Atypical Presentation of Illness in the Elderly

What is Going on With Grandma?
Dale C. Moquist, MD
C. Frank Webber Lectureship
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Disclosure

Dr. Moquist has disclosed that neither he nor members of his immediate family have a relevant financial relationship with any ineligible companies in the past 24 months.
Goals

By the end of this educational presentation, learners will be better able to:

1. Discuss how the presentation of an acute illness is modified in older patients.
2. Identify what is taken as "normal" in the elderly can be a treatable or preventable illness.
3. Discuss what illnesses can be hidden in the elderly.
Outline

Altered Physiology in the Elderly
Altered Presentation in the Elderly
The Ms of Geriatric Care
Altered Disease Presentations
Altered Physiology in the Elderly

- Body Composition
- Thermal Variance
- Nutrition
- Musculoskeletal
- Endocrine
- Cardiovascular
- Pulmonary
- Renal
Changes in Body Composition with Age

- **↓** Bone mass, lean mass, water content
- **↑** Total body fat, commonly with **↑** intra-abdominal fat stores
- Cannot generalize well-standardized nutrient requirements of young or middle-aged adults to older adults
What is Normal in the Elderly?

- Compromised function not evident in resting state
- Physiologic effects present when internal/external stressors
- Systems-wide dysregulation and loss of maintenance
- Decreased response to thermal variance
  - Loss of fat and thinning of skin
  - Loss of sweat glands
  - Decreased blood flow to the skin
  - Decreased muscle mass
  - Fewer neurons to monitor temp
Nutrition Changes

- Gastric emptying delayed with fatty meals
- Decreased absorption of Vitamins A, D, K and Zinc
- Decreased Vitamin D production by skin
- Decreased sense of smell
- Altered flavor preferences
- Decreased Iron, B12, and Calcium absorption
- Decreased saliva production leads to oral infection
- Increase in achlorhydria
- Atrophy of muscle layers leads to diverticula, decrease in transit time, and constipation
Musculoskeletal Changes

- Joints become stiffer and less flexible
- Decrease in bone density
- Decrease tone and contractility
- Movement slows and become limited
- Decreased coordination and muscle weakness
- Places overweight and obese at increased risk
Endocrine Changes in Aging

- Thyroxine does not change: Production declines and clearance decreases
- TSH shifts to higher levels in > 80
- Triiiodothyronine (T3) levels are unchanged until extreme old age
- Decrease in aldosterone and cortisol
- Steady state of cortisol remains unchanged
- Increase in parathyroid, erythropoietin and norepinephrine
- Decrease in testosterone
- Decrease in estrogen
- Decrease in growth hormone
- Negative feedback delayed after a stressor
Audience Polling Question #1
Changes in the Heart Include

1. Increase in size and weight
2. Increase in L ventricular wall thickness
3. L atrium dilates
4. L ventricular cavity size does not change
5. None of the above
6. All of the above
The prevalence of CVD increases progressively with age, exceeding 80% in both men and women >80 years old.

<table>
<thead>
<tr>
<th>Age Cohort</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–39 years old</td>
<td>11.9%</td>
<td>10.0%</td>
</tr>
<tr>
<td>40–59 years old</td>
<td>40.5%</td>
<td>35.5%</td>
</tr>
<tr>
<td>60–79 years old</td>
<td>69.1%</td>
<td>67.9%</td>
</tr>
<tr>
<td>≥80 years old</td>
<td>84.7%</td>
<td>85.9%</td>
</tr>
</tbody>
</table>
### Principal Effects of Aging on the Cardiovascular System

<table>
<thead>
<tr>
<th>Age Effect</th>
<th>Clinical Implication</th>
</tr>
</thead>
<tbody>
<tr>
<td>↑ Arterial stiffness</td>
<td>↑ Afterload and systolic BP</td>
</tr>
<tr>
<td>↓ Myocardial relaxation &amp; compliance</td>
<td>↑ Risk of diastolic heart failure and atrial fibrillation</td>
</tr>
<tr>
<td>Impaired responsiveness to $\beta$-adrenergic stimulation</td>
<td>↓ Maximum heart rate and cardiac output; impaired thermoregulation</td>
</tr>
<tr>
<td>↓ Sinus node function and conduction velocity in the atrioventricular node and infranodal conduction system</td>
<td>↑ Risk of sick sinus syndrome, atrioventricular block, left anterior fascicular block, and bundle branch block</td>
</tr>
</tbody>
</table>
## Principal Effects of Aging on the Cardiovascular System

<table>
<thead>
<tr>
<th>Age Effect</th>
<th>Clinical Implication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impaired endothelium-dependent vasodilation</td>
<td>↑ Demand ischemia and risk of coronary artery disease and peripheral arterial disease</td>
</tr>
<tr>
<td>↓ Baroreceptor responsiveness</td>
<td>↑ Risk of orthostatic hypotension, falls, and syncope</td>
</tr>
<tr>
<td>↓ Exercise response</td>
<td>↓ Exercise capacity and ↑ cardiac complications (ischemia, heart failure, shock, arrhythmias, death) with illness</td>
</tr>
<tr>
<td>(↓ maximal heart rate, maximal cardiac output, VO₂ max, coronary blood flow, peripheral vasodilation)</td>
<td></td>
</tr>
</tbody>
</table>
Clinical Effects of CV Changes

- In healthy older adults, age-related changes have modest clinically relevant effects on cardiac hemodynamics and performance at rest.
  - Resting heart rate, ejection fraction, stroke volume, and cardiac output are well preserved even at very advanced age.

