Geriatrics Literature Update

Niharika Suchak, MBBS, MHS, FACP, AGSF
Associate Professor, Department of Geriatrics
Florida State University College of Medicine
Learning objectives

• identify areas in clinical medicine where new strong evidence has been uncovered that may affect geriatric practice

• describe the results of a critical appraisal of this evidence;

• discuss clinical advances in caring for older adults from a review of select peer-reviewed journal issues from 2015 to mid-2016.
ACKNOWLEDGMENT

Geriatrics Literature Updates 2016
Eric Widera, MD
Kenneth Covinsky, MD
University of California San Francisco
San Francisco VA Medical Center
• Dextromethorphan
  ➢ Low-affinity NMDA receptor antagonist, Serotonin and norepinephrine reuptake inhibitor, Sigma-1 receptor agonist
  ➢ Exact mechanism of action responsible for the reduction of dementia-associated agitation is not known

• Quinidine
  ➢ d–isomer of quinine
  ➢ Quinidine inhibits degradation of Dextromethorphan, allowing higher brain concentration

• Quinine
  ➢ Stereoisomer of quinidine
  ➢ Like quinidine, inhibits peripheral metabolism of dextromethorphan
  ➢ Flavor component of tonic water
The combination of these two very cheap medications (Dextromethorphan-Quinidine) produces one very expensive pill (>750/one month supply).
Effect of Dextromethorphan-Quinidine on Agitation in Patients With Alzheimer Disease Dementia: A Randomized Clinical Trial

Jeffrey L. Cummings, MD, ScD, Constantine G. Lyketsos, MD, MHS, Elaine R. Peskind, MD, Anton P. Porsteinsson, MD; Jacobo E. Mintzer, MD, MBA; Douglas W. Scharre, MD; Jose E. De La Gandara, MD; Marc Agronin, MD; Charles S. Davis, PhD; Uyen Nguyen, BS; Paul Shin, MS; Pierre N. Tariot, MD; João Siffert, MD

**Importance** Agitation is common among patients with Alzheimer disease; safe, effective treatments are lacking.

**Objective** To assess the efficacy, safety, and tolerability of dextromethorphan hydrobromide-quinidine sulfate for Alzheimer disease-related agitation.

**Design, Setting, and Participants** Phase 2 randomized, multicenter, double-blind, placebo-controlled trial using a sequential parallel comparison design with 2 consecutive 5-week treatment stages conducted August 2012-August 2014. Patients with probable Alzheimer disease, clinically significant agitation (Clinical Global Impressions-Severity...
Research Question

Does Dextromethorphan-Quinidine reduce agitation in patients with dementia?
Participants

• 220 patients with Alzheimer Disease
  ➢ Clinically significant agitation (such as aggressive physical or verbal behaviors, or nonaggressive physical behaviors)
  ➢ Mean age 78 years
  ➢ Stable dosages of antidepressants, antipsychotics, hypnotics, and antidementia medications were allowed
  ➢ 12% were from nursing home or assisted living
Study Design (concerns?)

• “Proprietary” sequential parallel comparison
  ➢ Phase 1: 5 weeks drug vs placebo
  ➢ Phase 2: Take “placebo nonresponders” and Rerandomized to drug vs placebo

• This study design enriches the study with patients who are less susceptible to placebo effect.

• Treatment at experienced trial sites by specialized clinicians under a clinical protocol prescribing frequent assessments does not correspond to real life situations.
  ➢ Study design exaggerates the effectiveness of the drug when used in real world.

• Agitation in residents of nursing homes was underrepresented (5.5% of study participants).
Results

Agitation
• Improved NPI Agitation score: 1.6 point improvement on a 12 point scale
[Neuropsychiatric Inventory (NPI) Agitation/Aggression domain (scale range, 0 = absence of symptoms to 12 = symptoms occur daily and with marked severity)].

➢ Probably slight, but meaningful improvement
➢ Some evidence the change was noticeable to caregivers and clinicians
“Conclusion”

“In this preliminary 10-week phase 2 randomized clinical trial of patients with probable Alzheimer disease, combination dextromethorphan-quinidine demonstrated clinically relevant efficacy for agitation and was generally well tolerated.”
Adverse Effects

<table>
<thead>
<tr>
<th></th>
<th>Placebo</th>
<th>Dextromethorphan</th>
<th>Difference</th>
<th>NNH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falls</td>
<td>3.9%</td>
<td>8.6%</td>
<td>4.7</td>
<td>21</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>3.1</td>
<td>5.9</td>
<td>2.8</td>
<td>36</td>
</tr>
<tr>
<td>UTI</td>
<td>3.9</td>
<td>5.3</td>
<td>1.4</td>
<td>71</td>
</tr>
<tr>
<td>Dizziness</td>
<td>2.4</td>
<td>4.6</td>
<td>2.2</td>
<td>45</td>
</tr>
</tbody>
</table>

- Investigators concluded drug was “generally well tolerated” but an alternate interpretation can be inferred.
Choose your Conclusion(s)

• **Conclusion A:**
  - Dextromethorphan efficacious for reducing agitation with tolerable side effects.

• **Conclusion B:**
  - Dextromethorphan efficacious in increasing falls with some additional mild benefits of reduced agitation.

• Should you consider Dextromethorphan for off label use for patients with dementia agitation?
  - Evidence of effectiveness is very modest, and risk for harm substantial.
Original Study

Pain, Delirium, and Physical Function in Skilled Nursing Home Patients With Dementia

Ann Kolanowski PhD, RN, FAAN\textsuperscript{a,\*}, Jacqueline Mogle PhD\textsuperscript{b}, Donna M. Fick PhD, RN, FAAN\textsuperscript{a}, Nikki Hill PhD, RN \textsuperscript{a}, Paula Mulhall RPN, RGN, RN \textsuperscript{a}, Jamie Nadler\textsuperscript{a}, Elise Colancecco MS, RN \textsuperscript{a}, Liza Behrens RN, MSN, CCRC\textsuperscript{a}

\textsuperscript{a}College of Nursing, Penn State, University Park, PA
\textsuperscript{b}Center for Healthy Aging, College of Health & Human Development, Penn State, University Park, PA

\textbf{A B S T R A C T}

\textbf{Objective:} Skilled nursing facilities (SNFs) are major sites of postacute care for patients with dementia. A recent Office of the Inspector General report indicated that outcomes in SNFs are suboptimal because of poor-quality treatment, including the failure to provide needed care. Pain is frequently unrecognized and
Aim (exploratory study):

- examine the effect of daily pain on delirium and physical function in patients with dementia in SNFs

- examine the association of daily pain with discharge disposition

  [discharge disposition via 3-month follow-up phone interview with the responsible party and was classified as home or assisted living (community), nursing home, or death]
Study Information

• **Design:** Secondary analysis of data from an on-going randomized clinical trial
• **Setting:** Eight SNFs located in central and northeast Pennsylvania
• **Participants:**
  - 103 SNF patients that have both dementia and delirium diagnoses on admission to SNF
  - community-dwelling before admission, have a knowledgeable informant
  - 65 years or older; mean age of 86 (+6.8) years
  - most were women (66%) and white (98%)
  - 89 participants completed their 3-month follow-up phone interview
• **Measurements** - taken daily for 30 days or until discharge: Measures of
  - pain (Pain Assessment in Advanced Dementia)
  - delirium (Confusion Assessment Method)
  - physical function (Barthel Index)
Pain Assessment in Advanced Dementia Scale (PAINAD)

**Instructions:** Observe the patient for five minutes before scoring his or her behaviors. Score the behaviors according to the following chart. Definitions of each item are provided on the following page. The patient can be observed under different conditions (e.g., at rest, during a pleasant activity, during caregiving, after the administration of pain medication).

