What is the remaining life expectancy for an 80 year old woman?

Another:

1. 2 years
2. 4 years
3. 6 years
4. 8 years
5. 12 years
What % of women at age 80 have 2 or more chronic diseases?

1. 10%
2. 30%
3. 50%
4. 70%
5. 100%
What % of seniors aged 75-84 have **no** important functional impairments? (They are independent).

1. 10%
2. 30%
3. 50%
4. 70%
5. 90%
What % of ALL Healthcare Costs are “Consumed” by the Frail Elderly (15% of the elderly = 3% of the overall Population)

1. 1 %
2. 5%
3. 15%
4. 30%
5. 50%
What Proportion of People Make 100?

1. 1 in 5,000
2. 1 in 10,000
3. 1 in 50,000
4. 1 in 100,000
5. 1 in 500,000
1. Do you use the term Frail?
2. How do YOU define FRAILTY?
3. If you LABEL someone frail, how does it change what you think and do?
4. Is Frailty associated with bad outcomes?
5. Can Frailty be modified?
WHAT IS FRAILTY?

356 multi disciplinary attendees at CAG:

\( \frac{2}{3} \) frailty was a useful concept

\( \frac{3}{4} \) represented risk or vulnerability (ADL dependency, adverse outcomes)

\( \frac{3}{4} \) imbalance: excess demands vs reduced capacity

\( \frac{2}{3} \) represented precarious physiological balance

\( \frac{1}{2} \) being dependent

WHAT IS FRAILTY?

- It is not normal
- It is not a good thing
- It has something to do with age
- It is more common with some diseases, but can occur without specific disease
- It leads to adverse health outcomes e.g. death, institutional admission
- That is about as far as the agreement goes!!!
Definition of Frailty

Increased **VULNERABILITY** to insult or challenges resulting from impairments in multiple domains that **COMPROMISE** compensatory ability. JAMA 1995
Increased Risk for:

- Geriatric syndromes
- Hospitalization
- LTC institutionalization
- Death
Atypical presentations of disease are frequently seen

- Classical
- Silent
- Pseudosilent
- Atypical Presentations
  - Weakness/Fatigue
  - Dwindles
  - Falls/Immobility
  - Incontinence
  - Cognition/Mood Change
  - Social Crisis

“Geriatric Giants”
Acute illness superimposed on Frailty: impact on individual

- Multiple organ stress
- Failure of homeostasis
- Potential exacerbation of chronic diseases
- Increased potential for drug interactions and adverse effect
- Increased vulnerability to delirium, falls and incontinence with caregiver stress
- Atypical presentation of disease frequently seen
Frail (Dictionary Definition)

- Physically weak or delicate
- Easily damaged or broken
Frailty is like pornography; it’s hard to define but you recognize it when you see it.

Anonymous clinician.
Your Word of the Day

- Dodgy
- The willies
- A lymphatic person
- Vulcanize
- Unfrail
Recognition of Frailty is an Opportunity to “UNFRAI L”
What is Different About “FRAIL” Patients?

Multiple diseases with multiple drugs = **complexity**.
Multiple problem areas = **multidimensionality**.
Premorbid function disability = **slippery slope**.
Medical/Psychiatric interface.

- Increased importance of social network
- Need for a complex combination of medical and social services = **DISCHARGE PLANNING**.

**VULNERABLE**
### Medline citations for “Frail Elderly”

<table>
<thead>
<tr>
<th>YEARS</th>
<th>NUMBER OF PUBLICATIONS</th>
</tr>
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<tbody>
<tr>
<td>1981-1985</td>
<td>0</td>
</tr>
<tr>
<td>1986-1990</td>
<td>36</td>
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<td>1991-1995</td>
<td>793</td>
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<td>1996-2000</td>
<td>1098</td>
</tr>
<tr>
<td>2001-2006</td>
<td>1332</td>
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</tbody>
</table>
**POSITIVE**
- Robust health
- Supportive environment
- Adequate financial resources
- Attitude

