<td>F</td>
<td>447</td>
<td>504</td>
</tr>
<tr>
<td>1</td>
<td>Shyu\textsuperscript{20} (2008)</td>
<td>PR</td>
<td>G</td>
<td>80</td>
<td>82</td>
</tr>
<tr>
<td>1</td>
<td>Khan\textsuperscript{24} (2002)</td>
<td>PCRC</td>
<td>F</td>
<td>208</td>
<td>537</td>
</tr>
<tr>
<td>1</td>
<td>Naglie\textsuperscript{22} (2002)</td>
<td>PR</td>
<td>G</td>
<td>141</td>
<td>139</td>
</tr>
<tr>
<td>1</td>
<td>Marcantoni\textsuperscript{26} (2001)</td>
<td>PR</td>
<td>G</td>
<td>62</td>
<td>64</td>
</tr>
<tr>
<td>1</td>
<td>Swanson\textsuperscript{28} (1998)</td>
<td>PR</td>
<td>F</td>
<td>38</td>
<td>33</td>
</tr>
<tr>
<td>1</td>
<td>Antonelli Incalzi\textsuperscript{19} (1993)</td>
<td>PCRC</td>
<td>F</td>
<td>287</td>
<td>216</td>
</tr>
<tr>
<td>2</td>
<td>Adunsky\textsuperscript{29} (2011)</td>
<td>RCR</td>
<td>F</td>
<td>847</td>
<td>2267</td>
</tr>
<tr>
<td>2</td>
<td>Miura\textsuperscript{17} (2009)</td>
<td>PCRC</td>
<td>F</td>
<td>91</td>
<td>72</td>
</tr>
<tr>
<td>2</td>
<td>Stenvall\textsuperscript{30} (2007)</td>
<td>PR</td>
<td>G</td>
<td>102</td>
<td>97</td>
</tr>
<tr>
<td>3</td>
<td>Gregersen\textsuperscript{16} (2011)</td>
<td>RCR</td>
<td>F</td>
<td>233</td>
<td>262</td>
</tr>
<tr>
<td>3</td>
<td>Gonzalez-Montalvo\textsuperscript{18} (2010)</td>
<td>PR</td>
<td>G</td>
<td>101</td>
<td>123</td>
</tr>
<tr>
<td>3</td>
<td>Friedman\textsuperscript{31} (2009)</td>
<td>RCR</td>
<td>F</td>
<td>193</td>
<td>121</td>
</tr>
<tr>
<td>3</td>
<td>Vidan\textsuperscript{23} (2005)</td>
<td>PR</td>
<td>G</td>
<td>155</td>
<td>164</td>
</tr>
<tr>
<td>3</td>
<td>Khasraghi\textsuperscript{15} (2005)</td>
<td>RCR</td>
<td>F</td>
<td>273</td>
<td>237</td>
</tr>
</tbody>
</table>
Systematic Reviews: Validity

4. Were assessments of primary studies reproducible?
   • At least 2 abstractors
   • Disagreements

Study Selection

Article titles and abstracts were reviewed by authors K.G. and H.J. to determine if they met the inclusion criteria. Articles were included for full text review based on the abstract, or if it was not discernible from the abstract, full text articles were reviewed to determine inclusion. Two primary reviewers (K.G. and H.J.) independently evaluated each full text article for inclusion. Any disagreements were discussed between the reviewers, and as necessary, with input from a third reviewer (J.R.), to resolve differences.
Systematic Review: Results

1. Were the results similar from study to study?
   - Clinical assessment of heterogeneity in population, intervention, outcomes
   - Statistical test or $I^2$
   - “Poor man’s” test in Forest Plot
Poor Man’s Test for Heterogeneity

In-Hospital Mortality

<table>
<thead>
<tr>
<th>Study</th>
<th>RR (95% CI)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cogan (2010)</td>
<td>0.40 (0.19–0.86)</td>
<td>12.89</td>
</tr>
<tr>
<td>Fisher (2006)</td>
<td>0.61 (0.36–1.02)</td>
<td>20.86</td>
</tr>
<tr>
<td>Naglie (2002)</td>
<td>0.53 (0.22–1.29)</td>
<td>10.39</td>
</tr>
<tr>
<td>Swanson (1998)</td>
<td>0.87 (0.13–5.83)</td>
<td>2.80</td>
</tr>
<tr>
<td>Antonelli Incalzi (1993)</td>
<td>0.46 (0.29–0.75)</td>
<td>22.49</td>
</tr>
<tr>
<td>Stenvall (2007)</td>
<td>0.82 (0.28–2.34)</td>
<td>7.94</td>
</tr>
<tr>
<td>Gregersen (2011)</td>
<td>1.34 (0.70–2.54)</td>
<td>16.29</td>
</tr>
<tr>
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<td>0.63 (0.13–3.06)</td>
<td>3.92</td>
</tr>
<tr>
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<td>0.12 (0.02–0.92)</td>
<td>2.42</td>
</tr>
<tr>
<td>Overall (I² = 28.4%, P = 0.192)</td>
<td></td>
<td>100.00</td>
</tr>
</tbody>
</table>

Overall (I² = 28.4%, P = 0.192)
What are the Results?

