Prognosis: Renewed Attention to a Lost Art & Science

Alex Smith, MD, MS, MPH

UCSF Division of Geriatrics

GeriPal Podcast

ePrognosis

JAGS

Ellipsis (omission) of Prognosis…

- 1892: Olser's textbook Principles and Practice of Medicine, Chapter on Pneumonia
  - 1/3 Diagnosis, 1/3 Treatment, 1/3 Prognosis
- 1988
  - 100% Diagnosis and Treatment, 0% Prognosis

Nicholas Christakis, "A Death Foretold: Prophecy and Prognosis in Medical Care"

Ellipsis (omission) of Prognosis

- Older physician interviewed about practice in early 1900s
  - Armamentarium was limited
  - Often nothing could do but describe what's ahead
  - Communicating prognosis important to patient & doctor
  - Good prognosis communication = known as a good doctor
- Rise of new diagnostic techniques and treatments
- Reimbursement tied to diagnosis and treatment

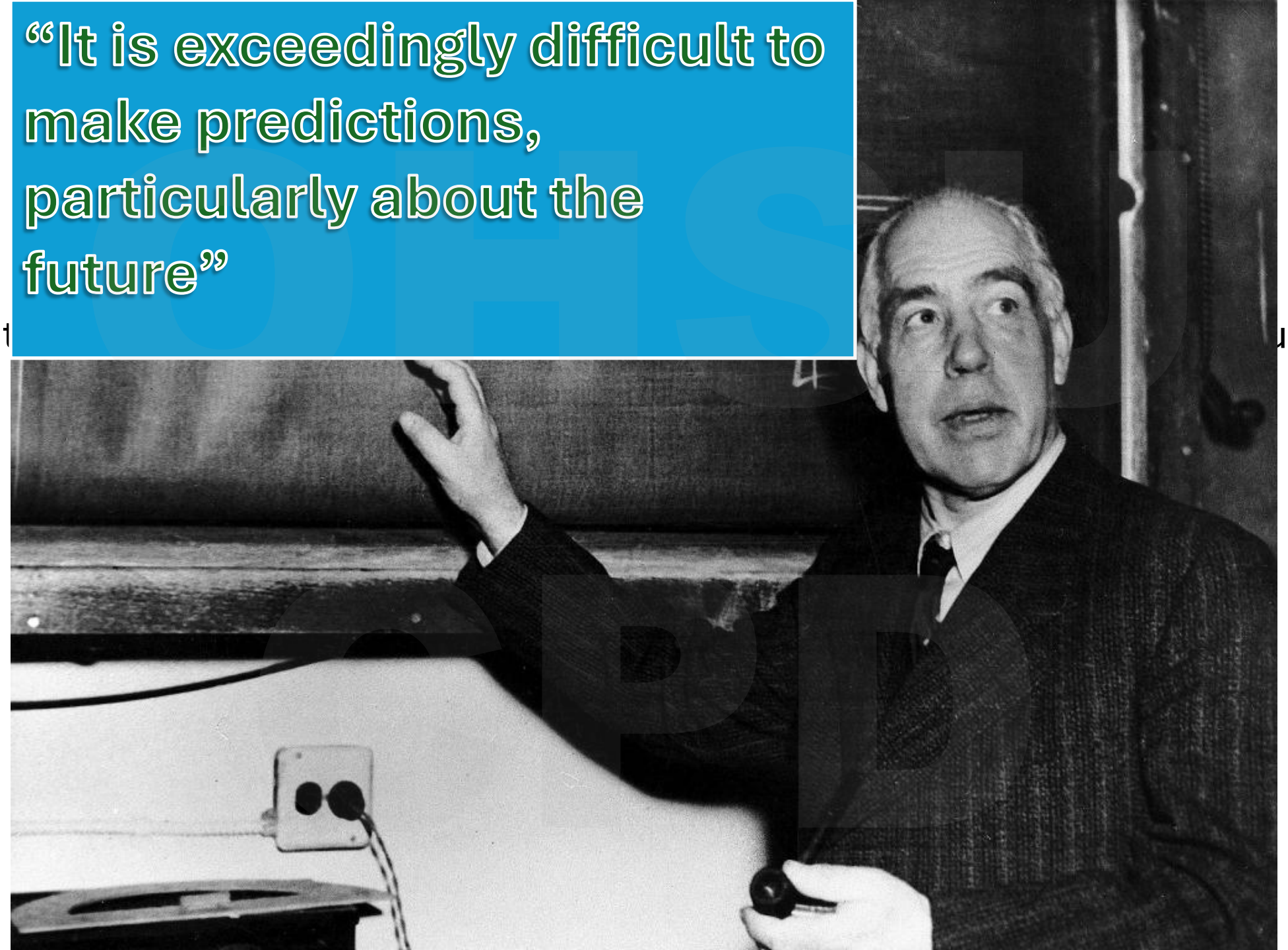
Nicholas Christakis, "A Death Foretold: Prophecy and Prognosis in Medical Care"

Renewed attention to prognosis?

- With rise of palliative care???
- Relentless focus on diagnostics and treatment comes at a cost
  - Monetary cost to society: high costs of care at the EOL
  - Costs to patients: potentially burdensome treatment
  - Costs to families: PTSD, complicated grief
- Story of ePrognosis and scientific basis for renewed attention to prognosis
- **Prognosis is critical to clinical decision-making for older adults**

Prognosis Estimation (Science)

“It is exceedingly difficult to make predictions, particularly about the future”



Clinical Decisions Influenced by Life Expectancy

Life Expectancy	Clinical Decision
>4-6 weeks	SSRI > methylphenidate for depression
>3 months	Surgery > XRT for malignant spinal cord compression
>6 months	Hospice, Finasteride
>1-2 years	Blood Pressure control to prevent stroke
>2 years	Statins to prevent cardiovascular outcomes
>8 years	Tight blood sugar control in diabetes
>10 years	Breast and colon cancer screening

All tests or treatments

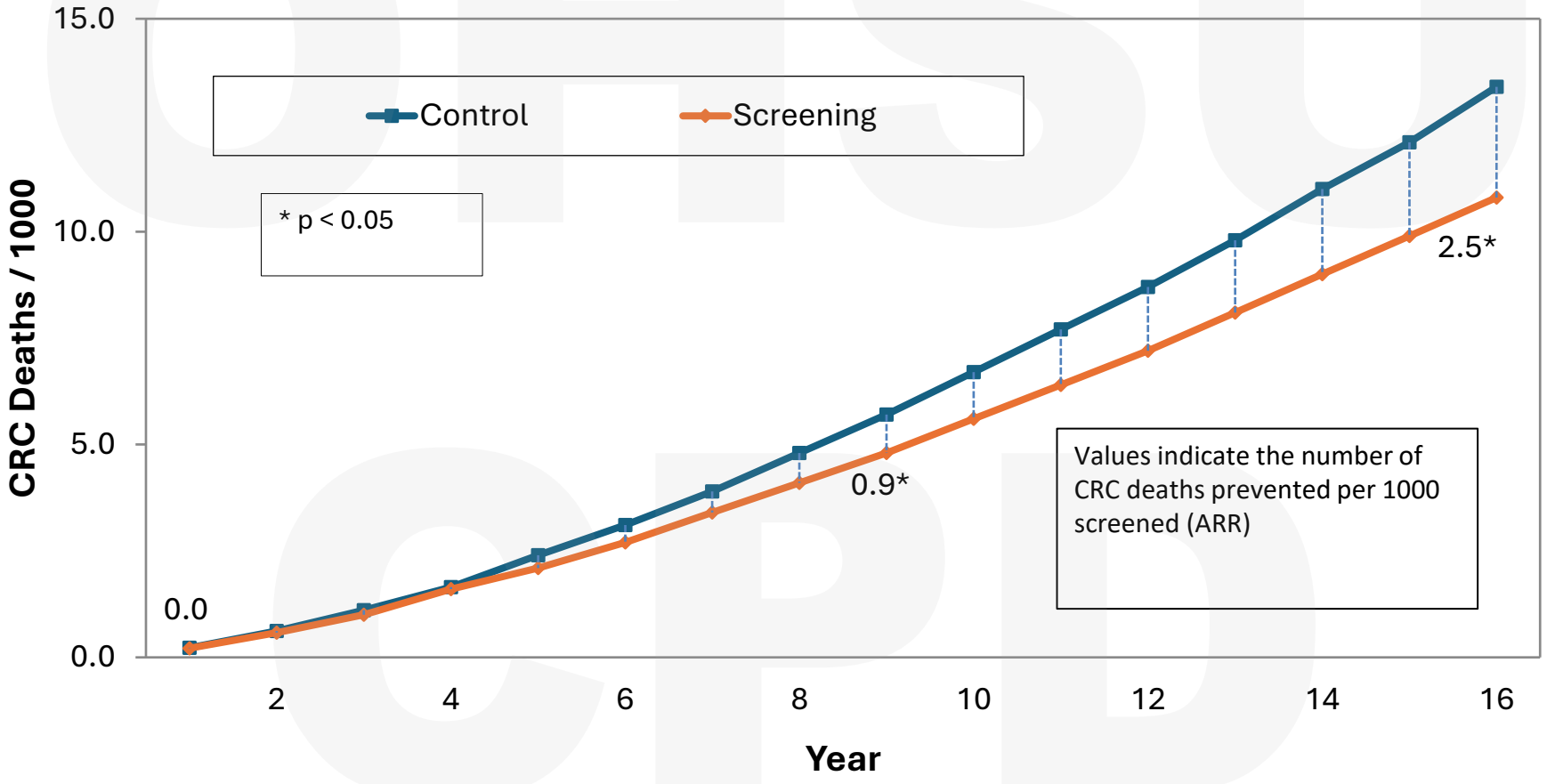
Lag time to benefit

- When will it help?
- Benefits delayed
- Cancer screening: slow growing cancers, take years to develop

