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NEW JERSEY INSTITUTE FOR SUCCESSFUL AGING

MEDICATION APPROPRIATENESS FOR THE AGING POPULATION

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Building Partnerships for Successful Aging

Learning objectives

- Appreciate complexities involved in making appropriate clinical decisions in older adults with regard to stopping medications.

- Describe guiding principles for the care of older adults with multiple co-morbidities as relating to pharmacologic treatment.

- Discuss the impact of life expectancy, functional status, goals of care, and time to treat on this decision making process.

No Disclosures

- I have no financial disclosures to report.

Chronic Conditions

- Hypertension
- Diabetes melltius
- Osteoarthritis
- Congestive heart failure
- Diabetes mellitus
- Hyperlipidemia
- Osteoporosis
- Atrial fibrillation
- COPD

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The Medication Appropriateness Index

- Is there an indication for the drug?
- Is the medication effective for the condition?
- Is the dosage correct?
- Are the directions correct?
- Are the directions practical?
- Are there clinically significant drug-drug interactions?
- Are there clinically significant drug-disease/condition interactions?
- Is there unnecessary duplication with other drugs?
- Is the duration of therapy acceptable?
- Is this drug the least expensive alternative compared with others of equal usefulness?

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Case: Mrs. B

Mrs. B is a 79-year-old woman with 5 chronic conditions of moderate severity:

- COPD
- Hypertension
- Diabetes mellitus
- Osteoporosis
- Osteoarthritis

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Treatment regimen based on clinical practice guidelines

Time	Medications	Non-pharmacologic Therapy	All Day	Periodic
7 AM	Ipratropium MDI Alendronate 70mg weekly	Check feet Sit upright 30 min. Check blood sugar	Joint protection Energy conservation Exercise (non-weight bearing if severe foot disease, weight bearing for osteoporosis) Muscle strengthening exercises, Aerobic Exercise ROM exercises Avoid environmental exposures that might exacerbate COPD Wear appropriate footwear Albuterol MDI prn Limit Alcohol Maintain normal body weight	Pneumonia vaccine, Yearly influenza vaccine All provider visits:Evaluate Self-monitoring blood glucose, foot exam and BP Quarterly HbA1c, biannual LFTs Yearly creatinine, electrolytes, microalbuminuria, cholesterol Referrals: Pulmonary rehabilitation Physical Therapy DEXA scan every 2 years Yearly eye exam Medical nutrition therapy Patient Education: High-risk foot conditions, foot care, foot wear Osteoarthritis COPD medication and delivery system training Diabetes Mellitus
8 AM	Eat Breakfast HCTZ 12.5 mg Lisinopril 40mg Glyburide 10 mg ECASA 81 mg Metformin 850mg Naproxen 250mg Omeprazole 20mg Calcium + Vit D 500mg	2.4gm Na, 90mm K, Adequate Mg, ↓ cholesterol & saturated fat, medical nutrition therapy for diabetes, DASH		
12 PM	Eat Lunch Ipratropium MDI Calcium+ Vit D 500 mg	Diet as above		
5 PM	Eat Dinner	Diet as above		
7 PM	Ipratropium MDI Metformin 850mg Naproxen 250mg Calcium 500mg Lovastatin 40mg	3800-4800 US$ per year out of pocket.		
11 PM	Ipratropium MDI			