2. What are the overall results of the review?
   – Forest plots and tables

3. How confident are you in the results?
   - Confidence intervals
In-Hospital Mortality

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<td>2.42</td>
</tr>
<tr>
<td>Overall ($I^2 = 28.4%$, $P = 0.192$)</td>
<td>0.60 (0.43–0.84)</td>
<td>100.00</td>
</tr>
</tbody>
</table>
## Results by Model and Outcome

<table>
<thead>
<tr>
<th></th>
<th>In-hospital Mortality</th>
<th>Long-term Mortality</th>
<th>Length of Stay</th>
<th>Time to Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RR (95% CI)</td>
<td>RR (95% CI)</td>
<td>SMD (95% CI)</td>
<td>SMD (95% CI)</td>
</tr>
<tr>
<td></td>
<td>$\Gamma$, $P$</td>
<td>$\Gamma$, $P$</td>
<td>$\Gamma$, $P$</td>
<td>$\Gamma$, $P$</td>
</tr>
<tr>
<td></td>
<td>$n$</td>
<td>$n$</td>
<td>$n$</td>
<td>$n$</td>
</tr>
<tr>
<td>All 3 models combined</td>
<td>0.60 (0.43–0.84)</td>
<td>0.83 (0.74–0.94)</td>
<td>-0.25</td>
<td>-0.10</td>
</tr>
<tr>
<td></td>
<td>28.4%, $P = 0.19$</td>
<td>0.0%, $P = 0.72$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$n = 9$</td>
<td>$n = 11$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Routine geriatric consultation (model 1)</td>
<td>0.51 (0.38–0.69)</td>
<td>0.78 (0.65–0.95)</td>
<td>-0.0 (to 0.14)</td>
<td>-0.13 (-0.23 to -0.03)</td>
</tr>
<tr>
<td></td>
<td>0.0%, $P = 0.86$</td>
<td>0.0%, $P = 0.55$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$n = 5$</td>
<td>$n = 7$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geriatric ward (model 2)</td>
<td>N/A</td>
<td>N/A</td>
<td>-0.3 (to 0.41)</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>$n = 1$</td>
<td>$n = 2$</td>
<td>$n = 3$</td>
<td></td>
</tr>
<tr>
<td>Shared care (model 3)</td>
<td>0.6 (0.28)</td>
<td>N/A</td>
<td>-0.61 (-0.28)</td>
<td>-0.15 (0.05)</td>
</tr>
<tr>
<td></td>
<td>64. 0.06</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$n = 2$</td>
<td>$n = 2$</td>
<td>$n = 3$</td>
<td></td>
</tr>
</tbody>
</table>

*There may be evidence of publication bias in these analyses.
Back to Grandmother and Ike
Time to vote: Audience Response

A = Orthopedic care on Surgical Ward

B = Routine Geriatric Consultation on Ortho Unit

C = Geriatrics Unit
Objectives

- Define a systematic review, meta-analysis
  - What they can and can’t do for you
- Explain terms of
  - Heterogeneity
  - Weighting
  - Effect Size/Summary Effect Size
  - Publication Bias
- Draw and interpret a Forest Plot
- Critically appraise a systematic review
- Find, critically appraise, and apply clinical practice guidelines
Time for a Break!
Recapping the Workshop to Date:

- **EBM 1.0** is important

- **EBM 2.0** is the wave of the future
Health Care will be supported by a “knowledge cloud” integrated with consumer- and care provider-facing systems (best practices, scientific knowledge)
EBM 2.0
Not your Grandmother’s EBM

Evolution of the Evidence Paradigm
This *is* Your Grandmother’s EBM...
What Does Grandmother Want?

- Computerized history-gathering
- Healthcare Provider using the EHR
- Human Interaction and Discussion

How can we incorporate this “cloud” to best help Grandmother in real time while honoring her values, preferences, and need to interact with a human being to make decisions?
What Good are Guidelines?

**Benefits of Guidelines**
- Streamlining
- Consistency
- Intended to Promote Better Outcomes
- In line with Health System CMO vision of EBM 2.0

**Drawbacks of Guidelines**
- Timeliness
- Applicability
- Quality
  - Who writes the guidelines?
What Good are Guidelines?

Benefits of Guidelines
- Streamlining
- Consistency
- Better Outcomes

Drawbacks of Guidelines
- Timeliness
- Applicability
- Appropriateness to situation (not guaranteed by virtue of existence)
How To Find Guidelines:

Deep Venous Thrombosis Prophylaxis in Orthopedic Surgery
www.medscape.com/article/1268573-overview
Aug 15, 2014 - Deep Venous Thrombosis Prophylaxis in Orthopedic Surgery ... Additional recommendations by the ACCP for extended out of hospital

Deep Vein Thrombosis: From the American Academy of ... www.aaos.org/phyphys - American Academy of Orthopaedic Surgeons
"Hip and knee arthroplasty [joint replacement surgery] is among the most... According to the guideline, in the absence of prophylaxis, DVT occurs in about 37...

