Update in Geriatrics

Danelle Cayea, MD, MS
Colleen Christmas, MD
Elizabeth Eckstrom, MD
Disclosures

• None
Objectives

• Review recent publications that have immediate impact on primary care of the elderly in the following areas:
  – Prevention
  – Cognition
  – Function

• Understand the strength of evidence behind current therapies
Title of Article

• What’s the question
• Features and problems with how the study was done
• What they concluded
• How this affects practice or thinking
Annual High-Dose Oral Vitamin D and Falls and Fractures in Older Women


Sponsor: National Health and Medical Research Council and by the Australian Government Department of Health and Ageing
What’s the question?

• Results of vitamin D studies mixed
• Adherence → greater fracture reduction
• Rationale:
  – prevent decreases in 25-hydroxycholecalciferol over winter
  – address low adherence
  – be a practical intervention easily translated to clinical practice
Methods

• DB, PC, RT

• Inclusion:
  – Higher risk of hip fracture

• Exclusion:
  – Couldn’t provide informed consent or info about falls or fractures
  – NH resident
  – Corrected calcium level > 10.6 mg/dL
  – Creatinine > 1.7 mg/dL
  – Currently taking vitamin D doses of 400 IU or more, calcitriol, or antifracture therapy
Methods

• Randomized to single dose 500,000 IU cholecalciferol in winter months or placebo x 3-5 years
• Vigorous follow up
• Primary outcomes
  – Falls
  – Fractures
# Results

<table>
<thead>
<tr>
<th></th>
<th>Vit D (n=1131)</th>
<th>Placebo (n=1125)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>76</td>
<td>76.1</td>
</tr>
<tr>
<td><strong>Baseline risk profile</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self- or physician reported</td>
<td>39.7%</td>
<td>38.1%</td>
</tr>
<tr>
<td>high fall risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fracture since age 50</strong></td>
<td>36.5%</td>
<td>32.7%</td>
</tr>
<tr>
<td><strong>Maternal hip fx</strong></td>
<td>10%</td>
<td>10.1%</td>
</tr>
<tr>
<td><strong>Ever used walking aid</strong></td>
<td>26%</td>
<td>24.4%</td>
</tr>
<tr>
<td><strong>25-OH vit D level</strong></td>
<td>53 nmol/L</td>
<td>45 nmol/L</td>
</tr>
<tr>
<td><strong>Started antifracture tx</strong></td>
<td>8%</td>
<td>7.7%</td>
</tr>
</tbody>
</table>
# Results

<table>
<thead>
<tr>
<th></th>
<th>Vitamin D</th>
<th>Placebo</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total falls</td>
<td>2892</td>
<td>2512</td>
<td></td>
</tr>
<tr>
<td>With fracture</td>
<td>137</td>
<td>109</td>
<td></td>
</tr>
<tr>
<td>Without fracture</td>
<td>2755</td>
<td>2403</td>
<td></td>
</tr>
<tr>
<td>With soft tissue injury</td>
<td>1710</td>
<td>1488</td>
<td>.02</td>
</tr>
<tr>
<td>&gt;1 fall</td>
<td>837 (74%)</td>
<td>769 (68.4%)</td>
<td>.003</td>
</tr>
<tr>
<td>Total fractures</td>
<td>171</td>
<td>135</td>
<td></td>
</tr>
</tbody>
</table>

15% more falls, 26% more fractures
## Results

**Table 3. Incidence Rate Ratio for Falls and Fractures and Analysis Adjusted by Calcium Intake**

<table>
<thead>
<tr>
<th></th>
<th>Incidence Rate Ratio for Vitamin D Group, Estimate (95% Confidence Interval)</th>
<th>( P ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No adjustment, No. Falls</strong></td>
<td>1.15 (1.02-1.30)</td>
<td>.03</td>
</tr>
<tr>
<td><strong>Fractures</strong></td>
<td>1.26 (1.00-1.59)</td>
<td>.047</td>
</tr>
<tr>
<td><strong>Nonvertebral fractures</strong></td>
<td>1.28 (1.00-1.65)</td>
<td>.06</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adjusted for calcium intake, No.</th>
<th></th>
<th>( P ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Falls adjusted</strong></td>
<td>1.16 (1.03-1.31)</td>
<td>.02</td>
</tr>
<tr>
<td><strong>Fractures adjusted</strong></td>
<td>1.25 (0.99-1.58)</td>
<td>.06</td>
</tr>
<tr>
<td><strong>Nonvertebral fractures</strong></td>
<td>1.27 (0.98-1.65)</td>
<td>.08</td>
</tr>
</tbody>
</table>
Results—also of note...

