Prognostication-
a practical approach

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Disclosure/Disclaimer

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No conflicts of interest.
The tools presented today are only as reliable as the skill of the user. They need to be utilized within the context of the overall clinical presentation of each patient.
Objectives

- Recognize the difference between prognostication for hospice eligibility and prognostication for life-care planning
- Discuss and become familiar with various available tools useful in performing prognostications
- Recognize the role and value of performing prognostications
- Recognize problems inherent to performing prognostications
- Discuss how/when to perform prognostications and how to best deliver the results to patients/families/caregivers
Definition

- The art/skill of determining how long a person has left to live (normally a time range) OR determining a time demarcation (i.e. < or = to 6 months left to live) for hospice eligibility purposes.
Role/value of Prognostication

- Determination of hospice eligibility and for recertification
- ADRs
- Truth-telling v. hope
- Life-care planning (planning for the future)
  - Physically/Medically
  - Emotionally
  - Spiritually
  - Financially
  - Grieving process
  - Closure
HOPE

- Hope is relative
- Hope is a perception defined by context, presentation and interpretation
Problems with Prognostication

- Potential family discord
- Self-fulfilling prophesy
- Depression
- Errors in prognostication.....whoops!
Accuracy of Prognostications

- Accuracy is < 35%
- > 90% are overestimated
  - > 50% of the time the actual life expectancy is < 1/2 the actual life span
- What does this mean?
Prognostication for Hospice Eligibility

- The 6-month cut-off
- Prognostication
- LCD
- Documentation
Clues to Hospice Eligibility

- Primary disease process (LCD Guidelines)
- Functional status*
- Nutritional status*
- Cognitive status*
- Co-morbidities
- Clinical opinion

*rapidity of decline
CMS Definition of Hospice Eligibility

- “the certification regarding terminal illness of an individual shall be based on the physician’s or medical director’s clinical judgment regarding the normal course of the individual’s illness.”

- Based on the premise that individuals who present in the same way, generally die in 6 months
Tools/History/Findings

- LCDs (local coverage determination)
- Co-morbidities
- PPS
- FAST
- NYHA functional class
- Weight loss
- BMI/MAC
- GFR
- Rapidity of decline
- ADLs
- Other diagnostic tests & physical findings
- Your impression/other tools
## Palliative Performance Scale (PPSv2)

### Version 2

<table>
<thead>
<tr>
<th>PPS Level</th>
<th>Ambulation</th>
<th>Activity &amp; Evidence of Disease</th>
<th>Self-Care</th>
<th>Intake</th>
<th>Conscious Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>Full</td>
<td>Normal activity &amp; work No evidence of disease</td>
<td>Full</td>
<td>Normal</td>
<td>Full</td>
</tr>
<tr>
<td>90%</td>
<td>Full</td>
<td>Normal activity &amp; work Some evidence of disease</td>
<td>Full</td>
<td>Normal</td>
<td>Full</td>
</tr>
<tr>
<td>80%</td>
<td>Full</td>
<td>Normal activity with Effort Some evidence of disease</td>
<td>Full</td>
<td>Normal or reduced</td>
<td>Full</td>
</tr>
<tr>
<td>70%</td>
<td>Reduced</td>
<td>Unable Normal Job/Work Significant disease</td>
<td>Full</td>
<td>Normal or reduced</td>
<td>Full</td>
</tr>
<tr>
<td>60%</td>
<td>Reduced</td>
<td>Unable hobby/house work Significant disease</td>
<td>Occasional assistance necessary</td>
<td>Normal or reduced</td>
<td>Full or Confusion</td>
</tr>
<tr>
<td>50%</td>
<td>Mainly Sit/Lie</td>
<td>Unable to do any work Extensive disease</td>
<td>Considerable assistance required</td>
<td>Normal or reduced</td>
<td>Full or Confusion</td>
</tr>
<tr>
<td>40%</td>
<td>Mainly in Bed</td>
<td>Unable to do most activity Extensive disease</td>
<td>Mainly assistance</td>
<td>Normal or reduced</td>
<td>Full or Drowsy +/- Confusion</td>
</tr>
<tr>
<td>30%</td>
<td>Totally Bed Bound</td>
<td>Unable to do any activity Extensive disease</td>
<td>Total Care</td>
<td>Normal or reduced</td>
<td>Full or Drowsy +/- Confusion</td>
</tr>
<tr>
<td>20%</td>
<td>Totally Bed Bound</td>
<td>Unable to do any activity Extensive disease</td>
<td>Total Care</td>
<td>Minimal to nil</td>
<td>Full or Drowsy +/- Confusion</td>
</tr>
<tr>
<td>10%</td>
<td>Totally Bed Bound</td>
<td>Unable to do any activity Extensive disease</td>
<td>Total Care</td>
<td>Mouth care only</td>
<td>Drowsy or Coma +/- Confusion</td>
</tr>
<tr>
<td>0%</td>
<td>Death</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Functional Assessment Staging (FAST) - Check highest consecutive level of disability:

- 1. No difficulty either subjectively or objectively.
- 3. Decreased job functioning evident to co-workers. Difficulty in traveling to new locations. Decreased organizational capacity.*
- 4. Decreased ability to perform complex tasks, e.g., planning dinner for guests, handling personal finances (such as forgetting to pay bills), difficulty marketing, etc.*
- 5. Requires assistance in choosing proper clothing to wear for the day, season, or occasion, e.g., patient may wear the same clothing repeatedly unless supervised.*
- 6. a) Improperly putting on clothes without assistance or cueing (e.g., may put street clothes on over night clothes, or put shoes on wrong feet, or have difficulty buttoning clothing) occasionally or more frequently over the past weeks.*
- b) Unable to bath properly (e.g., difficulty adjusting the bath-water temperature) occasionally or more frequently over the past weeks.*
- c) Inability to handle mechanics of toileting (e.g., forgets to flush the toilet, does not wipe properly or properly dispose of toilet tissue) occasionally or more frequently over the past weeks.*
- d) Urinary incontinence (occasionally or more frequently over the past weeks).*
- e) Fecal incontinence (occasionally or more frequently over the past weeks).*
- 7. a) Ability to speak limited to approximately a half a dozen intelligible different words or fewer, 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 (the person may repeat the word over and over).
- c) Ambulatory ability is loss (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 head up independently.

### NYHA functional class

<table>
<thead>
<tr>
<th>Functional Capacity</th>
<th>Objective Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class I.</strong> Patients with cardiac disease but without resulting limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea, or anginal pain.</td>
<td>A. No objective evidence of cardiovascular disease.</td>
</tr>
<tr>
<td><strong>Class II.</strong> Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea, or anginal pain.</td>
<td>B. Objective evidence of minimal cardiovascular disease.</td>
</tr>
<tr>
<td><strong>Class III.</strong> Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary activity causes fatigue, palpitation, dyspnea, or anginal pain.</td>
<td>C. Objective evidence of moderately severe cardiovascular disease.</td>
</tr>
<tr>
<td><strong>Class IV.</strong> Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of heart failure or the anginal syndrome <strong>may be present even at rest.</strong> If any physical activity is undertaken, discomfort is increased.</td>
<td>D. Objective evidence of severe cardiovascular disease.</td>
</tr>
</tbody>
</table>

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Certification/Recertification

- Initial certification
  - Admitting physician and
  - Hospice medical director
- Recertification
  - Hospice medical director
- The ultimate authority on eligibility is the hospice medical director
Case Presentation

SP is a 94.5 y.o. female with a history of COPD, and dementia. She had a PPS score of 50% six months prior to evaluation for hospice services. It has dropped to 40% recently. Her FAST score is 6e. She requires hands-on assistance with all of her ADLs. She weighs 99 pounds and her BMI is 18.1. Her prior weight is unknown. Her oxygen saturation on room air is 87%. She has dyspnea with minimal exertion and dyspnea at rest. She is on oxygen at 2 LPM. She is on appropriate medications for her COPD.
LIFE-CARE PLANNING
PROGNOSTICATION

- When to use it
- How to perform it (including tools)
- Putting it all together
- Presentation of the findings
When

- When asked
- When needed
- When you ask*

*the Friedman Factor” or be careful what you ask for
General tools

- **PPS-2**
- **ADLs** (reflects ↑hospitalizations, LTCF placement, and one of several 2-yr mortality rate predictors)
- **PPI**
- **PaP**
- **TCP**
- **Charlson Comorbidity Index**
- **Circumstances with poor prognosis**
## PPS-Mortality Rates Over Time

<table>
<thead>
<tr>
<th>Death on or before (days)</th>
<th>1</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>14</th>
<th>30</th>
<th>45</th>
<th>60</th>
<th>90</th>
<th>180</th>
<th>365</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Mortality (all patients)</td>
<td>11</td>
<td>26</td>
<td>35</td>
<td>42</td>
<td>59</td>
<td>77</td>
<td>84</td>
<td>89</td>
<td>94</td>
<td>98</td>
<td>100</td>
</tr>
<tr>
<td>PPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10% (n=66)</td>
<td>52</td>
<td>85</td>
<td>94</td>
<td>100</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>20% (n=89)</td>
<td>30</td>
<td>69</td>
<td>83</td>
<td>88</td>
<td>94</td>
<td>96</td>
<td>96</td>
<td>99</td>
<td>100</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>30% (n=218)</td>
<td>6</td>
<td>18</td>
<td>29</td>
<td>44</td>
<td>68</td>
<td>86</td>
<td>91</td>
<td>96</td>
<td>97</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>40% (n=225)</td>
<td>1</td>
<td>13</td>
<td>19</td>
<td>24</td>
<td>45</td>
<td>70</td>
<td>77</td>
<td>83</td>
<td>91</td>
<td>96</td>
<td>100</td>
</tr>
<tr>
<td>50% (n=118)</td>
<td>1</td>
<td>6</td>
<td>10</td>
<td>14</td>
<td>30</td>
<td>52</td>
<td>64</td>
<td>75</td>
<td>85</td>
<td>95</td>
<td>100</td>
</tr>
<tr>
<td>60% (n=17)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>12</td>
<td>41</td>
<td>65</td>
<td>65</td>
<td>76</td>
<td>94</td>
<td>100</td>
</tr>
</tbody>
</table>

