# PROGNOSTICATION 101

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# Faculty/Presenter Disclosure

- **Faculty:** **Mehrnoush Mirhosseini / Ingrid de Kock**

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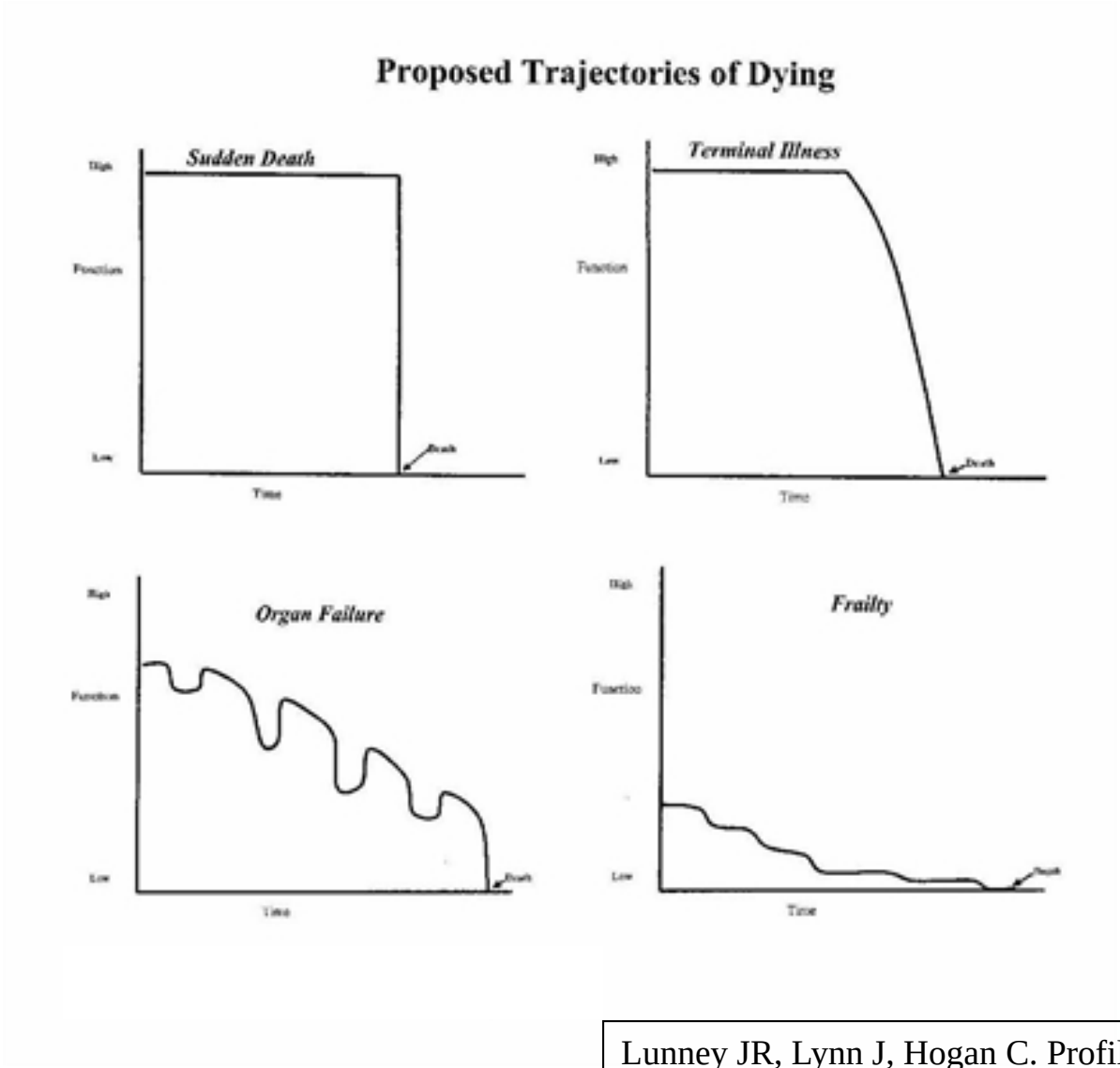
Christakis NA. ***Death Foretold: Prophecy & Prognosis in Medical Care***. U of Chicago Press, 1999

*"As a result of a failure to prognosticate, let alone prognosticate accurately, patients may die* ***deaths they deplore*** *in* ***locations they despise***"

# Discussion points

- When do you have to prognosticate in your practice?
- How do you formulate a prognosis?
- Does prognostication differ for cancer vs non-cancer patients?
- Are there challenges when trying to establish prognosis?
- How do you discuss this with your patient?