- Ability to respond to increased demands associated with exercise or illness (either cardiac or noncardiac) declines progressively with advancing age.
  - Peak aerobic capacity declines inexorably with age.
Cardiac Procedures in Adults > 65

- 71% of CVD hospitalizations
- >50% of percutaneous and surgical coronary procedures
- 60% of defibrillator implantations
- 71% of arterial endarterectomies
- 82% of permanent pacemakers
Audience Polling Question #2

Pulmonary changes include all of the following except:

1. Decreased elastic recoil
2. Surface of the lung decreases
3. Residual volume decreases
4. Vital capacity decreases
5. Forced vital capacity decreases
Age-Related Pulmonary Changes

- Reduced airway size
- Shallow alveolar sacs
- Reduced chest wall compliance
- Intercostal muscle atrophy
- Reduction in diaphragmatic strength by 25%
- Decline of Forced Vital Capacity (FVC)
- \( \text{PaO}_2 \) decreases with age: 110-\((0.4 \times \text{age})\)
Difficulties in Recognizing Respiratory Symptoms

- A common misperception is that older people tend to overestimate or exaggerate respiratory symptoms – the opposite is more often true
- Older people often have more than one cause of their problems
  - Dyspnea, cough, and wheezing may overlap
  - The causes may include a combination of diseases such as asthma or emphysema, obstructive sleep apnea, heart failure, and GERD
Urinary Changes

- Kidney size and weight decreases
- GFR declines
- Concentrating ability declines
- Impaired electrolyte homeostasis
- Serum creatinine overestimates kidney function
- Decrease in renal blood flow
- Decrease in ability to resorb glucose
- Decrease in renal clearance of drugs and toxins
Lower Urinary Tract Changes

- Bladder contractility decreases
- Uninhibited bladder contractions increase
- Diurnal urine output occurs later in day
- Sphincteric striated muscle attenuates
- Post void residual increases
- Bladder capacity decreases
- Vaginal mucosal atrophy is prevalent
- Prostate hypertrophy in men
Altered Presentation in the Elderly

- Different 95th Percentile
- Why Altered Presentation
- Lots of Icebergs
- Rule of Fourths
- Disease Presentation
Range of the 95th percentile of practically anything

Age
Why Altered Acute Presentation?

- Altered central processing
  - Direct effect of the brain by the illness
- Patients' negativity: No chief complaint
  - Tolerate symptoms limiting activities
- Fear of illness and treatment
  - Hospitalization
  - Institutionalization
- Denial of symptoms
  - Ignorance of significance of bodily changes
- Peripheral sensitivity
  - Reduced sensation and awareness
- Unrecognized depression
More on Altered Presentation

- Decrease in functional reserve
- Reduced stamina and fatigue
- Increase of physiologic diversity: What is normal
- Environment and function
- Immobility
- Multiple morbidities
- Iatrogenesis
- Icebergs are common
Rule of Fourths

- $\frac{1}{4}$ Due to Disease: Medical Treatment
- $\frac{1}{4}$ Due to Disuse: Activity Regimen
- $\frac{1}{4}$ Due to Misuse: Prevent & Preserve
- $\frac{1}{4}$ Due to Physiologic Aging: Adapt & Compensate
Disease Presentation

- Abrupt change in functional status
- Falls occurring as prodrome to developing illness
- Brain is especially vulnerable organ
- Limited reserve of several organ systems: Certain illnesses present in an organ system remote from those primarily affected
- Cardiovascular symptoms are often symptoms of other illnesses
The Ms of Geriatric Care

Mind/Mentation
Micturition
Mobility
Medications
Multi-Complexity
Matters Most
Mind/Mentation

Maintaining mental activity
Abrupt change in cognitive function = Delirium
Dementia may be underlying chronic condition
D rugs
electrolytes
L ack of Drugs
I nfections
R educed Sensory
I ntracranial
U rinary Retention
M yocardial
Micturition Problem = Incontinence

Warning signs of underlying disease
Delirium
Infection
Atrophic Vaginitis
Pharmaceuticals
Psychologic – Think Depression
Endocrine
Restricted Mobility
Stool Impaction
Instability Leads to Mobility Problem

- Falls can start the escalating loss of independence
- Fear of fracture
- Especially hip fracture
- Inability to take care of oneself
  - ADLs
  - IADLs
- Underlying disease
Another Mobility Problem: Immobility

- Pressure Ulcers
- Pneumonia
- Depression
- Pain
- Isolation
- Elder Abuse
- Malnutrition
Medications

- What changes have been made in medication regimen?
- Polypharmacy = Multiple concurrent meds
- Failure to follow-up on effectiveness
- Change in pharmacodynamics
  - Decrease in lean mass and increase in adipose tissue
  - Increase in half-life
- Prescription and OTC meds
- The BAG Test!
Risk Factors for Adverse Drug Effects

- Age > 85
- Low body weight
- Six or more concurrent chronic diagnoses
- Estimated GFR < 50
- Nine or more medications
- 12 or more doses per day
- A prior adverse drug event
Principles of Prescribing

- Start with a low dose
- Titrate dose up slowly as patient tolerates
- Try not to start two medications at same time
- Is medication necessary? Nonpharmacologic RX
- What are therapeutic endpoints?
- Benefits outweigh risks?
- Is medication being used to treat side effect?
- Is there a medication to treat 2 conditions?
More Questions?