<table>
<thead>
<tr>
<th>Behavior</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breathing</td>
<td>Normal</td>
<td>Occasional labored breathing</td>
<td>Noisy labored breathing</td>
<td>Noisy labored breathing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Short period of hyperventilation</td>
<td>Long period of hyperventilation</td>
<td>Long period of hyperventilation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cheyne-Stokes respirations</td>
<td>Cheyne-Stokes respirations</td>
</tr>
<tr>
<td>Negative vocalization</td>
<td>None</td>
<td>Occasional moan or groan</td>
<td>Repeated troubled calling out</td>
<td>Repeated troubled calling out</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low-level speech with a negative or disapproving quality</td>
<td>Loud moaning or groaning</td>
<td>Loud moaning or groaning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Crying</td>
</tr>
<tr>
<td>Facial expression</td>
<td>Smiling or inexpressive</td>
<td>Sad</td>
<td>Facial grimacing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frightened</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body language</td>
<td>Relaxed</td>
<td>Tense</td>
<td>Rigid</td>
<td>Rigid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distressed pacing</td>
<td>Fists clenched</td>
<td>Fists clenched</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fidgeting</td>
<td>Knees pulled up</td>
<td>Knees pulled up</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pulling or pushing away</td>
<td>Pulling or pushing away</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Striking out</td>
<td>Striking out</td>
</tr>
<tr>
<td>Consolability</td>
<td>No need to console</td>
<td>Distracted or reassured by voice or touch</td>
<td>Unable to console, distract, or reassure</td>
<td></td>
</tr>
</tbody>
</table>

(Warden et al., 2003)

- observational scale of 5 items
- scored from 0 to 10
Confusion Assessment Method (CAM) - Delirium

• CAM
  ➢ sensitivity 94% -- 100%
  ➢ specificity 90% -- 95%

• CAM includes 4 features:
  ➢ (1) acute onset and fluctuating course
  ➢ (2) inattention
  ➢ (3) disorganized thinking
  ➢ (4) altered level of consciousness

• Those with 2 or more features were admitted to the study

Mahoney FL, Barthel D. “Functional evaluation: the Barthel Index.”
Maryland State Medical Journal 1965;14:56-61.

- 10 items: (7 self-care & 3 mobility)
- Total score range: 0--100
  - 0 (totally dependent)
  - 100 (fully independent)
Results

• Participants experienced pain on 38.4% of days
  ➢ none (61.6%)
  ➢ mild (29.43%)
  ➢ moderate (8.46%)
  ➢ severe (0.53%)

• Delirium symptoms were evident on 46.9% of days.

• Average Functioning score = 44.42 (SD = 23.3); range: 0--100
Results

• more pain \(\approx\) more delirium symptoms
• more pain \(\approx\) poorer physical function
• higher average daily pain \(\approx\) more likely to be placed in a nursing home (odds ratio [OR] 4.77)
• higher average daily pain \(\approx\) more likely to have died (OR 6.3)
Conclusion

- SNFs are sites of transitional care & the goal is to return the person to the community.
- Pain is common in SNFs but underrecognized in patients with dementia.
- It is important to recognize association of pain to both delirium and functional dependency and subsequent risk for death or permanent institutionalization.
- Staff need to recognize the presence of even mild increases in daily pain in patients with dementia, and take steps to reduce the adverse effects on delirium and physical function, as well as eventual discharge disposition following postacute care.
3
CLINICAL INVESTIGATIONS

Effects of a Stepwise Multidisciplinary Intervention for Challenging Behavior in Advanced Dementia: A Cluster Randomized Controlled Trial

Marjoleine J. C. Pieper, MSc, Anneke L. Francke, PhD, Jenny T. van der Steen, PhD, Erik J. A. Scherder, PhD, Jos W. R. Twisk, PhD, Christine R. Kovach, PhD, and Wilco P. Achterberg, PhD

OBJECTIVES: To assess whether implementation of a stepwise multicomponent intervention (STA OP!) is effective in reducing challenging behavior and depression in nursing home residents with advanced dementia.

RESULTS: Multilevel modeling revealed an overall effect of the intervention on challenging behavior and depression: CMAI (mean difference -4.07 points, 95% confi-
Background

• Neuropsychiatric symptoms are highly prevalent in advanced dementia
  ➢ psychotic features such as hallucinations and delusions
  ➢ depression
  ➢ aggressive and agitated behavior
  ➢ euphoria
  ➢ apathy

• Together with physical impairment, neuropsychiatric symptoms have a major effect on quality of life in individuals with dementia and are the main reason for seeking help and institutionalization
Background

- Neuropsychiatric symptoms are
  - more prominent in the more-advanced stages of dementia
  - usually distressing for the individuals, their family, (in)formal caregivers, and treating physicians (e.g., neurologists, psychiatrists, geriatricians)
  - frequently lead to the prescription of psychotropic medications that are associated with substantial side effects, including falls, cerebrovascular events, and mortality
Objectives

• To assess whether implementation of a stepwise multicomponent intervention (STA OP!) is effective in reducing challenging behavior and depression in nursing home residents with advanced dementia.
Setting

• Twenty-one clusters (single independent nursing home units) in 12 nursing homes within the Netherlands

• Data collection was performed between January 2010 and June 2012.

• 6 month study period (after intervention)

VU University Medical Center, Amsterdam, the Netherlands
Design

• **Cluster** randomized controlled trial

• The trial was single blinded (the researcher knew the condition, but the research assistants performing the measurements were blinded).

• Residents were the targets of the intervention, but because the intervention was multidisciplinary, and training was given to the entire staff of a nursing home unit, the **nursing home units served as the unit of randomization.**
Participants

- Participating nursing homes were recruited from within the academic nursing home network of the VU University Medical Center and met the criteria, that
  - at least one psychogeriatric unit was willing to participate
  - no major organizational changes or building activities were planned or performed during the study period
- Residents with advanced dementia; (N = 288).
Procedures

• A trained research assistant assessed all measures based on a face-to-face interview with the nursing staff member (a certified nursing assistant or registered nurse) who was familiar with the resident
  ➢ before implementation
  ➢ 3 months (end of the training period)
  ➢ 6 months after the intervention.