• Temporal relationship

<table>
<thead>
<tr>
<th>Time after treatment, mo</th>
<th>Falls</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 3</td>
<td>1.31 (1.12-1.54)</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>After 3</td>
<td>1.13 (0.99-1.29)</td>
<td>.08</td>
<td></td>
</tr>
</tbody>
</table>

• Serum vitamin D levels
  – Post-dose 75-125 nmol/L vs. 30-50
Clinical Bottom Line

• Studies showing benefit used intermittent dosing, smaller doses
• Other studies neutral or positive
• No calcium supplementation
• Mega-dose vitamin D may increase the risk of falls and fractures in older women at high risk for both
Safety of Herpes Zoster Vaccine in the Shingles Prevention Study
A Randomized Trial


Sponsors: Cooperative Studies Program, Department of Veterans Affairs, Office of Research and Development; grants from Merck to the Veterans Affairs Cooperative Studies Program; and the James R. and Jesse V. Scott Fund for Shingles Research
What’s the question?

• VZV vaccine is a live-attenuated vaccine that is effective:
  – 51% in preventing zoster
  – 67% in preventing postherpetic neuralgia

• Vaccine use is low

• Is the VZV vaccine safe?
The study

• DB, PC, RCT of 38,546 adults >60 yo w/ h/o of chickenpox, and no h/o herpes zoster followed for 3.4 years

• No NH or immunocompromised pts

• Substudy of 6616
  – More detailed safety monitoring for 42 days
What they found

<table>
<thead>
<tr>
<th></th>
<th>Age 60-69</th>
<th></th>
<th>Age ≥70</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vaccine N=1732</td>
<td>Placebo N=1727</td>
<td>Vaccine N=1613</td>
<td>Placebo N=1544</td>
</tr>
<tr>
<td>Injection site reaction</td>
<td>56.6%</td>
<td>19.1%*</td>
<td>39.2%</td>
<td>13.8%*</td>
</tr>
<tr>
<td>Rash</td>
<td>0.7%</td>
<td>0.1%¹</td>
<td>0.5%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Erythema</td>
<td>41.6%</td>
<td>8.0%*</td>
<td>29.4%</td>
<td>5.9%*</td>
</tr>
<tr>
<td>Swelling</td>
<td>32.4%</td>
<td>5.4%*</td>
<td>19.5%</td>
<td>3.6%*</td>
</tr>
<tr>
<td>Pain</td>
<td>43.0%</td>
<td>10.2%*</td>
<td>25.3%</td>
<td>6.8%*</td>
</tr>
</tbody>
</table>

*p<0.001
¹p<0.05
What they found

• Serious adverse event rates similar
• Varicella-like rash, occurred at inoculation site vaccine > placebo (0.11% vs. 0.04%)
• Rashes elsewhere similar (0.10% vs. 0.07%)
• Inoculation site small, localized, brief
• Herpes-zoster like rashes placebo > vaccine (24 vs. 7 confirmed)
Clinical bottom line

• Zoster vaccine has low rate of serious side effects
• Minor side effects similar to other vaccines
• Does not increase risk of acquiring Herpes zoster in immediate post-vaccination period
• This is true at least among community dwellers not severely debilitated
Resistance Training and Executive Functions


*Sponsor:* The Vancouver Foundation, Natural Sciences and Engineering Research Council of Canada, Michael Smith Foundation for Health Research, New Opportunities Fund from the Canada Foundation for Innovation
What’s the question?