- Are there potential drug-drug or drug-disease interactions?
- Will new medication administration times be the same time as existing medications?
- Do the patient/caretaker understand what the new medication is for, how to take it, how long to take it, when it should start to work, and possible side effects?
- Can the patient afford the new medication?
- Load iGeriatrics on your smart phone – Beers Criteria
Over Prescribed Meds

- Antibiotics
- Anticholinergics
- Urinary and GI Antispasmodics
- Antipsychotics
- Benzodiazepines
- Digoxin for Diastolic Dysfunction
- NSAIDS
- Insulin Sliding Scale
- Dipyridamole
- Tricyclic Antidepressants
- Protein Pump Inhibitors
- H2 Receptor Antagonists and Sedating Antihistamines
- Skeletal Muscle Relaxants
Underprescribed Medications

- ACE inhibitors for diabetes & proteinuria
- Angiotensin-receptor blockers
- Anticoagulants
- Antihypertensives for uncontrolled HTN
- B Blockers for Post MI & heart failure
- PPIs for NSAID protection
- Statins
- Vitamin D & Calcium for osteoporosis risk
- Bronchodilators
# Adverse Drug Interactions

<table>
<thead>
<tr>
<th>Combination</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE inhibitor + potassium-sparing diuretic</td>
<td>Hyperkalemia</td>
</tr>
<tr>
<td>Anticholinergic + anticholinergic</td>
<td>Cognitive decline</td>
</tr>
<tr>
<td>Calcium channel blockers + erythromycin or clarithromycin</td>
<td>Hypotension and shock</td>
</tr>
<tr>
<td>Concurrent use of $\geq 3$ CNS active drugs</td>
<td>Falls and fractures</td>
</tr>
<tr>
<td>Digoxin + erythromycin, clarithromycin, or azithromycin</td>
<td>Digoxin toxicity</td>
</tr>
<tr>
<td>Lithium + loop diuretics or ACE inhibitor</td>
<td>Lithium toxicity</td>
</tr>
<tr>
<td>Peripheral alpha$_1$ blockers + loop diuretics</td>
<td>Urinary incontinence in women</td>
</tr>
<tr>
<td>Phenytoin + SMX/TMP</td>
<td>Phenytoin toxicity</td>
</tr>
</tbody>
</table>
# Adverse Drug Interactions

<table>
<thead>
<tr>
<th>Combination</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theophylline + ciprofloxacin</td>
<td>Theophylline toxicity</td>
</tr>
<tr>
<td>Sulfonylureas + SMX/TMP, ciprofloxacin, levofloxacin, erythromycin, clarithromycin, azithromycin, and cephalexin</td>
<td>Hypoglycemia</td>
</tr>
<tr>
<td>Tamoxifen + paroxetine (other CYP2D6 inhibitors)</td>
<td>Prevention of converting tamoxifen to its active moiety, resulting in increased breast cancer-related deaths</td>
</tr>
<tr>
<td>Trimethoprim (alone or as SMX/TMP) + ACE inhibitor or ARB or spironolactone</td>
<td>Hyperkalemia</td>
</tr>
<tr>
<td>Warfarin + SMX/TMP, ciprofloxacin, levofloxacin, gatifloxacin, fluconazole, amoxicillin, cephalexin, and amiodarone</td>
<td>Bleeding</td>
</tr>
<tr>
<td>Warfarin + NSAIDs</td>
<td>GI Bleeding</td>
</tr>
</tbody>
</table>
Multi-Complexity

- Loss of homeostasis
- Functional capacity – Not chronologic age
- Decrease in functional reserve
- Age-dependent increases in frequency of diseases
- Internal/external stressors perturb homeostasis
- Multiple chronic diseases
- Multiple physicians
- Multiple physiologic changes
Matters Most

- Coordinating Advance Care Planning
- Setting priorities
- Comprehensive problem list
- Helping manage goals of care
- Making sure patient’s preferences are reflected in treatment plans
- What is important to the patient?
Audience Polling Question #3
Which of the following is NOT a characteristic presentation of illness in the elderly?

1. Depression without sadness
2. Infectious disease without leukocytosis
3. Fever without cause
4. Apathetic thyrotoxicosis
5. Myocardial infarction without chest pain
Altered Disease Presentations

- Depression without Sadness
- Silent Infectious Disease
- Hyperthyroidism
- Hypothyroidism
- Presentation of Acute Coronary Syndrome
- Unique Case
- Covid-19
Depression Without Sadness

- May exhibit little dysphoria
- Not a normal part of aging
- Somatic issues dominate and mask the depression
- Patient preoccupied with:
  - Appetite changes
  - Vague GI symptoms
  - Constipation
  - Sleep disturbances
- Mental confusion: “Pseudodementia”
- Higher rate of psychotic and melancholic depression
Minor depression (“other specified depressive disorder” in *DSM-5*): presence of depressed mood with 2 or 3 additional symptoms of major depressive disorder
- 15% of older people (range 8% to >40%)
- Associated with ↑ use of health services, excess disability, poor health outcomes, including ↑ mortality

Major depressive disorder
- 6%–10% of older adults in primary care clinics
- 12%–20% of nursing home residents
- 11%–45% of hospitalized older adults
Other Issues with Depression

- Physicians concentrate on symptoms
- Interpret symptoms as an appropriate reaction to multiple medical problems
- “Wouldn’t you be depressed in that situation?”
- Harder to recognize medical illness
  - Hypothyroidism
  - Hyperthyroidism
- Response to catastrophic loss
  - Bereavement or financial collapse
  - Crippling disability or illness
  - Natural disaster
- Overlapping symptoms of depression & somatic illness
PHQ-2 for Screening

- During the past month have you often been bothered by:
  - Little interest or pleasure in doing things?
  - Feeling down, depressed, or hopeless?
- If the answer is “No” to BOTH questions, the screen is negative
- If the answer is “Yes” to EITHER, then proceed with in-depth evaluation
- Sensitivity: 96% Specificity: 57%
Patient Health Questionnaire-9

- Designed to correspond with DSM-V
- Sensitivity: 88% & Specificity: 88%
- Serial testing with PHQ-2 and PHQ-9 best validated two-stage strategy to detect major depression
- Score of $\geq 10$ is positive
- 0-4 No symptoms
- 5-9 Minor symptoms
- Can incorporate into EHR
- Use to monitor treatment
**PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9)**