Lag time to harm

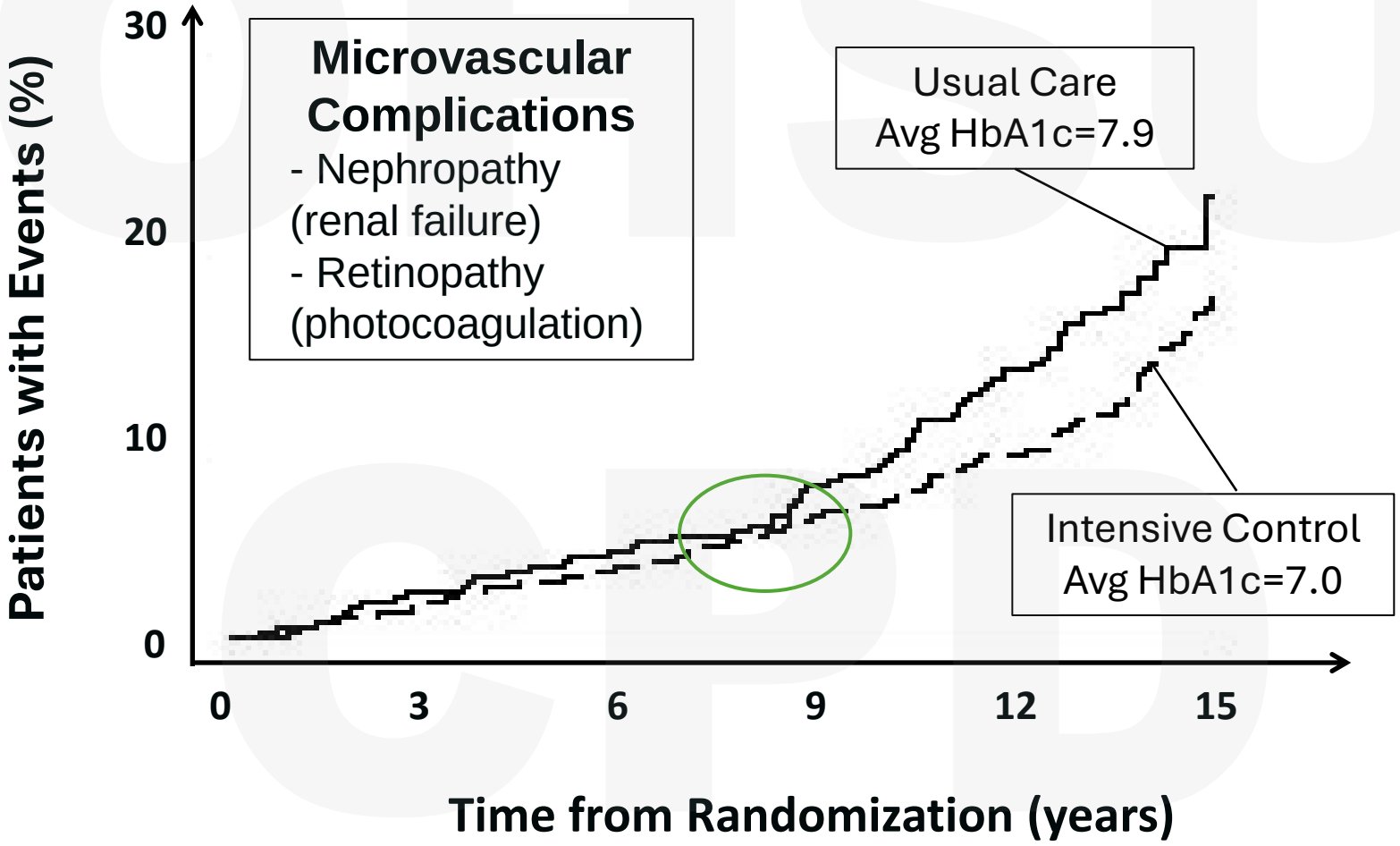
- When will it harm?
- Harms often up front
- False positives, workup/treatment for disease never would harm in lifetime

Colorectal Cancer Screening

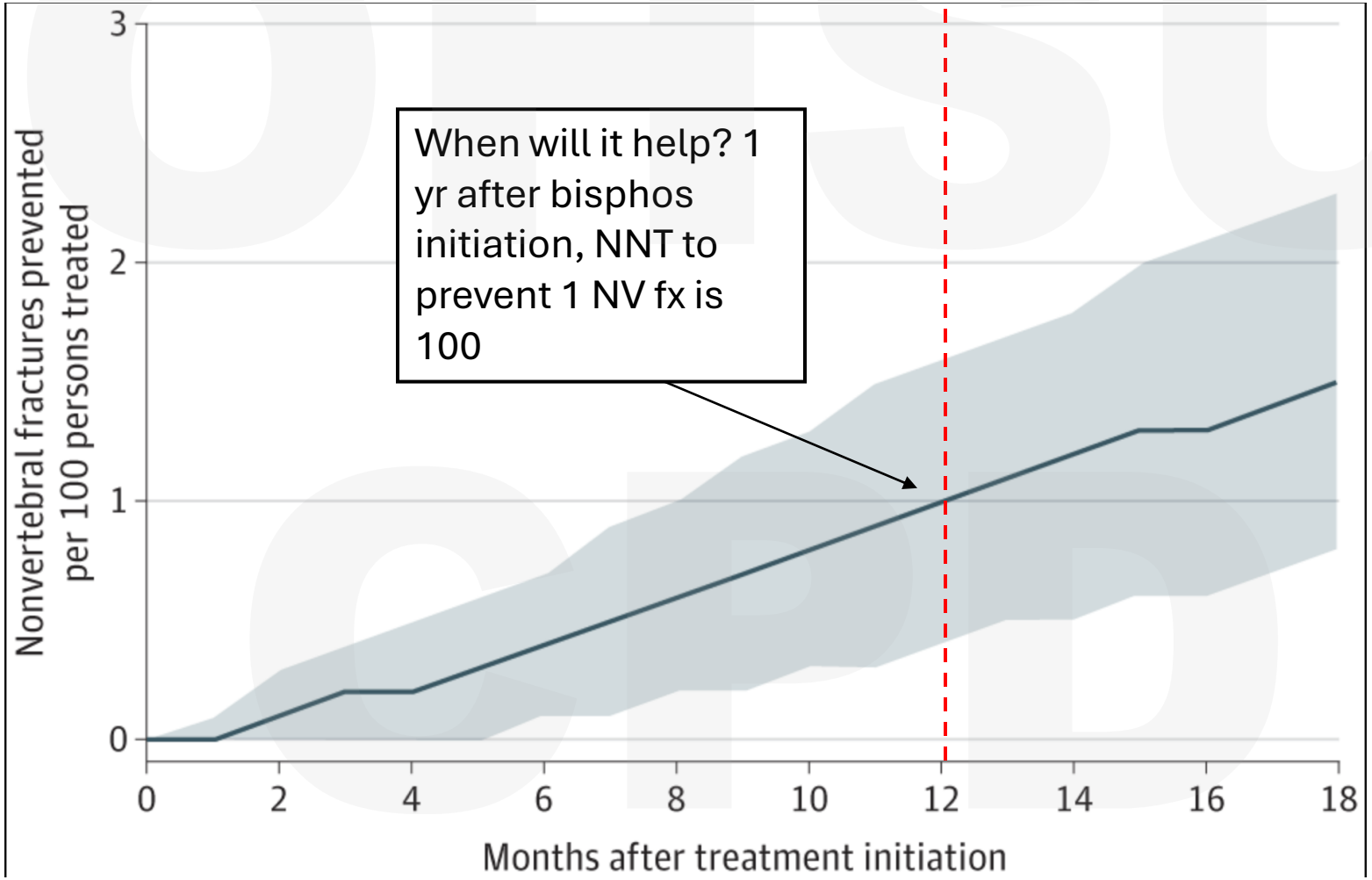


Lee SJ et al, BMJ 2013 Jan 8; 346. e8441

Glycemic Control: UKPDS



Bisphos to Prevent non-Vertebral Fracture



Deardorff JAMA IM 2021

Patient example

- 78 community dwelling woman
- Regular mammograms – continue?
- Diabetes
- Former smoker
- Mammography has about a 10 year lag-time to benefit

What is the best way to estimate prognosis for our 78 year old patient?