**NEGATIVE**
- Chronic illness
- Preexisting disabilities
- Poor social supports
- Inadequate financial resources
- Acute illness

Rockwood K et al CMAJ; 150:489
Bergman  www.frail-fragile.ca
Measuring Frailty

- Rules based
- Summation of impairments
- Clinical judgement
FRAILTY: A PHYSICAL DEFINITION

- Cardiovascular Health Study multicentre USA 5317 men & women over age 65
- Followed for 4-7 years
- 5 frailty criteria (unintentional weight loss 10lbs; self reported exhaustion; weakness-grip strength; slow walking speed; low physical activity)
- Frail=3 or more criteria
- At risk or pre-frail 1 or 2 criteria
### FRAILTY: CHS CRITERIA

**Adjusted HR (95% CI)**

Fried et al. J Gerontol 2001;56A M146

<table>
<thead>
<tr>
<th>Outcome at 3 years</th>
<th>No Frailty</th>
<th>Pre frail</th>
<th>Frail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worse mobility</td>
<td>1</td>
<td>1.58 (1.41,1.76)</td>
<td>1.50 (1.23,1.82)</td>
</tr>
<tr>
<td>Worse ADL disability</td>
<td>1</td>
<td>1.67 (1.41,1.99)</td>
<td>1.98 (1.54,2.55)</td>
</tr>
<tr>
<td>Death</td>
<td>1</td>
<td>1.49 (1.11,1.99)</td>
<td>2.24 (1.51,3.33)</td>
</tr>
</tbody>
</table>
Lower extremity function predicts disability after 4 years

- 1363 individuals free of disability at baseline
- Lower extremity function measured by: standing balance; walking speed; chair rises (Total score 0-12) higher scores, better performance

Disability status after 4 years
CSHA Clinical Frailty Scale

- 2305 participants in the CSHA
- Followed for 5 years
- One of 7 categories assigned by a clinician (different specialties)
- Outcomes death, admission to institution
- Compares favourably with other scales

Rockwood, K. CMAJ; 2005, 173:489-95
Box 1: The CSHA Clinical Frailty Scale

1. *Very fit* — robust, active, energetic, well motivated and fit; these people commonly exercise regularly and are in the most fit group for their age.

2. *Well* — without active disease, but less fit than people in category 1.

3. *Well, with treated comorbid disease* — disease symptoms are well controlled compared with those in category 4.

4. *Apparently vulnerable* — although not frankly dependent, these people commonly complain of being “slowed up” or have disease symptoms.

5. *Mildly frail* — with limited dependence on others for instrumental activities of daily living.

6. *Moderately frail* — help is needed with both instrumental and non-instrumental activities of daily living.

7. *Severely frail* — completely dependent on others for the activities of daily living, or terminally ill.

Note: CSHA = Canadian Study of Health and Aging.
CSHA Clinical frailty scale

Rockwood et al CMAJ 2005;173:489
Screening for Frailty: Criteria/Predictors of Outcomes

C. Winograd (Jags 1991) – 985 patients w year follow up

1. Independent (intact ADLs/short term acute illness)
2. Frail (see below)
3. Severely impaired (severe dementia/ADL dependence)
Frailty (any of below 15 Criteria)

- CVA/falls/impaired mobility
- Chronic and disabling illness/malnutrition
- Confusion/depression/restraints
- Dependence in ADLs/incontinence/sensory impairment
- Prolonged bedrest/pressure sore/family problems
Outcomes - NH placement  
- Hospital readmission

<table>
<thead>
<tr>
<th>Survivors N = 357</th>
<th>Admitted to Nursing Home n (%) (p &lt; .0001)</th>
<th>Readmitted to Hospital (NS) n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>6 (3)</td>
<td>120 (49)</td>
</tr>
<tr>
<td>Frail</td>
<td>31 (34)</td>
<td>52 (58)</td>
</tr>
<tr>
<td>Severely impaired</td>
<td>10 (42)</td>
<td>11 (46)</td>
</tr>
</tbody>
</table>
Early Clues to Impending Frailty

