Prognostication in Geriatric Care

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No disclosures

Objectives

- Define prognosis and prognostication

- Explore the relationship between function and prognosis

- Identify prognostic indicators that signify a change in patient's trajectory for certain common chronic diseases

- Learn skills to aid in prognostication and discussions of prognosis with older adults and their families

Introduction to Prognostication

- **Prognosis** – The predication of the probability that a particular outcome will develop in an individual over a period of time

- **Prognostication** – A broader term that incorporates both estimating and communicating prognosis

- Developing skill in prognostication and understanding lag time to benefit are important for guiding patient-centered goal setting and shared decision making

Importance of Prognostication

- Helps with medical decision making

- Helps clinicians with recommendations

- Allows end of life planning

- Builds trust

- Patients and families want to know

Outcomes

Situations
- "Normal" Aging
- Disease Processes
- Interventions (surgery, therapeutics)

Types
- Survival (life expectancy, mortality)
- Quality of Life

Quality of Life

- Will I be able to live independently?

- Will I be able to get around on my own?

- Will I suffer?

The Surprise Question

"Would I be surprised if this patient died in the next 12 months?"

Systematic review of 16 studies (n=621)

For death at 6-18 months
◦ Sensitivity 67%, Specificity 80%
◦ PPV 37%, NPV 93%
◦ Better discrimination in patients with cancer

Downar J et al, CMAJ, 2017

Prognostication Accuracy

- Prospective cohort study

- Five outpatient hospices in Chicago

- 343 physicians provided survival estimates for 468 patients at time of referral

Christakis NA and Lamont EB, BMJ, 2000

How Well are we Doing?

Only 20% of predictions were accurate (within 33% of actual survival)
- 63% overly optimistic
- 17% overly pessimistic

Modifiers
- Experience <u>increased</u> accuracy
- Length of relationship <u>decreased</u> accuracy

On average, survival = prediction/5.3

Christakis NA and Lamont EB, BMP, 2000

Dementia Health Care Proxies' Experience

- Received prognostic information: 18%

- Counselled on dementia related complications: 33%

- More comfort oriented care for patient at EOL when HCP understood prognosis and clinical course of advanced dementia

Source: Mitchell SL et al. The clinical course of advanced dementia. NEJM: 2009

Room for Improvement

- Clinical experience is an important factor in prognostication and skills **can** improve over time

- Tools exist that can improve a clinician's ability to prognosticate

Murray et al. BMJ 2005
Chow et al. Clin Oncol 2001
Casarett et al. J Palliat Med 2012

Lag Time to Benefit

Definition: Interval between the time of a diagnostic or therapeutic intervention and the time when improved health outcomes may be expected

Examples with regard to a preventive intervention:
- **Life expectancy is significantly less than the lag time**: The likelihood of harm rather than benefit is high
- **Life expectancy significantly exceeds the lag time**: The likelihood of benefit is now much higher
- **Life expectancy approximately equals the lag time**: Further discussion of prognosis and patient goals of care may help guide decision making

Lag Time to Benefit for Common Interventions

Lag time to benefit	Intervention (s)
1-2 months	• SSRIs for depression
6 months	• Statins for secondary prevention of CVD • Finasteride for BPH
1-2 years	• BP control for primary prevention of CVD
1-3 years	• Strict BP and lipid control in type 2 DM
2-5 years	• Statins for CV events
8-10 years	• Tight glycemic control for prevention of microvascular complications in DM2
10 years	• Colon and breast cancer screening

Median Life Expectancy (US – all races)

At Age	Median Life Expectancy
65	83.5
85	91.1
100	102

National Center for Health Statistics, National Vital Statistics System, Mortality.

Estimating Prognosis:
Age-Based Life Expectancy

- Tables that give average life expectancy based on current age provide a broad estimate of median survival in the general population

- There is substantial heterogeneity in life expectancy among older adults within the same age category

- To partially account for this, practitioners can use tables that separate life expectancy into quartiles, then use clinical judgment to decide whether an individual is in the healthiest quartile, least healthy quartile, or somewhere in the middle.

In Older Adults, Function Rules

Function Predicts

- ◦ Mortality
- ◦ Morbidly
- ◦ Quality of Life
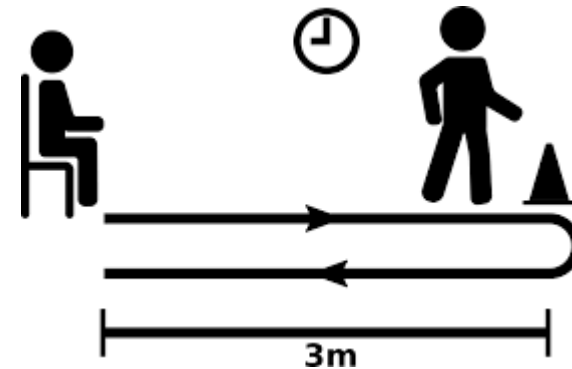
Prognosis in Older Adults
Stratify by Function

Single Measures

- Gait speed
  - 4m (13 ft) at usual pace
  - <0.6 m/s (slow), >1.0 m/s (fast)

- Timed Up and Go
  - 3m (10 ft) at usual pace
  - Cut off >/= 15 seconds

Predicting Functional Outcomes

At one year, slow gait speed and TUAG >/= 15 seconds equally predictive of:

- Global health declines (OR 6-9)
- New ADL difficulty (OR 3-4)
- Falls (OR 12)

Viccaro LJ et al. JAGS 2011;59:887-892

Postoperative Complications

Slow gait speed
- ◦ Incremental predictor of higher mortality and major morbidity after cardiac surgery

TUAG >/= 15 seconds
- ◦ Predictor of postoperative complications and one year mortality

Arilalo J et al. J Am Coll Cardiol 2010
Savva GM et al. J Gerontol A Biol Sci Med Sci 2013

Prognosis in Older Adults

Frailty
- Decrease in physiologic reserves that results in
  - Diminished resiliency
  - Loss of adaptive capacity
  - Increased vulnerability to stressors
- Individuals of same age differ in vulnerability to adverse health outcomes
- Frailty measure attempt to quantify physiologic compromise.