From *Use of Palliative Performance Scale in End-of-Life Prognostication*-see references
## PaP - Palliative Prognostic Score

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Assessment</th>
<th>Partial Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyspnea</td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Anorexia</td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>1.5</td>
</tr>
<tr>
<td>Karnofsky Performance Status</td>
<td>≥ 30</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>≤ 20</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Clinical Prediction of Survival</strong></td>
<td>&gt;12</td>
<td>0</td>
</tr>
<tr>
<td>(weeks)</td>
<td>11-12</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>7-10</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>5-6</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>3-4</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>1-2</td>
<td>8.5</td>
</tr>
<tr>
<td>Total WBC (x10 9/L)</td>
<td>&lt;8.5</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>8.6-11</td>
<td>0.5</td>
</tr>
<tr>
<td>Lymphocyte Percentage</td>
<td>20-40%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>12-19.9%</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>&lt;12%</td>
<td>2.5</td>
</tr>
<tr>
<td>RISK GROUP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>&gt;70%</td>
<td>0-5.5</td>
</tr>
<tr>
<td>B</td>
<td>30-70 %</td>
<td>5.6-11</td>
</tr>
<tr>
<td>C</td>
<td>&lt;30%</td>
<td>11.1-17.5</td>
</tr>
</tbody>
</table>
## Palliative Prognostic Index (PPI)

<table>
<thead>
<tr>
<th>Provision</th>
<th>Max Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palliative Performance Scale</td>
<td>10-20</td>
</tr>
<tr>
<td></td>
<td>30-50</td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
</tr>
<tr>
<td>Oral Intake</td>
<td></td>
</tr>
<tr>
<td>Severely Reduced (&lt;mouthfuls)</td>
<td>2.5</td>
</tr>
<tr>
<td>Mod. Reduced (&gt;mouthfuls)</td>
<td>1.0</td>
</tr>
<tr>
<td>Normal</td>
<td>0</td>
</tr>
<tr>
<td>Edema</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>1.0</td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td>Dyspnea at rest</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>3.5</td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td>Delirium</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>4.0</td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
</tbody>
</table>

If the PPI is greater than 6.0, survival is less than three weeks (Sensitivity - 80%; Specificity - 85%).
# TCP - Terminal Cancer Prognostic Score

<table>
<thead>
<tr>
<th>Severity</th>
<th>Partial Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diarrhea</strong></td>
<td></td>
</tr>
<tr>
<td>None to mild</td>
<td>0-1</td>
</tr>
<tr>
<td>Moderate to severe</td>
<td>2-3</td>
</tr>
<tr>
<td><strong>Anorexia</strong></td>
<td></td>
</tr>
<tr>
<td>None to mild</td>
<td>0-1</td>
</tr>
<tr>
<td>Moderate to severe</td>
<td>2-3</td>
</tr>
<tr>
<td><strong>Confusion</strong></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Mild, moderate or severe</td>
<td>1-3</td>
</tr>
</tbody>
</table>

## Interpretation of the TCP

<table>
<thead>
<tr>
<th>Total score</th>
<th>Median survival time (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>103</td>
</tr>
<tr>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>&gt;4</td>
<td>25.5</td>
</tr>
</tbody>
</table>
Charlson Comorbidity Index

<table>
<thead>
<tr>
<th>Comorbidity Score</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MI; CHF; PVD; CVA; Dementia; COPD; CTD; PUD; Mild liver dz; Diabetes</td>
</tr>
<tr>
<td>2</td>
<td>Hemiplegia; Moderate or severe renal dz; Diabetes with end-organ damage; Any tumor, leukemia, lymphoma</td>
</tr>
<tr>
<td>3</td>
<td>Moderate or severe liver dz</td>
</tr>
<tr>
<td>6</td>
<td>Metastatic solid tumor; AIDS</td>
</tr>
</tbody>
</table>

Sum of 1 point/decade >40 + points for each patient condition to achieve total score.

Score/Mortality (per pt-yr) ≤3/0.03 4-5/0.13 6-7/0.27 ≥8/0.49
Circumstances with a very poor prognosis

- Cancer
  - Multiple metastases to the brain, liver, or lung
  - Refractory hypercalcemia
  - Ongoing bleeding from tumor, or bone marrow failure without transfusions
- CHF
  - Hemodynamic failure requiring inotrope support
  - Progressive renal insufficiency
  - Repeated hospitalizations
- Renal Failure
  - Discontinuation of dialysis
  - Severe hyperkalemia without treatment
- COPD
  - Respiratory failure
- Misc
  - Sepsis in a frail, bedridden patient
  - Any condition causing coma where fluids are not given (e.g. massive CVA, post-resuscitative hypoxic encephalopathy)
Oodles of Tools/Information

- COPD-BODE index
- CHF-6-minute walk test, Seattle Heart Failure Model, Effect Heart Failure Model Calculator
- ESLD-MELD score, variations and other factors
- Lung Cancer
- Brain Tumors
- Prostate Cancer
- Hypoxic-ischemic coma
- Severe stroke
- Dementia-MDS 12
- Delirium
- CRF
- ARF
- And more
Fast Fact and Concept #141: Prognosis in End-Stage COPD

Authors: Julia Wilson, Childrens, Bob Ahmed and J Randell Curle

Prognostic variables in COPD patients are not well described. The decision making regarding when to move away from aggressive life-sustaining treatments is challenging. This Fast Fact will review currently available COPD prognostic models.