- Weight loss
- Weariness
- Low exercise tolerance
- Low level of physical activity
- Slow walking speed
- Also maybe cognitive impairment and or depression
Summary

1. Frailty is measurable

2. Frailty = Bad Outcomes

3. Frailty is modifiable
The Elderly in Canada

- 80% Well
- 15% Frail
- 5% Institutionalized
The frail elderly are 15% of seniors and 3% of the overall population.
The Elderly and Physiologic Decline

- Disease
- Normal Aging
- Deconditioning
How Do You Unfrail?

1. Primary Intervention
1º Prevention

1. Tobacco Cessation
2. Nutritional Advice
3. Calcium: 1200-1500 mg elemental Calcium daily
4. Exercise
   - Aerobic
   - Strength
Exercise

1. RCT of exercise Training for Older People (Senior Silver Centre Trial) (I. Tsuji. Journal of Epidemiology. 2000 10:pg 55-64)
   - **Intervention**: Warm up, bicycle, resistance exercised (rubber films), cool down (2 – 3 x 2 hour classes/week x 25 weeks).
   - **Results**: Net gain VO$_2$ Max ↑ 2.1 ml/kgm/min (10.3%) equivalent to participants becoming younger in aerobic capacity by 5 YEARS
Exercise

2. High Intensity Strength Training in Nonagenarians in a Nursing Home (Fiatarone M. JAMA. 1990. 38:1256-1300)

□ Intervention

■ 3 sessions quad strengthening exercises/week x 8 weeks
1° Prevention

5. Safe Driving – Counselling /“Screening”

6. Vaccinations
   - Influenza (annual)
   - Pneumococcal – high risk, ? 65+, (once or twice?)
   - Tetanus – single booster at age 65
   - Herpes

7. Advice re: sun exposure.

8. Vitamin D 1000 IU
How Do you Unfrail?

2. Case find (Screen) for high risk conditions in high risk individuals.
Healthy Aging Toolkit N=32

1. **Cognition** 19/32 +ve (2 on AChEI) Yield: 17/32 = 53%  
   - 4 item questionnaire (6)  
   - Animals in 1 minute (14)  
   - 3 item recall ≤ (13)  
   - Clock drawing (12)
# Dementia Risk Calculator

<table>
<thead>
<tr>
<th>Age</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 65</td>
<td>1%</td>
</tr>
<tr>
<td>65</td>
<td>2%</td>
</tr>
<tr>
<td>70</td>
<td>4%</td>
</tr>
<tr>
<td>75</td>
<td>8%</td>
</tr>
<tr>
<td>80</td>
<td>16%</td>
</tr>
<tr>
<td>85</td>
<td>32%</td>
</tr>
</tbody>
</table>

- Risk Doubles every 5 years of Age
- Each additional vascular risk factor approximately doubles the risk
- Positive family history doubles the risk

**Overall risk** = age risk ____% x family hx risk multiplier ____ x vascular risk multiplier ____ = ____%
Dementia Quick Screen

- 3 item recall (0-1 correct: OR 3.1)
- Animals in 1 minute (<15: OR 20.2)
- Clock drawing (abnormal: OR 24)

References:
DECIDE: A Canadian Dementia Screening Study

1. Screening (Animal fluency) 122 PCPs/1523 patients over 65 with 2 or more vascular risk factors.
   - Felt by PCPs to have NO CI.

