

Supplemental Materials for the study:

**Validation of the Intermountain Risk Score and Get with the Guidelines-Heart Failure  
Score in Predicting Mortality**

Erik K. Engelsingjerd<sup>\*</sup>, Catherine P. Benziger MD MPH<sup>†</sup>, Benjamin D. Horne, PhD, MStat,  
MPH<sup>‡,§</sup>

<sup>\*</sup>Des Moines University, Des Moines, IA; <sup>†</sup>Essentia Health Heart and Vascular Center, Duluth,  
MN; <sup>‡</sup>Intermountain Medical Center Heart Institute, Salt Lake City, UT; <sup>§</sup>Stanford University,  
Division of Cardiovascular Medicine, Stanford, CA

**Supplemental Table S1.** Odds ratios (OR) and 95% confidence intervals (CI) from the univariable associations of each score with study outcomes (N=703, except as noted).

| Score   | 30-day Mortality  |         | 1-year Mortality   |         |
|---|-------------------|---------|--------------------|---------|
|   | OR (95% CI)       | p-value | OR (95% CI)        | p-value |
| <i>Continuous variables (ORs and CIs are per +1 score) [Ranges were, GWTG-HF score: 19-65 (females), 24-65 (males); 30-day IMRS: 1-27 (females), 4-29 (males); 1-year IMRS: 1-22 (females), 5-26 (males)]</i> |                   |         |                    |         |
| GWTG-HF (n=300)   | 1.11 (1.06, 1.16) | <0.001  | 1.08 (1.04, 1.11)  | <0.001  |
| Females (n=142)   | 1.08 (1.02, 1.15) | 0.011   | 1.05 (1.002, 1.09) | 0.042   |
| Males (n=158)   | 1.14 (1.06, 1.23) | <0.001  | 1.12 (1.06, 1.18)  | <0.001  |
| IMRS (30-day mortality version)*  |                   |         |                    |         |
| Females (n=312)   | 1.19 (1.08, 1.32) | <0.001  | -----              | -----   |
| Males (n=391)   | 1.23 (1.12, 1.36) | <0.001  | -----              | -----   |
| IMRS (1-year mortality version)*  |                   |         |                    |         |
| Females (n=312)   | -----             | -----   | 1.14 (1.06, 1.23)  | <0.001  |
| Males (n=391)   | -----             | -----   | 1.28 (1.18, 1.38)  | <0.001  |

| Score  | 30-day Mortality   |         | 1-year Mortality   |         |
|--|--------------------|---------|--------------------|---------|
|  | OR (95% CI)        | p-value | OR (95% CI)        | p-value |
| <i>Categorical variables</i>   |                    |         |                    |         |
| GWTG-HF (n=300) (risk score tertiles were $\leq 37$ , 38-45, and $\geq 46$ for tertiles 1, 2, and 3, respectively) |                    |         |                    |         |
| Combined (Females and Males)   |                    |         |                    |         |
| Tertile 1 (n=97)   | (referent)         | ----    | (referent)         | ----    |
| Tertile 2 (n=99)   | 0.83 (0.27, 2.56)  | 0.75    | 1.53 (0.75, 3.12)  | 0.24    |
| Tertile 3 (n=104)  | 3.86 (1.58, 9.43)  | 0.003   | 3.04 (1.56, 5.92)  | 0.001   |
| Females (n=142)  |                    |         |                    |         |
| Tertile 1 (n=53)   | (referent)         | ----    | (referent)         | ----    |
| Tertile 2 (n=49)   | 0.63 (0.14, 2.77)  | 0.54    | 1.11 (0.43, 2.84)  | 0.84    |
| Tertile 3 (n=40)   | 2.79 (0.85, 9.10)  | 0.09    | 2.06 (0.81, 5.21)  | 0.13    |
| Males (n=158)  |                    |         |                    |         |
| Tertile 1 (n=44)   | (referent)         | ----    | (referent)         | ----    |
| Tertile 2 (n=50)   | 1.34 (0.21, 8.41)  | 0.75    | 2.46 (0.79, 7.66)  | 0.12    |
| Tertile 3 (n=64)   | 6.43 (1.39, 29.74) | 0.017   | 5.00 (1.74, 14.40) | 0.003   |

| Score   | 30-day Mortality   |         | 1-year Mortality |         |
|---|--------------------|---------|------------------|---------|
|   | OR (95% CI)        | p-value | OR (95% CI)      | p-value |
| IMRS (30-day mortality version; for females and males, respectively, scores were low-risk: $\leq 14$ , $\leq 14$ ;<br>moderate-risk: 15-19, 15-18; and high-risk: $\geq 20$ , $\geq 19$ ) |                    |         |                  |         |
| Combined (Females and Males)  |                    |         |                  |         |
| Low-risk (n=217)  | (referent)         | ----    | ----             | ----    |
| Moderate-risk (n=310)   | 2.55 (1.23, 5.28)  | 0.012   | ----             | ----    |
| High-risk (n=176)   | 5.51 (2.65, 11.44) | <0.001  | ----             | ----    |
| Females (n=312)   |                    |         |                  |         |
| Low-risk (n=79)   | (referent)         | ----    | ----             | ----    |
| Mod-risk (n=158)  | 5.90 (1.35, 25.85) | 0.018   | ----             | ----    |
| High-risk (n=75)  | 9.63 (2.12, 43.72) | 0.003   | ----             | ----    |
| Males (n=391)   |                    |         |                  |         |
| Low-risk (n=138)  | (referent)         | ----    | ----             | ----    |
| Mod-risk (n=152)  | 1.52 (0.61, 3.79)  | 0.37    | ----             | ----    |
| High-risk (n=101)   | 4.53 (1.92, 10.65) | <0.001  | ----             | ----    |