• Symptoms of challenging behavior were recorded using
  ➢ the CMAI
  ➢ a Dutch translation of the NPI-NH
Training: Intervention & Control

• Intervention:
  ➢ implementation of the STA OP! protocol;
  ➢ all healthcare professionals (nursing staff, physicians, psychologists, physiotherapists) received a comprehensive stepwise multidisciplinary training of **five meetings lasting 3 hours each**
  ➢ protocol was linked to structured daily or weekly team meetings, and focus groups

• Control:
  ➢ Healthcare professionals received training, but **this training lacked the stepwise component** and focused on general nursing skills, dementia management, and pain

• Weekly visits by project coordinator
STEP 5: administer a trial of prescribed as-needed psychotropic drugs; Page 263

Table 1. Description of STA OP! Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Perform a basic care needs assessment and determine whether basic care needs are fulfilled (e.g., hunger, thirst, eyeglasses, hearing aids, toileting). If assessment is positive, a targeted intervention is implemented, or the appropriate discipline is consulted to begin treatment. If the assessment is negative, or if treatment fails to decrease symptoms, the nurse moves to the next step (1).</td>
</tr>
<tr>
<td>1</td>
<td>Perform a pain and physical needs assessment. In addition to a brief physical nursing assessment by the nursing home physician, nurses fill out an observational pain instrument (Dutch Pain Assessment Checklist for Seniors with Limited Ability to Communicate). This form is given to the nursing home physician (or if available a nurse practitioner), who performs a more-comprehensive physical assessment to find other probable physical causes associated with discomfort. For residents already using pain medication or psychotropic drugs who still have behavioral symptoms possibly related to pain or affective discomfort, the nursing home physician assesses whether the medication given is in accordance with the guidelines of the World Health Organization and Verenso (the Dutch association of nursing home physicians) (also see steps 4 and 5). If assessment is positive, a targeted intervention is implemented, or the appropriate discipline is consulted to begin treatment. If the assessment is negative, or if treatment fails to decrease symptoms, the nurse moves to the next step (2).</td>
</tr>
<tr>
<td>2</td>
<td>Perform affective needs assessment that focuses on needs of people with dementia: (a) environmental stress threshold not exceeded, (b) balance between sensory-stimulating and sensory-calming activity throughout the day, and (c) receipt of meaningful human interaction each day. The psychologist (or social worker) working in the nursing home can be consulted at this step. If assessment is positive, a targeted intervention is implemented, or the appropriate discipline is consulted to begin treatment. If the assessment is negative, or if treatment fails to decrease symptoms, the nurse moves to the next step (3).</td>
</tr>
<tr>
<td>3</td>
<td>Administer a trial of nonpharmacological comfort treatment(s). Treatments used are customized to the person and the situation and are based on a list of psychosocial and environmental treatments that have been associated with decreasing agitated behaviors.</td>
</tr>
</tbody>
</table>
Measurement of Outcomes

• The primary outcome was agitation [Cohen-Mansfield Agitation Inventory (CMAI)]: a 29-item instrument (score range 29–203)

• Secondary outcomes included:
  ➢ psychotropic medication use,
  ➢ Neuropsychiatric symptoms (Neuropsychiatric Inventory—Nursing Home version (NPI-NH): a 12-items structured interview to rate frequency & severity; score range for each item: 0—12; total score range: 0—144; higher scores → worse behavior
  ➢ symptoms of depression: Cornell Scale for Depression in Dementia (CSDD): 19-item instrument; score range for each item: 0—2; total score range: 0—38; higher scores → more depressive symptoms.
  ➢ symptoms of depression: Minimum Dataset Depression Rating Scale (MDS-DRS): a seven-item instrument rating the presence of depressive symptoms in the past 30 days; score range: 0 to 14; higher scores → more depressive symptoms

• Measurements were made at baseline and 3 and 6 months after the intervention.
Neuropsychiatric symptoms (Neuropsychiatric Inventory—Nursing Home version (NPI-NH)):

- delusions,
- hallucinations,
- agitation or aggression,
- depression or dysphoria,
- anxiety,
- euphoria,
- apathy,
- disinhibition,
- Irritability or lability,
- aberrant motor behavior,
- nighttime behavior disturbances,
- appetite or eating abnormalities
Psychotropic drug use

- Retrieved from medication lists
- Classified as
  - antipsychotics
  - anxiolytics
  - hypnotics and sedatives
  - antidepressants
  - antidementia drugs
A sample of 168 residents was needed to detect a difference of 15%.

Finally, 288 residents were included in the STA OP! trial, with 148 in the intervention condition and 140 in the control condition. Of the 148 residents in the intervention condition, 39% were analyzed using the STA OP! protocol. The mean number of steps assessed was 2.8 ± 1.2.
The residents in the intervention condition were less VERY severely impaired and took fewer antidepressants than residents in the control condition but had more symptoms of depression.
“Conclusion”: Implementation of the adjusted and redesigned version of the serial trial intervention STA OP! improved overall agitation, depression, and other neuropsychiatric symptoms.
### Table 4. Change in Psychotropic Medication Use

<table>
<thead>
<tr>
<th>Psychotropic Medication (Anatomical Therapeutic Classification)</th>
<th>Unadjusted Model</th>
<th>Adjusted Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antipsychotics (N05A)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>0.68 (0.32–1.46)</td>
<td>0.69 (0.30–1.60)</td>
</tr>
<tr>
<td>3 months</td>
<td>0.57 (0.26–1.28)</td>
<td>0.55 (0.23–1.34)</td>
</tr>
<tr>
<td>6 months</td>
<td>0.83 (0.35–2.01)</td>
<td>0.87 (0.33–2.30)</td>
</tr>
<tr>
<td><strong>Anxiolytics (N05B)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>1.10 (0.50–2.40)</td>
<td>0.75 (0.27–2.12)</td>
</tr>
<tr>
<td>3 months</td>
<td>1.60 (0.66–3.83)</td>
<td>1.12 (0.37–3.35)</td>
</tr>
<tr>
<td>6 months</td>
<td>0.61 (0.24–1.56)</td>
<td>0.41 (0.12–1.37)</td>
</tr>
<tr>
<td><strong>Hypnotics and sedatives (N05C)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>0.88 (0.36–2.15)</td>
<td>0.90 (0.34–2.37)</td>
</tr>
<tr>
<td>3 months</td>
<td>0.79 (0.32–1.92)</td>
<td>0.75 (0.28–2.03)</td>
</tr>
<tr>
<td>6 months</td>
<td>1.12 (0.39–3.21)</td>
<td>1.13 (0.36–3.50)</td>
</tr>
<tr>
<td><strong>Antidepressants (N06A)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>1.28 (0.35–4.76)</td>
<td>2.63 (0.63–10.95)</td>
</tr>
<tr>
<td>3 months</td>
<td>1.41 (0.40–5.00)</td>
<td>3.51 (0.84–14.71)</td>
</tr>
<tr>
<td>6 months</td>
<td>0.93 (0.20–4.44)</td>
<td>1.87 (0.30–11.46)</td>
</tr>
<tr>
<td><strong>Antidementia drugs (N06B)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>1.28 (0.35–4.76)</td>
<td>2.63 (0.63–10.95)</td>
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</tr>
</tbody>
</table>