2. Animal fluency compared to MOCA and PCP clinical impression.
### Screening Results

1. AF +ve (<15) | 52%  
2. MOCA +ve (<26) | 56%  
3. PCP impression +ve for CI | 43%

**Key Point**  
AF screening had high yield in high risk elderly felt to have no CI  

Screen High Risk subpopulation in GP office, FHT, CHC etc: (maximize nursing assessment)
The Stillwater Project

195 Residents Reviewed

- MCI 9%
- Dementia 40%
  - On CI – 58%
  - No CI – 37%
  - Tried - D/Cd - 5%

- No Dementia 51% (100 residents)
- Dementia Quick Screen
  - Refused 8%
  - Passed 33%
  - FAILED 59%
  - Full Assessment
Cognitive Assessment for FHT/CHC

- GiIC – Screening High Risk Population
- Jan 09 – Regional Training Workshop (Nursing)
- Mar 09 – Individual Sessions FHT/CHC Drs/Nursing
2. **Hypertension** (Systolic 150) Yield: 13/32 = 41%
   1. 150-160 (7)
   2. 161-180 (3)
   3. >180 (3)

3. **Osteoporosis** (BMD not done in ♀) yield: 10/28 = 36%
5.  Pain ≥ 5 on scale 0-10  Yield: 10/32 = 31%

   (1) 5 (4)
   (2) 6 (4)
   (3) 7 (1)
   (4) 8 (1)
6. **Depression**: Yield: $9/32 = 28\%$

Defn = 2 or more of:

1. GDS $\geq 5$ out of 15
2. observer impression
3. in the last 2/52, have you often felt downhearted/sad

(2 residents were on antidepressants)
7. Incontinence of Urine  Yield: 7/32 = 22%

8. Nutrition (under) Yield: 6/32 = 19%

9. Total Cholesterol >6 yield: 4/23 = 18%

10. Smoking Yield: 4/32 = 13%

11. Diabetes 2 hr pp > 9  Yield: 5 (1 known) = 4/32 = 13%
Components of an appropriate assessment of illness in “Frail Elderly”

- Presenting Issues
- PMH
- Medications
- Communication
- Cognition/Mood
- Function
- Environment
- Socio-economic Status
- Formal and informal supports

Usual Assessment
Comprehensive Geriatric Assessment
Unfrailing: The Top 10

1. Health Promotion
2. Exercise
3. Early detection of acute illness (Geriatric Giants or atypical presentation)
4. Appropriate Treatment (acute and chronic) optimize co-morbidities
5. Review medication
6. Mobilize
7. Improve nutrition
8. Rehabilitation
9. Optimize environment – minimize personal disabilities
10. Maximize Caregiver support (family and formal)
THE NEW MODEL

WELL

↓  ↑

SUCCESSFUL AGING

FRAIL

GERIATRIC ASSESSMENT AND TREATMENT TO OPTIMIZE

• DISEASES
• DISABILITIES

THEN

SUPPORT SERVICES

INSTITUTIONALIZED
What is Successful Aging?

1. Chronic disease free?
2. Disability free?
3. Dependency free? \[ \text{High function} \]
4. Good cognition
5. Quantity of life
6. Quality of life (adding life to years)
7. Dealing optimally with your dealt hand in the great poker game of life
Senior’s Definition of Successful Aging
(Montroso, LP AM.J. Geriatrics. Psych 2006 (14) 43-51)

- 92% of seniors felt they were successfully aging although large majority failed to meet “Rowe & Kahn” definition because they had chronic diseases and/or physical/functional limitations.
Low risk of disease and disability
High mental and physical function
Active engagement in life

Self acceptance/self contentment
Engagement with life/self growth (can do)

Professionals

Successful Aging

Older Adults
Self Perceptions of Aging

- Predict mortality and change with approaching death (Berling Aging Study)  
  Kotter-Gruhn, D (psychology and Aging 2009)

- Lower Mortality
  - Higher aging satisfaction
  - Younger subjective age
  - Less decline in aging satisfaction
The Different Paths to 100
(Thomas Perls AM J Clin Nutr 2006)