Robinson TN et al. J Am Coll Surg 2015

Frail Older Adults at Highest Risk for:

Falls

Disability

Comorbid disease states

Delirium

Cognitive decline

Iatrogenic complications

Social withdrawal

Death

Robinson TN et al. J Am Coll Surg 2015

Phenotypic Frailty

Weight loss
◦ Unintentional ≥ 10 pounds/past yr

Weakness
◦ Grip strength in lowest 20% for sex/BMI

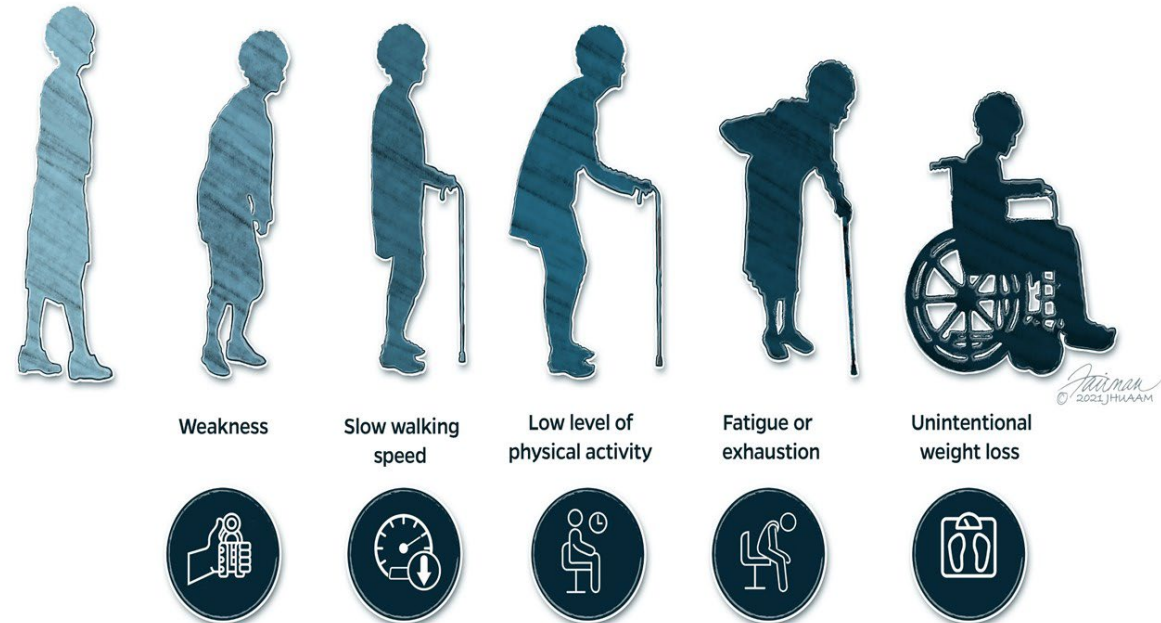Exhaustion
◦ Self-report everything an effort, ≥ 3d last week

Slowness
◦ Walking speed over 15 feet lowest 20%

Low activity
◦ Kcal/week expended in lowest 20%

Scoring: 0-1 robust, 2-3 pre-frail (vulnerable), 4-5 frail

Weakness | Slow walking speed | Low level of physical activity | Fatigue or exhaustion | Unintentional weight loss

Fried Phenotype Outcomes

Frailty Status at Baseline	(n)	Died		First Hospitalization		First Fall		Worsening ADL Disability		Worsening Mobility Disability	
		3yr %	7yr %	3yr %	7yr %	3yr %	7yr %	3yr %	7yr %	3yr %	7yr %
Robust	2469	3	12	33	79	15	27	8	23	23	41
Pre-Frail	2480	7	23	43	83	19	33	20	41	40	58
Frail	368	18	43	59	96	28	41	39	63	51	71
P		<.0001		<.0001		<.0001		<.0001		<.0001	

Fried LP et al. J Gerontol A Biol Sci Med Sci 2002

Pre-operative Phenotypic Frailty Outcomes

Outcome	Pre-Frail	Frail
Postoperative Complications	OR: 2.06 (1.18-3.60)	OR: 2.54 (1.12-5.77)
Length of Stay	IRR: 1.49 (1.24-1.80)	IRR: 1.69 (1.28-2.23)
Discharge to a skilled or assisted living facility after previously living at home	OR 3.16 (1.0-9.99)	OR: 20.48 (5.54-75.68)

Markary MA et al. J Am Coll Surg 2020

FRAIL SCALE

F   **Fatigue**: felt tired "all of the time" or "most of the time" during the past 4 weeks

R   **Resistance**: difficulty walking up 10 steps alone without resting and without aids

A   **Ambulation**: any difficulty walking several hundred yards alone and without aids

I   **Illnesses**: > 5 of the following:

Hypertension, diabetes, cancer (other than a minor skin cancer), chronic lung disease, heart attack, CHF, angina, asthma, arthritis, stroke, kidney disease

L   **Loss of weight**: self-report of ≥ 5%/last year

Scoring: 0 robust, 1-2 pre-frail (vulnerable), ≥ 3 frail

Morley JE et al. J Nutr Health Aging 2012

Woo J et al. J Am Med Dir Assoc 2015

FRAIL SCALE

	Men				Women			
	Died (n)	P for trend	Physical limitation 5 yr f/u (n)	P for trend	Died (n)	P for trend	Physical limitation 5 yr f/u (n)	P for trend
0	16.1% (276)	<.001	29% (397)	<.001	6.2% (107)	.003	52% (721)	<.001
1	23.9% (62)		51.1% (94)		10.4% (26)		61.7% (116)	
2	44.4% (12)		60% (9)		16.75% (4)		90% (9)	
3					0 (0)		100% (2)	

TUAG as a Frailty Measure

Timed Up and Go > 15 sec
- Specificity 100% pre-frail or frail
- Sensitivity 12 %