# Disease trajectories




Lunney JR, Lynn J, Hogan C. Profiles of older medicare decedents. *J Am Geriatr Soc*.2002;50:1108-1112

# When do you have to prognosticate in your practice?

# Why is prognostication important for the patient and the family?

- 81% of patients with recently diagnosed metastatic cancer wanted information about average survival times (Hagerty et al; 2004; J of clinical Oncology)
- Adequate informed consent for ongoing care
- Shared decision making
- Decisions made with full knowledge vs based on hopeful assumptions
- To realign goals of care

Glare and Sinclair; Journal of Palliative Medicine; 2008

# Why does prognostication matter to clinicians?

- Planning for possible eventualities
  - Symptoms
  - Function
  - Emergencies
  - Family impact
  - Social and financial issues
- Sharing information on treatments and side effects
- Connecting the patient to the right services
- Common language

Glare and Sinclair; Journal of Palliative Medicine; 2008

# What is the significance of prognostication to the health care system?

- Discharge planning
- Policy making
- Resource allocation
- Improving patient care
- Design and analysis of clinical trials

# How do you formulate a prognosis?

# Useful resources

## Patient survival according to Gold Standard Framework(GSF)

www.goldstandardframework.nhs.uk

## National Guideline Clearing House

www.guideline.gov

## Systematic Review of Non-cancer Presentation with a Median Survival of 6 Months or Less

Salpeter, et al; Am. J. of Medicine, 125 (5) May 2012

# Types of prognostication

- Temporal vs probabilistic method
- Probabilistic: best, least known
- Temporal:
  - main focus in literature (often 6 mo.) and commonly used by programs, e.g. in Edmonton hospice admission criteria include survival of 3-4 mo.
  - method of choice for many clinicians when communicating prognosis to pt and family

Hui et al; Oncologist. Nov 2011; 16(11): 1642–1648

# Clinician Prediction of Survival (CPS)

- MDs overestimate survival

  Christakis, Lamont; BMJ 320:469-472, 2000

- Health care aids are better than nurses and nurses better than MDs
- Repeated estimates seem to be more accurate
- Close physician-patient relationship decreases accuracy

  Maltoni et al; JCO 23(25):6240-6248, 2005

- Is it more accurate closer to death???

  Selby D. et al;2011;JPSM; Mirhosseini, De Kock, unpublished data

- Tools can strengthen CPS

  Mirhosseini, De Kock, unpublished data

# Clinician Prediction of Survival (CPS)

- Experience increases the accuracy:

  Dependent on having ++ cases and reliable memory

- Surprise question: “Will you be surprised if this pt dies within the next ….. months?”

# General prognostic factors

**Generally accepted:**

- Advanced disease (Cancer: SEER program, National Institute of cancer; non-cancer: Salpeter et al 2012)
- Poor Functional status(Grade B Evidence) (Maltoni et al, 2005)
- Decreasing functional performance status (Maltoni et al, 2005; National Guideline Clearing House 2006)
- Progressive weight loss (Grade B Evidence) (Maltoni et al, 2005; National Guideline Clearing House 2006)
- Low serum albumin ( Salpeter et al, 2012)
- Decreasing response to treatments, decreasing reversibility
  - Patient's choice of no further active treatment
  - lack of response to current available treatments

# General factors (cont.)

Possibly contributing:

- Frequent hospital presentation/admission (Salpeter et al, 2012)
- Co-morbidity (Maltoni et al, 2005; Cho et al, 2013)
- Symptoms:
  - Dyspnea (Grade B Evidence) (Maltoni et al, 2005; NGCH 2006 )
  - Dysphagia (Grade B Evidence) (Maltoni et al, 2005; NGCH 2006 )
  - Leg edema ( Morieta et al, 1999; Maltoni et al 2005)
- Syndromes:
  - Cognitive impairment (NGCH2006 )
  - delirium (Grade B Evidence) (Maltoni et al, 2005)

National Guideline Clearing House; Gold Standard Framework;
Salpeter, et al; Am. J. of Medicine, 125 (5) May 2012

# Tools and Prognostication

- Functional tools:
  - KPS(Karnofsky Performance Status)
  - PPS ( Palliative Performance Scale)
  - ECOG ( Eastern Co-operative Oncology Group performance status scale)
- Prognostic tools:
  - CPS( Clinician Prediction of survival)
  - PaP( Palliative Performance score)
  - PPI ( Palliative Performance Index)

# Practical wisdom

Monitoring functional decline is a strong prognostic factor:

> An illness whose functional decline is noted month-to-month will likely continue for a number of months. An illness whose functional decline is noted weekly is likely to continue for a number of weeks. Daily functional decline may indicate a prognosis limited to days.
>
> Harlos, Woelk; Guideline for Estimating Length of Survival in Palliative Patients, Virtual Hospice

# Does prognostication differ for cancer vs non-cancer patients?

# Disease specific prognostic factors – 1. Cancer

- Primary cancer, metastases (1)
- Symptoms: Dyspnea(2,3,4), dysphagia(2,4), leg edema(2)
- Clinical syndromes: SCC(5), MBO(6), delirium(2,4), SVC obstruction(7)
- Organ failure: renal impairment, liver impairment
- Lab indices: Lymphocytopenia, leukocytosis, CRP(4)


1)National Institute of Cancer, SEER (Surveillance,Epidimiology and End Results) program
2) Pirovano et al; JPSM. 1999 Apr;17(4):231-9
3)Vigano et al; Pall.Med; 2000;14;363-374
4)Maltoni ; J Clin Oncol. 2005 Sep 1;23(25):6240-8
5) Rades et al; 2008;Cancer,; Loblaw et al;2003; J. Clin. Oncol.
6) Henry et al; 2012; Wright et al 2010
7)Chan et al 2013; Arinc et al 2010

# Disease specific prognostic factors – 2. Congestive heart failure

- Age > 70 y(1,2,3,4)
- History of arrhythmia, cardiac arrest, resuscitation, mech. ventilation(1)
- Systolic blood pressure(2)
- Left ventricular ejection fraction(1,3)
- Beta blockers not used(1,3)
- Loop diuretics >240mg/day(1)

# Disease specific prognostic factors – 2. Congestive heart failure (cont.)

- Use of inotropic and anti-arrhythmic agents other than beta-blockers(3)
- Lab: BNP(1,3,4) , creatinine & BUN(1,2,3,4), sodium(1,4), troponin I(3)

1)O'Connor et al; J Am Coll Cardiol. 2010;55(9):872-878
2) Douglas et al; AMA, 2003; 290(19)
3) Salpeter et al; Am. J. Med., 2012; 125(5)
4) Jessup et al; Circulation; 119:1977–2016, 2009

# Prognostic tools in CHF:

## Heart Failure Risk Scoring System

- Predicting Mortality Among Patients Hospitalized for Heart Failure Derivation and Validation of a Clinical Model; Lee D. et al; JAMA, November 19, 2003; 290(19), 2581-7

# Disease specific prognostic factors – 3. Respiratory diseases

- Age >70 y (1,3)
- Oxygen need ( 1)
- Pulm. function test indices: FEV1, TLC, higher RV (as % predicted), lower DlCO (% predicted) (1,4)
- BODE index of ≥ to 7 (1,2,4)

# Disease specific prognostic factors – 3. Respiratory diseases (cont.)

- Lower lung zone emphysema > upper lobe emphysema (1)
- Lower exercise capacity on cardiopulmonary exercise testing vs 6MWT distance (1 )