Boyd et al JAMA 2005;294:716-724

Potential treatment interactions

	Hypertension	Diabetes	Osteoarthritis	Osteoporosis	COPD
Her meds	HCTZ ACE inhibitor	Sulfonylurea, Metformin, ASA, HMG CoA reductase	NSAID Proton Pump inhibitor	Vit D, Calcium, Bisphosphonates	Albuterol Ipra-tropium
Med-Disease inter-actions	**Diabetes:** 1) Diuretics ↑ glucose & lipids		**HTN:** 1) NSAIDS ↑ BP 2) NSAIDS +HTN ↑ renal risk		
Med-Med inter-actions	**Diabetes Meds:** HCTZ may ↓effectiveness of glyburide.	**Osteoarthritis Meds:** 1) NSAIDS + ASA ↑ risk of bleeding **Diabetes Medications:** 2) Glyburide and ASA : ↑ Hypoglycemia 3) Aspirin may ↓ effectiveness of lisinopril.	**Diabetes Meds:** 1) NSAIDS+A SA ↑ bleeding risk **HTN Meds:** 2) NSAIDS ↓ diuretic efficacy	**Diabetes Meds:** 1) Calcium may ↓ efficacy of ASA 2) ASA + Alendronate may lead to GI upset. **Osteoporosis Meds:** 3) Calcium may ↓ serum alendronate	
Med-Food inter-actions		1) Glyburide + ETOH: low sugar, flushing, ↑RR, ↑HR 2) Aspirin + ETOH: ↑ risk of GI bleed 3) Metformin+ ETOH: Extreme weakness, ↑RR 4) Atorvastatin + GF Juice: Muscle weakness, pain 5) Metformin + Food: Decreases amount absorbed		4) Calcium + Oxalic acid (spinach, rhubarb), Phytic (bran & whole cereals) may ↓ Calcium 5) Alendronate + calcium: 2 hours apart from food with calcium and on empty stomach 6) Avoid OJ on alendronate	

What should be considered appropriate prescribing for patients late in life?

1. Remaining life expectancy
2. Time until benefit
3. Goals of care
4. Treatment targets

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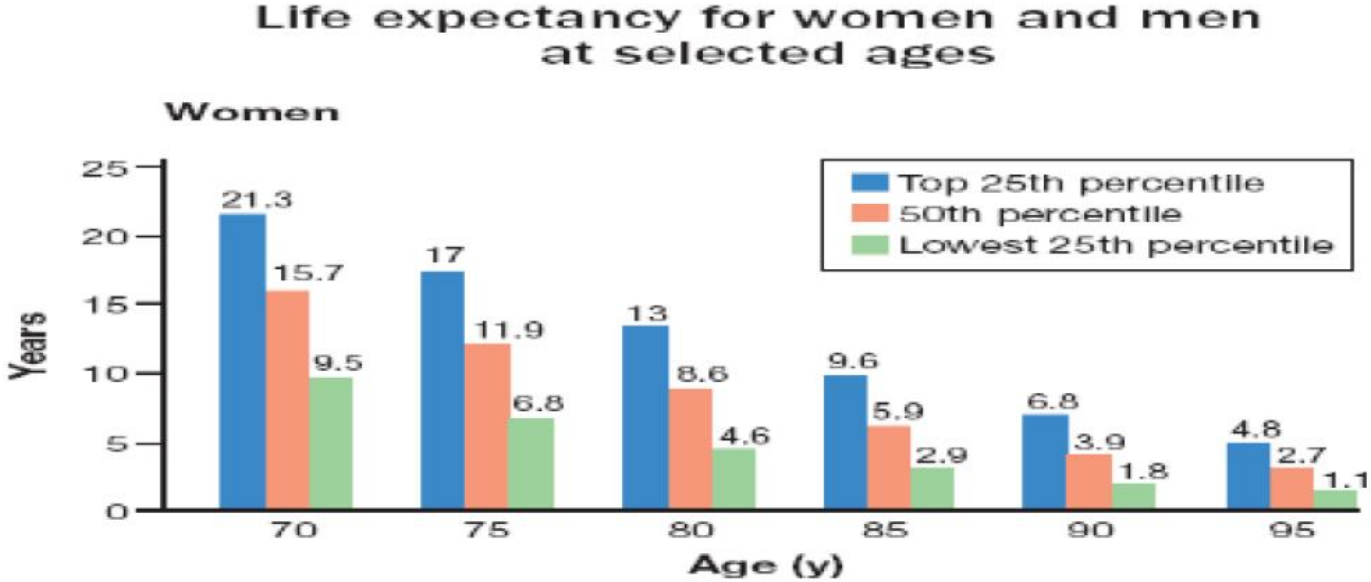
Life Expectancy



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Life Expectancy

Table 1. A Framework for Considering Treatment Goals for Glycemia, Blood Pressure, and Dyslipidemia in Older Adults with Diabetes