Ambulatory COPD patients

The forced expiratory volume in one second (FEV₁) has traditionally been used to assess COPD severity. A FEV₁ of less than 65% of the predicted value is measured in severe disease. 50% of these patients will die within two years and 65% by four years. A number of other studies have shown that age, low body mass index (BMI), and low FVC were independent predictors that correlated to reduced survival time. A scale consisting of body mass index (BMI), exercise capacity, and subjective estimates of dyspnea, has been shown to help predict survival over 1-3 years (Gale, 2004).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Points on BODE Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVC (%) predicted</td>
<td>0, 1, 2, 3</td>
</tr>
<tr>
<td>Distance walked in 6 min (miles)</td>
<td>&gt;350, 250-349, 150-249, &lt;149</td>
</tr>
<tr>
<td>MMRC dyspnea grade*</td>
<td>5, 4, 3, 2</td>
</tr>
<tr>
<td>Body mass index (BMI)</td>
<td>&gt;21, 21-20, 19-20, 18-19</td>
</tr>
</tbody>
</table>

*MMRC dyspnea scale range from 0 (none) to 4 (very dyspneic).

<table>
<thead>
<tr>
<th>BODE Index Score</th>
<th>One year mortality</th>
<th>Two year mortality</th>
<th>52 month mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>2%</td>
<td>5%</td>
<td>19%</td>
</tr>
<tr>
<td>2-4</td>
<td>2%</td>
<td>8%</td>
<td>12%</td>
</tr>
<tr>
<td>4-8</td>
<td>2%</td>
<td>12%</td>
<td>4%</td>
</tr>
<tr>
<td>&gt;8</td>
<td>5%</td>
<td>10%</td>
<td></td>
</tr>
</tbody>
</table>

Note: these variables do not appear to help predict prognosis within six months of death.

Hospitalized COPD patients

Mortality statistics vary for patients admitted with COPD exacerbation depending on age, functional status, comorbidities, and physiology of the chest and lower limbs. Roughly 30% of patients admitted with an acute exacerbation will die during the index hospitalization, 25% will die within six months, and 43% within a year (Gerst J, 1998). Patients with severe COPD have lower in-hospital mortality rates (Pille M, 2003). COPD patients who require mechanical ventilation have an in-hospital mortality of 28% (Grimen K, 2009). Mortality before and after hospitalization from severe or fatal illness (APACHE II score, blood volume and renal function, previous mechanical ventilation, failures).
### MMRC Dyspnea Scale
(Modified Medical Research Council)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not troubled with breathlessness except with strenuous exercise</td>
</tr>
<tr>
<td>1</td>
<td>Troubled by shortness of breath when hurrying on the level or walking up a slight hill</td>
</tr>
<tr>
<td>2</td>
<td>Walks slower than people of the same age on the level because of breathlessness or has to stop for breath when walking at own pace on the level</td>
</tr>
<tr>
<td>3</td>
<td>Stops for breath after walking about 100 yards or after a few minutes on the level</td>
</tr>
<tr>
<td>4</td>
<td>Too breathless to leave the house or breathless when dressing or undressing</td>
</tr>
</tbody>
</table>
The MELD Model

In the following model, survival probability of a patient with end stage liver disease is estimated based on the following variables. Please enter data in the corresponding boxes.

- What is the INR?
- What is the bilirubin? (mg/dl)
- What is the creatinine? (mg/dl)

MELD score: ___

Disclaimer
This is the original version of the MELD scale as developed by investigators at Mayo Clinic. A number of modifications have been made by UNOS to the model for its implementation in organ allocation for liver transplantation. The UNOS-modified version is also available on this site under MELD, UNOS modification.

This page is created by W. Ray Kim, M.D. for use by health care providers. Please send comments tokim.woong@mayo.edu.
MELD additional information

3-Month Mortality in Hospitalized Patients

<table>
<thead>
<tr>
<th>MELD Score</th>
<th>Death Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 9</td>
<td>4</td>
</tr>
<tr>
<td>10-19</td>
<td>27</td>
</tr>
<tr>
<td>20-29</td>
<td>76</td>
</tr>
<tr>
<td>30-39</td>
<td>83</td>
</tr>
<tr>
<td>≥ 40</td>
<td>100</td>
</tr>
</tbody>
</table>

Kamath 2001
End-of-life care should be considered in patients who have advanced, persistent HF with symptoms at rest despite repeated attempts to optimize pharmacologic and nonpharmacologic therapy, as evidenced by one or more of the following:

- Frequent hospitalizations (3 or more per year)
- Chronic poor quality of life with inability to accomplish activities of daily living
- Need for intermittent or continuous intravenous support
- Consideration of assist devices as destination therapy

Strength of Evidence = C

HFSA=Heart Failure Society of America
Seattle Heart Failure Model
**EFFECT Heart Failure Mortality Prediction**

This prediction score is a method to stratify the risk of death in heart failure patients that can be applied using clinical information available at the bedside. Using the heart failure risk index, one can predict the risk of death at 30 days and one year. The common risk variables are summarized into three domains: age, vital signs, and clinical factors. The two prediction methods described below can be used to stratify risk within hours of hospital presentation. Reference: JAMA 2003; 289(11):1288–1295.