Savva GM et al. J Gerontol A Biol Sci Med Sci 2013

Prognosis in Older Adults

Disease trajectories for
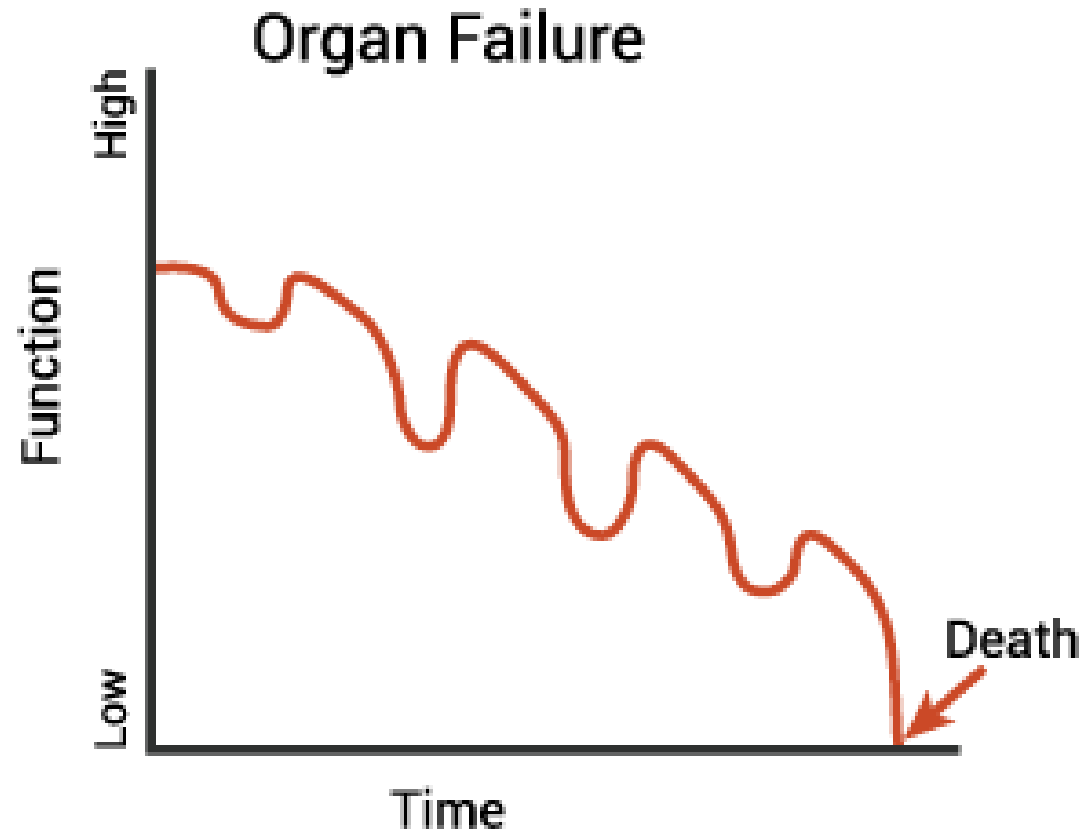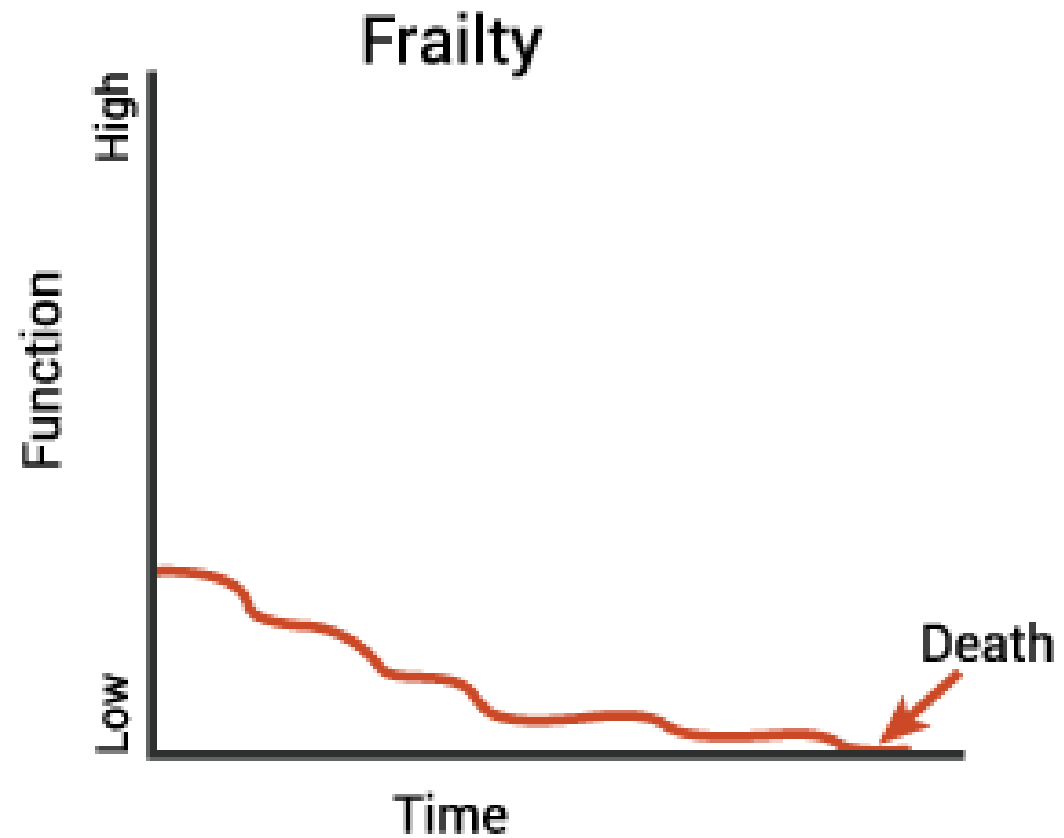- Quality of Life
- Life expectancy
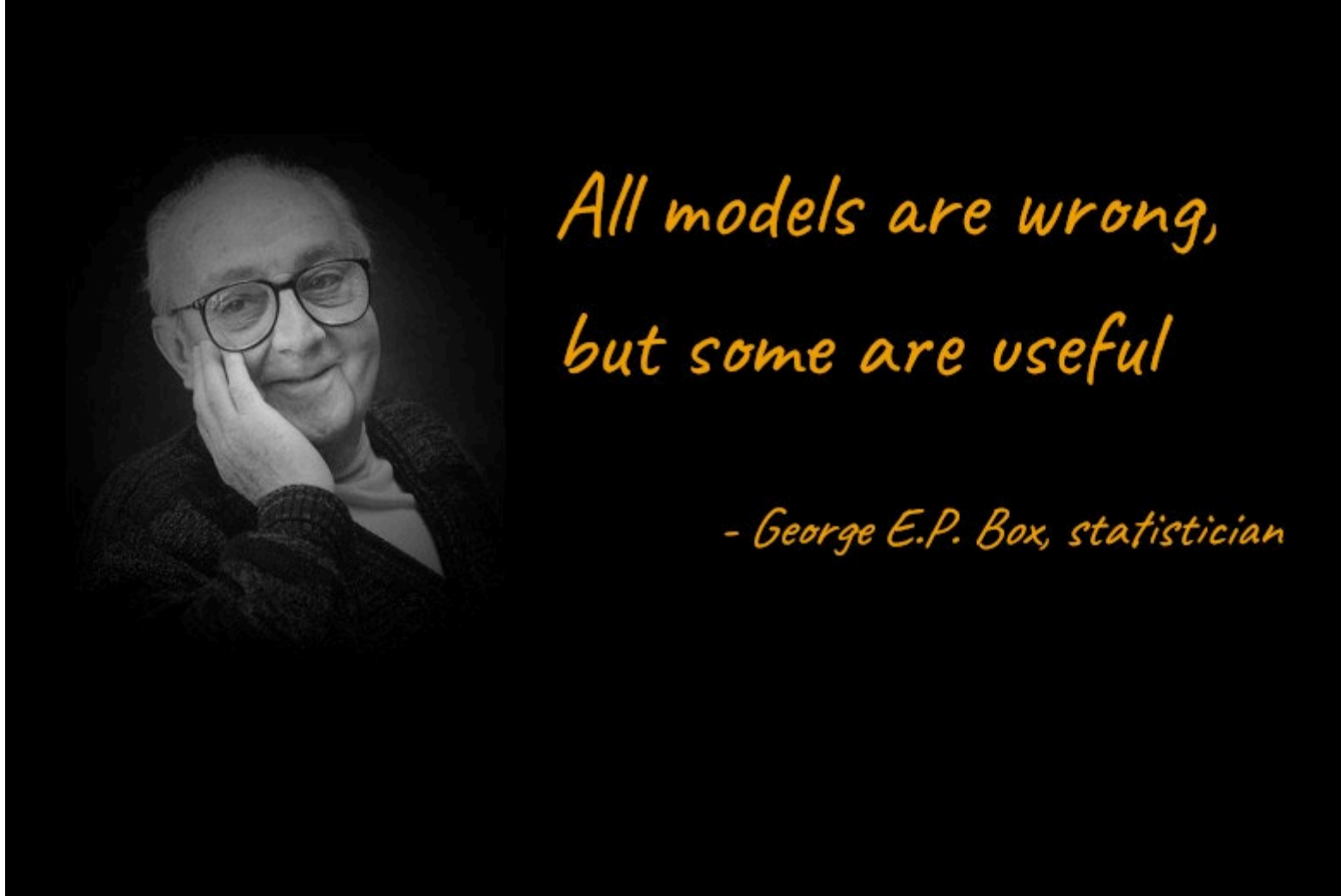
Cancer Trajectory
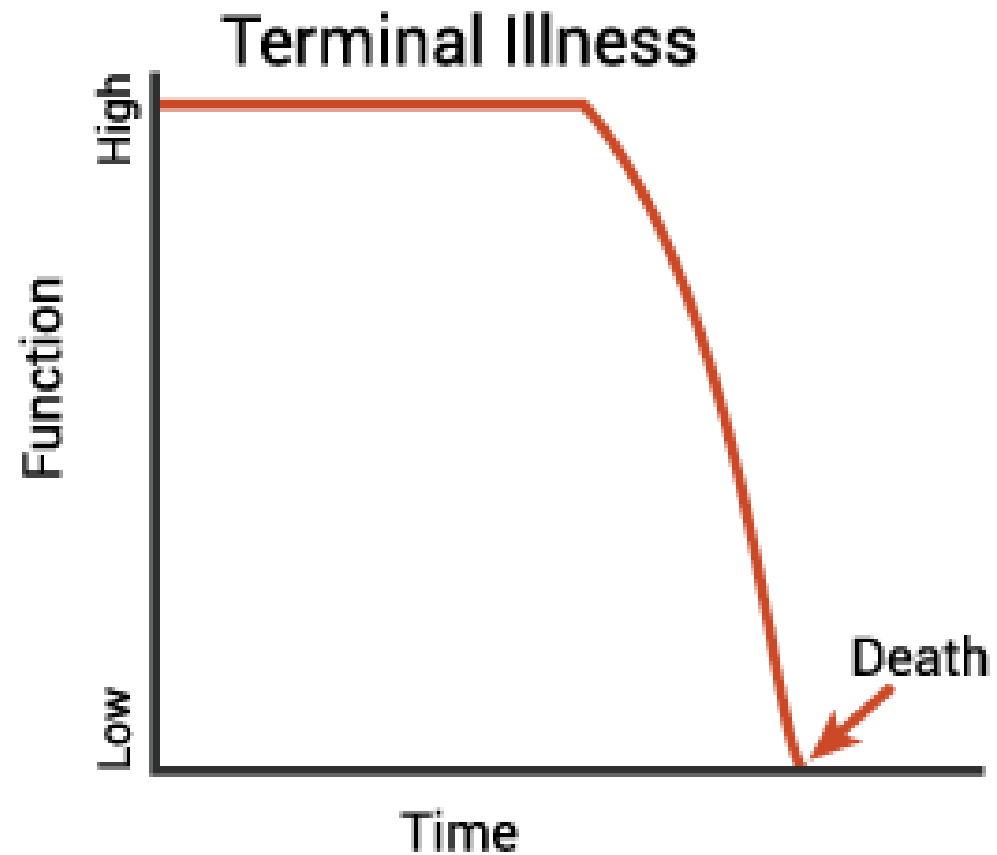
Organ System Failure Trajectory

Organ Failure

Function Trajectories

All models are wrong,

but some are useful

- George E.P. Box, statistician

Changes in Disease Trajectories

For many disorders, there are key features that signal a change in trajectory

This is the time to have that discussion with patients/their families

Trajectory Change:
End Organ Disease and Cancer

Impaired Performance Status (basis of NHO guidelines)

Impaired nutritional status (≥ 10% loss over 6 months)

Decreased serum albumin (< 2.5g/dL)

Glare, P and Christakis, N. Predicting survival in patients with advanced disease. Oxford Textbook of Pall Med.

Estimating Prognosis: Prognostic Indices

Use of a prognostic index requires understanding ofites accuracy, validity, and generalizability

- Example: Indices developed to estimate risk of mortality for nursing-home residents do not apply to community-dwelling adults

For patients with one dominant life-limiting condition, disease-specific indices are often valuable
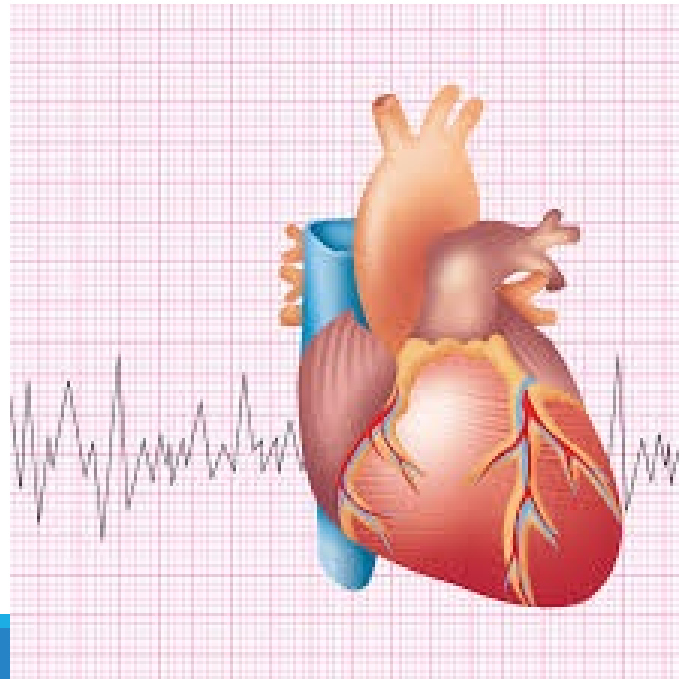
Otherwise, nondisease-specific indices tailored to populations residing in different settings (community, nursing home, hospital, hospice) may be most useful

Congestive Heart Failure

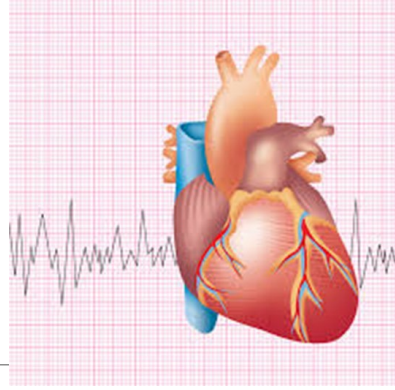Approximately ½ patients will die within 5 years of the diagnosis

Overall annual mortality ranges from 5-75%

CHF Hospice Guidelines

Primary Factor: NYHA Class IV and receiving optimal treatment

Secondary Supporting Factors:
- EF </= 20%
- Symptomatic arrhythmias
- Prior history of cardiac arrest
- Concomitant HIV
- CVA of cardiac origin
- Unexplained syncope

Storey et al. AAHPM 2003

CHF associated with survival < 6 months: NYHA Class III or IV, hospitalized with 3+:

Clinical Characteristics	Lab/Imaging
Age > 70	LVEF </= 20%
Co-morbid DM, dementia, COPD, cirrhosis, cancer	BNP > 950
4th hospitalization for CHF	Troponin I > 0.40 ng/mL
Repeat hospitalization in 2 months	CRP > 3.5 mg/mL
Dependency in 3+ ADLs or need for home care after hospital discharge	Weight loss >-= 2.3kg/2mos or albumin < 2.5
History of cardiogenic shock, arrhythmia, cardiac arrest, CPR or mechanical ventilation	Systolic BP </= 100 Creatinine > 2 or BUN > 40 Serum sodium < 135

Salpeter et al. Am J Med 2012
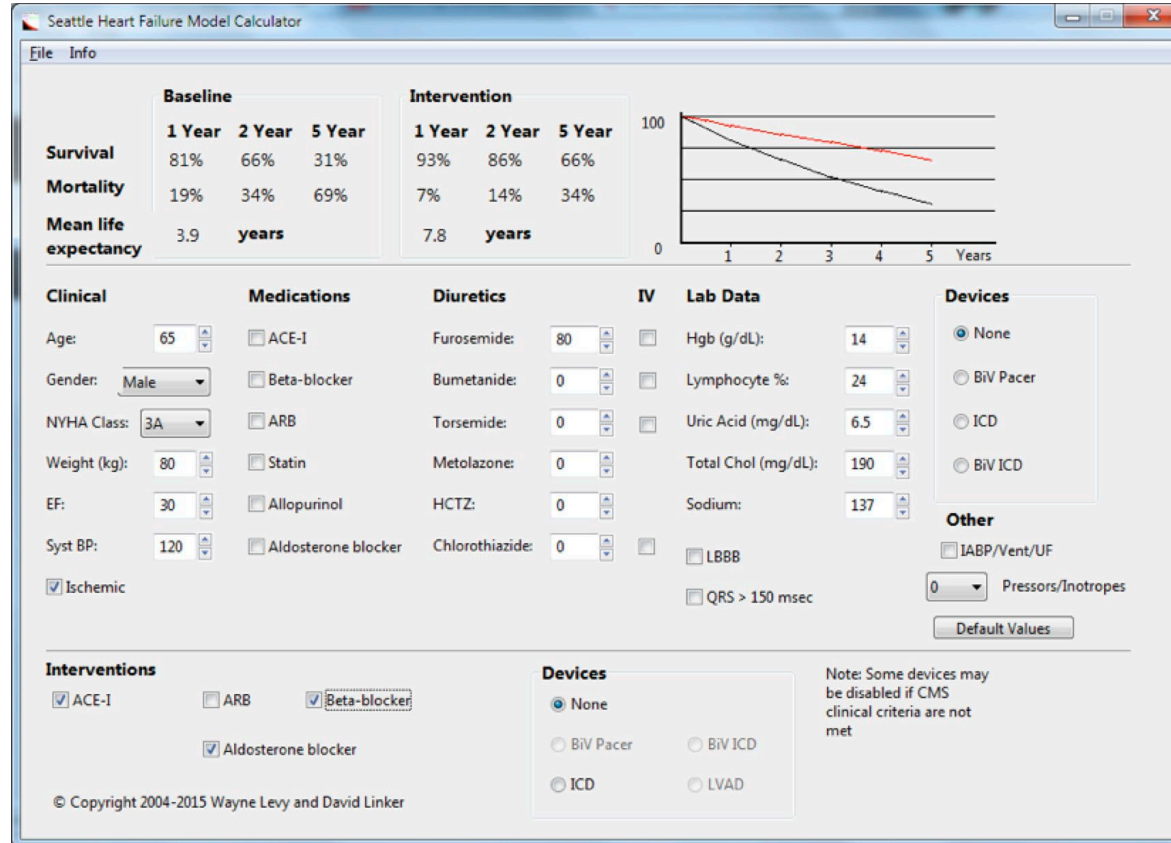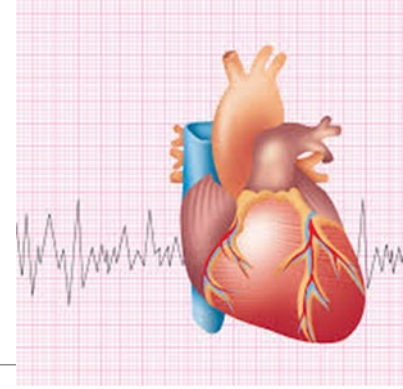
Estimating Prognosis in Heart Failure
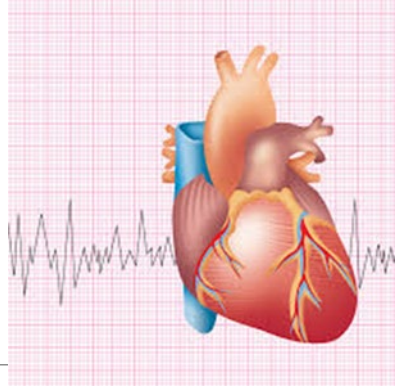
Important markers for poor prognosis – demographic factors, HF severity, need for repeat hospitalizations, comorbid disease, physical examination findings, laboratory values, functional status

Seattle Heart Failure Model – Validated in community-dwelling outpatients without significant comorbidities; online tool but time-consuming

EFFECT Model – Calculates 30-day and 1-year predicted mortality for individuals hospitalized with heart failure

Seattle Heart Failure Model

Dementia

	MCI	Mild	Moderate	Severe
MMSE	26-30	21-25	11-20	0-10
Time course	Preclinical	1-3 years	2-8 years	6-12 years
Functional Impairment	None	Finances Driving Medications	IADLs Some BADLs Gait/Balance	ADSLs Incontinence Mobility Dysphagia
Cognitive Change	Mild construction, language, executive dysfunction	Decreased insight, STM deficits, judgement	Disoriented to date/place, wore memory, disorientation	Little output remote memory, poor recognition
Behavioral Issues		Social withdrawal, apathy, depression	Behavioral issues, wandering	Decreased motor, verbal issues, behavioral disturbances
Complications		Adverse drug reactions	Can't live alone Falls	Pressure Sores Contracture Aspiration PNA

Prognostication in Dementia
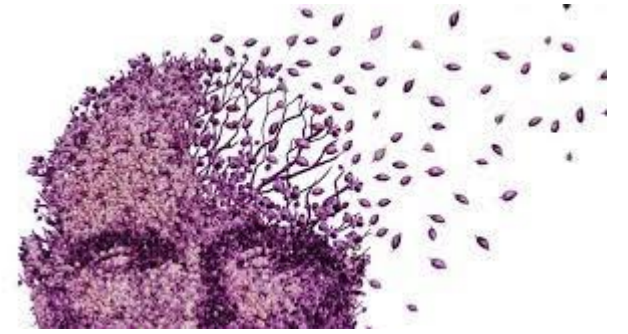
Dementia is a terminal illness

Predictors of high 6 month mortality:
◦ Pneumonia
◦ Febrile episode
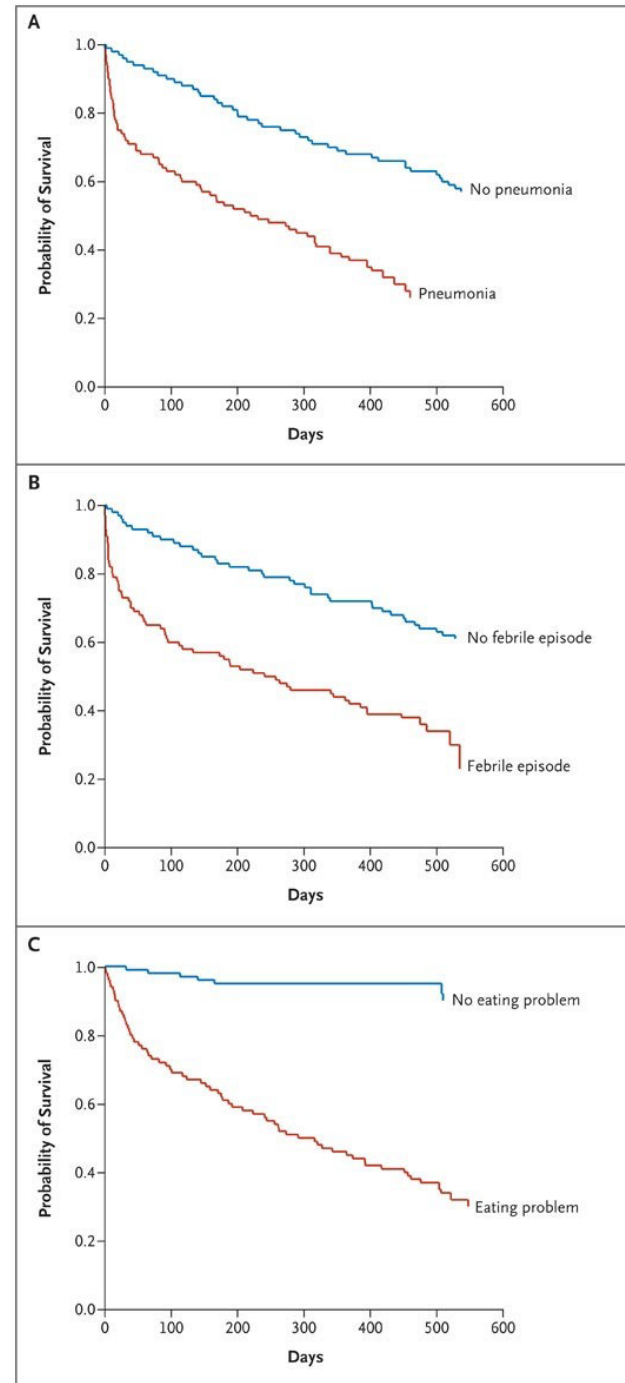◦ Eating difficulties

Xie et al. BMJ 2008
Mitchell et al. NEJM 2009

Survival after:

A: First Episode of Pneumonia

B: First Febrile Episode

C: Development of an Eating Problem

Mitchell SL et al. NEJM 2009

Functional Assessment Scale (FAST)

1	No difficulty either subjectively or objectively.
2	Complains of forgetting location of objects. Subjective work difficulties.
3	Decreased job functioning evident to co-workers. Difficulty in traveling to new locations. Decreased organizational capacity. *
4	Decreased ability to perform complex task, (e.g., planning dinner for guests, handling personal finances, such as forgetting to pay bills, etc.)
5	Requires assistance in choosing proper clothing to wear for the day, season or occasion, (e.g. pt may wear the same clothing repeatedly, unless supervised.*
6	Occasionally or more frequently over the past weeks. * for the following A) Improperly putting on clothes without assistance or cueing . B) Unable to bathe properly (not able to choose proper water temp) C) Inability to handle mechanics of toileting (e.g., forget to flush the toilet, does not wipe properly or properly dispose of toilet tissue) D) Urinary incontinence E) Fecal incontinence
7	A) Ability to speak limited to approximately ≤ 6 intelligible different words in the course of an average day or in the course of an intensive interview. B) Speech ability is limited to the use of a single intelligible word in an average day or in the course of an intensive interview C) Ambulatory ability is lost (cannot walk without personal assistance.) D) Cannot sit up without assistance (e.g., the individual will fall over if there are not lateral rests [arms] on the chair.) E) Loss of ability to smile. F) Loss of ability to hold up head independently.

*Scored primarily on information obtained from a knowledgeable informant.
Psychopharmacology Bulletin, 1988 24:653-659.

Estimating Prognosis: Dementia

Hospice eligibility: FAST Stage 7A plus one of the following:

◦ Infection (aspiration pneumonia, upper UTI, sepsis)

◦ Multiple stage 3-4 ulcers

◦ Persistent fever

◦ Weight loss > 10% within 6 months

  ◦ These guidelines often fail to predict 6-month survival in patients with advanced dementia

Advanced Dementia Prognostic Tool (ADEPT)– Greater predictive value than general hospice eligibility criteria in identifying nursing-home residents with advanced dementia who have estimated life expectancy </= 6 months

Prognostic Tools: *Single Diseases*

General: Palliative Performance Scale, Palliative Prognostic Score

Oncology: ECOG Performance Status

Heart Failure: Seattle HF Calculator

Liver Disease: Child-Turcotte, MELD

ESRD: Modified Charlson Comorbidity Index

Dementia: FAST, Mortality Risk Index

Most older adults have more than one disease

How to prognosticate for them?

- **Function**
  - TUAG, gait speed, frailty
- **Prognostic Indices**

Common Prognostic Indices: Nondisease-Specific

Prognostic Index	Patient Population	Website
Walter 1-year index	Hospitalized adults >/= 70 years old	www.ePrognosis.org
Lee 4- and 10-year index	Community-dwelling adults >/= 50 years old	
Schonberg 5- and 9-year index	Community –dwelling adults >/= 65 years old	
Go-FAR	Neurologically intact survival to discharge after in-hospital arrest	www.gofarcalc.com

Common Prognostic Indices: Disease-Specific

Prognostic Index	Patient Population	Website
Palliative Performance Scale	Cancer and noncancer patients in clinics, hospitals, and hospices	www.ePrognosis.org
Seattle Heart Failure Model	Outpatients without significant other comorbidities. May overestimate prognosis in the old-old.	http://depts.washington.edu/shfm
EFFECT Model	Inpatients hospitalized with acute decompensated heart failure	http://www.ccort.ca/Research/CHFRiskModel.html

Common Prognostic Indices: Disease-Specific

Prognostic Index	Patient Population	Website
BODE	Outpatients with COPD. May be more accurate in patients with severe COPD.	Reference.Medscape.com/calculator/bode-index-copd
Advance Dementia Prognostic Tool (ADEPT)	Nursing-home residents with advanced dementia	www.ePrognosis.org

Estimating Prognosis: Prognostic Indices

- Prognostic indices are validated tools that use select characteristics from a particular population, such as functional status and comorbidities, to calculate a prognostic estimate

- When used for mortality predictions in older adults, tools that incorporate functional status tend to perform better than those that rely only on factors normally captured in an electronic medical record

WHERE IS YOUR PATIENT?

CLINIC - LIVING AT HOME

NURSING HOME

HOSPITAL

HOSPICE

Outcomes of Hospitalization for Older Adults

- 30-40% lose >/= 1 BADL at discharge compared with pre-admission
  - 25-40% remain impaired 3 months later
  - 20% readmitted within 30 days

- Patients discharged with new ADL disability who did not recover function by 1 month were unlikely to recover to prior function by 1 year

- One-year mortality is more than **2x higher** than those discharged at baseline function

Barry LF et al. JAGS 2011
Boyd C et al JAGS 2008

Prognosis for a Hospitalized Older Adult

- 80 year old man independent in ADLs with CKD, Cr 3.2 on admission, albumin 2.9, hospitalized with pneumonia.

- Respiratory status improves but hospitalization complicated by delirium, resulting in functional decline.

- At discharge, he is dependent in transferring, toileting and bathing.

Adapted from Walter, LC et al. Development and Validation of a Prognostic Index for 1-year Mortality in Older Adults After Hospitalization. JAMA 2001.

What is the probability that he will die in the year following this hospitalization?

- 10%

- 20%

- 35%

- 50%

- 65%

1. Whats is your patient's biological sex?

Male ▾

2. Upon discharge, does your patient need help from others in order to:

• bathe (defined as bathing more than one part of the body and/or getting in or out of the tub or shower)?   ◉ Yes   ○ No

• dress (defined as help dressing self)?   ○ Yes   ◉ No

• transfer (defined as moving from bed to chair)?   ◉ Yes   ○ No

• toilet (defined as transferring to toilet, cleaning self, or using bedpan or commode)?   ◉ Yes   ○ No

• eat (defined as partial or total help feeding or requiring parenteral feeding)?   ○ Yes   ◉ No

3. Does your patient have congestive heart failure?   ○ Yes   ◉ No

4. Does your patient have solitary or metastatic cancer? (If your patient has only had minor skins cancers, select "no.")   ◉ No
○ Solitary
○ Metastatic

5. What is your patient's admission creatinine?

> 3.0 ▾

6. What is your patient's admission albumin?

< 3.0 ▾

Total Points: 7

One Year Mortality

Results Based on Score:

Your total score is: **7**

One Year Mortality

Points	Risk of 1 year mortality (95% CI)
0 - 1 Points	4% (2-4)
2 - 3 Points	19% (15-23)
4 - 6	34% (29-39)
> 6	64% (58-70)

Prognosis:
Part of the Goals of Care Discussion

- End of Life

- Serious illness

- Treatment decisions

Communicating Prognosis

Reluctance about Prognostication

- Not part of our daily routine

- Time

- Ambivalence
  - Bad news
  - Discomfort and uncertainty

Principles of Communicating Prognosis

- Make well-informed estimates of prognosis and place prognosis into the context of lag time to benefit

- 4 main goals:
  - Assess the knowledge, expectations, and readiness of patients and their surrogates
  - Provide information in coherent, manageable quantities aligned with the needs and expectations of patients and their surrogates
  - Support patients and their surrogates
  - Develop a shared plan for next steps

"SPIKES" Mnemonic for Communicating Prognosis

Setting – Normalize conversation

Perception – Understand what they understand

Invitation – Do they want to know and how should information be delivered

Knowledge – Delivering prognostic information

Emotions – Attend to emotions

Summary/Strategy

Speak in days/weeks/months/years

"SPIKES" Mnemonic for Communicating Prognosis

Step	Specific Tasks
Set up Interview	• Have a unified message: obtain key prognostic data and communicate with team members before the meeting • Prepare for emotional responses to difficult information and questions • Control the setting
Assess Perception	• Begin with an open-ended question: "What have your providers told you about your medical situation so far?" • Redefine with specific questions: "What specific concerns do you have about…?" • Tailor prognostic information according to the patient's level of understanding.

"SPIKES" Mnemonic for Communicating Prognosis

Step	Specific Tasks
Obtain Invitation	• Gain permission to share prognosis: "Many people have questions about prognosis and wonder about how long do I have? I'm wondering if you have those questions?" • Explore how much information should be given: "Some patients like all of the information. Would you like me to discuss it all, or try to summarize for you?"
Impart Knowledge	• If needed, begin with a warning statement: "I'm afraid that what I have to tell you is bad news." • Use 1 or 2 sentences at a time, avoid jargon, pause frequently, and assess understanding • Address uncertainty: use ranges, best or worst scenarios, and most likely case scenarios

"SPIKES" Mnemonic for Communicating Prognosis

Step	Specific Tasks
Address Emotions	• Observe and internally identify emotions. If unclear, clarify: "Can you tell me what you are worried about?" • Validate your understanding of the emotion – statement or gesture
Summarize and Strategize	• Assess understanding and address gaps in knowledge: "Before we move on, I want to make sure I communicated well. What have you heard from me today? What questions do you have?" • Set a specific timeline for: • What specific treatment or diagnostic decisions need to be made • When they need to be made • Who will communicate decisions to whom

Summary

- Prognostication includes both predication and communication of the probability that a particular outcome will develop in an individual over a period of time

- Prognostication and understanding of lag time to benefit are important for guiding shared clinical decision making

- Prognosis can be estimated using clinical judgment, age-based life expectancy, published studies, and prognostic indices

- The SPIKES mnemonic can assist in the delivery of difficult news

Madame, all stories, if continued far enough, end in death, and he is no true-story teller who would keep that from you.

- Ernest Hemingway -