**RESULTS:** Table 4; Page 267

- Intervention participants **significantly less likely** to receive antidepressants
- Other findings though not significant:
  - Intervention participants **less likely** to receive:
    - antipsychotics
    - anxiolytics
    - hypnotics and sedatives
  - Intervention participants **more likely** to receive:
    - antidementia drugs
    - anxiolytics at 3 months *
    - hypnotics and sedatives at 6 months *

*probably explained by an earlier identification of challenging behavior (intervention effect)*

Overall agitation, depression, and other symptoms, showing that a customized stepwise intervention focusing on psychosocial and physical unmet needs is effective for nursing home residents with dementia and that these effects can be explained in part by earlier identification of challenging behavior (intervention effect).
Table 1. Description of STA OP! Steps

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Perform a pain and physical needs assessment. The physician (or social worker) working in the nursing home physician, nurses fill an observational pain instrument (Dutch Pain Assessment Checklist for Seniors with Limited Ability to Communicate). This form is given to the nursing home physician (or available a nurse practitioner), who performs a more comprehensive physical assessment to find other probable physical causes associated with discomfort. For residents already using pain medication or psychotropic drugs who still have behavioral symptoms possibly related to pain or affective discomfort, the nursing home physician assesses whether the medication given in accordance with the guidelines of the World Health Organization and Veren (the Dutch association of nursing home physicians) (also see steps 4 and 5).</td>
</tr>
<tr>
<td>2</td>
<td>If assessment is positive, a targeted intervention is implemented, or the appropriate discipline is consulted to begin intervention. If the assessment is negative, or if treatment fails to decrease symptoms, the nurse moves to the next step (1).</td>
</tr>
<tr>
<td>3</td>
<td>If assessment is positive, a targeted intervention is implemented, or the appropriate discipline is consulted to begin intervention. If the assessment is negative, or if treatment fails to decrease symptoms, the nurse moves to the next step (1).</td>
</tr>
<tr>
<td>4</td>
<td>Administer a trial of nonpharmacological comfort treatment(s) based on a list of psychosocial and environmental factors. If a one-time treatment is effective, and continued use is desirable, administer analgesic medication. If treatment is effective, and continued use is desirable, effective treatments for continued use, write it down nonpharmacological comfort treatment(s) does not at the next step (4). If treatment is effective, and continued use is desirable, effective treatments for continued use, write it down nonpharmacological comfort treatment(s) does not at the next step (4).</td>
</tr>
<tr>
<td>5</td>
<td>Administer a trial of analgesic agents by administering analgesic medication. If treatment is effective, and continued use is desirable, effective treatments for continued use, write it down nonpharmacological comfort treatment(s) does not at the next step (4). If treatment is effective, and continued use is desirable, effective treatments for continued use, write it down nonpharmacological comfort treatment(s) does not at the next step (4).</td>
</tr>
</tbody>
</table>

1. Perform a pain and physical needs assessment. In addition to a brief physical nursing assessment by the nursing home physician, nurses fill out an observational pain instrument (Dutch Pain Assessment Checklist for Seniors with Limited Ability to Communicate). This form is given to the nursing home physician (or available a nurse practitioner), who performs a more comprehensive physical assessment to find other probable physical causes associated with discomfort. For residents already using pain medication or psychotropic drugs who still have behavioral symptoms possibly related to pain or affective discomfort, the nursing home physician assesses whether the medication given in accordance with the guidelines of the World Health Organization and Veren (the Dutch association of nursing home physicians) (also see steps 4 and 5).

If a one-time treatment is effective, and continued use is desirable, administer a trial of nonpharmacological comfort treatment(s) does not at the next step (4).

4. Administer a trial of analgesic agents by administering analgesic medication. If treatment is effective, and continued use is desirable, effective treatments for continued use, write it down nonpharmacological comfort treatment(s) does not at the next step (4). If treatment is effective, and continued use is desirable, effective treatments for continued use, write it down nonpharmacological comfort treatment(s) does not at the next step (4).
SERIAL TRIAL INTERVENTION


by Christine Kovach, PhD, RN
Lessons learned?

**Efficacy of treating pain to reduce behavioural disturbances in residents of nursing homes with dementia: cluster randomised clinical trial**

Bettina S Husebo *postdoctoral fellow*¹, Clive Ballard *professor*², Reidun Sandvik *registered nurse*¹, Odd Bjarte Nilsen *statistician*³, Dag Aarsland *professor*⁴

¹Department of Public Health and Primary Health Care, University of Bergen, 5020 Bergen, Norway; ²Wolfson Centre for Age-Related Diseases, Wolfson Wing and Hodgkin Building, Guy’s Campus, Kings College, London SE1 1UL, UK; ³Department of Psychiatry, Stavanger University Hospital, 4011 Stavanger, Norway; ⁴Karolinska Institute, Department of Neurobiology, Care Sciences and Society, Karolinska Institute-Alzheimer Disease Research Center, Novum, Stockholm, Stavanger University Hospital, Department of Psychiatry, Stavanger, Norway, and University of Oslo, Oslo, Norway
Burden of Health Care Costs

Background:

• Common diseases, particularly dementia, have large social costs for the U.S. population.

• However, less is known about the end-of-life costs of specific diseases and the associated financial risk for individual households.
Objective: To examine social costs and financial risks faced by Medicare beneficiaries 5 years before death.
What do health conditions cost?