- Cognitive decline scary
- Drugs don’t help much
- Observational studies suggest exercise might reduce decline
- How much and what type not clear
Methods

• Single blind, RCT
• 155 Community dwelling women 65- 75 y.o. in Vancouver
  – Recruited by ads in newspaper and on TV
• Exclusion:
  – Dementia or inability to comply with exercise or testing (debility, medical contraindication, depression, not English language, visually impaired)
  – Taking estrogen or testosterone
Methods

• Once weekly or twice weekly **resistance training** or twice weekly balance and tone training (control) for a **year**
  – **60 minute classes** by fitness instructors
• Outcomes at 0, 6 months, 1 year
  – Primary outcome
    • Stroop test measure of executive function
  – Secondary
    • Trail Making Tests (parts A and B)
    • Working memory assessed by verbal digit span
    • Gait speed
    • Muscular function
    • Whole brain volume by MRI
• Analysis
  – Between-group differences at midpoint and at trial completion by multiple linear regression, controlling for baseline score and others
Results

• Mean age 69.6 years
  – 31% had a fall in the past year
• Highly compliant with exercise
  – 71% 1xRT
  – 70.3% 2xRT
  – 62% BAT
Results

• All changes insignificant at 6 months, but reach significance at 1 year

• Both RT groups improved Stroop test vs BAT where Stroop declined ($p<0.03$)
  – Trails A and B (set shifting), digit span (working memory) not changed
  – Gait speed and 1-RM not changed
  – Peak power improved only in 2xRT

• Brain volume reduced in both RT groups vs BAT
Clinical Bottom Line

• Resistance exercise is good for your brain!!!
• 1 hour once a week for a year does something measureable to executive function
  – Also something to brain volume that we have no idea what the implications of are
• At least in 69 yo independently living women
Weight Loss, Exercise, or Both and Physical Function in Obese Older Adults

Villareal DT, Chode S, Parmimi N, et al.

Sponsor: National Institutes of Health
What’s the question?

- Sarcopenic obesity is a mounting problem
- Weight loss may or may not improve function
- In obese older individuals at risk for frailty, which is best to improve function: weight loss, exercise, or a combination?
Methods

- RCT, assessors blinded to group allocation
- 107 adults over 65yo and obese, sedentary, mild-moderate frailty, but not very sick
- **Diet**: weekly meetings with dietician, food diary, weekly weigh-ins, behavioral therapy
  - Goal lose 10% in 6 months then maintain for 6 months
- **Exercise**: 3x90 min sessions w PT per week
  - Aerobic, resistance, and flexibility
- **Both**
- **Control**: General health exercise, monthly meeting with research staff
- All received 1500 mg calcium/day and 1000 IU vitamin D/day
Methods