The following is a descriptive guide to use the EFFECT heart failure risk prediction.

1. Select the first domain: heart failure risk prediction.
2. Enter age (in years).
3. Enter systolic blood pressure at hospital presentation.
4. Enter New York Heart Association functional class.
5. Enter left ventricular ejection fraction.
6. Enter New England Congestive Heart Failure Class.
7. Enter New England Congestive Heart Failure Class.
8. Select “Calculate” to calculate the 30-day and one-year score.
9. Refer to the chart for mortality risk.

### Mortality risk at 30 days:

<table>
<thead>
<tr>
<th>30-Day Score</th>
<th>30-Day Mortality Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 99</td>
<td>0.6</td>
</tr>
<tr>
<td>100 – 149</td>
<td>2.3</td>
</tr>
<tr>
<td>150 – 199</td>
<td>5.7</td>
</tr>
<tr>
<td>200 – 249</td>
<td>8.4</td>
</tr>
<tr>
<td>&gt; 250</td>
<td>11.0</td>
</tr>
</tbody>
</table>

### Mortality risk at one year:

<table>
<thead>
<tr>
<th>One-Year Score</th>
<th>One-Year Mortality Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 99</td>
<td>1.8</td>
</tr>
<tr>
<td>100 – 149</td>
<td>3.3</td>
</tr>
<tr>
<td>150 – 199</td>
<td>5.2</td>
</tr>
<tr>
<td>200 – 249</td>
<td>7.2</td>
</tr>
<tr>
<td>&gt; 250</td>
<td>9.0</td>
</tr>
</tbody>
</table>

We are interested in your comments and feedback on the website. Please email comments by e-mail to: info@effectheartfailure.com.

Click here for the Pocket PC version of heart failure mortality prediction.
# Mortality Risk Index (Dementia)

Based on 12 risk factors obtained from the MDS

<table>
<thead>
<tr>
<th>Points</th>
<th>Risk factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.9</td>
<td>Complete dependence with ADLs</td>
</tr>
<tr>
<td>1.9</td>
<td>Male gender</td>
</tr>
<tr>
<td>1.7</td>
<td>Cancer</td>
</tr>
<tr>
<td>1.6</td>
<td>Congestive heart failure</td>
</tr>
<tr>
<td>1.6</td>
<td>O2 therapy needed w/in 14 days</td>
</tr>
<tr>
<td>1.5</td>
<td>Shortness of breath</td>
</tr>
<tr>
<td>1.5</td>
<td>&lt;25% of food eaten at most meals</td>
</tr>
<tr>
<td>1.5</td>
<td>Unstable medical condition</td>
</tr>
<tr>
<td>1.5</td>
<td>Bowel incontinence</td>
</tr>
<tr>
<td>1.5</td>
<td>Bedfast</td>
</tr>
<tr>
<td>1.4</td>
<td>Age &gt;83 years</td>
</tr>
<tr>
<td>1.4</td>
<td>Not awake most of the day</td>
</tr>
</tbody>
</table>

## Risk estimate of death within 6 months

<table>
<thead>
<tr>
<th>Score</th>
<th>Risk %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8.9</td>
</tr>
<tr>
<td>1-2</td>
<td>10.8</td>
</tr>
<tr>
<td>3-5</td>
<td>23.2</td>
</tr>
<tr>
<td>6-8</td>
<td>40.4</td>
</tr>
<tr>
<td>9-12</td>
<td>57.0</td>
</tr>
<tr>
<td>≥ 12</td>
<td>70.0</td>
</tr>
</tbody>
</table>
Most important of all

- The hands-on visit
Putting it all together

- Collect history from patient, family, caregivers, physicians......
- Perform physical exam
- Use appropriate tools
- Evaluate your data
- Make a judgment
Delivering the results

- Contact attending when appropriate
- Present findings only to those appropriate people, (patient, family members, friends), in person
  - As allowed by patient or MPOA
  - As offered and accepted
- Preface your findings, give a range, and be sure to talk about why a person could live shorter or longer than your determination
  - “Snapshot” of patient
  - Confounding circumstances: other future diseases, infections
  - Patient’s personality (COPD)
Delivering the results

- Do not “cookbook” your patients-always individualize
- Be prepared to address questions and issues
- Be honest
- Be sensitive
G.L. is a 73 y.o. male with Stage 4 SCLC diagnosed one month ago. He has metastatic disease to his T-spine, liver, calvarium, possibly other organs and has spinal chord compression secondary to his tumor. He is presently undergoing a 10-day course of radiation therapy to his spinal lesion. In the last 5 months his weight has dropped from 185# to 153#. His PPS score has dropped from 50% to 30% in the last 11 months. His FAST is 6e. He has anorexia, cognitive failure and dyspnea. His PPI is 6. His PaP is 7.5, based on incomplete data. His TCP score is 4. His Charlson Comorbidity Index is >8. His oncologist is strongly recommending chemotherapy after the radiation therapy is complete.