Ways to Prognosticate

Clinical Judgement

Clinical Judgment

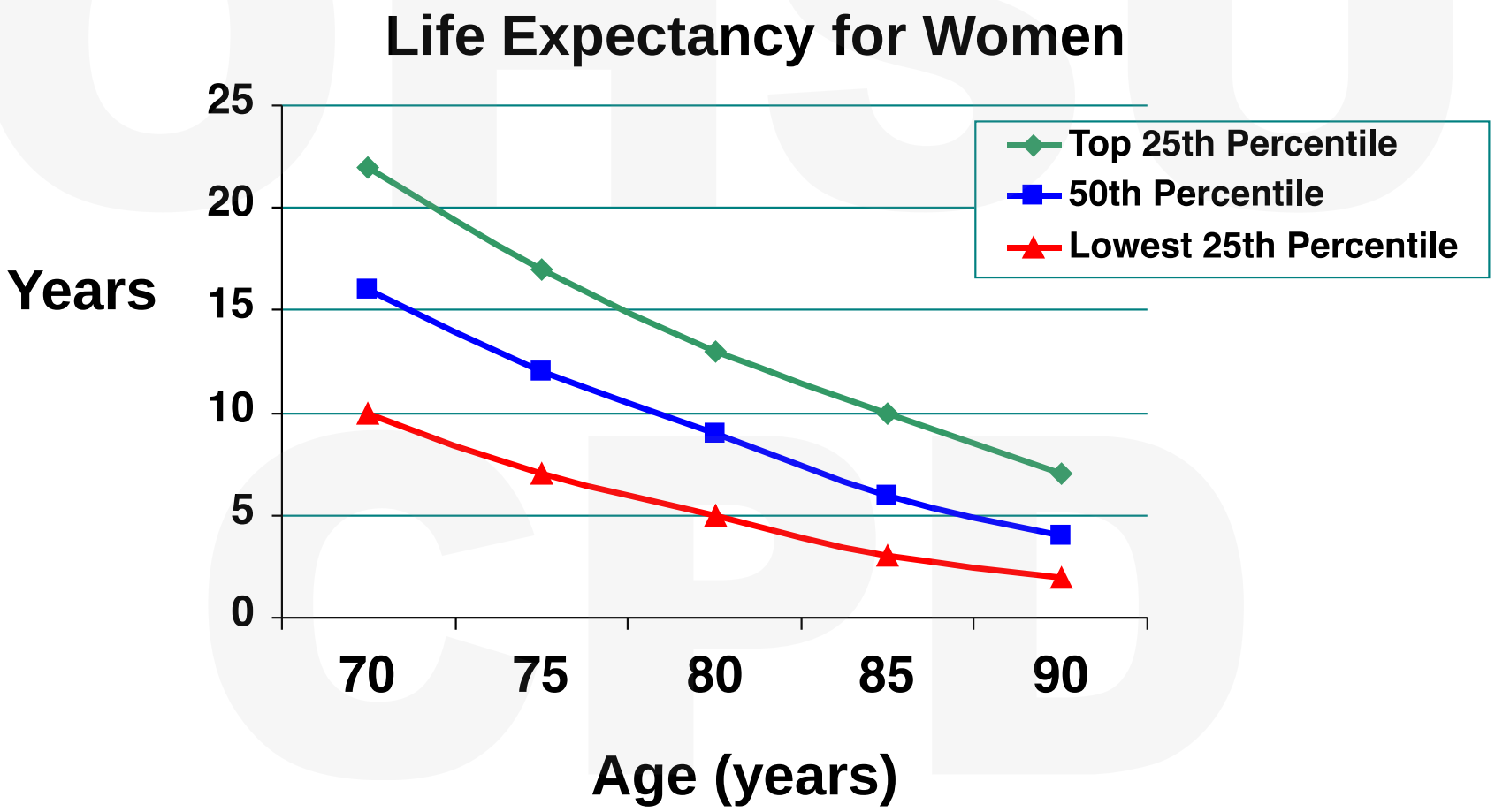
Shortcomings of Clinical Predictions

- Tend to overestimate patient survival by a factor of between 3-5.
- Influenced by relationships
  - The length of doctor patient relationships increases the odds of making an erroneous prediction.

Christakis BMJ 2000

Population Averages

Great Variation in Life Expectancy for People of Similar Ages



Walter LC. *JAMA* 2001;285:2750-56

How to determine who is in the bottom or top quartile?

Prognostic Indices

Prognostic Indices for Older Adults
A Systematic Review

Lindsey C. Yourman, MD
Sei J. Lee, MD, MAS
Mara A. Schonberg, MD, MPH
Eric W. Widera, MD
Alexander K. Smith, MD, MS, MPH

Context To better target services to those who may benefit, many guidelines recommend incorporating life expectancy into clinical decisions.

Objective To assess the quality and limitations of prognostic indices for mortality in older adults through systematic review.

Data Sources We searched MEDLINE, EMBASE, Cochrane, and Google Scholar from their inception through November 2011.

- Systematic review
- Identified 16 validated non-disease specific prognostic indices for older adults
- Evaluated quality: Accuracy and generalizability


easy

WHAT WOULD YOU LIKE TO DO?

PROGNOSTIC CALCULATORS

TIME TO BENEFIT

CANCER SCREENING

NEW AND MOST USED PROGNOSTIC CALCULATORS

Lee Schonberg Index

- Population: Community dwelling adults aged 50 and older
- Outcome: All cause 4, 5, 10 and 14 year mortality
- Scroll to the bottom for more detailed information

English | Español | Français | Português

Risk Calculator

1. How old is your patient? — 75-79

2. What is the sex of your patient? — (•) Female ( ) Male

3. What is your patient's BMI? — < 25

4. Which best describes your patient's health in general? — Good

5. Does your patient have chronic lung disease, such as emphysema or chronic bronchitis? — ( ) Yes (•) No

6. Has your patient ever had cancer (excluding minor skin cancers)? — ( ) Yes (•) No

10. Does your patient have difficulty walking 1/4 mile (several city blocks) without help from other people or special equipment?

○ Yes ◉ No

11. During the past 12 months, how many times was your patient hospitalized overnight? None

12. Because of a physical, mental or emotional problem, does your patient need the help of others in handling routine needs such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?

○ Yes ◉ No

13. Because of a health or memory problem, does your patient have difficulty managing money - such as paying bills and keeping track of expenses?

○ Yes ◉ No

14. Because of a health or memory problem, does your patient have difficulty with bathing or showering? ○ Yes ◉ No

15. Because of a health problem, does your patient have difficulty pushing or pulling large objects like a living room chair?

○ Yes ◉ No

Total Lee Index Points: 6

Total Schonberg Index Points: 8

Your best guess of 10 year mortality risk 15 - 23%

Calculate Risk ▶

Mortality Risk for Schonberg Index

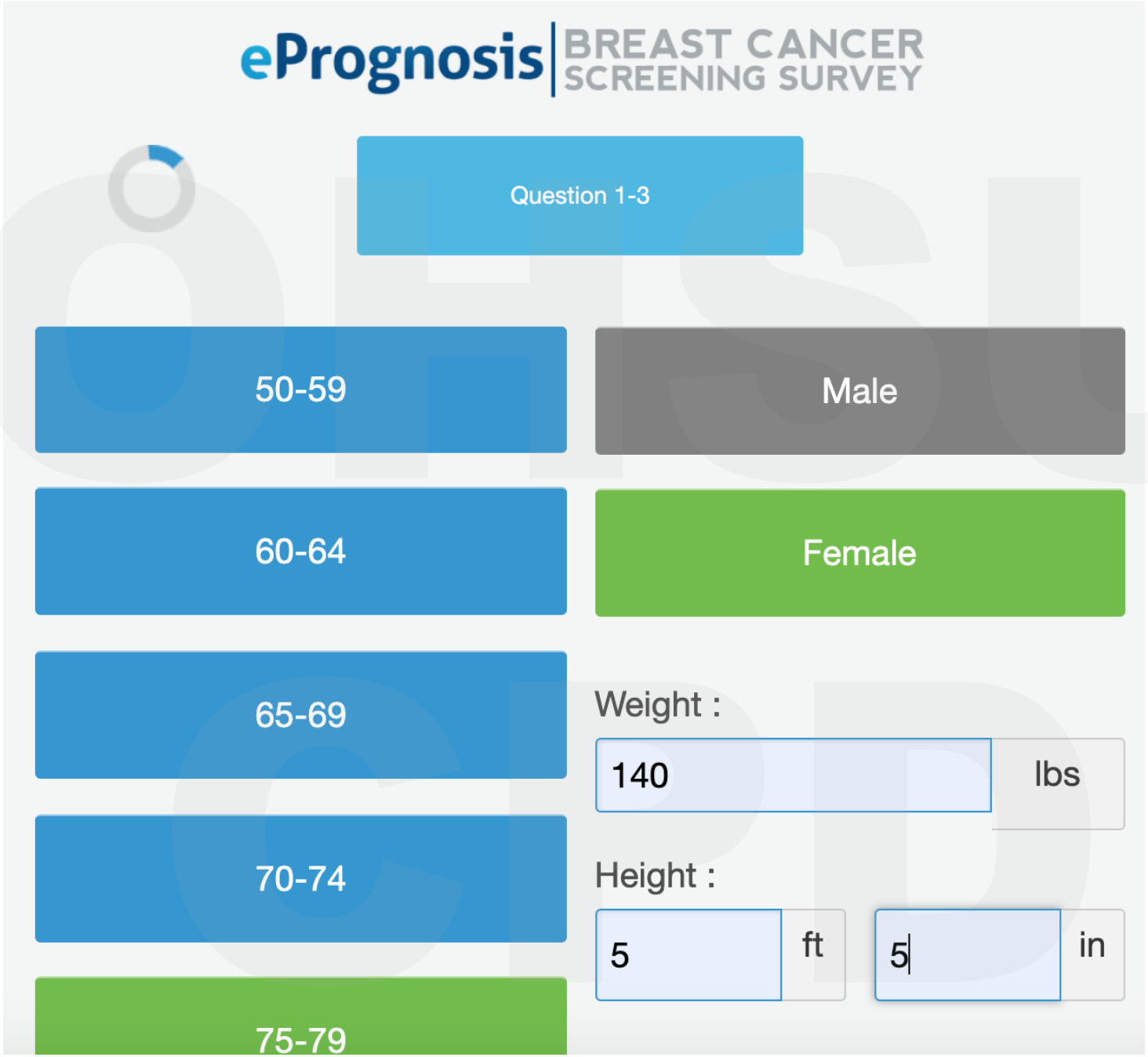
Points	Risk of FIVE YEAR mortality	Risk of TEN YEAR mortality	Risk of FOURTEEN YEAR mortality
0 - 1	<3%	5 - 11%	19 - 21%
2 - 3	3 - 6%	9 - 12%	19 - 24%
4 - 5	7 - 8%	15 - 21%	27 - 36%
6 - 7	10 - 12%	26 - 37%	42 - 52%
8 - 9	17 - 27%	37 - 44%	42 - 52%
10 - 11	26 - 29%	53 - 60	74 - 78%
12 - 13	37 - 41%	60 - 68	81 - 83%
14 - 15	47 - 52%	74 - 76	87 - 88%
16 - 17	60 - 61%	86 - 87	100%
≥17	70%	92%	100%