• Measurements baseline, 6 months, 1 year
• Primary outcome: change from baseline in Physical Performance Test
• Secondary outcomes:
  – Functional assessments, VO2 max, DEXA and MRI for body composition and BMD, QOL
• Analysis by intention to treat
  – Longitudinal changes between groups by mixed-model repeated measures analysis of variance with adjustment for baseline values and sex
Table 1. Baseline Characteristics of Participants.*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Control (N = 27)</th>
<th>Diet (N = 26)</th>
<th>Exercise (N = 26)</th>
<th>Diet–Exercise (N = 28)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age — yr</td>
<td>69±4</td>
<td>70±4</td>
<td>70±4</td>
<td>70±4</td>
<td>.85</td>
</tr>
<tr>
<td>Sex — no. (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9 (33)</td>
<td>9 (35)</td>
<td>10 (38)</td>
<td>12 (43)</td>
<td>.89</td>
</tr>
<tr>
<td>Female</td>
<td>18 (67)</td>
<td>17 (65)</td>
<td>16 (62)</td>
<td>16 (57)</td>
<td></td>
</tr>
<tr>
<td>Race — no. (%)†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>22 (81)</td>
<td>23 (88)</td>
<td>21 (81)</td>
<td>25 (89)</td>
<td>.78</td>
</tr>
<tr>
<td>Black</td>
<td>4 (15)</td>
<td>3 (12)</td>
<td>4 (15)</td>
<td>3 (11)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1 (4)</td>
<td>0</td>
<td>1 (4)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Education — no. (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than college degree</td>
<td>9 (33)</td>
<td>7 (27)</td>
<td>7 (27)</td>
<td>9 (32)</td>
<td>.85</td>
</tr>
<tr>
<td>College degree</td>
<td>13 (48)</td>
<td>15 (58)</td>
<td>10 (38)</td>
<td>9 (32)</td>
<td></td>
</tr>
<tr>
<td>Graduate school</td>
<td>5 (19)</td>
<td>4 (15)</td>
<td>9 (35)</td>
<td>10 (36)</td>
<td></td>
</tr>
<tr>
<td>Marital status — no. (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>1 (4)</td>
<td>3 (12)</td>
<td>2 (8)</td>
<td>2 (7)</td>
<td>.73</td>
</tr>
<tr>
<td>Married</td>
<td>19 (70)</td>
<td>19 (73)</td>
<td>13 (50)</td>
<td>16 (57)</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>2 (8)</td>
<td>2 (8)</td>
<td>6 (23)</td>
<td>5 (18)</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>5 (19)</td>
<td>2 (8)</td>
<td>5 (19)</td>
<td>5 (18)</td>
<td></td>
</tr>
<tr>
<td>Weight — kg</td>
<td>101.0±16.3</td>
<td>104.1±15.3</td>
<td>99.2±17.4</td>
<td>99.1±16.8</td>
<td>.66</td>
</tr>
<tr>
<td>Body-mass index‡</td>
<td>37.3±4.7</td>
<td>37.2±4.5</td>
<td>36.9±5.4</td>
<td>37.2±5.4</td>
<td>.33</td>
</tr>
<tr>
<td>Chronic diseases — no.</td>
<td>2.2±1.2</td>
<td>2.2±1.4</td>
<td>2.0±1.3</td>
<td>2.2±1.3</td>
<td>.26</td>
</tr>
<tr>
<td>Routine medications — no.</td>
<td>4.6±2.6</td>
<td>3.3±2.3</td>
<td>4.7±2.5</td>
<td>4.1±2.8</td>
<td>.34</td>
</tr>
</tbody>
</table>

* Plus–minus values are means ±SD.
† Race was self-reported.
‡ The body-mass index is the weight in kilograms divided by the square of the height in meters.
What they found

• 87% completed
• Over 80% median attendance for diet or exercise (or both) sessions!
Mean Percentage Changes in Objective and Subjective Measures of Frailty during the 1-Year Intervention.

**Panel A:** Physical Performance Test (PPT), which range from 0 to 36, with higher scores indicating better physical status* primary outcome

**Panel B:** Peak oxygen consumption ($VO_{2peak}$)

**Panel C:** Functional Status Questionnaire (FSQ), which range from 0 to 36, with higher scores indicating better functional status.

In Panels A and B, the change in the diet–exercise group differed significantly from the changes in the exercise group and in the diet group, and the changes in the exercise group and in the diet group differed significantly from that in the control group. In Panel C, the change in the diet–exercise group differed significantly from that in the diet group, and the changes in the exercise group and in the diet group differed significantly from that in the control group.
Mean Percentage Changes in Body Weight during the 1-Year Intervention
What they found

• Lean body mass
  – Increased with exercise, decreased with diet, decreased less with diet and exercise

• Fat mass
  – Reduced in all, more in both diet groups than exercise alone

• BMD
  – Decreased 2.6% in diet, 1.1% in diet-exercise, increased 1.5% exercise at hip, no changes in spine or total body

• 1-RM, time to complete obstacle course, time stand on a single leg, gait speed, physical component of SF-36 all changed favorably
Clinical bottom line

- Need diet if you want to lose weight, but will lose some muscle and bone with that
- Need exercise if you want to get strong but won’t lose weight if you don’t diet
- If you diet and exercise you lose weight, get stronger, and are more functional!

- Remaining questions: What are long term effects? How about sicker or frail-er people? Any difference between genders? How about less intense, more “real world” interventions?
A Biobehavioral Home-Based Intervention and Well-Being of Patients with Dementia and their Caregivers

Care of Persons with Dementia in their Environments (COPE) Trial

- Gitlin, LN, Winter, L, Dennis, MP, Hodgson, N, Hauck, WW, A Biobehavioral Home-Based Intervention and Well-Being of Patients with Dementia and their Caregivers. JAMA. 2010; 304(9): 983-991.