Patient Characteristics/ Health Status	Rationale	Reasonable A1C Goal (A Lower Goal May Be Set for an Individual if Achievable without Recurrent or Severe Hypoglycemia or Undue Treatment Burden)	Fasting or Preprandial Glucose (mg/dL)	Bedtime Glucose (mg/dL)	Blood Pressure (mmHg)	Lipids
Healthy (Few coexisting chronic illnesses, intact cognitive and functional status)	Longer remaining life expectancy	<7.5%	90–130	90–150	<140/80	Statin unless contraindicated or not tolerated
Complex/intermediate (Multiple coexisting chronic illnesses[a] or 2+ instrumental ADL impairments or mild to moderate cognitive impairment)	Intermediate remaining life expectancy, high treatment burden, hypoglycemia vulnerability, fall risk	<8.0%	90–150	100–180	<140/80	Statin unless contraindicated or not tolerated
Very complex/poor health (Long-term care or end-stage chronic illnesses[b] or moderate to severe cognitive impairment or 2+ ADL dependencies)	Limited remaining life expectancy makes benefit uncertain	<8.5%[c]	100–180	110–200	<150/90	Consider likelihood of benefit with statin (secondary prevention more so than primary)

Time Until benefit

- Is the patient's life expectancy long enough that they will benefit from the drug?
- What is the amount of time until the medication will show a benefit?

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Goals of Care

- Collaboration between physicians, patients, and families about goals of care will facilitate decisions regarding starting, stopping, and continuing medications.

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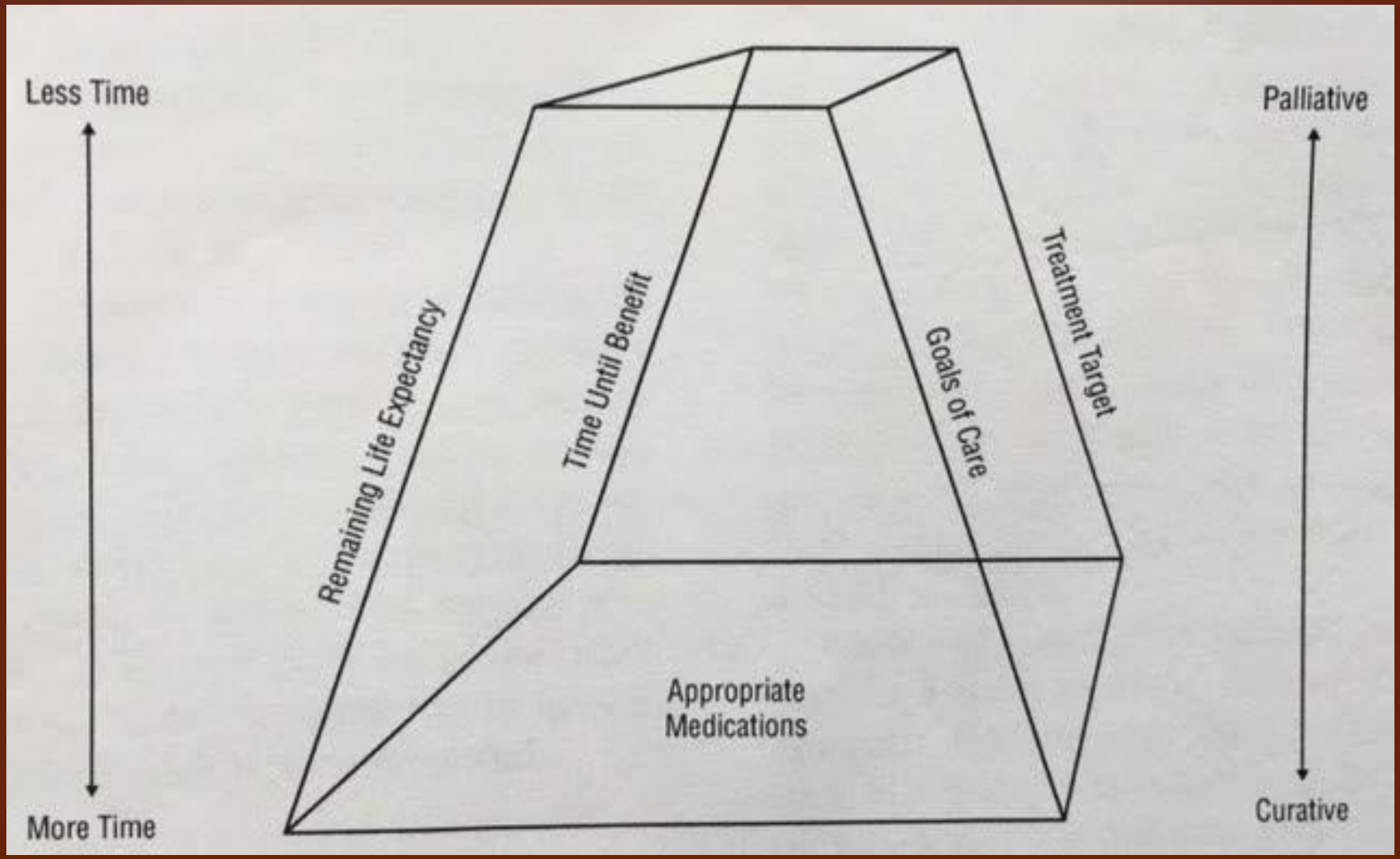
Goals of Care