Over the last 2 weeks, how often have you been bothered by any of the following problems? (Use ‘*’ to indicate your answer)

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Several days</th>
<th>More than half the days</th>
<th>Nearly every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Little interest or pleasure in doing things</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Feeling down, depressed, or hopeless</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Trouble falling or staying asleep, or sleeping too much</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Feeling tired or having little energy</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Poor appetite or overeating</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Feeling bad about yourself — or that you are a failure or have let yourself or your family down</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Trouble concentrating on things, such as reading the newspaper or watching television</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Thoughts that you would be better off dead or of hurting yourself in some way</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

For office coding

\[ 0 + ______ + ______ + ______ = \text{Total Score: } ______ \]

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

<table>
<thead>
<tr>
<th>Not difficult at all</th>
<th>Somewhat difficult</th>
<th>Very difficult</th>
<th>Extremely difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
### Response to PHQ-9

<table>
<thead>
<tr>
<th>PHQ-9 Score</th>
<th>Depression Severity</th>
<th>Clinician Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–4</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>5–9</td>
<td>Mild to moderate</td>
<td>If not currently treated, rescreen in 2 weeks. If currently treated, optimize antidepressant and rescreen in 2 weeks</td>
</tr>
<tr>
<td>10–14</td>
<td>Major depressive disorder</td>
<td>Start antidepressant therapy</td>
</tr>
<tr>
<td>≥15</td>
<td>Major depressive disorder</td>
<td>Start antidepressant therapy; obtain psychiatric consultation if suicidality or psychosis suspected</td>
</tr>
</tbody>
</table>
Response to Treatment

Prescriber response guidelines at 4 weeks based on PHQ-9 and Sequenced Treatment Alternatives to Relieve Depression (STAR*D) Studies

<table>
<thead>
<tr>
<th>PHQ-9 Score or Change</th>
<th>Outcome</th>
<th>Clinician Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>No decrease or increase</td>
<td>Nonresponse</td>
<td>Switch medication</td>
</tr>
<tr>
<td>Decrease of 2–4 points</td>
<td>Partial response</td>
<td>Add medication</td>
</tr>
<tr>
<td>Decrease of ≥5 points</td>
<td>Response</td>
<td>Maintain medication</td>
</tr>
<tr>
<td>Score &lt;5</td>
<td>Remission</td>
<td>Maintain medication</td>
</tr>
</tbody>
</table>
SSRIs

- Make them drugs of choice for RX
  - Safety
  - Side effects
- Dropout rates are much less
- Initially more costly but generics are now available
- Less IP and OP care
- Less sedation and anticholinergic SEs
- Little or no influence on cognition
- Fewer cardiovascular SEs BUT QT Prolongation – Citalopram
  - <65 Maximum dose of 40 mgm
  - >65 Maximum dose of 20 mgm
More on SSRIs

- Fluoxetine, Sertraline, Paroxetine, Citalopram, Escitalopram
- Give initially in AM because of activation
- Occasional Sedation: May give at night
- Side Effects: Weight loss, fatigue, dry mouth, nausea, diarrhea, headache, sexual dysfunction, hyponatremia, and anxiety
- Be sure to check BMP for SIADH
- High inhibitory effects on CYP2D6
  - Fluoxetine: Agitation & insomnia
  - Paroxetine: Dry mouth, fatigue, & constipation
- GI side effects reduced by dose titration
<table>
<thead>
<tr>
<th>Drug</th>
<th>Initial Dosage</th>
<th>Final Dosage</th>
<th>Comments/Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citalopram</td>
<td>10mg qam</td>
<td>20mg qam</td>
<td>Risk of Qtc prolongation in doses &gt;20 mg, nausea, tremor, hyponatremia, serotonin syndrome</td>
</tr>
<tr>
<td>Escitalopram</td>
<td>10mg qam</td>
<td>10-20mg qam</td>
<td>Nausea, tremor, serotonin syndrome; reduce dosage in renal insufficiency</td>
</tr>
<tr>
<td>Sertraline</td>
<td>25mg qam</td>
<td>100-200mg qam</td>
<td>Nausea, tremor, insomnia, serotonin syndrome, diarrhea</td>
</tr>
<tr>
<td>Paroxetine</td>
<td>10mg qam</td>
<td>40mgm qam</td>
<td>Constipation, nausea, tremor, serotonin syndrome, insomnia</td>
</tr>
<tr>
<td>Fluoxetine</td>
<td>10mg qam</td>
<td>40mgm qam</td>
<td>Agitation, Insomnia, headache, nausea, diarrhea, sexual dysfunction</td>
</tr>
</tbody>
</table>
Serotonin Syndrome

- Acute headache, agitation, hyperactivity, confusion
- Diarrhea and GI upset
- Fever usually >100.5 F and diaphoresis
- Hyperreflexia and tremor
- Shivering and seizures
- Most common in:
  - Paroxetine
  - Venlafaxine
  - Sertraline
- Least common with Fluoxetine
### SSRIs/SNRIs Dosing

<table>
<thead>
<tr>
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<th>Initial Dosage</th>
<th>Final Dosage</th>
<th>Comments/Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duloxetine</td>
<td>20-30mg qam</td>
<td>60mg qam</td>
<td>Drug interactions (CYP1A2, -2D6 substrate); chronic liver disease, alcoholism, increased serum transaminase; reduce dosage in renal insufficiency, treatment of UI, treatment for chronic pain</td>
</tr>
<tr>
<td>Venlafaxine XR</td>
<td>37.5-75mg qam</td>
<td>75-225mg qam</td>
<td>Mild hypertensive; headache, nausea, vomiting; do not stop abruptly; reduce dosage in renal insufficiency, sexual dysfunction</td>
</tr>
<tr>
<td>Vortioxetine</td>
<td>5mg qam</td>
<td>10-20mg qam</td>
<td>Nausea; no data available on doses &gt;5mg in older adults</td>
</tr>
</tbody>
</table>
## Other Antidepressants