• Typical Perspective
  • What insurers (i.e., Medicare) pay

• The Truth: Patients and Families Pay huge sums
  ➢ Out of pocket costs: for services not paid by insurance
    ❑ Nursing home care, day health care, home health aides, home renovations, some medicines, etc.
    ❑ “Implicit” Costs: Family caregiving
      ✓ May have no money exchanged, but incredibly valuable
      ✓ Often leads to loss of wages/employment/savings
      ✓ $ave$ Billion$ in public nur$ing home co$ts
Methods

• Identified everyone who died while in Health and Retirement Study (representative of US)
• Looked back 5 years to identify costs
  ➢ Medicare claims
    □ Included all claims for inpatient, outpatient, skilled-nursing facility, hospice, home care
  ➢ Subject (and Family) reports of spending
    □ Includes insurance, medication, nursing home, hired helpers, in-home medical care, and other expenses
  ➢ Caregiving costs (hours X home health aide wage)
• Compared those with dementia vs other diagnoses
Results

• Average **total cost** per decedent in the last 5 years of life
  ➢ **Dementia** $287 000
  ➢ Heart disease $175 000
  ➢ Cancer $173 000

• Medicare expenditures were similar across groups

• Average **out-of-pocket spending**
  ➢ **Dementia** $62 000
  ➢ Heart disease $35 000
  ➢ Cancer $29 000

• Average **informal care costs**
  ➢ **Dementia** $83 000
  ➢ Heart disease $32 000
  ➢ Cancer $39 000
Asset WIPEOUT

• % of assets obliterated in last 5 years of life
  - Dementia 32%
  - Other diseases 11%

• Dementia destroys savings of most disadvantaged
  - African American ethnicity: 84%
  - Less than high school education: 48%
So, where should we spend our money?

- PET scans for early diagnosis of Alzheimer’s Disease?
  - Pre-clinical Alzheimers?
Why focus on early diagnosis of dementia?

• An early diagnosis of dementia is often greeted with severe shock, with feelings of disbelief, anger, loss and grief.

• An early diagnosis – and access to the right services and support –
  ➢ can help people take control of their condition
  ➢ can help people plan for the future
  ➢ can help to eliminate the possibility of other, potentially treatable, conditions with dementia-like symptoms
The 3 truths of Dementia

• Finite Formal Care—Inexhaustible Familial Care
  ➢ families and friends provide the bulk of care and assistance;
    formal care resources utilized only as a last resort

• Accessible Community Resources: Reality or Rhetoric?
  ➢ long waiting lists (e.g., respite), rigid eligibility criteria (e.g., home
    care support), or cost of services

• Diminishing Care Resources-Increasing Care Needs
  ➢ constant risk that resources will cease to be available or will
    become inadequate as dementia progresses

Conclusions

• Dementia is very expensive
  - Not so much from Medicare perspective
  - But very much so from patient perspective
    - Very large out of pocket expenses
    - Huge cost in terms of caregiver workload
    - Often wipes out family assets, especially in those who don’t start with much

• Just a thought........Before spending more and more $$ for early diagnosis of dementia, how about we invest more $$ into needs of patients and their families that already have dementia?
A pilot randomized controlled trial of a self-management group intervention for people with early-stage dementia (The SMART study)

Catherine Quinn,1 Gill Toms,2 Carys Jones,3 Andrew Brand,4 Rhiannon Tudor Edwards,3 Fiona Sanders5 and Linda Clare1

1REACH: The Centre for Research in Ageing and Cognitive Health, Department of Psychology, College of Life and Environmental Sciences, Exeter University, Exeter, EX4 4QG, UK
2School of Psychology, Bangor University, Bangor, Gwynedd, LL57 2AS, UK
3Centre for Health Economics and Medicines Evaluation, Bangor University, Bangor, Gwynedd, LL57 2PZ, UK
4North Wales Organization for Randomized Trials in Health, College of Health and Behavior Sciences (CoHABS), Bangor University, Bangor, Gwynedd, LL57 2PZ, UK
5Glan Traeth Community Team, Glan Traeth CPN office, Royal Alexandra Hospital, Betsi Cadwaladr University Health Board, Denbighshire, LL18 3AS, UK

ABSTRACT

Background: Self-management equips people to manage the symptoms and lifestyle changes that occur in long-term health conditions; however, there is limited evidence about its effectiveness for people with early-stage dementia. This pilot randomized controlled trial (RCT) explored the feasibility of a self-management intervention for people with early-stage dementia.
Self-management

Background:

• Self-management equips people to manage the symptoms and lifestyle changes that occur in long-term health conditions.

• However, there is limited evidence about its effectiveness for people with early stage dementia.
Aim (pilot study): 

- to develop and evaluate a self-management intervention for people with early stage dementia
Study Information

• **Design:** single-site, single-blind pilot randomized controlled trial

• **Setting:** community setting in North Wales, U.K.

• **Participants:**
  - people with early-stage dementia (n = 24) and for each participant a caregiver also took part
  - identified from an NHS memory clinic serving a semi-rural area of North Wales, U.K.
Measurements:

• **Quantitative**: three and six months post-randomization
  - **self-efficacy scale (GSES)**: higher score ⇑ self efficacy
  - **anxiety and depression scale**: higher score ⇓ mood
  - **mental health symptoms** exploring four domains: higher score ⇓ psychological well-being
  - **health-related quality of life** covering five domains: index value 0.59 - 1, with 1 representing best possible health related quality of life;
  - **capability-related well-being** in five domains: higher score ⇑ well-being

• **Qualitative interview**: two months post-randomization, just after the program had finished
**Table 2. Baseline characteristics of the participants**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Intervention (N = 13)</th>
<th>TAU (N = 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Person with dementia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3</td>
</tr>
<tr>
<td>Age</td>
<td>Mean (SD)</td>
<td>75.2 (8.7)</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>52–88</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>UK nationality</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Divorced</td>
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</tr>
<tr>
<td></td>
<td>Single</td>
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</tr>
<tr>
<td>Marital status</td>
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</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>4</td>
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<tr>
<td></td>
<td>College/university</td>
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</tr>
<tr>
<td>Level of education</td>
<td>Less than a year</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1–2 years</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>More than 2 years</td>
<td>5</td>
</tr>
<tr>
<td>Time since diagnosis</td>
<td>MMSE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>23.5 (1.9)</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>20–27</td>
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<tr>
<td></td>
<td>ACE-III</td>
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<tr>
<td></td>
<td>Range</td>
<td>50–82</td>
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<td>Other co-morbid conditions</td>
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<td>10</td>
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<tr>
<td></td>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td><strong>Caregiver</strong></td>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>10</td>
</tr>
<tr>
<td>Age</td>
<td>Mean (SD)</td>
<td>67.0 (15.0)</td>
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<td></td>
<td>Range</td>
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<tr>
<td>Ethnicity</td>
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<td></td>
<td>Level of education</td>
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<td></td>
<td>Primary</td>
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</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>7</td>
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<tr>
<td></td>
<td>College/university</td>
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</tr>
<tr>
<td>Relationship to person with dementia</td>
<td>Spouse/partner</td>
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</tr>
<tr>
<td></td>
<td>Son/daughter</td>
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</tr>
<tr>
<td></td>
<td>Friend</td>
<td>2</td>
</tr>
<tr>
<td>Living with person with dementia</td>
<td>Yes</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1</td>
</tr>
</tbody>
</table>
Format and content of intervention based on:
• systematic literature review of self-management in people with dementia and MCI
• suggestions from people with dementia and caregivers about self management

Random Allocation to: a self-management group intervention lasting eight weeks or treatment as usual (TAU).