Treatment Targets

- Palliative model
- Life prolongation
- Prevention of morbidity and mortality
- Maintenance of current state/function and treatment of acute illness

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Primary and Secondary Prevention

- **Primary prevention** aims to prevent disease or injury before it occurs.

- **Secondary prevention** aims to reduce the impact of a disease or injury that has already occurred.

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Case 1

- A 75-year-old Caucasian female.
- Past medical history: hypertension, osteoarthritis
- Newly diagnosed type 2 diabetes mellitus
- ADLs: 6/6 (independent)
- IADLs: 8/8 (independent)
- Labs: LDL 143, Cr 1.0, GFR >60, A1c 8.7%
- Meds: atorvastatin, calcium, lisinopril, aspirin

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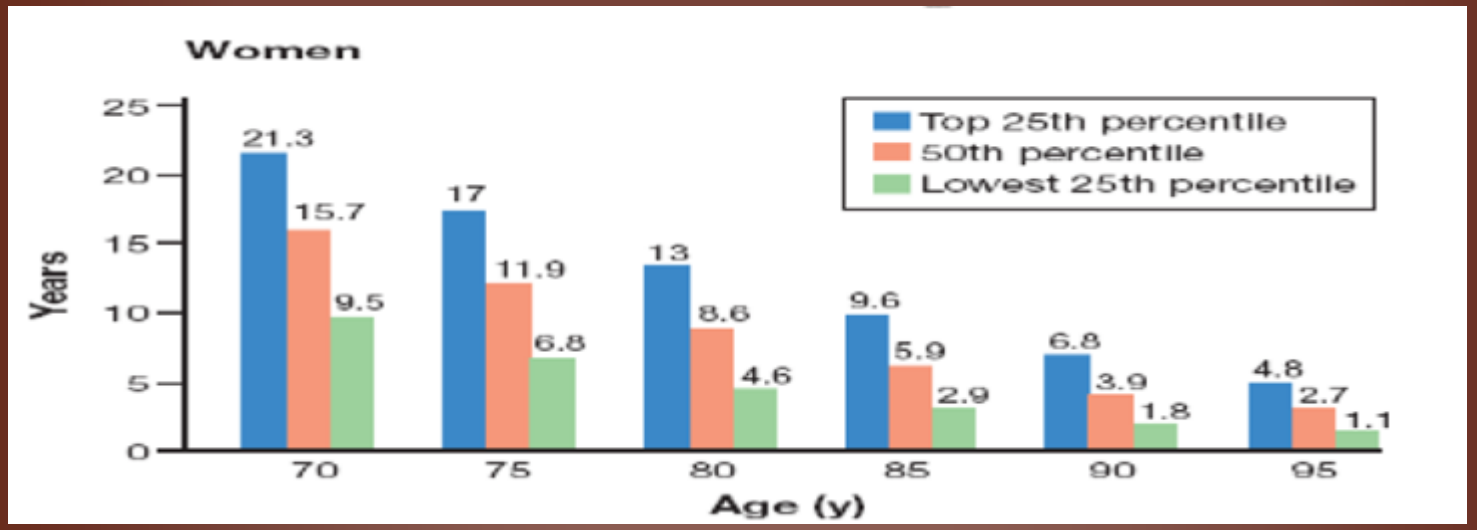
Case 1 – What is her life expectancy?



