

## Oxygen Delivery Calculation Chart

		Cardiac Index ml/min/m <sup>2</sup>									
		0.5	1	1.2	1.6	1.8	2.0	2.2	2.4	2.6	2.8
Hemoglobin (g/dl)	6.5	47	95	114	151	170	189	208	227	246	265
	7	51	101	122	162	182	203	223	243	263	284
	7.5	54	108	130	173	194	216	238	259	281	302
	8	57	115	138	184	206	229	252	275	298	321
	8.5	61	121	146	194	219	243	267	291	316	340
	9	64	128	154	205	231	256	282	307	333	359
	9.5	67	135	162	216	243	270	297	324	350	377
	10	71	142	170	226	255	283	311	340	368	396
	10.5	74	148	178	237	267	296	326	356	385	415
	11	77	155	186	248	279	310	341	372	403	434
	11.5	81	162	194	259	291	323	356	388	420	452
	12	84	168	202	269	303	337	370	404	438	471
	12.5	88	175	210	280	315	350	385	420	455	490
	13	91	182	218	291	327	363	400	436	472	509

\*Assumptions: SaO<sub>2</sub> = 100%, PaO<sub>2</sub> ≥250mmHg

Indexed Oxygen delivery and consumption calculations shall be utilized to evaluate and optimize gas exchange.[1],[2],[3],[4],[5]

- Oxygen Delivery: DO<sub>2i</sub> = 10 x CI x CaO<sub>2</sub>
- Oxygen Consumption: VO<sub>2i</sub> = 10 x CI x (CaO<sub>2</sub> – CvO<sub>2</sub>)

Where:

CaO<sub>2</sub> (arterial oxygen content) = (Hb x 1.36 x SaO<sub>2</sub>) + (0.0031 x PaO<sub>2</sub>), and  
 CvO<sub>2</sub> (mixed venous oxygen content) = (Hb x 1.36 x SvO<sub>2</sub>) + (0.0031 x PvO<sub>2</sub>)

CI = cardiac index

Hb = hemoglobin

SaO<sub>2</sub> = arterial oxygen saturation

PaO<sub>2</sub> = partial pressure of oxygen in arterial blood

SvO<sub>2</sub> = venous oxygen saturation

PvO<sub>2</sub> = partial pressure of oxygen in venous blood

[1] de Somer F, Mulholland JW, Bryan MR, Aloisio T, Van Nooten GJ, Ranucci M. O<sub>2</sub> delivery and CO<sub>2</sub> production during cardiopulmonary bypass as determinants of acute kidney injury: time for a goal-directed perfusion management? Crit Care. 2011 Aug;10;15(4):R192. doi: 10.1186/cc10349. PMID: 21831302; PMCID: PMC3387634.

[2] Newland RF, Baker RA, Woodman RJ, Barnes MB, Willcox TW; Australian and New Zealand Collaborative Perfusion Registry. Predictive Capacity of Oxygen Delivery During Cardiopulmonary Bypass on Acute Kidney Injury. Ann Thorac Surg. 2019 Dec;108(6):1807-1814.

[3] Newland RF, Baker RA. Low Oxygen Delivery as a Predictor of Acute Kidney Injury during Cardiopulmonary Bypass. J Extra Corpor Technol. 2017 Dec;49(4):224-230. PMID: 29302112; PMCID: PMC5737422.

[4] Ranucci M, Johnson I, Willcox T, Baker RA, Boer C, Baumann A, Justison GA, de Somer F, Exton P, Agarwal S, Parke R, Newland RF, Haumann RG, Buchwald D, Weitzel N, Venkateswaran R, Ambrogi F, Pistuddi V. Goal-directed perfusion to reduce acute kidney injury: A randomized trial. J Thorac Cardiovasc Surg. 2018 Nov;156(5):1918-1927.e2.

[5] Ranucci M, Romitti F, Isgro G, et al. Oxygen delivery during cardiopulmonary bypass and acute renal failure after coronary operations. Ann Thorac Surg 2005;80:2213-20.