- Centenarians 1 in 10,000 → 1 in 5,000
- Centenarians = genetics, environment, lifestyle and luck
- Longevity enabling genes – sibling study – male siblings 17xs/female siblings 8xs more likely to reach 100.
- 3 Groups
  1. 13% escapers (no diseases of aging at 100)
  2. 45% delayers (diseases of aging only after 80)
  3. 42% survivors (at least 1 disease of aging by 80)
Top 10 Diseases of Aging (Age Associated)

1. Heart Disease
2. Hypertension
3. Stroke
4. Diabetes
5. COPD
6. Skin cancer
7. Non-skin cancer
8. Osteoporosis
9. Parkinson’s
10. Thyroid

What’s Missing??
Successful Aging: The Contribution of Early Life and Midlife (Age 44) Risk Factors
(Britton A., JAGS 2008, 56(6) 1098-1105)

- A longitudinal British Civic Service Cohort Study
- SA = free of major disease and top tertile of physical and cognitive function.

- Height
- Education (men)
- Not smoking
- Diet
- Exercise
- Moderate ETOH (women)
- Work Support (men)
Physical Activity at Midlife in Relation to Successful Survival in Women at Age 70 years or Older (Sun Q. Arch Int Med 170 (Jan 2010) 194-201)

- Nurses Health Study (13535) who reached 70
- CSA = freedom from 10 major chronic diseases or CABG and no cognitive/physical/mental health limitations
- Total Physical Activity = MET (Metabolic-Equivalent Tasks) into quintiles
- SA=10.8%
- SA → TPA quintiles 1, .98, 1.19, 1.50, 1.47
- Walking Speed also = SA easy 1, moderate 90% ↑ odds, brisk 268% ↑ odds
3 Large Cohort Studies

- Much lower risk CAD/CVA if had all 3
  1. Did not smoke
  2. Exercised 3-4 times/week
  3. Healthy diet (fat/glycemic load)

BUT only 4% had all 3
Dementia

- Cognitive impairment most reliable marker of mortality
- Centarians (12-30% dementia free), prevalence of centarians with CI, >90% were cognitively intact well into 90s.
- Dementia incidence peaks at 93 (men), 97 (women)
- Centarians developing dementia 50% is pure vascular dementia
- APOE E4 DECREASES over 90, APOE E2 INCREASES
- Beta-carotene products
## Beta Carotene

<table>
<thead>
<tr>
<th>Position</th>
<th>Food</th>
<th>Micrograms</th>
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<tbody>
<tr>
<td>1.</td>
<td>Pina Colada</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Apricots</td>
<td>2464</td>
</tr>
<tr>
<td>3.</td>
<td>Chinese cabbage</td>
<td>4333</td>
</tr>
<tr>
<td>4.</td>
<td>Beet greens</td>
<td>6610</td>
</tr>
<tr>
<td>5.</td>
<td>Kale</td>
<td>11,470</td>
</tr>
<tr>
<td>6.</td>
<td>Collards</td>
<td>11,591</td>
</tr>
<tr>
<td>7.</td>
<td>Spinach</td>
<td>13,750</td>
</tr>
<tr>
<td>8.</td>
<td>Sweet potato</td>
<td>16,803</td>
</tr>
<tr>
<td>9.</td>
<td>Pumpkin</td>
<td>17,003</td>
</tr>
<tr>
<td>10.</td>
<td>Carrot juice</td>
<td>22,000</td>
</tr>
</tbody>
</table>

Think **ORANGE**, **& GREEN** & **RED**
Exercise and the Aging Brain

1. Walking 1 hour a week vs talking decreased dementia at 3 years by 30%.
2. Walking 1 hour a week increased hippocampal volume 1% in a year vs control group decrease 2%
3. 30 trial meta-analysis of effects of exercise training in elderly persons with CI and dementia
   □ Statistically significant benefits A,B,C (MMSE 16)
Walk Lots and Walk Fast

Americans –
85% do NO vigorous activity but 44% walk.