Mortality Risk for Lee Index

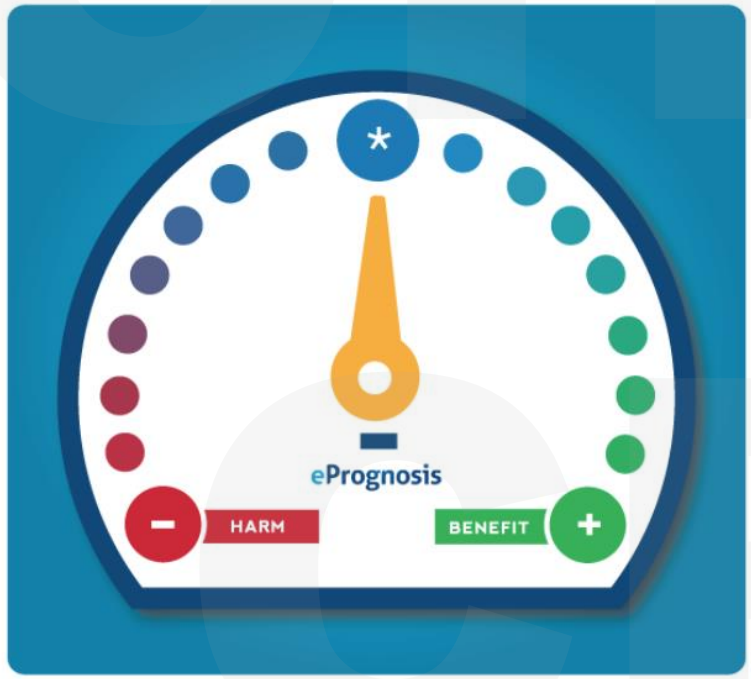
Points	Risk of FIVE YEAR mortality	Risk of TEN YEAR mortality	Life Expectancy (years)
0 - 1	1 - 2%	2 - 5%	33.1 - 35.4
2 - 3	2 - 4%	7 - 10%	23.7 - 30.1
4 - 5	6 - 8%	15 - 23%	17.7 - 21.1
6 - 7	9 - 15%	34 - 43%	12.6 - 14.3
8 - 9	20%	52 - 58%	8.9 - 10
10 - 11	28 - 45%	52 - 82%	5.0 - 7.2
12 - 13	44 - 59%	83 - 91	3.8 - 5.1
≥14	63%	93%	2.9

ePrognosis | CANCER SCREENING

WHAT WOULD YOU LIKE TO SCREEN FOR?


ePrognosis
BREAST CANCER SCREENING SURVEY
Question 1-3
50-59
60-64
65-69
70-74
75-79
Male
Female
Weight :
140
lbs
Height :
5
ft
5
in

ePrognosis | CANCER SCREENING



RESULTS

IT IS NOT CLEAR THAT GETTING SCREENED FOR BREAST CANCER WILL HELP THIS PERSON.

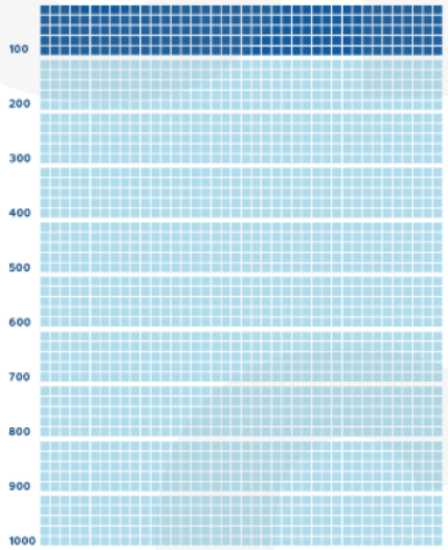
THIS PERSON'S THOUGHTS AND FEELINGS SHOULD BE THE MAJOR DRIVER OF THE DECISION.

VIEW HARMS VIEW BENEFITS

OF 1000 PEOPLE LIKE THIS PERSON WHO GOT TESTED FOR BREAST CANCER

100

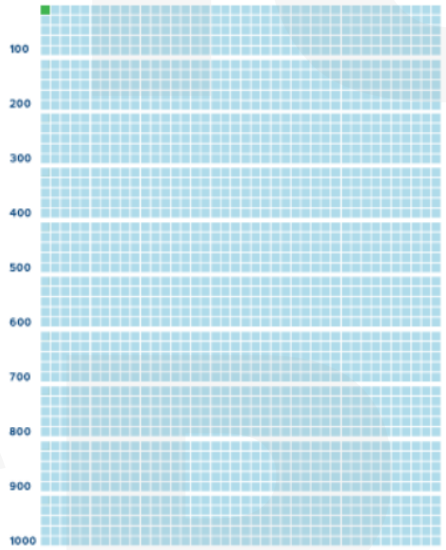
PEOPLE WILL EXPERIENCE HARM IN THE FIRST YEAR.



AFTER 10 YEARS, OF 1000 PEOPLE LIKE THIS PERSON WHO GOT TESTED FOR BREAST CANCER

1

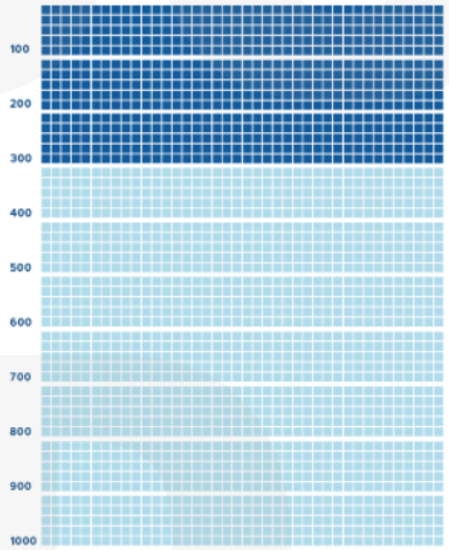
WILL AVOID DEATH FROM BREAST CANCER.



AFTER 10 YEARS, OF THE 1000 PEOPLE LIKE THIS PERSON

300

WILL DIE WHETHER OR NOT THEY GOT TESTED FOR BREAST CANCER.