<table>
<thead>
<tr>
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<th>Final Dosage</th>
<th>Comments/Precautions</th>
</tr>
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<tbody>
<tr>
<td><strong>TCAs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nortriptyline</td>
<td>10-25mg qhs</td>
<td>25-100mg qhs</td>
<td>Glaucoma, prostatic disease, diabetes; may be fatal in overdose; therapeutic window 50-150 ng/mL serum level</td>
</tr>
<tr>
<td><strong>Other Antidepressants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bupropion</td>
<td>75mg q12h, 150mg qam</td>
<td>150-300mg extended release qam</td>
<td>Agitation, insomnia, seizures, tremor, sexual dysfunction less common, minimal weight gain</td>
</tr>
<tr>
<td>Mirtazapine</td>
<td>7.5mg qhs</td>
<td>15-45mg qhs</td>
<td>Dry mouth, weight gain, potential for neutropenia, reduce dosage in renal insufficiency, somnolence, no sexual SEs</td>
</tr>
</tbody>
</table>
Silent Infectious Disease

- Many older patients have SEPSIS without leukocytosis and fever
  - One study 48% afebrile
  - 58% no significant leukocytosis
- Many take anti-inflammatory meds
- Tachycardia can be absent
- Peritonitis can be modified
- Presentation of pneumonia is changed
Different clinical presentation in elderly
Patients >65 account for over 50% of cases
Clinical picture is incomplete
Fever and cough can be absent
Chest x-ray may be normal
Altered mental status
Delay in administering antibiotics
Goal is to administer antibiotics within 4 hours of presentation
Factors Predicting a Delay in Antibiotic Delivery of >4 Hours

- Altered Mental State 2.89
- Absence of Hypoxia 1.82
- Absence of Fever 1.59
- Age 1.01
- Cerebrovascular Disease 1.09
- NH Resident 3.24
- Absence of Shock 1.76
- Tachycardia >125 1.30
- Respiratory Rate > 30 1.25

Grant W. Waterer. Delayed Administration of Antibiotics & Atypical Presentation in CAP. Chest 2006;130:11-15
CURB-65

- Confusion
- Urea > 20
- Respiratory Rate > 30
- BP: Systolic < 90 or Diastolic < 60
- Age > 65
- Each Factor is One Point

<table>
<thead>
<tr>
<th>SCORING</th>
<th>FOR</th>
<th>CURB-65</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 Points</td>
<td>Low Severity</td>
<td>Death &lt; 3%</td>
</tr>
<tr>
<td>2 Points</td>
<td>Moderate Severity</td>
<td>Death &lt; 9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider Hospital</td>
</tr>
<tr>
<td>3-5 Points</td>
<td>High Severity</td>
<td>Death &lt; 15-40%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hospital Indicated</td>
</tr>
</tbody>
</table>
Nursing Home Patients

- Pneumonia is common in NH
- Frequent reason for transfer to hospital
- Hospital Admission: Decline in function & quality of life
- Developed clinical pathway in Canada
- 680 Patients: 327 in pathway & 353 in usual care
- Pneumonia: 2 or more symptoms & signs
  - New/Increased Cough
  - New/Increased sputum
  - Temp > 38 C
  - Pleuritic chest pain
  - New/Increased findings on chest exam
Clinical Pathway For NH

- Able to eat & drink
- Pulse < 100
- Respiratory rate < 30
- Systolic BP > 90 or less than 20
- Oxygen saturation >92 or COPD > 90
- Decreased hospitalization: 10% vs. 22%
- No difference in mortality: 8% vs. 9%
- Cost saving of > $1000 per NH resident

Hyperthyroidism in the Elderly

- Hyperthyroidism less common in elderly
  - Prevalence 2%
  - 15-25% of cases happened > 60 y/o
- Most cases are Grave’s disease
- Primary SX: Relative tachycardia, weight loss, fatigue, HF, muscle atrophy, atrial fibrillation
- Typical symptoms less common or absent
  - Tremor and tachycardia
  - Hyperkinesis and brisk reflexes
  - Heat intolerance and increased perspiration
  - Ophthalmopathy and frequent BMs
  - Goiter
Apathetic Thyrotoxicosis

- Rarely seen in younger adults: More common in elderly
- Hyperkinesis replaced with
  - Depression
  - Inactivity
  - Lethargy
  - Withdrawn behavior
- Common symptoms
  - Anorexia and weight loss
  - Constipation
  - Muscle weakness
  - Cardiac symptoms
Diagnosing Hyperthyroidism

- Initial test is TSH and confirm with Free T4
- Low TSH: 3-fold risk of AF within 10 years
- Common manifestations
  - Atrial Fibrillation
  - Heart Failure
  - Muscle Atrophy
  - Weakness
- Hyperthyroidism in 13-30% of AF
- Cause of secondary osteoporosis
Subclinical Hyperthyroidism

- Most asymptomatic with low TSH are clinically euthyroid have normal T4
  - Repeat TSH in 6 weeks is normal
- Definition: Low or absent TSH with normal T3 & T4
- Exogenous subclinical HT in 20-40% on levothyroxine
- 1-2% develop hyperthyroidism with TSH < 0.1
- TSH 0.1-4.5 normalize over time
- TSH < 0.1
  - Atrial Fibrillation
  - Reduced BMD
  - Increased cardiovascular mortality
  - Increased total mortality
Hypothyroidism