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Case 1

- This patient's life expectancy is:

At least 17 years (top 25th percentile)

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Case 1

- What is the time until benefit of the following therapies?

- Diabetes: 10 years to see benefit with ACE and sulfonylurea
- Hypertension: 2 years to see benefit with ACE
- Vascular events: statin can reduce risk of events after 2 years
- Cardiovascular events: statin can reduce risk of events after 5 years

- Primary prevention: aspirin reduces risk of MI after 5 years

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Case 1

- Goals of care:
  - Patient wishes to prevent progression of her disease
  - She wishes to maintain her excellent functional status

- Treatment targets:
  - Primary and secondary prevention strategies

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Case 2

- 72-year-old Caucasian male
- Past Medical History: Systolic CHF (NYHA class IV), emphysema
- ADL:3/6
- IADL:3/8
- VS: 84% on room air
- ROS: +Dyspnea at rest
- Meds: Metolazone, albuterol sulfate, furosemide, lisinopril, isosorbide mononitrate, ipratropium bromide, fluticasone, theophylline

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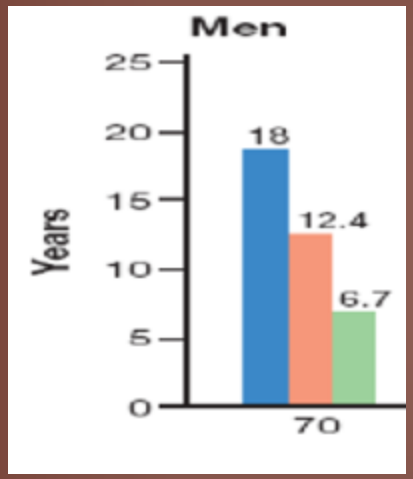
Case 2-What is his life expectancy?

- This patient's life expectancy is:



At least 6.7 years (lower 25th percentile) but may be less based on organ system failure.

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Case 2

- What is time until benefit of the following therapies?
- CHF: relatively speaking, medications to prevent heart failure mortality such as ACE inhibitors can have a longer time to benefit than medications to treat fluid overload such as loop diuretics
- Emphysema: similar to CHF, inhaled corticosteroids and theophylline may have a longer time until benefit than bronchodilators

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Case 2

- Goals of care: The patient wishes to avoid further testing and hospital care

- Treatment targets: Palliative
  - Analgesics, anti-anxiety, bronchodilators
  - Consider stopping steroids and ACE inhibitors

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Feasibility Study of a Systematic Approach for Discontinuation of Multiple Medications in Older Adults

- Background: Studying the feasibility of using the Good Palliative –Geriatric practice algorithm (GP-GP) for drug cessation in community-dwelling older patients
- Methods: GP-GP was applied to 70 community dwelling patients
- Results: Successful discontinuation is 81%
- Conclusions: Feasibility of using an algorithm for trialing discontinuation of medications