BENEFITS

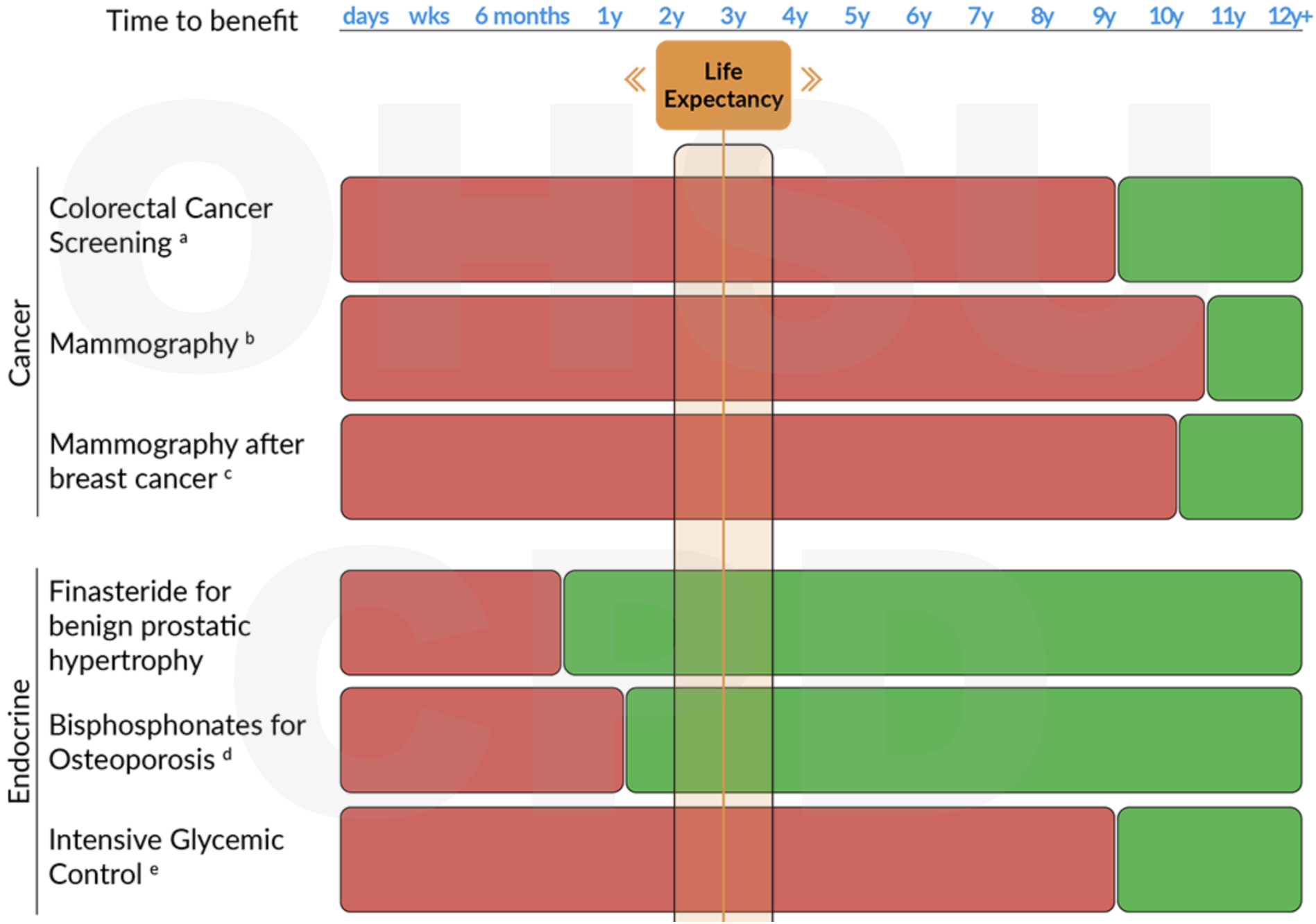
- A mammogram is more likely to find breast cancer when it is small, improving a woman's chances of only needing a minor surgery.
- Getting a mammogram may lower a woman's

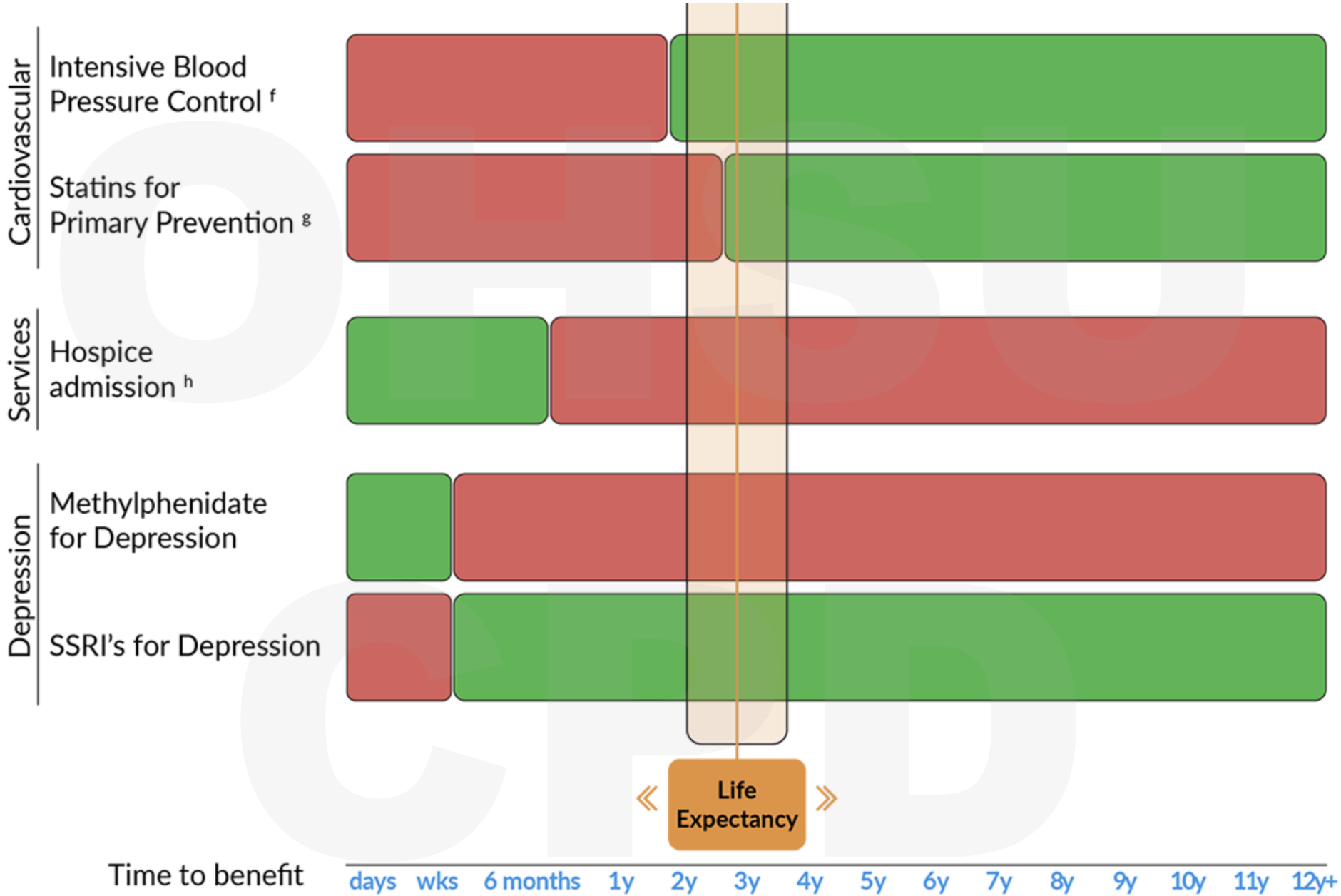
HARMS

- Getting a mammogram may be uncomfortable or cause anxiety.
- Some women who get a mammogram will experience a false alarm. These women are

Lag time to benefit for other interventions

- Bisphosphonates
- Tight glycemic control
- Statins
- Etc


Time to benefit
days
wks
6 months
1y
2y
3y
4y
5y
6y
7y
8y
9y
10y
11y
12y+
Life Expectancy
Cancer
Colorectal Cancer Screening a
Mammography b
Mammography after breast cancer c
Endocrine
Finasteride for benign prostatic hypertrophy
Bisphosphonates for Osteoporosis d
Intensive Glycemic Control e


Cardiovascular
Intensive Blood Pressure Control f
Statins for Primary Prevention g
Services
Hospice admission h
Depression
Methylphenidate for Depression
SSRI's for Depression
Life Expectancy
Time to benefit
days
wks
6 months
1y
2y
3y
4y
5y
6y
7y
8y
9y
10y
11y
12y+

Non-mortality outcomes

- Older adults care about quality of life, independence, and function as much or more than quantity of life

Original Investigation

December 4, 2023

Development and External Validation of Models to Predict Need for Nursing Home Level of Care in Community-Dwelling Older Adults With Dementia

W. James Deardorff, MD[1,2]; Sun Y. Jeon, PhD[1,2]; Deborah E. Barnes, PhD, MPH[3,4]; W. John Boscardin, PhD[1,2,3]; Kenneth M. Langa, MD, PhD[5,6,7,8]; Kenneth E. Covinsky, MD, MPH[1,9]; Susan L. Mitchell, MD, MPH[10,11]; Sei J. Lee, MD, MAS[1,2]; Alexander K. Smith, MD, MS, MPH[1,2]

» Author Affiliations | Article Information

JAMA Intern Med. 2024;184(1):81-91. doi:10.1001/jamainternmed.2023.6548

Models to predict need for nursing home level of care in community-dwelling older adults with dementia

Population: Community dwelling older adults aged 65 years and older with dementia

Outcomes: 2, 5, and 10 year risk and median time to needing nursing home level of care. The outcome of nursing home level of care was defined as one of the following 3 items:

1. ≥3 ADL dependencies (including bathing/showering, getting in/out of bed, dressing, toileting, and walking across the room),
2. ≥2 ADL dependencies and proxy report that the individual wanders or cannot be left alone,
3. eating dependency (e.g., needing help cutting up food).

In general, dependency with an ADL was defined by needing help with the task.

Scroll to the bottom for more detailed information.

Risk Calculator

1. Was the information obtained from the patient or via a surrogate?
   - (●) Patient
   - ( ) Surrogate (e.g., spouse, other family member, or caregiver)

2. What is your patient's age?
   - (●) 65-69
   - ( ) 70-74
   - ( ) 75-79
   - ( ) 80-84
   - ( ) 85-89
   - ( ) 90+

3. What is your patient's biological sex?
   - (●) Male
   - ( ) Female

4. Which of the following ADL and IADL dependencies does your patient have?

   Dependency with an ADL/IADL means that the patient requires help performing the specific task and cannot perform it independently. Note: If your patient has 3 ADL dependencies or eating dependency at baseline, they would already be classified as nursing home level of care.