His wife and other family members present at the initial visit (in home) would like to know G.L.’s life expectancy. They also have expressed that they do not want him to have chemotherapy.
What to consider for this evaluation

- Clinical variables that have strong predictive association in regards to survival
  - Poor PPS, anorexia, CES (clinical estimation of survival), cognitive failure, dyspnea, weight loss
- Symptoms
- Age and what this means to patient/family
- QOL
  - Present
  - During/immediately after chemotherapy
- Comorbidities
  - Dementia
  - COPD
And the chemotherapy?

- Will this person live long enough to receive the benefits of chemotherapy?
- What are the benefits, (i.e. symptom control, prolongation of life)?
- What is the likelihood of success and what is success?
- Do the benefits outweigh the burden/risks?
- Is this person ambulatory?
Useful Websites

- www.eperc.mcw.edu
- www.depts.washington.edu/shfm/app.php
- www.adjuvantonline.com/index.jsp
- www.cohort.ca/CHFriskmodel.aspx
- www.epi.bris.ac.uk/art-cohort/hiv_form.html***
- www.mayoclinic.org/meld
- www.fpnotebook.com
- www.eperc.mcw.edu  (for FAST FACTS)***

***corrected
Add’l info since handout created

- EPERC-Fast Facts and Concept #191: Prognostication in Patients Receiving Dialysis (for add’l info on CRF patients)

  - This article references additional tools helpful in prognostication for lung, breast, colon and prostate cancer.
  - Also references additional web-based tools
    - Prognostigram—an adult cancer tool. (offline at time article was published while a version 2 is being developed.)
Questions & (maybe) Answers
References

Evidence-Based Formulation of Prognosis, presented at the AAHPM/HPNA Annual Assembly, February 14, 2007; M. Affield, MD, M. Salacz, MD, C. Sinclair, MD.


References


EPERC-Fast Facts and Concept #125: The Palliative Performance Scale.

EPERC-Fast Facts and Concept #141: Prognosis in end-stage COPD.

EPERC-Fast Facts and Concept #150: Prognostication in Dementia.

References


References


References


UNOS Modification - for organ allocation for liver transplant

The MELD Model, UNOS Modification

In the following model, survival probability of a patient with end-stage liver disease is estimated based on the following variables. Please enter data in the corresponding boxes.

- What is the INR?
- What is the bilirubin? (mg/dl)
- What is the creatinine? (mg/dl)
- Has the patient had dialysis at least twice in the past week? (Yes/No)

MELD score: 

Mortality Risk Models

- The MELD Model
- The MELD-xe Model
- The MELD Model, UNOS modification
- MELD score and 90-day mortality rate for alcoholic hepatitis
- Post-operative Mortality Risk in Patients with Cirrhosis
- Other mathematical models for liver disease patients

Go to Original MELD Model

This page is created by W. Ray Kim, M.D. for use by health care providers. Please send comments to kim.woong@mayo.edu.
MELD Score and 90-Day Mortality Rate for Alcoholic Hepatitis

Based on a cohort of 73 patients and 16 deaths, our study calibrated the MELD score to predict 90-day mortality in patients with alcoholic hepatitis. Please enter the value for INR, bilirubin and creatinine in the corresponding boxes. Alternatively you may enter the MELD score.

**Note:** This calculator is optimized for Internet Explorer.

Enter values to calculate MELD and press Calculate.

- Creatinine: \[\text{mg/dl}\]
- Total Bilirubin: \[\text{mg/dl}\]
- INR:

**Mortality Risk Models**

- The MELD Model
- The MELD-Na Model
- The MELD Model, UNOS modification
- MELD score and 90-day mortality rate for alcoholic hepatitis
- Post-operative Mortality Risk in Patients with Cirrhosis
- Other mathematical models for liver disease patients

To calculate 90-Day Mortality Rate, enter MELD and press Calculate.

90-Day Mortality Rate: \[\text{}\]

**Calculate Mortality**

**Reset Values**
Primary Billiary Cirrhosis

THE UPDATED NATURAL HISTORY MODEL FOR PRIMARY BILIARY CIRRHOSIS

In the following model, short-term survival probability of a patient with primary biliary cirrhosis is estimated based on repeated observation. Please enter data in the corresponding boxes.