- Prevalence: 0.5-5%
- Subclinical: 5-10%
- Main cause is chronic autoimmune thyroiditis
- DX only made by clinical exam in 10-20% may rapidly become severely hypothyroid
- Dementia patients improve but rarely recover normal cognitive function
- Symptoms often atypical and insidious in onset
- Features suggest other diseases: Dry skin, slowed mentation, weakness, constipation, anemia, arthritis, paresthesias, edema, gait, neuropathy
Subclinical Hypothyroidism

- Increased TSH with normal T4
- Up to 15% over age 65
- More common in females
- Increased CVD in < Age 65
- Randomized RX of T4 supplementation: No improvement
- TSH > 10 may derive symptomatic improvement
- TSH > 10 increased risk of CAD & mortality for ALL
- 70% have values within age-specific 97.5 percentile
RX Subclinical Hypothyroidism

- Double-blind, randomized, placebo-controlled
- 737 adults over age 65
- TSH 4.60-19.99 and normal free T4
- Thyroid-related quality-of-life outcome & tiredness score
- No differences in hypothyroid symptoms at 1-year
- Levothyroxine provided no apparent benefit in older persons with subclinical hypothyroidism

Stott DJ. Thyroid Hormone Therapy for Older Adults with Subclinical Hypothyroidism. *NEJM* June 29, 2017. 376:2534-44.
Diagnose

- Increased TSH usually hypothyroidism
- Confirm with repeat TSH & free T4
- TSH transiently increased with severe nonthyroidal disease
- Normal or low TSH with low free T4 suggest secondary hypothyroidism
- Start at low dose of 25mcg and increase Q4-6 weeks until TSH is normal
- Severe cardiac disease start at 12.5mcg
What Affects Lab Results?

- Lower TSH
  - Dopamine
  - Phenytoin
  - Glucocorticoids
  - Fasting
- Decrease conversion T4 to T3
  - Beta Blockers
  - High-dose glucocorticoids
- Increase TSH
  - Amiodarone
  - Lithium
  - Iodine
Audience Polling Questions #4  
Most common initial presenting symptom for ACS in patients > 80 is:

1. Chest Pain  
2. Diaphoresis  
3. Dizziness  
4. Shortness of breath  
5. Nausea and vomiting
Acute Coronary Syndromes

- Include unstable angina, NSTEMI, and STEMI
- Chest pain presentation declines with age
- SOB most common initial symptom
- Elderly ACS presentation:
  - Altered mental status
  - Confusion
  - Dizziness
  - Syncope
- Delayed presentation to medical facility
- More likely to die or recurrent MI
- Less likely to receive PCI
Presentation of ACS

- Sedentary lifestyles delay symptom onset
- Initial EKG tends to be nondiagnostic:
  - Prior MI
  - LVentricular hypertrophy
  - Conduction abnormalities: LBBB
  - Paced rhythm
- Proportion of ACS with ST Elevation declines
- Delay in RX:
  - Altered symptoms
  - Nondiagnostic EKG
  - Presentation delays
Age Differences for ACS Outcomes

- Prospective observational cohort study
- Typical Scottish General Hospital
- 869 presenting with ACS over 6 months
- 477 Patients > 65
- Less likely present with chest pain
- More likely SOB & collapse
- Fewer major risk factors
- Highlighted age as a predictor of adverse outcome

Soiza Roy. Age-Dependent Differences in Presentation, Risk Factor Profile & Outcome of Suspected ACS. JAGS 2005; 53:1961-1965
Another Altered Presentation

- 91 y/o HM presents to clinic complaining of lightheadedness. No falling or vertigo. Worse in the AM and when he stands up. This can last all day. Denies chest pain or SOB.
- Illnesses: HTN, Type II DM, Rhinitis, Hx of TIA, Hypothyroidism
- Medications: Diovan 160 BID, Glucophage 850 QD, Levothyroxine 88mcg QD, Metoprolol XL 100 QD, Glimepiride 1mg QD
- Lab: HgbA1C = 6.6, TSH NL, Creatinine = 1.23
Case Continued

• BP = 122/80 (obtained by nurse)
• Alert and awake
• Ambulates normally
• Chest: Clear
• Heart: Reg rate, no murmur
• Ext: No edema
• Smiling in the office
Audience Polling Questions #5
What should YOU do now?

1. Check blood sugar
2. Check CBC
3. Check electrolytes
4. Order cardiac echo
5. Palpate postural blood pressure
Pseudohypertension

- Caused by sclerotic arteries
- These arteries do not collapse
- BP readings are erroneously elevated
- More common in elderly
- Actual prevalence is unclear
- More accurate readings by palpation
Postural Hypotension

- Systemic review and meta-analysis
- Prevalence is substantial in primary care
- Reduction: Systolic \( \geq 20 \) or Diastolic \( \geq 10 \) within 3 minutes
- Hypertension: 19%
- Diabetes: 21%
- Parkinson’s: 25%
- Dementia: 29%

What About COVID-19?

- Identify early in course to provide appropriate medical care
- Main Symptoms
  - Fever
  - Cough
  - Shortness of breath
  - Loss of taste and smell
  - Headache
  - Myalgias and fatigue
- Elderly with multiple comorbidities present atypically
- Not the typical inflammatory febrile response
Atypical Presentation of COVID-19

- 516 patients admitted with Covid-19 to 4 hospitals
  - 14.1% had delirium
  - Increased in-hospital mortality
- 817 older patients with Covid presented to ER
  - 28% delirium at presentation & worse outcomes
  - Sixth most common presenting symptom or sign
  - 16% delirium was primary symptom
  - 37% no cough or fever
  - Must include in differential diagnosis of delirium
Nursing Home Patients

- 5256 NH residents with Covid: 21% 30-day mortality
  - Increased age
  - Male sex
  - Impaired cognitive function
  - Impaired physical function


- Classically define fever as 38.0° C
  - VA (1301) and community (3368) NH
  - Lack sensitivity & insufficient to trigger testing
  - More realistic to use 37.2° C improves sensitivity

McConeghy K. Temperature Screening for SARS-CoV-2 in Nursing Homes: Evidence from Two National Cohorts. *JAGS* DOI: 10.1111/jgs.16876
SUMMARY

- Discussed “normal” changes in the elderly
- Discussed M signs of geriatric care
  - Mind/mentation
  - Micturition
  - Mobility
  - Medications
  - Multi-complexity
  - Matters most
- Iatrogenesis: What we prescribe!
- Discussed atypical presentation of disease in the elderly
Since more and more Seniors are texting and tweeting, there appears to be a need for an STC (Senior Texting Code). If you qualify for Senior Discounts, this is the code for you.