   Activities of Daily Living (ADLs):
   - [ ] Bathing or showering
   - [ ] Getting in or out of bed
   - [ ] Dressing, including putting on shoes and socks
   - [ ] Using the toilet, including getting up and down

   Instrumental Activities of Daily Living (IADLs):
   - [ ] Using a telephone
   - [ ] Preparing a hot meal
   - [ ] Taking medications
   - [ ] Managing money (such as paying bills and keeping track of expenses)
   - [ ] Shopping for groceries

5. What is your patient's driving status?
   - (●) Still driving
   - ( ) No longer driving
   - ( ) Never drove

Results

For an individual with these baseline characteristics, the predicted probability of nursing home level of care equals:	
2 years	25%
5 years	45%
10 years	65%
Median predicted time to nursing home level of care (25th to 75th percentile)	4.7 years (1.5 - 11 years)

Original Investigation | Geriatrics

July 8, 2024

Prognoses Associated With Palliative Performance Scale Scores in Modern Palliative Care Practice

Kara E. Bischoff, MD[1]; Kanan Patel, MBBS, MPH[2]; W. John Boscardin, PhD[2]; David L. O'Riordan, PhD[1]; Steven Z. Pantilat, MD[1]; Alexander K. Smith, MD, MPH[2]

» Author Affiliations | Article Information

JAMA Netw Open. 2024;7(7):e2420472. doi:10.1001/jamanetworkopen.2024.20472

Palliative Performance Scale

- Population: Patients who have received a palliative care consultation at an academic medical center.
- Outcome: 1-month mortality, 6-month mortality, median survival in months.
- Scroll to the bottom for more detailed information.

Palliative Performance Scale Score

1. Is your patient in the **inpatient** (hospital) or **outpatient** (home, clinic, or nursing home) setting?	Inpatient
2. Does your patient have **cancer** or **a non-cancer** serious illness, primarily?	Cancer
3. If you **know** your patient's PPS score input it here:	Unknown

If you **don't know** your patient's PPS score, complete the following 5 questions to determine their score:

4. How ambulatory is this patient?	Totally bed bound
5. What is the patient's daily level of activity? Is there any evidence of disease?	Unable to do any activity, exten
6. How much self-care assistance does this patient require?	Total care
7. How much oral intake does this patient have?	Minimal to sips
8. What is this patient's level of consciousness?	Full or drowsy +/- confusion

Calculate risk ›

- The Palliative Performance Scale (PPS) has been shown to be both valid and useful for a broad range of palliative care patients: those with advanced cancer diagnoses or life-threatening non-cancer diagnoses in clinics, hospitals, and hospices.
- Data from University of California, San Francisco 1/1/2018-12/31/2020.
- Average age was 63 years, 51% women, 57% white.
- Among inpatients, 62.3% had cancer, 5.1% had neurologic illnesses, and 32.6% had other serious illnesses. Among outpatients, 73.9% had cancer, 11.9% had neurologic illnesses, and 14.2% had other serious illnesses.

PPS	1-month mortality, %	6-month mortality, %	Median survival (95% CI) in months
10 (n=170)	66.5	77.7	0.62 (0.49 - 0.76)
20 (n=89)	57.3	73.0	0.75 (0.53 - 1.08)
30 (n=138)	40.6	58.0	1.68 (1.05 - 6.08)
40 (n=158)	30.4	56.3	2.30 (1.77 - 6.11)
50 (n=121)	14.1	30.6	≥30 (22.28 - ≥30)
60 (n=90)	8.9	28.9	≥30 (14.49 - ≥30)
70 (n=70)	6.3	25.0	≥30 (≥30 - ≥30)
80 (n=27)	0.0	18.5	≥30 (14.95 - ≥30)

*PPS = palliative performance scale, CI = confidence interval

ePrognosis has grown

- Now about 15k uses/month
- 85% clinicians
- Primary care, geriatrics, palliative care, urologists, oncologists
- International user base
  - 50% US
  - 50% International
- Top cities
  - Sao Paulo, New York, Mexico City, Chicago
  - Portland, OR 28th globally

ePrognosis: Next Steps

- R01 to develop prognostic models for hospitalized older adults
  - UCSF, Cleveland Clinic, BIDMC, Hopkins
  - Function
- Prognostic model for incarcerated
  - Compassionate release
- Thiago Silva: Walter index in Brazil
- James Deardorff: Prognosis in SNF
- Website redesign – AI for communication?
- EHR integration?

Prognosis Communication (Art)

Why do patients want to know?

- 65 disabled older adults; English, Spanish, Cantonese
- 2/3 want to know if life doctor thought life expectancy < 5 years

Outcome	Life Choices
Life expectancy	Being at peace with God; preparing my family
Time to disability	Consider moving in with children; exercise
Time to difficulty managing finances	Arrange for durable power of attorney for finances
Time to loss of mobility	Prepare home for worsened mobility

Ahalt JGIM 2012

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE
Efficacy and Safety of Acoramidis in Transthyretin Amyloid Cardiomyopathy

PERSPECTIVE
Transforming Population Health — ARPA-H's New Program Targeting Broken Incentive...

Perspective

Discussing Overall Prognosis with the Very Elderly

Alexander K. Smith, M.D., M.P.H., Brie A. Williams, M.D., and Bernard Lo, M.D.

Article Figures/Media Metrics

5 References 70 Citing Articles

IT'S LATE IN THE DAY IN THE OFFICE OF A BUSY PRIMARY CARE physician, who is relieved to see that his last patient is a woman who, though 86 years old, has multiple stable medical problems and is visiting for her annual exam. The patient is accompanied by her daughter, who helps her mother with several activities of daily living, including bathing, dressing, and balancing her checkbook. During the visit, the daughter asks about preventive health measures for

The NEW ENGLAND JOURNAL of MEDICINE

MEDICINE AND SOCIETY
The Financialization of Health in the United States

MEDICINE AND SOCIETY
On Calling — From Privileged Professionals to Cogs of Capitalism?

Perspective

Uncertainty — The Other Side of Prognosis

Alexander K. Smith, M.D., M.P.H., Douglas B. White, M.D., and Robert M. Arnold, M.D.

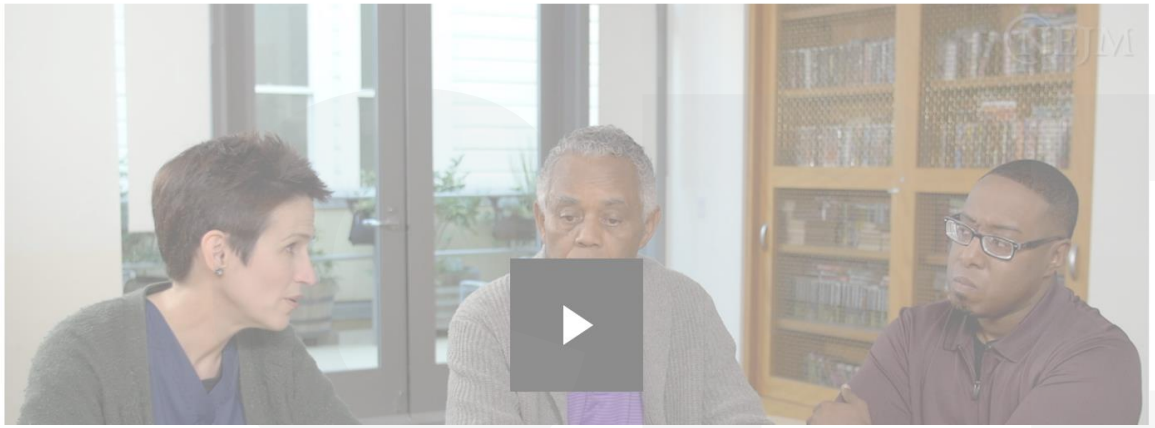
RECENTLY, THERE HAS BEEN A RESURGENCE OF INTEREST IN prognosis. This interest has been driven by a recognition that prognosis plays a central role in medical decision making, from counseling outpatients about stopping cancer screening to making decisions with patients' surrogates about withdrawal of life support in intensive care units.[1,2] Patients say that understanding prognosis is important for making life choices, such as engaging in financial planning, arranging custodial care, and deciding when it's important for

Prognosis: Family Meetings

VIDEOS IN CLINICAL MEDICINE FREE PREVIEW

Family Meetings on Behalf of Patients with Serious Illness

Eric Widera, M.D., Wendy G. Anderson, M.D., Lekshmi Santhosh, M.D., M.A.Ed., Kanako Y. McKee, M.D., Alexander K. Smith, M.D., M.P.H., and James Frank, M.D.



September 10, 2020
N Engl J Med 2020; 383:e71
DOI: 10.1056/NEJMvcm1913056

Editors

Julie R. Ingelfinger, M.D., Editor

Pre-meeting

Pre-meeting

- Pre-meeting is at least as important as meeting

Pre-meeting

- Pre-meeting is at least as important as meeting
- Critical to discuss prognosis

Pre-meeting

- Pre-meeting is at least as important as meeting
- Critical to discuss prognosis
- Anchor prognosis in “worst case” during pre-meeting

Photo Courtesy of George Skidmore

Photo Courtesy of Bill Fransen Photography

Blake Wales Hendee Smith, 1941-1998

Thank you!