How old is the patient? [ ] (years)
What is the bilirubin? [ ] (mg/dl)
What is the albumin? [ ] (g/dl)
What is the prothrombin time? [ ] (seconds)
Does the patient have peripheral edema? No [ ] Yes [ ]
Is the patient on diuretic therapy? No [ ] Yes [ ]

Compute

Risk score: [ ]

Estimated Probability of Survival (%)

<table>
<thead>
<tr>
<th>Time</th>
<th>3 Mos.</th>
<th>6 Mos.</th>
<th>9 Mos.</th>
<th>12 Mos.</th>
<th>15 Mos.</th>
<th>18 Mos.</th>
<th>24 Mos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# Six Minute Walk Test-CHF evaluation

(1-year rates)

<table>
<thead>
<tr>
<th>Distance walked (ft)</th>
<th>Hospitalization %</th>
<th>Mortality %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;984 (300 m)</td>
<td>40.9</td>
<td>10.2</td>
</tr>
<tr>
<td>&lt;1227 (374 m)</td>
<td>33.6</td>
<td>7.9</td>
</tr>
<tr>
<td>&lt;1473 (449 m)</td>
<td>27.4</td>
<td>4.2</td>
</tr>
<tr>
<td>&gt;1474 (450 m)</td>
<td>19.9</td>
<td>3.0</td>
</tr>
</tbody>
</table>

[www.fpnotebook.com](http://www.fpnotebook.com)

Site page written by Scott Moses, MD
ESLD-high risk for early death

- Low MELD score
- Low serum sodium (<126 is independent predictor of wait list mortality)
- Low serum sodium (MELD-Na) ↑ ability to to predict 3 & 6 month mortality
- Persistent/refractory ascites-50% survival in 6 months
- Hepatorenal syndrome-acute has median survival of < 2 wks, with 100% mortality at 8-10 weeks; chronic has a median survival of 6 months
- Spontaneous bacterial peritonitis has a 30% survival rate at 1 year
- Variceal bleeding (following initial hemorrhage) 1/3 died in hospital, 1/3 rebled within 6 weeks
- 2/3 survived less than 12 months

Information presented at Evidence-Based Formulation of Prognosis workshop, AAHPM Annual Assembly, 2/14/07, Affield, MD; Salacz, MD; Sinclair, MD; 2004, credit for information from Biggins 2005, Ruf 2005, Cardenas 2005, NHPCO Guidelines 1996
Lung Cancer

• Only 15% of all lung cancer patients are alive 5 years after diagnosis
  -National Comprehensive Cancer Network

• NSCLC: 5-year survival ranges from 67% (Stage 1A) to 1% (Stage IV)
  -NCCN Guidelines

• SCLC
  • Limited stage median survival 15-18 months
  • Extensive stage median survival 9-10 months
  • 2-year survival <10%
  -Jahan 2002

• Malignant pleural effusion-poor prognosis with average range of survival 3-6 months, median 4 months (65% in 3 months, 80% in 6 months)
  -Sahn 2001
Primary Malignant Brain Tumors

- (benign tumors can also cause death)
- 50% of all gliomas are glioblastomas and have a 3% 5-year survival rate
- <50 y, ECOG 0 = median survival of 17-21 months (Class III), depending on treatment
- >50 y & bx only or >50 and MMSE < 27 = median survival of 10 months (Class V)
- Everyone in between = median survival of 15-16 months (Class IV), depending on treatment
- 2-yr survival rates:
  - Class III = 32%
  - Class IV = 19%
  - Class V = 11%

Mirimanoff 2006
ECOG Performance Status

These scales and criteria are used by doctors and researchers to assess how a patient's disease is progressing, assess how the disease affects the daily living abilities of the patient, and determine appropriate treatment and prognosis. They are included here for healthcare professionals to access.

### ECOG Performance Status*

<table>
<thead>
<tr>
<th>Grade</th>
<th>ECOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Full active, able to carry on all pre-disease performance without restriction</td>
</tr>
<tr>
<td>1</td>
<td>Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light house work, office work</td>
</tr>
<tr>
<td>2</td>
<td>Ambulatory and capable of all self-care but unable to carry out any work activities. Up and about more than 50% of waking hours</td>
</tr>
<tr>
<td>3</td>
<td>Capable of only limited self-care, confined to bed or chair more than 50% of waking hours</td>
</tr>
<tr>
<td>4</td>
<td>Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair</td>
</tr>
<tr>
<td>5</td>
<td>Dead</td>
</tr>
</tbody>
</table>


The ECOG Performance Status is in the public domain therefore available for public use. To duplicate the scale, please cite the reference above and credit the Eastern Cooperative Oncology Group, Robert F. M.D., Group Chair.
# Metastatic Brain Tumors

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Survival (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No primary treatment</td>
<td>1</td>
</tr>
<tr>
<td>Steroids</td>
<td>2-3</td>
</tr>
<tr>
<td>Whole Brain Radiation</td>
<td>3-6</td>
</tr>
<tr>
<td>Surgery/SRS (1-2 mets only)</td>
<td>6-12</td>
</tr>
</tbody>
</table>
Metastatic Brain Tumors

• Median survival
  • Good function, primary tumor controlled, age < 65 y, no other mets = 7.1 months
  • In between = 4.2 months
  • Poor function (ECOG 2, Karnofsky < 70)

Gaspar 1997
# Prostate Cancer

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>5-yr survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Small local</td>
<td>98</td>
</tr>
<tr>
<td>2</td>
<td>Large loca</td>
<td>65</td>
</tr>
<tr>
<td>3</td>
<td>Outside prostate</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>Bladder, bone or LN</td>
<td>30 (mean 2 y)</td>
</tr>
</tbody>
</table>

American Cancer Society, www.cancerresearch.uk
Cancer

Adjuvant! Online
Decision making tools for health care professionals

Welcome to Adjuvant! Online

The purpose of Adjuvant! is to help health professionals and patients with early cancer discuss the risks and benefits of getting additional therapy (adjuvant therapy: usually chemotherapy, hormone therapy, or both) after surgery.