Created manual for an eight-week self-management program

<table>
<thead>
<tr>
<th>SESSION</th>
<th>TITLE OF SESSION</th>
<th>ATTENDEES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Information about dementia</td>
<td>Person with dementia and caregiver</td>
</tr>
<tr>
<td>2</td>
<td>Enjoying favorite activities and interests</td>
<td>Person with dementia</td>
</tr>
<tr>
<td>3</td>
<td>Staying well</td>
<td>Person with dementia</td>
</tr>
<tr>
<td>4</td>
<td>Practical ways to manage memory difficulties</td>
<td>Person with dementia</td>
</tr>
<tr>
<td>5</td>
<td>Maintaining relationships</td>
<td>Person with dementia</td>
</tr>
<tr>
<td>6</td>
<td>Planning for the future</td>
<td>Person with dementia</td>
</tr>
<tr>
<td>7</td>
<td>Coping skills</td>
<td>Person with dementia</td>
</tr>
<tr>
<td>8</td>
<td>Local resources</td>
<td>Person with dementia and caregiver</td>
</tr>
</tbody>
</table>
Intervention and Control

**Intervention:**
- eight weekly 90-minute group sessions; two groups
- participants were asked to name the group
- consistent structure and sequence for each session
  - refreshments & informal socialization, discussion about what group members had done since the previous meeting
  - two facilitators (a staff nurse and a support worker) introduced the session topic
  - participants selected most pertinent aspects to discuss, and were encouraged to problem-solve and set goals
  - a short break half way through the session
  - each session finished with a five-minute mindfulness based exercise
- caregivers were invited to attend the first and final sessions and could join the end of each meeting
- group members received a handbook covering session content, in which they could write notes

**Treatment As Usual (TAU):**
- routine memory clinic services, including nurse-led review and access to psychiatry, psychology, occupational therapy, and social services
A 2 year multidomain intervention of diet, exercise, cognitive training, and vascular risk monitoring versus control to prevent cognitive decline in at-risk elderly people (FINGER): a randomised controlled trial


• Individual and group sessions over 24 months:
  ➢ with nutritionist re: diet and lifestyle changes
  ➢ with physical therapist re: muscle strength training, aerobic training
  ➢ with psychologist for cognitive training including computer based training
• Management of metabolic & vascular risk factors (additional visits with study nurse & physician)
CLINICAL INVESTIGATIONS

American Geriatrics Society 2015 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

By the American Geriatrics Society 2015 Beers Criteria Update Expert Panel

The 2015 American Geriatrics Society (AGS) Beers Criteria are presented. Like the 2012 AGS Beers Criteria, they include lists of potentially inappropriate medications to be avoided in older adults. New to the criteria are lists of select drugs that should be avoided or have their dose adjusted based on the individual’s kidney function and select drug-drug interactions documented to be associated with harms in older adults. The specific aim was to have a 13-member interdisciplinary panel of experts in geriatric care and pharmacotherapy update the 2012 AGS Beers Criteria in a modified Delphi method to systematically

older adults is one strategy to decrease the risk of adverse events. Interventions using explicit criteria have been found to be an important component of strategies for reducing inappropriate medication usage.3–5

The AGS Beers Criteria for PIM Use in Older Adults are one of the most frequently consulted sources about the safety of prescribing medications for older adults. The AGS Beers Criteria are used widely in geriatric clinical care, education, and research and in development of quality indicators. In 2011, the AGS assumed the responsibility of updating and maintaining the Beers Criteria and, in
2015 Updated Beers Criteria

PIM’s - Drugs to Avoid

Drugs to Be Used with Caution

Drug–Drug Interactions

PIMs Based on Kidney Function

System/ Disease / Syndrome based :
Heart Failure  Insomnia
Syncope  Falls
Seizures  Fractures
Delirium  h/o gastric ulcers
Dementia  Chronic kidney disease

Organ System, Therapeutic Category, Cardiovascular, CNS: antidepressants, antipsychotics, Barbiturates, benzodiazepines

Drugs with strong anticholinergic properties
Nonpharmacological approaches using a person-centered approach to care

- Delirium
  Hospital Elder Life Program (HELP) for Prevention of Delirium: Nonpharmacological strategies for hospitalized older adults and their caregivers

- Dementia
  Nonpharmacological toolkit for reducing antipsychotic use in older adults by promoting positive behavioral health

Recommendations from 2015 Updated Beers Criteria
How to Use the American Geriatrics Society 2015 Beers Criteria—A Guide for Patients, Clinicians, Health Systems, and Payors

Michael A. Steinman, MD,*† Judith L. Beizer, PharmD, CGP,‡ Catherine E. DuBeau, MD,*§,*∗ Rosemary D. Laird, MD,†† Nancy E. Lundebjerg, MPA,‡‡ and Paul Mulhausen, MD, MHS*§§

The Beers Criteria are a valuable tool for clinical care and quality improvement but may be misinterpreted and implemented in ways that cause unintended harms. This article describes the intended role of the 2015 American Geriatrics Society (AGS) Beers Criteria and provides guidance on how patients, clinicians, health systems, and payors should use them. A key theme underlying these recommendations is that the Beers Criteria are intended to help make informed clinical judgements, not to be used as an exclusive guide for prescribing in older adults. Use of many medications included in the Beers Criteria has declined, others have been withdrawn from the market, and there is greater (although still too little) appreciation of the unique considerations that should be applied when prescribing for older adults.2–7

Yet, implementation and uptake of the Beers Criteria have not been without problems. Many clinicians misunderstand the Beers Criteria as a comprehensive list of medications that should never be prescribed, leading to overprescription of other medications. This is often exacerbated by the perception of the Beers Criteria as a means to control the costs of care, leading to underrecognition of the potential for harm from avoided medications, particularly in vulnerable populations.
Key Principles

• **Key Principle 1:** Medications listed are potentially inappropriate, not definitely inappropriate.

• **Key Principle 2:** Read the rationale and recommendations for important caveats and guidance.

• **Key Principle 3:** Understand why medications are included and adjust your approach to those medications.

• **Key Principle 4:** Where appropriate offer safer nonpharmacological and pharmacological therapies.
Key Principles

• **Key Principle 5:** It is a starting point for a comprehensive process of improving medication appropriateness and safety.

• **Key Principle 6:** Access to listed medications should not be excessively restricted by prior authorization and/or health plan coverage policies.

• **Key Principle 7:** The AGS 2015 Beers Criteria are not equally applicable to all countries.
STOPP/START criteria for potentially inappropriate prescribing in older people: version 2

What is the equivalent of the Beers Criteria in Europe?

Abstract

Purpose: screening tool of older people’s prescriptions (STOPP) and screening tool to alert to right treatment (START) criteria were first published in 2008. Due to an expanding therapeutics evidence base, updated STOPP/START criteria were added in 2014. A thorough literature review was performed to reassess the evidence base of the 2008 criteria and the proposed new criteria. Nineteen experts from 13 European countries reviewed a new draft of STOPP & START criteria including proposed new criteria. 80 STOPP criteria and 34 START criteria.
7
What’s the optimum SBP target?