- Sponsor: National Institute on Aging, National Institute on Nursing Research, and Pennsylvania Department of Health, Tobacco Settlement
What’s the Question?

Question: Can a non-pharmacologic intervention with dementia patients and their caregivers postpone functional decline?

Background:

• Most of the 5 million dementia patients in the US live at home with a family caregiver

• With disease progression, family caregivers increasingly provide hands-on assistance with ADLs and IADLs, heightening caregiver distress

• There are no medications proven to prevent functional impairment in dementia patients
Methods

• 237 patients with dementia and their family caregivers living in the community
  – Patient mean age 82, caregiver mean age 62
  – Patients 68% women, caregivers 89% women
  – Patient mean MMSE score 13
  – Average length of caregiving relationship 4 years
  – Functional status measured by modified Functional Independence Measure; average 50% assistance for all ADLs
  – Caregivers reported managing an average of 6 agitated behaviors
Methods

• Intervention: 12 home or telephone contacts over 4 months
  • 10 OT and 1 APN visits
  • Patient assessment
  • Obtained blood and urine samples
  • Caregiver education
  • Trained caregivers to modify home environment, activities and communication
  • Control group got 3 phone calls plus brochures and referral to community resources

• Main outcome measures:
  • For patients: Functional dependence, quality of life, frequency of agitated behaviors, engagement
  • For caregivers: Well-being, confidence using activities, perceived benefits of caregiving
What they found

• Sample size
  – 237 dyads randomized, 88% follow up at 4 months, 73% follow up at 9 months

• Outcomes at 4 months:
  – Functional dependence: 48% improved in intervention group, 30% improved in control group (mostly in IADLs)
  – Caregivers improved well-being, enhanced confidence using the activities
  – Cost estimated to be $537 per dyad

• Outcomes at 9 months: caregivers continued to perceive benefits, but there were no longer any patient differences
Table 3. Clinical Significance of Main Outcomes at 4 Months

<table>
<thead>
<tr>
<th></th>
<th>Control Group, No. (%)&lt;sup&gt;a&lt;/sup&gt; (n = 107)</th>
<th>Intervention Group, No. (%)&lt;sup&gt;a&lt;/sup&gt; (n = 102)</th>
<th>Difference in Net Improvement (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Improved</td>
<td>Worsened</td>
<td>Net Improvement</td>
<td>Improved</td>
</tr>
<tr>
<td>Overall functional</td>
<td>41 (39.8)</td>
<td>11 (10.7)</td>
<td>30 (29.3)</td>
<td>51 (51.5)</td>
</tr>
<tr>
<td>dependence&lt;sup&gt;b&lt;/sup&gt;</td>
<td>52 (50.5)</td>
<td>7 (6.8)</td>
<td>45 (43.7)</td>
<td>64 (64.6)</td>
</tr>
<tr>
<td>IADL dependence&lt;sup&gt;b&lt;/sup&gt;</td>
<td>40 (37.4)</td>
<td>42 (39.3)</td>
<td>-2 (-1.9)</td>
<td>44 (43.1)</td>
</tr>
<tr>
<td>Activity engagement</td>
<td>42 (39.3)</td>
<td>21 (19.6)</td>
<td>21 (19.6)</td>
<td>58 (56.9)</td>
</tr>
<tr>
<td>Perceived change in</td>
<td>29 (27.4)</td>
<td>24 (22.6)</td>
<td>5 (4.7)</td>
<td>41 (41.0)</td>
</tr>
<tr>
<td>well-being</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence using</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>activities&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; IADL, instrumental activities of daily living.

<sup>a</sup>Not shown are the numbers (%) of those who stayed the same.

<sup>b</sup>This measure was assessed for 99 of 102 patients in the intervention group and 103 of 107 patients in the control group because 7 patients were placed in nursing homes and their caregivers were unable to assess functional dependence.

<sup>c</sup>This measure was assessed for 106 caregivers in the control group.