1) Fernando et al; Am J. Resp & Crit. Care Med. 2006; 173: 1326-1334
2) Celli ; N Engl J Med 2004;350:1005–1012
3) Salpeter et al; Am. J. Med. 2012; 125(5)
4) Martin et al; Resp. Med. 2011; 105, 916-21


# Disease specific prognostic factors – 4. End stage renal disease

- Age > 70 y (3,2)
- Comorbidities (2) (Charlson Score) (1)
- Living in facility (2)
- Low BMI (2)
- Admission to ICU for an acute illness (2)
- Withdrawal/withholding of dialysis (4,2,5)


1) Davison et al; JPC 2011; 27(1): 53-61
2) Salpeter et al; Am. J. Med. 2012; 125(5)
3) The United States Renal Data System (USRDS) database
4) Chater et al; Clin Nephrol 2006; 66(5): 364–72.
5) Chanda et al; Nephrol Dial Transplant. Published online November 22, 2010; doi:10.1093/ndt/ gfq630

# Disease specific prognostic factors – 5. End stage liver disease

- High Child-Pugh score:

| | Numerical Value | | |
|---|---|---|---|
| Ascites | None | Slight | Moderate/Severe |
| Encephalopathy | None | Grade 1-2 | Grade 3-4 |
| Bilirubin (mg/dL) | < 2.0 | 2.0-3.0 | >3.0 |
| Albumin (mg/L) | > 3.5 | 2.8-3.5 | <2.8 |
| Increase in seconds from normal Prothrombin time | 1 to 3 | 4 to 6 | >6.0 |

- High MELD score:
  - Includes dialysis in the past 2 weeks, Cr, INR, Bili

| MELD Score | Predicted 6 month survival | Predicted 12 month survival | Predicted 24 month survival |
|---|---|---|---|
| **score of 0-9** | 98% | 93% | 90% |
| **score of 10-19** | 92% | 86% | 80% |
| **Score of 20-29** | 78% | 71% | 66% |
| **Score of 30-39** | 40% | 37% | 33% |

- Hepato-pulmonary or hepato-renal syndrome

1) Salpeter et al; Am. J. Med. 2012; 125(5)

# Disease specific prognostic factors – 6. Neurological disorders

General neurological factors:

- Increasing motor impairment causing dyspnea, dysphagia, dysarthria
- Medical complications(e.g. pneumonia, sepsis)

Salpeter et al; Am. J. Med. 2012; 125(5)

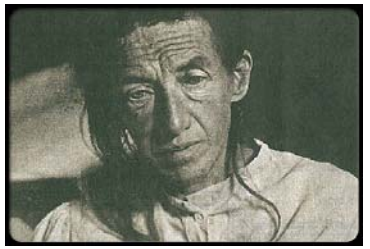
# Disease specific prognostic factors – 6. Neurological disorders (cont.)

Neurological disease specific:

- ALS: age(1), site of onset (bulbar is the worst)(1), diagnostic delay(1), low vital capacity (<70% of predicted on standard spirometry)(1,2)
- Parkinson's: psychiatric symptoms (depression, anxiety, psychosis, hallucinations)(3)
- MS: dementia(3)


1) Adriano et al; Amyotroph Lateral Scler. 2009 ; 10(5-6): 310–323
2) Salpeter et al; Am. J. Med. 2012; 125(5)
3) Adopted from Gold Standard Framework Prognostic indicators

# Disease specific prognostic factors – 7. Dementia



- Admission to a facility (1)
- Urinary or bowel incontinence (1,2)
- Inability to communicate verbally (1,2)
- Bedbound (1,2)
- Pressure ulcer (1,2)
- Male & >90 y (1,2)
- PEG Tube (1)
- BMI, CHF (2)


1) Salpeter et al; Am. J. Med. 2012; 125(5)
2) Mitchell; JPSM 2010; 40(5)

# Disease specific prognostic factors – 8. Frailty

- Age >75
- Admission to facility
- Heart failure

Salpeter et al; Am. J. Med. 2012; 125(5)