Please pass this on to your children and grandchildren so they can understand your texts.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATDO:</td>
<td>At The Doctor’s Office</td>
</tr>
<tr>
<td>BFF:</td>
<td>Best Friend Fainted</td>
</tr>
<tr>
<td>BTW:</td>
<td>Bring The Wheelchair</td>
</tr>
<tr>
<td>BYOT:</td>
<td>Bring Your Own Teeth</td>
</tr>
<tr>
<td>CBM:</td>
<td>Covered By Medicare</td>
</tr>
<tr>
<td>CGU:</td>
<td>Can't get up</td>
</tr>
<tr>
<td>CUATSC:</td>
<td>See You At The Senior Center</td>
</tr>
<tr>
<td>WDWE:</td>
<td>When Do We Eat</td>
</tr>
<tr>
<td>FWBB:</td>
<td>Friend With Beta Blockers</td>
</tr>
<tr>
<td>FWIW:</td>
<td>Forgot Where I Was</td>
</tr>
<tr>
<td>FYI:</td>
<td>Found Your Insulin</td>
</tr>
<tr>
<td>GGPBL:</td>
<td>Gotta Go Pacemaker Battery Low!</td>
</tr>
<tr>
<td>GHA:</td>
<td>Got Heartburn Again</td>
</tr>
<tr>
<td>IMHO:</td>
<td>Is My Hearing-Aid On?</td>
</tr>
<tr>
<td>LMDO:</td>
<td>Laughing My Dentures Out</td>
</tr>
<tr>
<td>LOL:</td>
<td>Living On Lipitor</td>
</tr>
<tr>
<td>LWO:</td>
<td>Lawrence Welk’s On</td>
</tr>
<tr>
<td>OMMR:</td>
<td>On My Massage Recliner</td>
</tr>
<tr>
<td>ROFL... CGU:</td>
<td>Rolling On The Floor Laughing... And Can’t Get Up</td>
</tr>
<tr>
<td>WAITT:</td>
<td>Who Am I Talking To?</td>
</tr>
<tr>
<td>WTP:</td>
<td>Where’s The Prunes?</td>
</tr>
<tr>
<td>WWNO:</td>
<td>Walker Wheels Need Oil</td>
</tr>
<tr>
<td>1971</td>
<td>2021</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Long Hair</td>
<td>Longing for Hair</td>
</tr>
<tr>
<td>KEG</td>
<td>EKG</td>
</tr>
<tr>
<td>Acid Rock</td>
<td>Acid Reflux</td>
</tr>
<tr>
<td>Seeds and Stems</td>
<td>Fiber</td>
</tr>
<tr>
<td>Hoping for a BMW</td>
<td>Hoping for a BM</td>
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<tr>
<td>Going to a New Hip Joint</td>
<td>Getting a New Hip Joint</td>
</tr>
<tr>
<td>Rolling Stones</td>
<td>Kidney Stones</td>
</tr>
<tr>
<td>Disco</td>
<td>Costco</td>
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<tr>
<td>Whatever</td>
<td>Depends</td>
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</table>
## Trade Names of Medications

<table>
<thead>
<tr>
<th>Generic</th>
<th>Trade Name</th>
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<tbody>
<tr>
<td>Escitalopram</td>
<td>Lexapro</td>
</tr>
<tr>
<td>Citalopram</td>
<td>Celexa</td>
</tr>
<tr>
<td>Fluoxetine</td>
<td>Prozac</td>
</tr>
<tr>
<td>Paroxetine</td>
<td>Paxil</td>
</tr>
<tr>
<td>Sertraline</td>
<td>Zoloft</td>
</tr>
<tr>
<td>Mirtazapine</td>
<td>Remeron</td>
</tr>
<tr>
<td>Venlafaxine</td>
<td>Effexor</td>
</tr>
<tr>
<td>Bupropion</td>
<td>Wellbutrin</td>
</tr>
<tr>
<td>Duloxetine</td>
<td>Cymbalta</td>
</tr>
<tr>
<td>Vortioxetine</td>
<td>Trintellix, Brintellix</td>
</tr>
<tr>
<td>Pimavanserin</td>
<td>Nuplazid</td>
</tr>
</tbody>
</table>
Resources

- 10th Edition Geriatrics Review Syllabus 2019
  - Chapter 2 Biology
  - Chapter 59 Endocrinology
  - Chapter 48 Cardiovascular Diseases and Disorders
  - Chapter 30 Urinary Incontinence
  - Chapter 11 Pharmacotherapy
Resources

- Soiza Roy. Age-Dependent Differences in Presentation, Risk Factor Profile & Outcome of Suspected ACS. *JAGS* 2005; 53:1961-1965
- GRS Teaching Slides – 10th Edition 2019
  - Respiratory Diseases and Disorders
  - Cardiovascular Diseases and Disorders
  - Endocrine and Metabolic Disorders
  - Depression and Other Mood Disorders
  - Pharmacotherapy
  - Chapter 1 Principles of Geriatrics & Primary Care pp. 3-17
  - Chapter 18 Depression pp 214-226
  - Chapter 49 Infectious Disease pp 523-526
## PHYSIOLOGIC CHANGES