The goal is to help health professionals make estimates of the risk of negative outcome (cancer related mortality or relapse) without systemic adjuvant therapy, estimates of the reduction of these risks afforded by therapy, and risks of side effects of the therapy. These estimates are based on information entered about individual patients and their tumors (for example, patient age, tumor size, nodal involvement, histologic grade, etc.). These estimates are then provided on printed sheets in simple graphical and text formats to be used in consultations.

Because of the complexity of interpretation of some of the input information (ambiguities about tumor size, margins, etc.), the information should be entered by a health professional with some experience in oncology (cancer medicine).
Adjuvant! Online

- Calculator for mortality for
  - Breast Cancer 10-year mortality rate
  - Colon Cancer 5-year mortality rate
  - Lung Cancer 5-year mortality rate
Cardiac arrest as cause of coma

- Pre-hospital cardiac arrest survival rate of 2-33%
- Inpatient cardiac arrest survival rate of 0-29%
- Meaningful neurological recovery rate of 10-30%

Booth 2004
Severe Stroke

- Poor prognosis
  - Strongest predictors of death and poor outcome
    - Persistant coma
    - Absent pupillary or corneal reflexes at day 2-3
  - Other variables associated with poor outcome
    - Co-morbidities
    - Midline shift
    - Fever
- Poor outcome in hemorrhagic stroke
  - Volume of blood and intraventricular hemorrhage
  - Hydrocephalus
  - Hypertension

Halloway 2005
Severe Stroke

- Favorable factors
  - Intubation for seizure or pulmonary reason
  - Younger age
  - Minimal co-morbidities
  - Spouse at home
  - Early neurological recovery
  - Lower body temp

Halloway 2005
Strokes and PEG Tubes

- In patients with stokes who required PEG tube
  - 6 month mortality rate nearly 50%
  - Mortality rate increases to 80% by 3 years
  - 78% who survived to 6 months had a severe disability

Halloway 2005
Strokes Syndromes Associated with Poor Outcome

- Higher mortality
  - Pontine hemorrhage with hyperthermia
  - Basilar artery occlusion with coma and apnea
- Severe disability
  - Large MCA infarcts
  - Pontine strokes resulting in locked-in syndrome

Halloway 2005
Stroke

- Strong predictors of early mortality
  - Coma or persistent vegetative state $> 3$ d
  - Severe myoclonus and obtundation persisting $> 3$ d
  - Any 3 of the following:
    - Abnormal brain stem response
    - Absent verbal response
    - Absent withdrawal from pain
    - Serum Cr $> 1.5$ mg/dl
    - Age $> 70$ y
  - Had 97% mortality by 2 months

NHPCO Guidelines 1996
Chronic Kidney Disease
(with dialysis)

- Stage 5 (<15 mL/min)
  - 1 yr survival 80% (65% if >65 y)
  - 2 yr survival 65%
  - 5 yr survival 38%
- Albumin < 3g/dL
  - 4.4x risk of death compared to Alb ≥ 4g/dl
- Albumin < 3.5g/dL
  - 1-yr mortality ~ 50%
- ↓ functional status predicts poor outcome
- ↑ number of comorbid dx = ↑ mortality

-Beddhu 2000
Acute Renal Failure

- Dialysis in critical care units
  - 50-65% mortality
  - Septic: 75% mortality
  - Bone marrow transplant

- American Society of Nephrology (ASN) and Renal Physicians Association (RPA) guidelines suggest not starting dialysis if particularly poor prognosis

-Cohen 2006
HIV-progression & mortality risks

Risk calculator for HIV positive patients starting antiretroviral therapy

Please note that this calculator is only applicable to patients who are:

- HIV-1 positive
- No previous antiretroviral therapy (ART)
- Age 16 years or older

It estimates the probability of experiencing a new AIDS defining disease or death by the end of each year up to 5 years after the patient starts antiretroviral therapy. It also estimates the probability of death from all causes (either HIV or non-HIV related) for up to five years after the start of therapy. Please note that CDC disease stage is defined by clinical diseases only and not by reference to CD4 cell count. You must enter all five prognostic factors for the calculator to work.

Enter patient's prognostic data at time of starting ART:

Age in years:  ○ 16 to 29 ○ 30 to 39 ○ 40 to 49 ○ 50 or over

CD4 cell count:  ○ under 25 ○ 25-49 ○ 50-99 ○ 100-199 ○ 200-349 ○ 350 or over

HIV-1 RNA copies/ml:  ○ under 100,000 ○ 100,000 or over

CDC disease stage:  ○ A or B ○ C

HIV transmission through injection drug use:  ○ yes ○ no

For more information on the methods used in the calculations and the limitations on their use, please see the corresponding publication from the ART Cohort Collaboration: