Health Outcome Prioritization as a Tool for Decision Making Among Older Persons With Multiple Chronic Conditions

Mary Tinetti, M.D.
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Faculty/Presenter Disclosure

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Mitigating Potential Bias

• Not applicable
Objectives

• To discuss limitations of current disease-outcome driven decision-making for persons with MCC

• To describe a health outcome priority driven approach to decision-making for persons with MCC
Why important: MCC common

- 3/4 persons ≥65 y.o. have multiple conditions
- 1/4 adults < 65 y.o. who receive healthcare have multiple conditions
- Most healthcare for persons with MCC
- MCC is the NORM

Anderson G; Fortin M; others
Why important: Problem with disease-outcome focus in face of MCC

- Causes treatment burden, complexity
- Causes therapeutic competition:
  - Treatment of one condition worsens another condition
- Ignores inherent tradeoffs
- Ignores individuals’ health outcome priorities
Problem with disease-outcome focus with MCC: Treatment burden and complexity

• 9 Conditions studied:
  ➢ AF, HF, angina, HTN, ↑Hyperlipidemia, DM, COPD, osteoporosis, osteoarthritis

Boyd et al, JAMA 2005
### Table 3. Treatment Regimen Based on Clinical Practice Guidelines for a Hypothetical 79-Year-Old Woman With Hypertension, Diabetes Mellitus, Osteoporosis, Osteoarthritis, and COPD*

<table>
<thead>
<tr>
<th>Time</th>
<th>Medications†</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 AM</td>
<td>Ipratropium metered dose inhaler</td>
<td>Check fast; Sit upright for 30 min on day when alendronate is taken; Check blood sugar</td>
</tr>
<tr>
<td></td>
<td>70 mg/wk of alendronate</td>
<td></td>
</tr>
<tr>
<td>8:00 AM</td>
<td>500 mg of calcium and 200 IU of vitamin D</td>
<td>Eat breakfast; 2.4 g/d of sodium; 90 mmol/d of potassium; Low intake of dietary saturated fat and cholesterol; Adequate intake of magnesium and calcium; Medical nutrition therapy for diabetes†; DASH‡</td>
</tr>
<tr>
<td></td>
<td>12.5 mg of hydrochlorothiazide</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 mg of lisinopril</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 mg of gliburide</td>
<td></td>
</tr>
<tr>
<td></td>
<td>81 mg of aspirin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>850 mg of metformin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250 mg of naproxen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 mg of omeprazole</td>
<td></td>
</tr>
<tr>
<td>12:00 PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:00 PM</td>
<td>Ipratropium metered dose inhaler</td>
<td>Eat lunch; 2.4 g/d of sodium; 90 mmol/d of potassium; Low intake of dietary saturated fat and cholesterol; Adequate intake of magnesium and calcium; Medical nutrition therapy for diabetes†; DASH‡</td>
</tr>
<tr>
<td></td>
<td>500 mg of calcium and 200 IU of vitamin D</td>
<td></td>
</tr>
<tr>
<td></td>
<td>500 mg of metformin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250 mg of calcium and 200 IU of vitamin D</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 mg of lovastatin</td>
<td></td>
</tr>
<tr>
<td>7:00 PM</td>
<td>Ipratropium metered dose inhaler</td>
<td>Eat dinner; 2.4 g/d of sodium; 90 mmol/d of potassium; Low intake of dietary saturated fat and cholesterol; Adequate intake of magnesium and calcium; Medical nutrition therapy for diabetes†; DASH‡</td>
</tr>
<tr>
<td></td>
<td>850 mg of metformin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>500 mg of calcium and 200 IU of vitamin D</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250 mg of naproxen</td>
<td></td>
</tr>
<tr>
<td>11:00 PM</td>
<td>Ipratropium metered dose inhaler</td>
<td></td>
</tr>
<tr>
<td></td>
<td>As needed; Albuterol metered dose inhaler</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: ADA, American Diabetes Association; COPD, chronic obstructive pulmonary disease; DASH, Dietary Approaches to Stop Hypertension.

*Clinical practice guidelines used: (1) Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure VII; (2) ADA; (3) American College of Rheumatology; (4) National Osteoporosis Foundation; this regimen assumes dietary intake of 200 IU of vitamin D. (5) National Heart, Lung, and Blood Institute and World Health Organization.†Taken orally unless otherwise indicated. The medication complexity score of the regimen for this hypothetical woman is 14, with 19 doses of medications per day, assuming 2 as needed doses of albuterol metered dose inhaler plus 70 mg/wk of alendronate.

‡DASH and ADA dietary guidelines may be synthesized, but the help of a registered dietitian is specifically recommended. Eat foods containing carbohydrate from whole grains, fruits, vegetables, and low-fat milk. Avoid protein intake of more than 20% of total daily energy; lower protein intake to about 10% of daily calories if overt nephropathy is present. Limit intake of saturated fat (<10% of total daily energy) and dietary cholesterol (<200-300 mg). Limit intake of transunsaturated fatty acids. Eat 2 to 3 servings of fish per week. Intake of polyunsaturated fat should be about 10% of total daily energy.

Problem with disease-outcome focus with MCC: Therapeutic competition

- Medication treating one condition may worsen coexisting condition
- Undetected therapeutic competition may be widespread
  - Disease guidelines recommend multiple drugs
  - People have multiple conditions
Prevalence of potential therapeutic competition in older adults

- **Aim**: Identify common chronic conditions and medications involved in potential therapeutic competition

- **Participants**: Nationally representative sample of 6,844 older adults in U.S.

Chronic conditions: Prevalence >5%*

- Hypertension (72%)
- Hyperlipidemia (60%)
- Osteoarthritis (52%)
- DM 2 (28%)
- CAD (27%)
- COPD (18%)
- GERD/PUD (17%)
- Hypothyroidism (15%)
- Atrial fibrillation (13%)
- Heart failure (13%)
- Osteoporosis (11%)
- BPH (11%)
- Depression (7%)
- Dementia (6%)

1+ medication recommended
Medications

• 26 medication classes recommended by national disease guidelines for these 14 chronic conditions

• Data sources for potential therapeutic competition: Disease guidelines; 2+ studies in medical literature since 2000
**Examples of potential therapeutic competition**

<table>
<thead>
<tr>
<th>Coexisting Conditions</th>
<th>No. Particip.</th>
<th>Pop. Estimates</th>
<th>% Receiving Potentially Competing Med</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension &amp; COPD</td>
<td>1052</td>
<td>3812031</td>
<td>Nonselective β-blocker (6%) Aβ-blocker (9%) Beta-agonist (38%)</td>
</tr>
<tr>
<td>Diabetes &amp; Heart Failure</td>
<td>405</td>
<td>1420958</td>
<td>Glitazone (13%)</td>
</tr>
<tr>
<td>Osteoporosis &amp; GERD/PUD</td>
<td>248</td>
<td>906295</td>
<td>Proton pump inhib. (63%) Bisphosphonate (43%)</td>
</tr>
</tbody>
</table>
Prevalence of potential therapeutic competition

- ≥1 med: 36%
- ≥2 meds: 20%
- ≥3 meds: 12%
Problem with disease-outcome focus with MCC: Ignore tradeoffs and priorities
Tradeoff in persons with coexisting HTN and fall risk

• ~1/3 persons ≥70 y.o. have both

• With antihypertensive medications:
  ➢ Absolute 5-year risk of CV (stroke or MI) event ↓ 26% to 18% but…
  ➢ Absolute risk of serious fall injury 18% to 24% and symptoms in ~20%
Variable priorities in persons with coexisting HTN and fall risk

- 125 persons ≥70 y.o. presented trade off: CV outcomes vs. fall injury / medication symptoms

Variable priorities in persons with coexisting HTN and fall risk

Findings:

- ≈ 1/2 prioritize avoiding CV events over fall injury or medication symptoms
- ≈ 1/2 prioritize avoiding fall injury or medication symptoms over CV events

What do you think...?
1º care MDs perceptions of caring for older adults with multiple conditions

Asked 5 focus groups of community and faculty practices (N~50) about
• Issues complicating decision-making for patients with multiple conditions

Fried T, Tinetti M, Arch Int Med 2011
Tradeoffs between conditions

“Even if I know that there is a benefit to x in hypertension or y in diabetes, [what is] the relative benefit when there are multiple of them? So this patient today, would it be better to treat their depression than to get their A1C down?”
Lack of data for outcomes important to patients

“They [trials] are looking at mortality and don’t take into consideration the patient’s perspective on the benefits that they would hope to receive.”

“…the problem of the outcome is that the lack of pain is probably as important an outcome as saving her life….”
So is there a better way?

“I know nothing about the subject, but I’m happy to give you my expert opinion.”
Is there a better way?

• **Problem**: Single disease-outcome focus in decision-making for patients with multiple chronic conditions

• **Possible solution**: Universal outcomes in decision-making for patients with multiple chronic conditions
Universal, cross-disease outcomes

• Key Characteristics
  ➢ Meaningful to patients
  ➢ ALL diseases exert their effect
  ➢ Individuals able to prioritize

• Potential Uses:
  ➢ Make treatment decisions (practice)
  ➢ Common metric to determine benefits and harms (research)
Meaningful to patients…
Views of older persons with multiple conditions on competing outcomes

• Methods
  - 66 persons ≥ 65 y.o. taking ≥ 5 medications
  - Qualitative; participants asked goals of treatment

• Results
  - Initially discussed disease-specific outcomes (e.g. BP, lipid level)
  - Shifted from disease-specific to universal, cross-disease health outcomes

Fried TR, et al, JAGS 2008
Treatment goals generated by participants

**Desired outcomes**

- Extend life
- Preserve
  - physical function
  - social function
- Prevent worsening of conditions
- Improve symptoms
  - Pain, SOB, depression

**Undesired Outcomes**

- Extend life w.o quality
- Symptoms
  - Pain; Nausea; Drowsiness; Dizziness
- Mental slowing, fogginess

Fried TR, et al, JAGS 2008
Universal health outcomes as way to elicit priorities. Is it most important to patient...

To be as functional as possible (physical, cognitive, social)

As free of symptoms as possible (e.g. dyspnea, pain, fatigue)

Live as long as possible?
Do chronic conditions exert their effect on universal health outcomes?
Determine relative effect of five chronic conditions on universal outcomes

- **Participants**: 5298 community-living individuals ≥65 y.o.

- **Chronic conditions**: Heart failure, COPD, osteoarthritis; depression, dementia

- **Outcomes**: Self-rated health; ADL function; symptom burden, survival
Independent effect of each condition on function (no. ADL difficulties)

<table>
<thead>
<tr>
<th>Chronic Condition</th>
<th>Beta (SE)*</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure</td>
<td>.70 (.08)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>COPD</td>
<td>.28 (.05)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Arthritis</td>
<td>.27 (.03)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Depression</td>
<td>.59 (.04)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Dementia</td>
<td>.58 (.06)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Difference in number of ADL difficulties (range 1-12) in those with vs. w.o. condition; adj. for other conditions, covariates
Independent effect of each condition on No. of symptoms

<table>
<thead>
<tr>
<th>Chronic Condition</th>
<th>Beta (SE)*</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure</td>
<td>.40 (.08)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>COPD</td>
<td>.40 (.05)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Arthritis</td>
<td>.57 (.03)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Depression</td>
<td>1.18 (.04)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Dementia</td>
<td>-.08 (.06)</td>
<td>.18</td>
</tr>
</tbody>
</table>

*Difference in No. symptoms (pain, fatigue, SOB, dizziness, weakness, GI) in those with vs. w.o. condition; adj. for other conditions and covariates
Independent association between conditions and death within 2 years

<table>
<thead>
<tr>
<th>Chronic condition</th>
<th>Hazard ratio (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure</td>
<td>2.8 (2.0-4.1)</td>
</tr>
<tr>
<td>COPD</td>
<td>2.6 (1.9-3.5)</td>
</tr>
<tr>
<td>Arthritis</td>
<td>0.9 (0.7-1.1)</td>
</tr>
<tr>
<td>Depression</td>
<td>1.5 (1.1-2.0)</td>
</tr>
<tr>
<td>Dementia</td>
<td>2.1 (1.5-2.9)</td>
</tr>
</tbody>
</table>

* Risk of dying in those with vs. w.o. the condition; adj. for other conditions and covariates
Can individuals prioritize among outcomes when there is a tradeoff?

- **Participants**: 337 older adults from senior centers and 1 independent living facility

- **Method**
  - Script explaining concept of competing outcomes (tradeoffs)
  - Rank ordered priorities.
  - Priority on visual analog scale (0-100)

Computerized Outcome Priority Scale
(Fried TR; Arch Intern Med, 2011)
Most important outcome among older adults with multiple conditions when faced with tradeoff

- Varied in their outcome priority
  - Maintain function: 76%
  - Relief of pain or other symptoms: 13%
  - Keep alive: 11%

Fried TR, et al; Arch Intern Med, 2011

- Priorities across 3 studies: Function 42%; Symptom burden 32%; Keep alive 27%
Health outcomes meaningful to older adults with multiple conditions…

- Patients with MCC think in terms of general, not disease-specific outcomes
- Understand the concept of tradeoffs among outcomes
- Agree on a small set of meaningful outcomes
- Able to articulate priorities in face of tradeoffs

Outcome priority decision-making with MCC

- Ascertain a patient’s health outcome priorities;
- Calculate likely effect of treatment options on these health outcome priorities;
- Shared decision-making informed by this information.
Mrs. S (81 y.o. with fatigue, weakness, no appetite)

- DM
- HTN; CAD
- CKD
- Atrial fibrillation
- Depression
- Cataracts
- Osteoporosis
- GERD
Mrs. S: Medications (N=16)

- coumadin
- ACEI
- furosemide
- KCL
- statin
- sulfonurea
- metformin
- beta blocker
- SSRI
- bisphosphonate
- Calcium
- Vitamin D
- proton pump inhibitor
- aspirin
Clinical decision-making

- **Disease-outcome care**: Diagnose, prevent, or treat individual diseases

- **Patient-outcome priority care**: Maximize patient-specific priorities within context of patient-specific health conditions and risks
Disease outcome(s)

- BP control
- HgA1C control
- Avoid MI
- Avoid stroke
- Avoid fracture

- Avoid HF rehospitalization
- Avoid ESRD
- Avoid GI bleed
- Better depression score
If follow guideline for each disease...

- ↓ and ↑ β-Blocker: More fatigued if ↑ β-Blocker
- ↑ and ↓ coumadin: ↑ chance of GI bleed because of GERD
- Add bisphosphonate: worsen GERD, appetite
- Add insulin: treatment more complex, ↑ chance of low blood sugar
- Add 2nd antidepressant: More fatigue
Patient-outcome decision-making for Mrs. S

• Ascertain her outcome priorities and goals
  ➢ Fewer symptoms and better function

• Treatment recommendations based on meeting those goals
  ➢ Reduce or stop β-Blockers, bisphosphonate, ?stain,
  ➢ Support participation in meals, exercise, and social programs
Arguments against patient-outcome priority care and decision-making

- Chaos (everyone with different outcome priorities)
- Patients (and clinicians) will not understand priorities / tradeoffs
- \( \uparrow \) rather than \( \downarrow \) interindividual variations
There are barriers and challenges...

"This really is an innovative approach, but I'm afraid we can't consider it. It's never been done before."