- Mortality Risk Index (MRI) tool Porock et al; J.Gerontology 2005; 60A (4): 491–498
  - Modified MRI (MMRI) developed in 2010 by same author BMC Research Notes 2010, 3:200

# Gold Standard Framework

- The GSF Prognostic Indicator Guidance :
  - Surprise question
  - General Prognostic Factors
  - Disease specific prognostic factors

http://www.goldstandardsframework.org.uk

# Are there challenges when trying to establish prognosis?

# Why do we refrain from communicating prognosis?

Lack of training
Inability to provide precise answer
Fear of being wrong
Prognostication along disease trajectory is dynamic
Prognostication might be self-fulfilling prophecy
Prognostication might dash hope
Prognostication has deep emotional toll
Time consuming
Medico-legal fears

Glare and Sinclair; Journal of Palliative Medicine; 2008

# Why do we refrain from prognostication?

Is the problem prognostication or communicating the prognosis?

The problem of prognosis and hospice referral is more likely related to physicians' attitudes about how and when to communicate a poor prognosis and initiate hospice discussions rather than to poor prognostic skills Daugherty et all; Journal of clinical Oncology;2003

# How do you discuss this with your patient?

# How do we communicate a prognosis?

P.R.E.P.A.R.E.D.

- **P**repare for the discussion
- **R**elate to pt
- **E**licit pt and family preferences
- **P**rovide info
- **A**cknowledge emotions and concerns
- **R**ealistic hope
- **E**ncourage questions
- **D**ocument discussion

Adapted from Clayton et al; Med J Aust ;2007;186(12 Suppl.):S77 and Kirk and Kirk; BMJ 2004;328(7542):1343

# Case 1: Mr. A

79 year old widower with right NSCL cancer metastatic to bone, lung, liver, adrenals. Received palliative RT chest.

You receive a call that he is in a great deal of pain and unable to come to the office. You see him at his home later that day. He is alone, as his daughter, a lawyer, lives in California and visits infrequently.

Within the first few minutes of your visit, he asks you how much time he has left.

- What are your thoughts at this time?
- What other information do you need to increase the accuracy of survival prediction?

# Case 1: Mr. A (cont.)

- Has spinal mets and now bedbound (PPS = 30%) due to spinal cord compression (SCC). His legs have 3+ pitting edema
- He is in severe pain due to SCC
- He has no appetite and has lost significant amount of weight, but still appears overweight
- He is very depressed and angry
- He is grieving for his wife who died one year ago from pancreatic cancer

# Case 1: Mr. A (cont.)

- How do you prognosticate to answer his question?
- What are the prognostic factors in his history that would help you?
- How do you communicate your prognosis to him?

# Case 2: Mrs. B

72 y. old grandmother of four, discharged from hospital a week ago where she was treated for an acute exacerbation of COPD. This is her fourth admission in the past six months. Her medical history includes CHF, diabetes, HTN, dyslipidemia, CAD, osteoporosis, RA. During two of these adm. she was treated for pulmonary edema and was diagnosed with renal impairment. She has been your pt for the past 23 years. Lately you have had to do several home visits. She asks for a home visit to discuss future planning with you. She is struggling to provide adequate care to her husband with dementia.

During your visit she c/o pain in her abdomen and is generally frustrated with her poor QoL. She specifically wants to know about hospice placement.

# Case 2: Mrs. B (cont.)

What other information do you need?

- SOBOE, increased $O_2$ need, longer recovery time
- LOW 20lbs
- Decreased appetite
- Inhalers are maximized, with several PRN doses used; wheezy
- Opioid started in hospital, with consistently high BT use
- Children supportive, but very busy with own lives
- Husband's dementia advanced; two falls together
- No PFT available
- Hyper-inflated lungs on CXR
- hs-CRP 200 mg/L, alb 27 G/L, WBC 6.9(10**9/L), lymphocytes 0.6 (10**9/L)

# Case 2: Mrs. B (cont.)

- How do you prognosticate to help with hospice admission?
- What are the prognostic factors in her history that would help you?