| Score   | 30-day Mortality |         | 1-year Mortality    |         |
|---|------------------|---------|---------------------|---------|
|   | OR (95% CI)      | p-value | OR (95% CI)         | p-value |
| IMRS (1-year mortality version; for females and males, respectively, scores were low-risk: $\leq 8$ , $\leq 10$ ;<br>moderate-risk: 9-14, 11-16; and high-risk: $\geq 15$ , $\geq 17$ ) |                  |         |                     |         |
| Combined (Females and Males)  |                  |         |                     |         |
| Low-risk (n=68)   | -----            | -----   | (referent)          | -----   |
| Moderate-risk (n=353)   | -----            | -----   | 4.15 (1.62, 10.65)  | 0.003   |
| High-risk (n=282)   | -----            | -----   | 9.18 (3.58, 23.52)  | <0.001  |
| Females (n=312)   |                  |         |                     |         |
| Low-risk (n=18)   | -----            | -----   | (referent)          | -----   |
| Mod-risk (n=132)  | -----            | -----   | 5.90 (0.76, 46.01)  | 0.009   |
| High-risk (n=162)   | -----            | -----   | 11.39 (1.48, 87.71) | 0.019   |
| Males (n=391)   |                  |         |                     |         |
| Low-risk (n=50)   | -----            | -----   | (referent)          | -----   |
| Mod-risk (n=221)  | -----            | -----   | 3.81 (1.31, 11.07)  | 0.014   |
| High-risk (n=120)   | -----            | -----   | 9.41 (3.19, 27.79)  | <0.001  |

\*Because IMRS weightings are sex-specific, no combined analysis with females and males in the model was conducted for continuous variables.

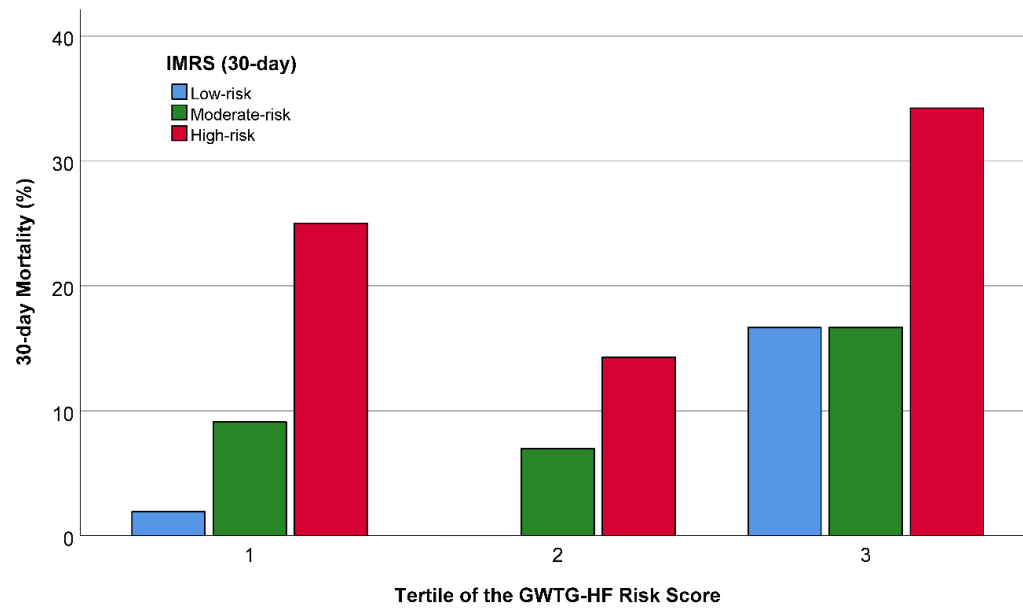
**Supplemental Table S2.** Association of IMRS with mortality in each tertile of the GWTG-HF risk score, provided as percent mortality with parenthesis enclosing the number of deaths and total sample size in the group (see also Supplemental Figure S1). The p-value for trend is evaluated across the three IMRS risk groups within each tertile of the GWTG-HF risk score.

| <b>Tertile of the</b>     | <b>IMRS</b>     | <b>IMRS</b>          | <b>IMRS</b>      |                |
|---------------------------|-----------------|----------------------|------------------|----------------|
| <b>GWTG-HF Risk Score</b> | <b>Low-Risk</b> | <b>Moderate-Risk</b> | <b>High-Risk</b> | <b>p-trend</b> |
| 30-day Mortality          |                 |                      |                  |                |
| Tertile 1                 | 1.9% (1/52)     | 9.1% (3/33)          | 25.0% (3/12)     | 0.006          |
| Tertile 2                 | 0.0% (0/35)     | 7.0% (3/43)          | 14.3% (3/21)     | 0.029          |
| Tertile 3                 | 16.7% (2/12)    | 16.7% (9/54)         | 34.2% (13/38)    | 0.07           |
| 1-year Mortality          |                 |                      |                  |                |
| Tertile 1                 | 5.6% (1/18)     | 9.3% (5/54)          | 40.0% (10/25)    | 0.001          |
| Tertile 2                 | 0.0% (0/10)     | 20.8% (11/53)        | 33.3% (12/36)    | 0.025          |
| Tertile 3                 | 100% (1/1)      | 31.8% (14/44)        | 40.7% (24/59)    | 0.63           |

**Supplemental Figure S1.** Association of IMRS with mortality in each tertile of the GWTG-HF risk score

(see also Supplemental Table S2) for: A) 30-day mortality and B) 1-year mortality.

A)



B)