Gitlin, L. N. et al. JAMA 2010;304:983-991
Figure 2. Perceived Benefits of Intervention and Control Group Caregivers at 9 Months

Study satisfaction
- Treated with respect
  - COPE (n=88)
  - Control (n=85)
  - P = .34

- Study clearly explained
  - COPE (n=88)
  - Control (n=85)
  - P = .62

- Too much work
  - P = .50

- Recommend to others
  - COPE (n=88)
  - Control (n=85)
  - P = .14

Caregiver benefits
- Benefited you
  - P < .001

- Helped you understand dementia
  - P = .001

- Made you more confident
  - P < .001

- Made your life easier
  - P < .001

- Helped you give care
  - P < .001

Patient benefits
- Improved patient’s life
  - P < .001

- Helped you keep patient at home
  - P = .02

Percentage Responding “Yes” or “a Great Deal”

Gitlin, L. N. et al. JAMA 2010;304:983-991

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Clinical Bottom Line

• This multicomponent, home-based intervention improved functional status of dementia patients, and enhanced well-being and confidence using activities for their family caregivers

• Comments: Poor patient function is a predictor of disease progression, higher risk of caregiver burden, and nursing home placement. This relatively low cost intervention compared favorably with pharmacological trials, yet with no adverse events or known risks
Cognitive Training Decreases Motor Vehicle Collision Involvement of Older Drivers

Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) Trial
What’s the Question?

Question: Can cognitive training reduce subsequent Motor Vehicle Collision (MVC) involvement of older drivers?


- Sponsor: National Institute on Aging, National Institute on Nursing Research. NIA and NINR representatives were directly involved in the study design, interpretation of the data, and review and approval of the manuscript. These representatives monitored the study conduct, collection, management, and analysis of the data.
Rationale

- Driving defines independence and provides a sense of self-esteem.
- Over 88% of older Americans rely on a private automobile for their transportation needs.
- Driving cessation often leads to decreased ability to freely participate in social opportunities or engage in IADLs.
- Motor Vehicle Collisions (MVCs) have increased 13% in people over 70 in the last 30 years.
- Risk factors for MVCs include slower speed of processing and cognitive impairment.
Methods

• Enrolled 908 community-dwelling drivers in Birmingham, Baltimore, Indianapolis, and State College, PA
  – Average age 73, 19% African American
  – 72% women
  – Self rated health 2.6/5 (1=excellent, 5=poor)
  – MMSE scores average 27 (had to be over 23)
  – Miles driven per year, mean~5000
  – Excluded if poor vision, hearing, >1 ADL deficit or difficult communication ability
Methods

- Randomized to one of 4 groups:
  - No contact control group
  - Memory intervention
    - Mnemonic strategies- organization, visualization, association
  - Reasoning intervention
    - Strategies for finding the patterns in everyday life such as travel schedules
    - Exercises included abstract reasoning and problem solving
  - Speed-of-processing intervention
    - Identify and locate visual information quickly in increasingly demanding visual displays

- Trainers led intervention groups of 2-4 participants lasting 70 minutes twice weekly for 5 weeks
What they Found

• Primary outcome was a state-recorded MVC
• Followed 5 years, or until death or cessation of driving

Association between Intervention Group and Motor Vehicle Collision Involvement

<table>
<thead>
<tr>
<th></th>
<th>Rate Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At Fault Motor Vehicle Collision</td>
<td>Memory Training</td>
</tr>
<tr>
<td>Person-time</td>
<td>0.82 (0.53-1.27)</td>
</tr>
<tr>
<td>Person-miles</td>
<td>0.93 (0.60-1.45)</td>
</tr>
</tbody>
</table>

Adjusted for age, sex, race, education, MMSE score, self-rated health status, vision, depression, and site
Clinical Bottom Line

• This RCT of older drivers showed that 10 sessions (5 weeks) of speed-of-processing training, and to a lesser extent reasoning training, led to fewer at-fault MVCs over 5 years as measured by state-recorded MVC involvement.

• Comments: Earlier ACTIVE manuscripts showed improved IADLs and HRQL after 5 years for participants. This study strengthens the evidence that cognitive training can help maintain function in older adults.