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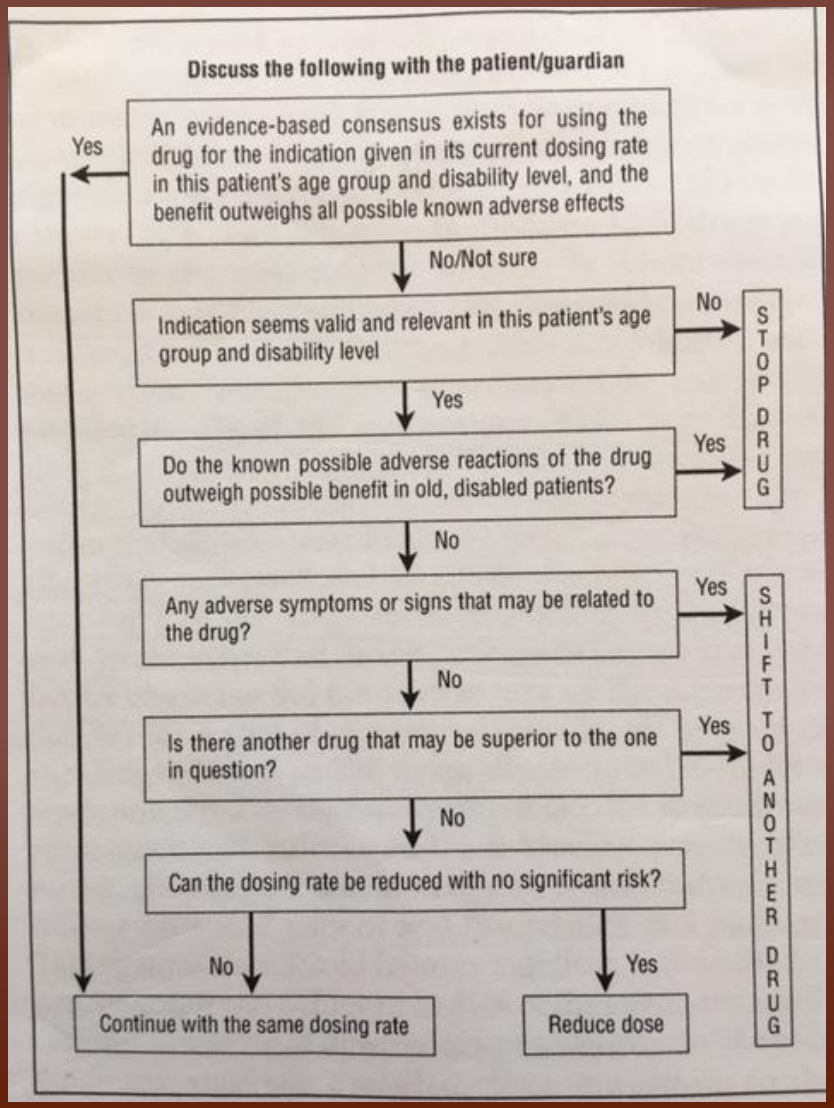
Good Palliative –Geriatric Practice(GP-GP) algorithm



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Case 3

- 86-year-old Caucasian male
- Past medical history: Hypertension, dementia, CKD stage 3, NYHA class III heart failure, hyperlipidemia
- ADL: 1/6
- IADLs: 0/8
- ROS: fatigue, generalized myalgias
- Medications: Furosemide, simvastatin

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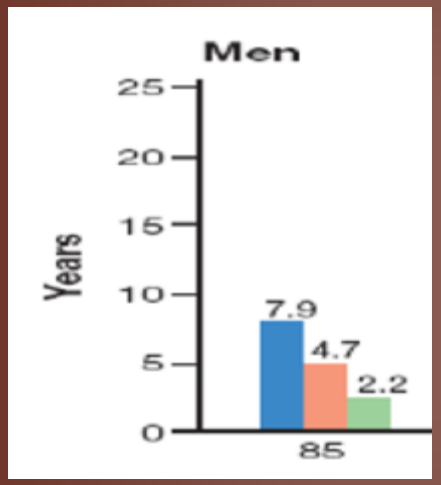
Case 3

- The patient's life expectancy



At least 2.2 years (top 25th percentile) but may be less based on organ system failure.

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Case 3

- What is the time until benefit of the following therapies?
- CHF: relatively speaking, medications to prevent heart failure mortality such as ACE inhibitors can have a longer time to benefit than medications to treat fluid overload such as loop diuretics
- Hyperlipidemia:
  - Vascular events: statin can reduce risk after 2 years
  - Cardiovascular events: statin can reduce risk after 5 years

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Case 3

- Goals of Care: The patient wishes to avoid any invasive procedure and maintain his current status

- Treatment goals: Symptom control, prevention of symptoms, and to treat acute exacerbations

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What does the research say?

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Hypertension and Diabetes

- Hypertension in the very elderly trial (HYVET) showed 21% reduction in overall mortality and 31% reduction in stroke after treatment for two years. Fewer adverse affects with active treatment than placebo.

- For diabetes, there is a lack of clinical trials focused on the elderly but estimates from other trials show:
  - Approximately 8 years are needed to prevent microvascular complications in new-onset diabetics
  - Approximately 4-6 years are needed for patients with pre-existing microvascular disease
  - ADVANCE trial: 20% reduction in albuminuria at 5 years
  - VADT trial: improving A1c from 8.4% to 6.9% appeared to have minimal effects

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Intensive vs. Standard Blood Pressure Control and Cardiovascular Disease Outcomes in Adults Aged ≥ 75

Research

Original Investigation

Intensive vs Standard Blood Pressure Control and Cardiovascular Disease Outcomes in Adults Aged ≥75 Years

A Randomized Clinical Trial

Jeff D. Williamson, MD, MHS; Mark A. Supiano, MD; William B. Applegate, MD, MPH; Dan R. Berlowitz, MD; Ruth C. Campbell, MD, MSPH; Glenn M. Chertow, MD; Larry J. Fine, MD; William E. Haley, MD; Amret T. Hawfield, MD; Joachim H. Ix, MD, MAS; Dalane W. Kitzman, MD; John B. Kostis, MD; Marie A. Krousel-Wood, MD; Lenore J. Launer, PhD; Suzanne Oparil, MD; Carlos J. Rodriguez, MD, MPH; Christianne L. Roumie, MD, MPH; Ronald I. Shorr, MD, MS; Kaycee M. Sink, MD, MAS; Virginia G. Wadley, PhD; Paul K. Whelton, MD; Jeffrey Whittle, MD; Nancy F. Woolard; Jackson T. Wright Jr, MD, PhD; Nicholas M. Pajewski, PhD; for the SPRINT Research Group

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Intensive vs. Standard Blood Pressure Control and Cardiovascular Disease Outcomes in Adults Aged ≥ 75

- Exclusion criteria:
  - Type 2 diabetes
  - CVA
  - Symptomatic heart failure within 6 months
  - Reduced EF
  - Dementia
  - Unexpected survival of less than 3 years
  - Unintentional weight loss during pass 6 months (>10% of body weight)
  - Nursing home resident
  - SBP of less than 110 mm Hg following 1 minute of standing

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Cardiometabolic Risk

Benefits of Statins in Elderly Subjects Without Established Cardiovascular Disease

A Meta-Analysis

Gianluigi Savarese, MD,* Antonio M. Gotto, Jr, MD, PhD,† Stefania Paolillo, MD,*
Carmen D'Amore, MD,* Teresa Losco, MD,* Francesca Musella, MD,* Oriana Scala, MD,*
Caterina Marciano, MD,* Donatella Ruggiero, MD,* Fabio Marsico, MD,*
Giuseppe De Luca, MD, PhD,‡ Bruno Trimarco, MD, PhD,* Pasquale Perrone-Filardi, MD, PhD*

Naples and Novara, Italy; and New York, New York

In elderly subjects at high cardiovascular risk without established cardiovascular disease, statins significantly reduce the incident of MI and stroke, but do not significantly prolong survival in the short-term.

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Lipids and Atherosclerosis

Statins for Secondary Prevention in Elderly Patients

A Hierarchical Bayesian Meta-Analysis

Jonathan Afilalo, MD,* Gustavo Duque, MD, PHD,*† Russell Steele, PHD,‡
J. Wouter Jukema, MD, PHD,§ Anton J. M. de Craen, PHD,‖ Mark J. Eisenberg, MD, MPH*¶

Montreal, Canada; and Leiden, the Netherlands

Statins reduce all-cause mortality in elderly patients and the magnitude of this effect is substantially larger than had been previously estimated.

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J Am Geriatr Soc. 2011 April ; 59(4): 666–672. doi:10.1111/j.1532-5415.2011.03362.x.