Alexander.Smith@ucsf.edu

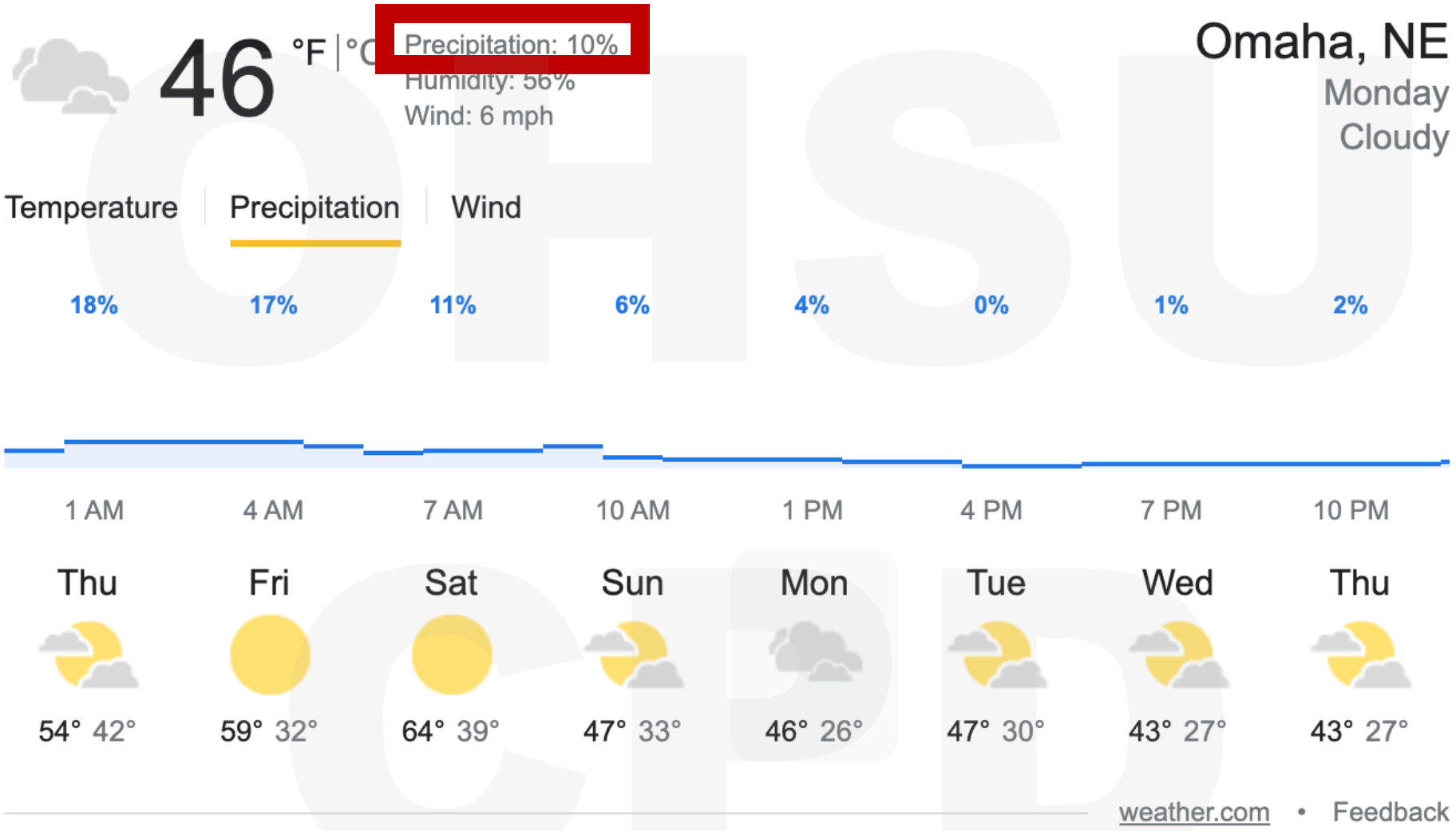
Prognostication

Three parts:

1. Estimating the probability of an individual developing a particular outcome over a specific period of time (prognosis).
2. Communicating the prognosis with the patient and/or family
3. Interpretation of the prognosis by the patient and/or family.

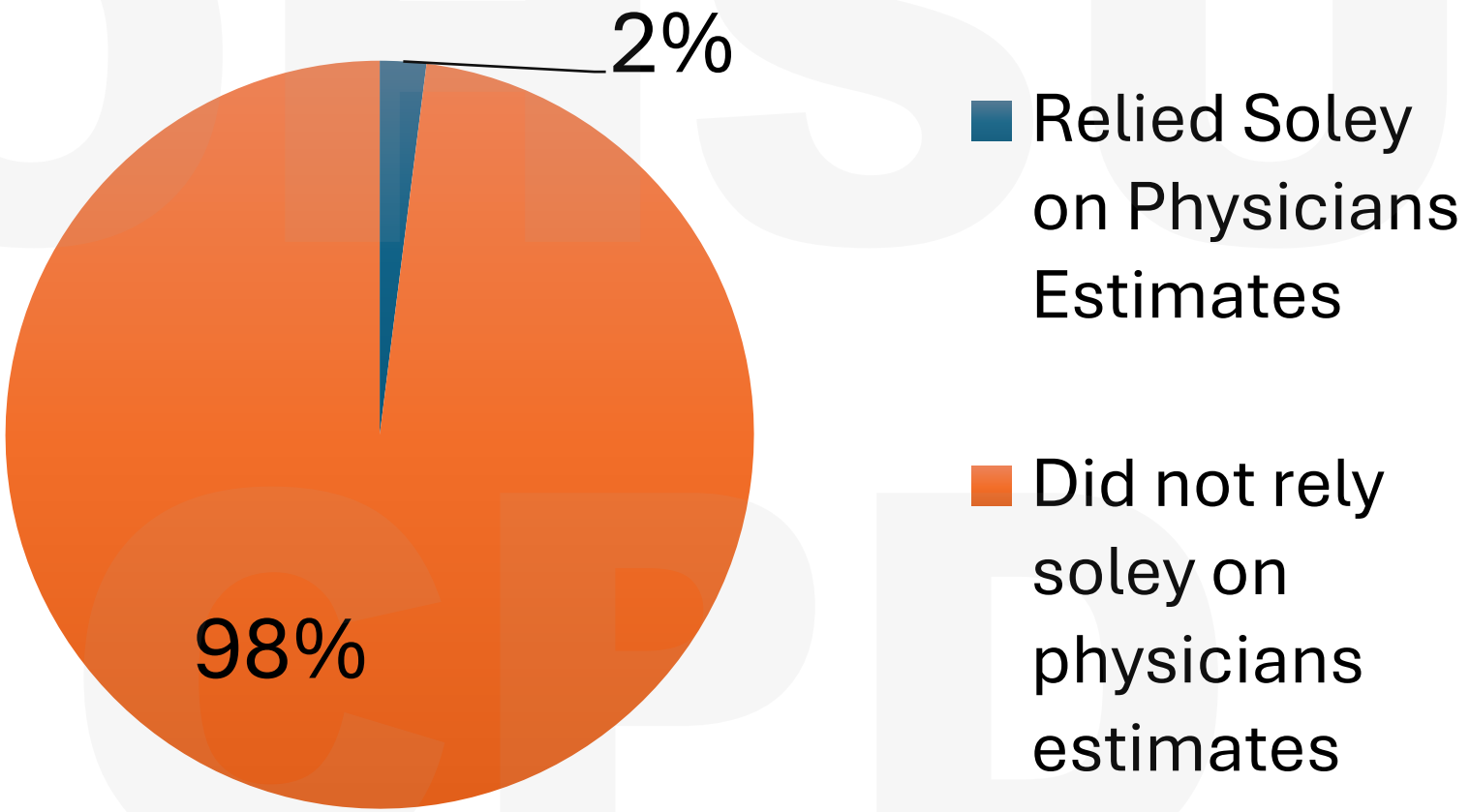

Will it rain on Monday?

About 1,630,000 results (0.57 seconds)



What % of surrogates rely solely on the physicians estimate when determining prognosis?