• SBP < 150
  • Systolic Hypertension in the Elderly Program (SHEP) and the
  • Hypertension in the Very Elderly Trial (HYVET)

• Goal of <120 instead of <140?
  • Action to Control Cardiovascular Risk in Diabetes (ACCORD) Blood Pressure trial
    • No benefit for treatment to the lower target for a composite cardiovascular disease outcome
Classification of Blood Pressure (in Adults)

<table>
<thead>
<tr>
<th>BP Classification (per JNC VII)</th>
<th>SBP</th>
<th>DBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>and &lt;80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>or 80-89</td>
</tr>
<tr>
<td>Stage 1 Hypertension</td>
<td>140-159</td>
<td>or 90-99</td>
</tr>
<tr>
<td>Stage 2 Hypertension</td>
<td>&gt;160</td>
<td>or &gt;100</td>
</tr>
</tbody>
</table>

Blood Pressure Goals and threshold for initiating pharmacologic treatment (per JNC VIII)

<table>
<thead>
<tr>
<th>Population</th>
<th>Blood Pressure Goal (Systolic/Diastolic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60 years old</td>
<td>&lt;140/90 mmHg</td>
</tr>
<tr>
<td>&gt; 60 years old</td>
<td>&lt;150/90 mmHg</td>
</tr>
<tr>
<td>Chronic Kidney Disease (CKD)</td>
<td>&lt;140/90 mmHg</td>
</tr>
<tr>
<td>Diabetes</td>
<td>&lt;140/90 mmHg</td>
</tr>
</tbody>
</table>

Blood Pressure Goals and threshold for initiating pharmacologic treatment (per JNC VIII)
A Randomized Trial of Intensive versus Standard Blood-Pressure Control

The SPRINT Research Group

ABSTRACT

BACKGROUND
The most appropriate targets for systolic blood pressure to reduce cardiovascular morbidity and mortality among persons without diabetes remain uncertain.

METHODS
We randomly assigned 9361 persons with a systolic blood pressure of 130 mm Hg or higher and an increased cardiovascular risk, but without diabetes, to a systolic blood-pressure target of less than 120 mm Hg (intensive treatment) or a target of less than 140 mm Hg (standard treatment). The primary composite outcome was myocardial infarction, other acute coronary syndromes, stroke, heart failure, or death from cardiovascular causes.

RESULTS
**SPRINT Trial**  
*(Systolic Blood Pressure Intervention Trial)*

- Randomized, controlled, open-label trial comparing a target goal of <120 mmHg vs <140 mmHg
- 9361 people in the US and Puerto Rico
  - 50 years and older
  - SBP 130 - 180 mmHg
  - An increased risk of cardiovascular events
    - Cardiovascular disease other than stroke.
    - CKD with eGFR of 20-59
    - Framingham 10-year risk CVD >=15%
    - Age > 75
- Excluded: stroke, diabetes, heart failure, protein in urine (>1g/d), Advanced CKD (eGFR <20), SPB<110 after 1 min of standing, nursing home, poor adherence (including dementia)
Who did they end up with?

- Demographics
  - Mean Age: 68
  - 28% >75yrs old
  - 29.9% black, 10.5% Hispanic
- Mean baseline SBP: 139 mmHg
  - 90% already on HTN medications
  - Only 16% of those taking one med were on a thiazide!
What did they do during the trial?

<table>
<thead>
<tr>
<th>Visits</th>
<th>• Started monthly x 3 then quarterly</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP</td>
<td>• Measured x 3 and averaged at each visit</td>
</tr>
</tbody>
</table>
| Meds         | • BP meds from all major classes available  
               • Provided for free |
**Start**: Begin w/ 2 or 3 drugs: combo thiazide +/- ACEI/ARB +/- CCB

**Treatment Algorithm for Intensive Group**

* ok to start w/ 1 drug for >75 years of age if SBP <140

- **SBP >= 120 at visit**
  - Yes: Is it a milepost visit
    - Yes: Add a new drug and see pt monthly until SBP <120
    - No: Titrate drugs or add new drug & see participant monthly until SBP <120
  - No: Continue therapy

- **DBP >= 100 or DBP >=90 on last 2 visits**
  - Yes: Titrate or add new drug
  - No: Continue therapy

- Monitor
Did they reach the target?

Standard Treatment:
Mean SBP 134
Mean # BPmeds 1.8

Intensive Treatment:
Mean SBP 122
Mean # BP meds 2.8
## The Good

<table>
<thead>
<tr>
<th>Outcome*</th>
<th>Absolute Risk Reduction</th>
<th>Number Needed to Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined MI, stroke, CHF, CV death</td>
<td>-1.6%</td>
<td>61</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>-0.8%</td>
<td>125</td>
</tr>
<tr>
<td>CV Mortality</td>
<td>-0.6%</td>
<td>167</td>
</tr>
<tr>
<td>All-Cause Mortality</td>
<td>-1.2%</td>
<td>83</td>
</tr>
</tbody>
</table>

- All are statistically significant
- Stopped early 3.26 years of planned 5 years
The Bad

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Absolute Risk Increase</th>
<th>Number Needed to Harm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>1.0%</td>
<td>100</td>
</tr>
<tr>
<td>Syncope</td>
<td>0.6%</td>
<td>167</td>
</tr>
<tr>
<td>Electrolyte abnormalities</td>
<td>0.8%</td>
<td>125</td>
</tr>
<tr>
<td>Acute Kidney Injury</td>
<td>1.6%</td>
<td>62</td>
</tr>
<tr>
<td>Serious ADE**</td>
<td>2.2%</td>
<td>45</td>
</tr>
</tbody>
</table>

* All are statistically significant (no diff in falls or bradycardia)
** Possibly or definitely related to the intervention
1000 with no diabetes or history of stroke; no issues with poor adherence to meds
Out of these 1000 people treated over 3.2 years to an SPB goal <120 compared to <140

16 Benefit - Primary Outcome

22 Harmed
Out of these 1000 people treated over 3.2 years to an SPB goal $<120$ compared to $<140$

12 Benefit in regards to all cause mortality
Importance and Conclusion

• We should consider a lower SBP target for patients over age 50 at increased cardiovascular risk but without diabetes, stroke, or other exclusions criteria!
• Most never reached target of <120
• There are harms
• Be careful to generalize results of SPRINT
  • Those with untreated SBP 120-129
  • Those with SBP >180, >170 on 2 HTN meds, >160 on 3meds, or >150 on 4 meds
  • Nursing home patients
  • Diabetics
  • Frail older adults
Last Point - Measuring Matters

• How SPRINT did it
  • Average of 3 office BP readings taken with proper cuff size
  • Participants seated with their back supported
  • 5 minutes of rest before measurement
  • No conversation during the rest period or BP determinations.