The Risks and Benefits of Implementing Glycemic Control Guidelines in Frail Elders with Diabetes

Sei J. Lee, MD MAS[1], W. John Boscardin, PhD[1], Irena Stijacic Cenzer, MA[1], Elbert S. Huang, MD MPH[2], Kathy Rice-Trumble, RN[3], and Catherine Eng, MD[3]

Implementing the AGS glycemic control guideline for Hemoglobin A1c (HbA1c)<8% in frail older patients with diabetes led to fewer hyperglycemic episodes, but more severe hypoglycemic episodes requiring ER visits in the Early implementation period. Future glycemic control guideline implementation efforts should be coupled with close monitoring for severe hypoglycemia in the early implementation period.

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Barriers to eliminating medications

- 1) Medications proven in well-designed studies
- 2) Contrary to their doctor's treatment
- 3) Computerized medical information
- 4) Direct-to-consumer pharmaceutical settings

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PLEASED Do

- **P**atient or family views?
- **L**ong-term benefits?
- **E**vidence of benefit
- **A**dverse effects present?
- **S**ymptom control?
- **E**xcessive dosage?
- **D**iscontinuation feasible?
- **DO**cument, plan, share, monitor

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Guide to stopping medications in the elderly

- Recognize the need to stop a medicine
- Reduce or stop one medicine at a time
- Taper medicines when appropriate
- Check for benefit or harm after each medicine has been stopped

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Guide to stopping medications

- Anti-hypertensives
- Benzodiazepines
- Oral corticosteroids
- Antidepressants
- Acid suppressants
- Bisphosphonates
- Statins

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Question 1

Which of the following is not a consideration with regard to appropriate prescribing of medications late in life?

- A. Remaining life expectancy
- B. Availability of generic medication
- C. Morbidity and mortality
- D. Patient expectations of treatment
- E. Laboratory test targets

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Question 2

Mrs. C is a 73-year-old female with active medical conditions including diabetes mellitus, seizure disorder, CVA with late effects including left-sided hemiparesis and dysphagia, chronic kidney disease stage 4, compensated diastolic heart failure with an ejection fraction of 55%, and chronic pain due to degenerative joint disease. Her functional status is 2/6 for her ADLs (independent with feeding and continence though she does have episodes of occasional functional incontinence) and she is 0/8 for her IADLs. She resides in a long-term care facility. Her current medications include glipizide, levetiracetam, clopidogrel, aspirin, tramadol, and atorvastatin. Her last hemoglobin A1c was 5.3%. Which of the following medications should be stopped at this time?

- A. glipizide
- B. levetiracetam
- C. clopidogrel
- D. aspirin
- E. atorvastatin

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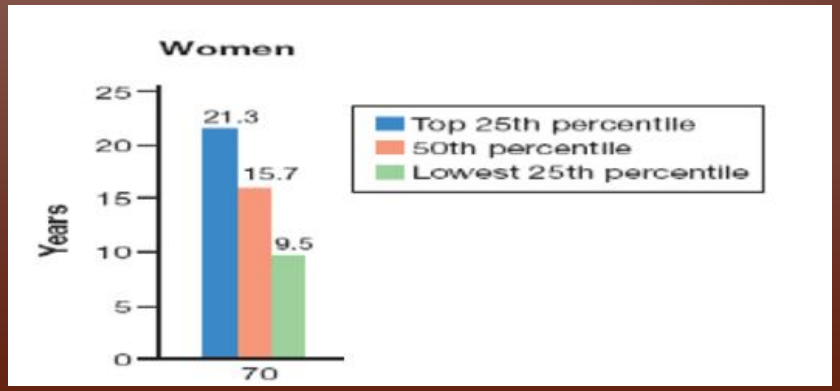
Question 3

Mrs. C is a 73-year-old female with active medical conditions including diabetes mellitus, seizure disorder, CVA with late effects including left-sided hemiparesis and dysphagia, chronic kidney disease stage 4, compensated diastolic heart failure with an ejection fraction of 55%, and chronic pain due to degenerative joint disease. Her functional status is 2/6 for her ADLs (independent with feeding and continence though she does have episodes of occasional functional incontinence) and she is 0/8 for her IADLs. She resides in a long-term care facility. Her current medications include glipizide, levetiracetam, clopidogrel, aspirin, tramadol, and atorvastatin. Her last hemoglobin A1c was 5.3%. What is her estimated life expectancy?

- A. 21.3 years
- B. 15.7 years
- C. 9.5 years



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