<table>
<thead>
<tr>
<th>Body system</th>
<th>Change</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nervous</td>
<td>↓ Number of neurons ↓ Action potential speed ↓ Axon/dendrite branches</td>
<td>↓ Muscle innervation ↓ Fine motor control</td>
</tr>
<tr>
<td>Muscle</td>
<td>Fibers shrink ↓ Type II (fast twitch) fibers ↑ Lipofuscin and fat deposits</td>
<td>Tissue atrophies ↓ Tone and contractility ↓ Strength</td>
</tr>
<tr>
<td>Skin</td>
<td>↓ Thickness ↑ Collagen cross-links</td>
<td>Loss of elasticity</td>
</tr>
<tr>
<td>Skeletal</td>
<td>↓ Bone density Joints become stiffer, less flexible</td>
<td>Movement slows and may become limited</td>
</tr>
</tbody>
</table>
# PHYSIOLOGIC CHANGES

<table>
<thead>
<tr>
<th>Body System</th>
<th>Change</th>
<th>Consequences</th>
</tr>
</thead>
</table>
| Heart       | ↑ Left ventricular wall thickness  
              ↑ Lipofuscin and fat deposits | Stressed heart is less able to respond |
| Vasculature | ↑ Stiffness  
              ↓ Responsiveness to receptor-mediated agents |  |
| Pulmonary   | ↓ Elastin fibers  
              ↑ Collagen cross-links  
              ↓ Elastic recoil of the lung  
              ↑ Residual volume  
              ↓ Vital capacity, forced expiratory volume, and forced vital capacity | ↓ Effort-dependent and independent ventilation (quiet and forced breathing)  
               ↓ Exercise tolerance and pulmonary reserve |
<table>
<thead>
<tr>
<th>Body System</th>
<th>Change</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td>$\uparrow$ Lipid infiltrates/deposits</td>
<td>$\downarrow$ Transparency of the cornea</td>
</tr>
<tr>
<td></td>
<td>$\uparrow$ Thickening of the lens</td>
<td>Difficulty in focusing on near objects</td>
</tr>
<tr>
<td></td>
<td>$\downarrow$ Pupil diameter</td>
<td>$\downarrow$ Accommodation and dark adaptation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eyes</td>
<td>$\uparrow$ Thickening of tympanic membrane</td>
<td>$\uparrow$ Conductive deafness (low-frequency range)</td>
</tr>
<tr>
<td></td>
<td>$\downarrow$ Elasticity and efficiency of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ossicular articulation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\uparrow$ Organ atrophy</td>
<td>$\uparrow$ Sensorineural hearing loss (high-frequency sounds)</td>
</tr>
<tr>
<td></td>
<td>$\downarrow$ Cochlear neurons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\downarrow$ Number of neurons in the</td>
<td>$\downarrow$ Detection of gravity, changes in speed, and rotation</td>
</tr>
<tr>
<td></td>
<td>utricle, saccule, and ampullae</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\downarrow$ Size and number of otoliths</td>
<td></td>
</tr>
</tbody>
</table>
## PHYSIOLOGIC CHANGES

<table>
<thead>
<tr>
<th>Body System</th>
<th>Change</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digestive</td>
<td>↑ Dysphagia</td>
<td>↓ Iron absorption</td>
</tr>
<tr>
<td></td>
<td>↑ Achlorhydria</td>
<td>↓ B&lt;sub&gt;12&lt;/sub&gt; and calcium absorption</td>
</tr>
<tr>
<td></td>
<td>Altered intestinal absorption</td>
<td>↑ Incidence of diverticula, transit time, and constipation</td>
</tr>
<tr>
<td></td>
<td>↑ Lipofuscin and fat deposition in pancreas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↑ Mucosal cell atrophy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓ Iron absorption</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓ B&lt;sub&gt;12&lt;/sub&gt; and calcium absorption</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓ Incidence of diverticula, transit time, and constipation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓ Ability to resorb glucose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓ Concentrating ability of kidney</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓ Renal clearance of drugs, toxins</td>
<td></td>
</tr>
<tr>
<td>Urinary</td>
<td>↓ Kidney size, weight, and number of functional glomeruli</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓ Number and length of functional renal tubules</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓ Glomerular filtration rate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓ Renal blood flow</td>
<td></td>
</tr>
</tbody>
</table>
# Physiologic Changes

<table>
<thead>
<tr>
<th>Body System</th>
<th>Change</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immune</td>
<td>↓ Primary and secondary response</td>
<td>↓ Immune functioning</td>
</tr>
<tr>
<td></td>
<td>↑ Autoimmune antibodies increase</td>
<td>↓ Response to new pathogens</td>
</tr>
<tr>
<td></td>
<td>↓ T-cell function; fewer naive and more memory T cells</td>
<td>↓ T lymphocytes, NK cells, cytokines needed for growth and maturation of B cells</td>
</tr>
<tr>
<td></td>
<td>Atrophy of thymus</td>
<td></td>
</tr>
<tr>
<td>Endocrine</td>
<td>↑ Atrophy of certain glands</td>
<td>Changes in target organ response, organ system homeostasis, response to stress, functional capacity</td>
</tr>
<tr>
<td></td>
<td>↓ Growth hormone, DHEA, testosterone, estrogen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↑ Parathyroid hormone, ANP, norepinephrine, baseline cortisol, erythropoietin</td>
<td></td>
</tr>
</tbody>
</table>
Treatment Algorithm for Subclinical Hypothyroidism.

Peeters RP. N Engl J Med 2017;376:2556-2565