• Conventional Auscultatory SBP
  • Up to 20mmHg higher than this technique
  • Potential for over-treatment

Hypertension.
2010; 55: 195-200
Exercise and Vitamin D in Fall Prevention Among Older Women: A Randomized Clinical Trial

Kirsti Uusi-Rasi, PhD; Radhika Patil, MSc; Saija Karinkanta, PhD; Pekka Kannus, MD, PhD; Kari Tokola, MSc; Christel Lamberg-Allardt, PhD; Harri Sievänen, DSc

**IMPORTANCE** While vitamin D supplementation and exercise are recommended for prevention of falls for older people, results regarding these 2 factors are contradictory.

**OBJECTIVE** To determine the effectiveness of targeted exercise training and vitamin D supplementation in reducing falls and injurious falls among older women.

**DESIGN, SETTING, AND PARTICIPANTS** A 2-year randomized, double-blind, placebo-controlled vitamin D and open exercise trial conducted between April 2010 and March 2013 in Tampere, Finland. Participants were 409 home-dwelling women 70 to 80 years old. The main inclusion criteria were at least 1 fall during the previous year, no use of vitamin D supplements, and no contraindication to exercise.
Exercise and Vitamin D to prevent falls

- Research question: In those with a history of falling
  - Does Vit D prevent recurrent falls?
  - Does Exercise prevent recurrent falls?
  - Do both work better together than either one alone?

- Participants: 409 persons in Finland, age 70-80
  - One fall in previous year
  - Not using Vit D supplements (Vit D defic. not required; level 27 ng/ml)
  - No moderate to vigorous exercise
  - Calcium and vitamin D intake comparable (1000mg/day and 10µg/day)
Interventions

• Vitamin D 800 IU/day (vs placebo)
• Exercise (vs no Exercise)
  • Group training classes 2 times/week for 1st yr, once a week in 2nd yr
  • Balance, strengthening, agility, weight training
  • Home training program
• Design: RCT with four groups
  • Vit D + Exercise
  • Vit D alone
  • Exercise alone
  • Neither exercise or Vit D
# Results

<table>
<thead>
<tr>
<th></th>
<th>Falls/100 py</th>
<th>Fall Injury/100 py</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo/No Exercise</td>
<td>118</td>
<td>13</td>
</tr>
<tr>
<td>Vit D/ No Exercise</td>
<td>132</td>
<td>13</td>
</tr>
<tr>
<td>Placebo + Exercise</td>
<td>120</td>
<td>6.5</td>
</tr>
<tr>
<td>Vit D + Exercise</td>
<td>113</td>
<td>5.0</td>
</tr>
</tbody>
</table>
Conclusion

• In elders with a prior history of falls:
  • Vitamin D had no impact on falls or fall injury
  • Exercise reduced the risk of fall injury
Original Investigation  |  LESS IS MORE

Monthly High-Dose Vitamin D Treatment for the Prevention of Functional Decline: A Randomized Clinical Trial

Heike A. Bischoff-Ferrari, MD, DrPH; Bess Dawson-Hughes, MD; E. John Orav, PhD; Hannes B. Staehelin, MD; Otto W. Meyer, MD; Robert Theiler, MD; Walter Dick, MD; Walter C. Willett, MD, DrPH; Andreas Egli, MD

**IMPORTANT** Vitamin D deficiency has been associated with poor physical performance.

**OBJECTIVE** To determine the effectiveness of high-dose vitamin D in lowering the risk of functional decline.

**DESIGN, SETTING, AND PARTICIPANTS** One-year, double-blind, randomized clinical trial conducted in Zurich, Switzerland. The screening phase was December 1, 2009, to May 31, 2010, and the last study visit was in May 2011. The dates of our analysis were June 15, 2012, to October 10, 2015. Participants were 200 community-dwelling men and women 70 years and older with a prior fall.
MegaDose Vitamin D in Fallers: Caveat Emptor

• **Research question:** Does high dose Vitamin D improve muscle function and prevent falls in elders with fall history?

• **Study Design**
  • 3 arm RCT in 200 fallers over age 70 (58% vitamin D deficient) treated for 12 months with
    • 24000 units of Vit D monthly
    • 60,000 units of Vit D monthly
    • 24000 units Vit D + 300µg calcifediol monthly
# Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Low dose Vit D</th>
<th>High dose Vit D</th>
<th>Vit D + calcifediol</th>
</tr>
</thead>
<tbody>
<tr>
<td>% with Vit D level &gt;30</td>
<td>55%</td>
<td>81%</td>
<td>84%</td>
</tr>
<tr>
<td>Mean SPPB Change</td>
<td>0.38</td>
<td>0.10</td>
<td>0.11</td>
</tr>
<tr>
<td>% of Fallers</td>
<td>48%</td>
<td>67%</td>
<td>66%</td>
</tr>
</tbody>
</table>

SPPB = Short Physical Performance Battery
Conclusion

• Compared to low dose Vitamin D, **High Dose Vitamin D**
  • Had no benefit on function
  • Markedly increased the risk of falling

• Do not use high dose Vitamin D
Vitamin D Supplementation and Increased Risk of Falling
A Cautionary Tale of Vitamin Supplements Retold

Steven R. Cummings, MD; Douglas P. Kiel, MD, MPH; Dennis M. Black, PhD

The randomized clinical trial (RCT) by Bischoff-Ferrari et al in this issue of JAMA Internal Medicine shows that vitamin D supplementation is associated with the risk of falls. Two “high” doses (60,000 IU of vitamin D₃ per month or 24,000 IU vitamin D₃ plus 300 mg of calcifediol per month) achieved a serum 25-hydroxyvitamin D (25[OH]D) level of 30 ng/mL in 80% of participants, a level that has been recommended as best for reducing the risk of fractures and for other health benefits (to convert 25[OH]D to nanomoles per liter, multiply by 2.496). However, compared with placebo, 24,000 IU of vitamin D per month (equivalent dwelling older adults. Previous meta-analyses of RCTs had differed about whether vitamin D supplements reduce the risk of falls or fractures in community-dwelling elderly individuals. In contrast meta-analyses have shown that 800 IU of vitamin D and 1200 mg of calcium reduced the risk of hip fracture and mortality for patients dwelling in institutions. These patients should receive calcium and vitamin D supplements.

Clinicians should not recommend vitamin D supplements for other putative health benefits. There is no evidence from meta-analyses of RCTs that vitamin D supplementation reduces the risk of cardiovascular disease or cancer.
Vitamin D – Cautionary Tale

• No evidence vitamin D supplements improve health outcomes in community-living seniors.

• “The Vitamin D story seems to be following the familiar pattern observed with antioxidant vitamins.”

• IOM Recommendations for community living elders over age 70
  • Aim for 800 IU Vit D/day from dietary sources