When should prophylactic anticoagulation begin after a hip ... https://www.clevelandclinicmeded.com/medcenter/sc/psm/grant.htm
by P Grant - 2006 - Related articles
venous thromboembolism (VTE) in patients with a hip fracture. ... The AGA guidelines do, however, allow once-daily prophylactic use of low-molecular-weight...

(VTE) Following Total Hip and Knee Arthroplasty: Risk ... www.guideline.gov - Synthesis Report
National Guideline Clearinghouse - A direct comparison of recommendations presented in the above guidelines for prevention of VTE (DVT or PE) following total hip or knee arthroplasty is provided...

Prevention of venous thromboembolism - Circulation
circ.ahajournals.org/content/125/7/1715.full
by D Weitz - 2012 - Cited by 9 - Related articles
Prevention of Venous Thromboembolism in Total Knee and Hip Replacement...
Second, she had a greater than usual risk of bleeding after surgery because... Meticulous timing and adherence to published anesthetic guidelines is essential.

Prevention of Venous Thromboembolism in Surgical Patients
circ.ahajournals.org/content/118/24_suppl_1_H14-4.full
by D Aggar - 2004 - Cited by 106 - Related articles
Prevention of DVT After Total Knee Replacement Surgery. ... As with replacement surgery, the current pharmacological recommendations for prophylaxis of VTE...

Duration of venous thromboembolism prophylaxis after ... www.ncbi.nlm.nih.gov/ - National Center for Biotechnology Information
by C Keenan - 2003 - Cited by 134 - Related articles
Duration of venous thromboembolism prophylaxis after surgery... for a minimum of 7 to 10 days of prophylaxis after hip and knee replacement, even if ACCP recommendations, at a minimum, extended prophylaxis should be used after...
How To Find Guidelines:

• What does our expert librarian recommend?


2. Go to Guidelines.gov and search for hip replacement

3. Go to association websites
GUIDELINES TO CONSIDER

MANAGEMENT OF HIP FRACTURES IN THE ELDERLY

EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE

Adopted by the American Academy of Orthopaedic Surgeons Board of Directors
September 5, 2014

This Guideline has been endorsed by the following organizations:

AAOS
ORTHOPAEDIC—TRAUMA—ASSOCIATION
AGS
Geriatrics Healthcare Professionals

American Academy of Physical Medicine and Rehabilitation

ASBMR
Bone and Joint Initiative

AACE
Foundation for Physical Therapy Research
Guidelines: Validity

Does the Guideline Address a Clear issue?

Are the Recommendations Valid?
- All options/outcomes specified?
- Explicit, sensible process to identify and combine evidence?
- Explicit, sensible process to consider relative value of outcomes? Whose values?
- Is the guideline resistant to clinically sensible variations in practice?

Finer Points:
- All stakeholders involved?
- Most recent evidence considered?
- Subject to peer review?
- Conflict of interest?

What Are the Recommendations?
- How strong is the evidence base?
Guidelines: Validity
IOM Standards for Trustworthiness

1. Transparent process
2. Conflicts of interest
3. Guideline development group composition
4. Systematic reviews
5. Evidence quality and recommendation strength
6. Articulating recommendations
7. External review
8. Updating
Which Guideline Should Your Hospital Use?
Guideline VTE Recommendations

2.3.1. In patients undergoing THA or TKA, irrespective of the concomitant use of an IPCD or length of treatment, we suggest the use of LMWH in preference to the other agents we have recommended as alternatives: fondaparinux, apixaban, dabigatran, rivaroxaban, LDUH (all Grade 2B), adjusted-dose VKA, or aspirin (all Grade 2C).

Remarks: If started preoperatively, we suggest administering LMWH ≥ 12 h before surgery. Patients who place a high value on avoiding the inconvenience of daily injections with LMWH and a low value on the limitations of alternative agents are likely to choose an alternative agent. Limitations of alternative agents include the possibility of increased bleeding (which may occur with fondaparinux, rivaroxaban, and VKA), possible decreased efficacy (LDUH, VKA, aspirin, and IPCD alone), and lack of long-term safety data (apixaban, dabigatran, and rivaroxaban). Furthermore, patients who place a high value on avoiding bleeding complications and a low value on its inconvenience are likely to choose an IPCD over the drug options.
Back to Your Grandmother’s EBM

macular degeneration (can’t see syringe markings)

Absolutely refuses SNF (“what would Ike do without me?”)

Copay 20% lovenox
$40 dabigatran
$1 ECASA

Neighbor and daughter willing to help, but she doesn’t want to be a burden
Objectives

• Define a systematic review, meta-analysis
  – What they can and can’t do for you
• Explain terms of
  – Heterogeneity
  – Weighting
  – Effect Size/Summary Effect Size
  – Publication Bias
• Draw and interpret a Forest Plot
• Critically appraise a systematic review
• Find, critically appraise, and apply clinical practice guidelines
“It would not be appropriate to end a Duke talk during a week like this without including a picture of the Duke Basketball Team”

-Tom Owens
Final Inspirations

The next clinical question