Comorbidity, Multimorbidity, and Evidence Based Decision Making

W. Scott Richardson, M.D.
Lynn M. Doster
Medical Partnership, Athens

Conflicts of Interest

• We have no financial ties with industry that pose a conflict of interest regarding the content of this presentation

• We will not be discussing “off label” uses of any medications or devices

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Session Aims

Define comorbidity & multimorbidity
Consider prevalence
Consider explanations for how it occurs
Show a model for examining the impact on evidence-based decision-making
Thank David Sackett for some of his many gifts

Our patient ...

• 73 M, exertional dyspnea & leg swelling
• New diagnoses:
  – HF with reduced systolic function
  – Stage IV CKD (Cr Cl ~ 22 mL/min)
  – Unrecognized hypertension

• How could the CKD affect decisions about treatment of HF?
More generally ...

- How does the co-occurrence of 2 or more disorders affect evidence-based clinical decisions about treatment?
- Can we use these insights to help us judge whether our patients are too different from those studied to allow us to apply the evidence to decisions?

**Comorbidity v Multimorbidity**

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>Multimorbidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical conditions that exist at the time of diagnosis of an index disease (not complications of that disease)</td>
<td>Co-occurrence of 2 or more chronic medical conditions (without designating one as the index disease)</td>
</tr>
</tbody>
</table>
Victor Montori, BMJ, 2015:

- “The most common chronic condition worldwide is, or will soon be, multimorbidity.”
- “As the population ages, the proportion with multimorbidity approaches universality.”
Interactions between entities

An underlying axiom ...

Humans vary!

- Specifically, they vary in many ways that define their circumstances (biologic, psychologic, sociologic) and determine their outcomes
- Also, they vary in many ways that determine their values and preferences
- How can we describe how comorbidity or multimorbidity affect these variations?
Clinical Decisions of Treatment

- ‘Baseline’ risks of poor outcome without Rx
- Treatment benefits – lowering these risks
- Treatment harms – raising other risks
- Other considerations, values & preferences

NNTs for varying baseline risks:

<table>
<thead>
<tr>
<th>CER</th>
<th>EER</th>
<th>ARR</th>
<th>NNT</th>
<th>RRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>20% (2/10)</td>
<td>10% (1/10)</td>
<td>10%</td>
<td>1 / 0.1 = 10</td>
<td>50%</td>
</tr>
<tr>
<td>2% (2/100)</td>
<td>1% (1/100)</td>
<td>1%</td>
<td>1 / 0.01 = 100</td>
<td>50%</td>
</tr>
<tr>
<td>0.2% (2/1000)</td>
<td>0.1% (1/1000)</td>
<td>0.1%</td>
<td>1 / 0.001 = 1000</td>
<td>50%</td>
</tr>
<tr>
<td>0.0002% (2/million)</td>
<td>0.0001% (1/million)</td>
<td>0.0001%</td>
<td>1 / 0.000001 = 1,000,000</td>
<td>50%</td>
</tr>
</tbody>
</table>
Clinical Decisions of Treatment

- ‘Baseline’ risks of poor outcome without Rx
- Treatment benefits – lowering these risks
- Treatment harms – raising these risks
- Other considerations, values & preferences
3-D Model

- **Risk**, e.g. R(c) or prognosis studies
- **Responsiveness**, e.g. RRR from Rx
- **Vulnerability**, e.g. ARI for harms

![3-D Model Diagram](image)

*Fig. 1. Three dimensions of risk, responsiveness, and vulnerability.*

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A Thousand Thanks!

[Image of book cover: Clinical Epidemiology]

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3-D Model

- ‘Ideal’ vs. ‘usual’ candidate for Rx
- Impact of comorbid conditions
  - Risk
  - Responsiveness
  - Vulnerability
- Study nature of interactions
- Study impact in 3-D

Back to our patient ...

- 73M, exertional dyspnea, leg swelling
- New diagnoses:
  - ‘Systolic’ HF
  - Stage IV CKD
  - Longstanding HT
- Effect of his multimorbidity on ...
Multimorbidity & E-b Decisions

- Risk
- Responsiveness
- Vulnerability

Can also affect:
- Other aspects of illness experience
- Values, preferences

Questions?