Inflammation and Host Response to Injury Glue Grant
How the Marshall Score is Computed

The classic Marshall score is the sum of the 6 component scores shown below. For the Inflammation and Host Response to Injury Glue Grant data analysis, the Marshall score is defined as the sum of 5 component scores with the Neurologic component excluded.

Component	**Measurement**	**Score**				
		0	**1**	**2**	**3**	**4**
Repiratory	PaO_2/FiO_2	> 300	(225, 300]	(150, 225]	(75, 150]	≤ 75
Renal	Creatinine	< 1.2	[1.2 , 2.4)	[2.4, 4.0)	[4.0, 5.7)	≥ 5.7
Hepatic	Bilirubin	< 1.2	[1.2, 3.6)	[3.6, 7.2)	[7.2. 14.2)	≥ 14.2
Cardiovascular	PAR*	≤ 10	(10, 15]	(15, 20]	(20, 30]	> 30
Hematologic	Platelet Count	> 120	(80, 120]	(50, 80]	(20, 50]	≤ 20
Neurologic	*Glasgow Coma Score*	*15*	*13-14*	*10-12*	*7-9*	*≤6*

Notation: (a,b] means $a< x \le b$ and [a,b) means $a \le x < b$.

Example: If Creatinine is 2.0 then renal component score is 1.

* PAR is Pressure Adjusted Heart Rate. It is computed as

$$PAR = heart\ rate\ x \left(\frac{CVP}{\frac{1}{3}\ sbp + \frac{2}{3}\ dbp} \right)$$

IMPORTANT NOTE: For the analysis of the data from the initial five years of the study, we computed linearly interpolated component scores. This resulted in a slight over-estimate for the renal, hepatic and cardiovascular scores and a slight under-estimate for the respiratory and hematologic scores. The actual formulas used are shown below.

Respiratory: $x = PaO_2/FiO_2$

If $x > 300$ then score = 0

If $225 < x \leq 300$ then score = $1 - \frac{x - 225}{300 - 225}$

If $150 < x \leq 225$ then score = $2 - \frac{x - 150}{225 - 150}$

If $75 < x \leq 150$ then score = $3 - \frac{x - 75}{150 - 75}$

If $0 < x \leq 75$ then score = $4 - \frac{x - 75}{75 - 0}$

Renal: x = Creatinine

If $0 < x < 1.2$ then score = $0 + \frac{x - 0}{1.2 - 0}$

If $1.2 \leq x < 2.4$ then score = $1 + \frac{x - 1.2}{2.4 - 1.2}$

If $2.4 \leq x < 4.0$ then score = $2 + \frac{x - 2.4}{4.0 - 2.4}$

If $4.0 \leq x < 5.7$ then score = $3 + \frac{x - 4}{5.7 - 4.0}$

If $x \geq 5.7$ then score = 4.

Hepatic: x = Bilirubin

If $0 < x < 1.2$ then score = $0 + \frac{x-0}{1.2-0}$

If $1.2 \le x < 3.6$ then score = $1 + \frac{x-1.2}{3.6-1.2}$

If $3.6 \le x < 7.2$ then score = $2 + \frac{x-3.6}{7.2-3.6}$

If $7.2 \le x < 14.2$ then score = $3 + \frac{x-7.2}{14.2-7.2}$

If $x \ge 14.2$ then score = 4.

Cardiovascular: x = PAR

If $0 < x \le 10$ then score = $0 + \frac{x-0}{10-0}$

If $10 < x \le 15$ then score = $1 + \frac{x-10}{15-10}$

If $15 < x \le 20$ then score = $2 + \frac{x-15}{20-15}$

If $20 < x \le 30$ then score = $3 + \frac{x-20}{30-20}$

If $x > 30$ then score = 4.

Hematologic: x = Platelet Count

If $x > 120$ then score = 0

If $80 < x \le 120$ then score = $1 - \frac{x-80}{120-80}$

If $50 < x \leq 80$ then score = $2 - \frac{x - 50}{80 - 50}$

If $20 < x \leq 50$ then score = $3 - \frac{x - 20}{50 - 20}$

If $0 < x \leq 20$ then score = $4 - \frac{x - 0}{20 - 0}$

Constance Elson, PhD, Massachusetts General Hospital, May 2007