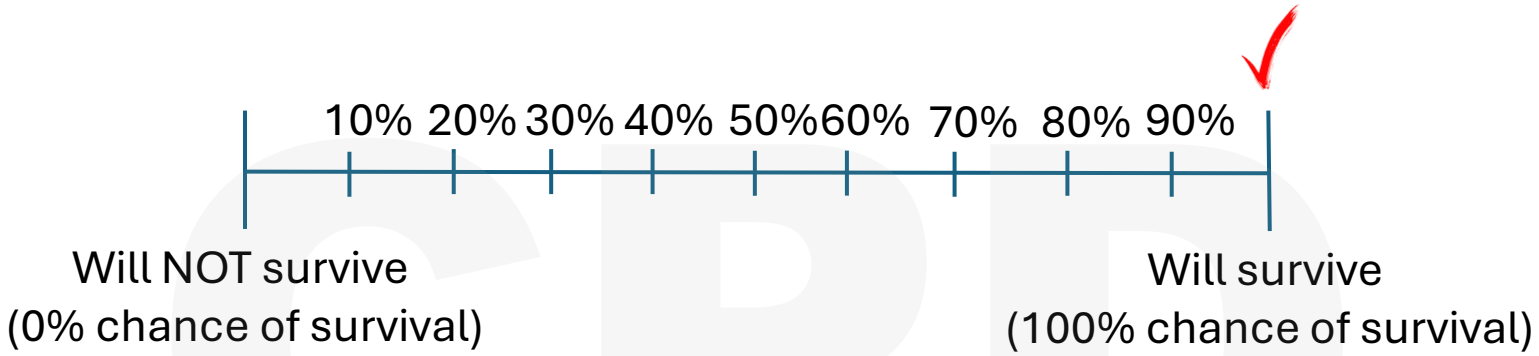
Interpretation



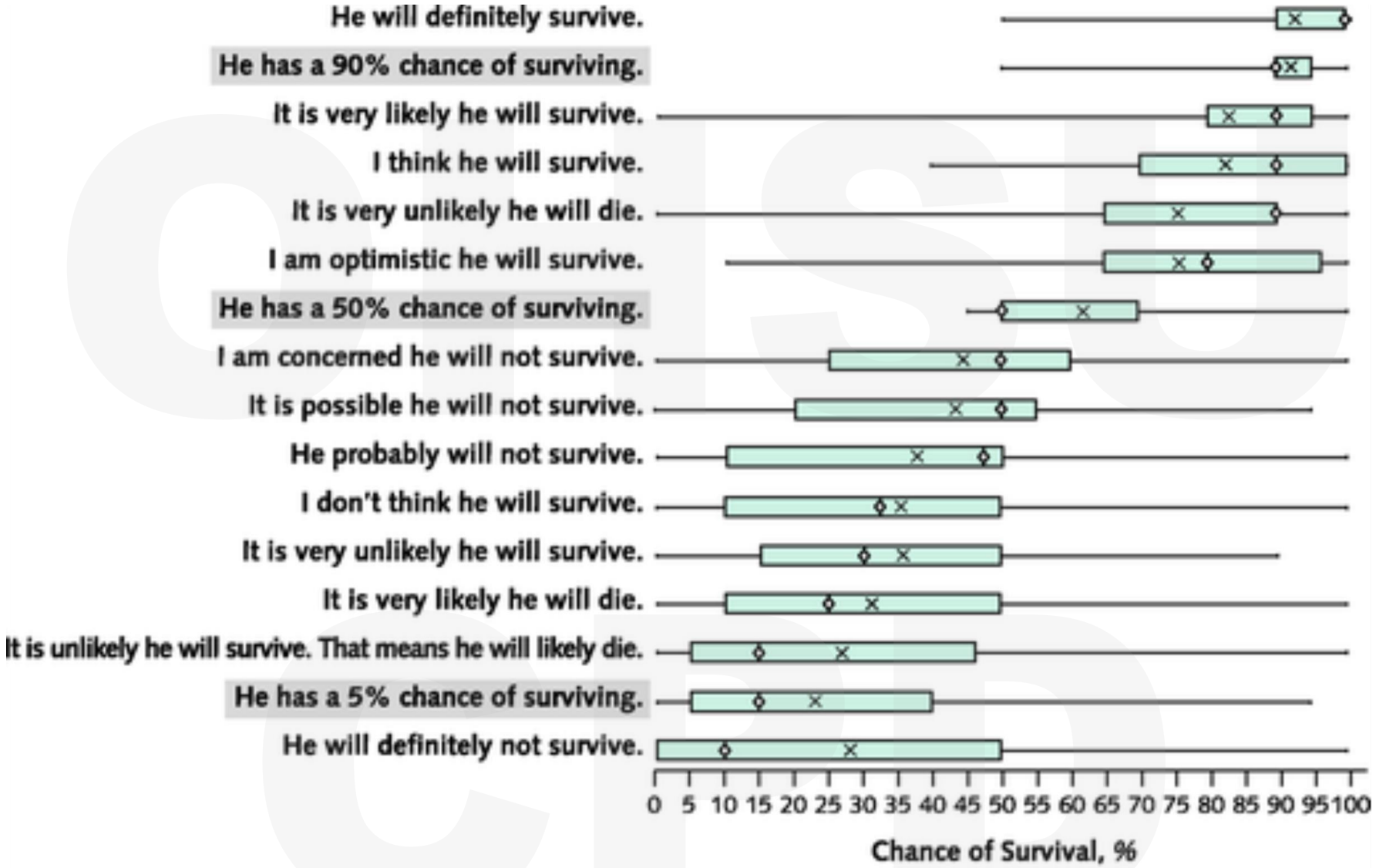
Boyd et al. Crit Care Med, 2010; 38: 1270-1275

Surrogates of current ICU patients were asked about prognostic statements.

For example, “If a doctor says ‘He will definitely survive,’ what does that mean to you?”



Zier Ann Intern Med. 2012;156:360-366.



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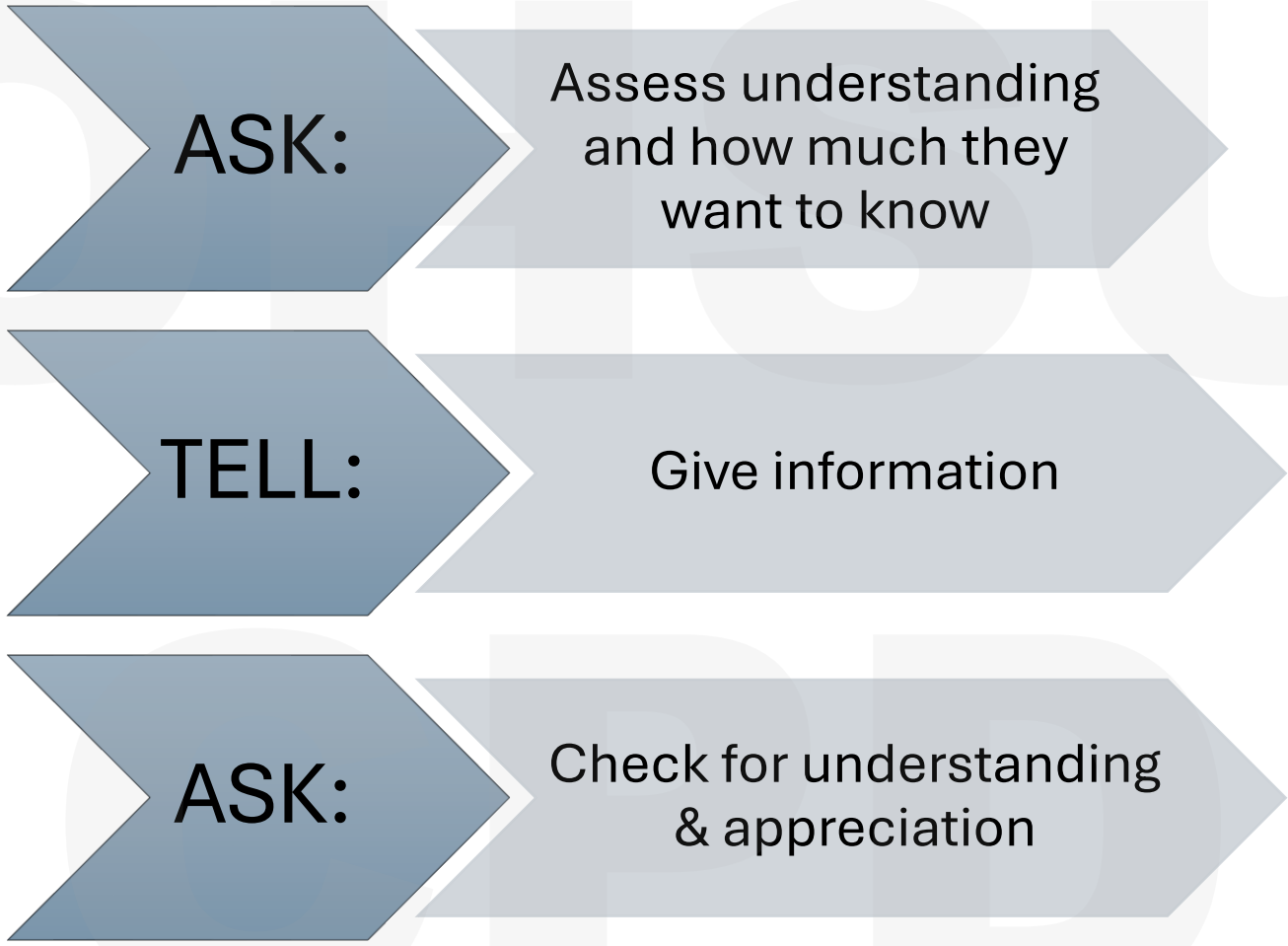
ASK:
Assess understanding and how much they want to know
TELL:
Give information
ASK:
Check for understanding & appreciation

Prognosis & ePrognosis scratches many itches

- “Pointy headed scientist” itch
- “Creative/start-up excitement” itch
- “More fun to work in teams” itch
- “Do something people will use” itch
- “Communication and ethics” itch