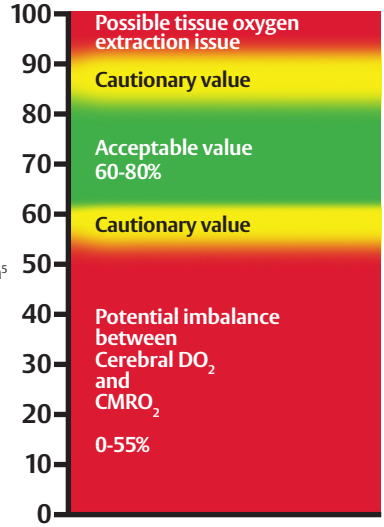
Clinical considerations and physiology of adult cerebral saturation in the ICU and OR

Cerebral tissue oximetry ($SctO_2$) values reflect the continuous and non-invasively monitored balance between cerebral oxygen delivery (cerebral DO_2) and consumption ($CMRO_2$), as well as the effects of interventions that affect oxygen delivery.[1]

Research has shown that neuronal ischemia is negatively associated with survival in ICU patients[2] and prolonged cerebral desaturations are associated with:

- Post-op delirium[3,4] and cognitive dysfunction[5]
- Extended time on mechanical ventilation[1]
- Extended ICU and hospital LOS[1,6]

Maintaining $SctO_2$ values within target ranges helps to mitigate incidences of cerebral desaturation events.[5,7]



Note: Monitor default alarm ranges may vary from physiologic ranges shown in graphic. Ensure they are set appropriately for your patient.

1. Deschamps A, Hall R, Grocott H, et al. Cerebral Oximetry Monitoring to Maintain Normal Cerebral Oxygen Saturation during High-risk Cardiac Surgery: A Randomized Controlled Feasibility Trial. *Anesthesiology*. 2016; 124(4):826-836.
2. Sharshar T, Annane D, de la Grandmaison GL, et al. The neuropathology of septic shock. *Brain Pathol*. 2004;14(1):21-33.
3. Wood MD, Maslove D, Muscedere J, et al. Low brain tissue oxygenation contributes to the development of delirium in critically ill patients: A prospective observational study. *J Crit Care*. 2017;41:289-295.
4. Lee KF, Wood MD, Maslove DM, et al. Dysfunctional cerebral autoregulation is associated with delirium in critically ill adults. *J Cereb Blood Flow Metab*. 2019;39(12):2512-2520.
5. Tang L, Kazan R, Taddei R, et al. Reduced cerebral oxygen saturation during thoracic surgery predicts early postoperative cognitive dysfunction. *British Journal of Anaesthesia*. 2012;08(4):623-629.
6. Murphy GS, Szokol JW, Marymont JH, et al. Cerebral oxygen desaturation events assessed by near-infrared spectroscopy during shoulder arthroscopy in the beach chair and lateral decubitus positions. *Anesth Analg*. 2010; 111(2):496-505.
7. Fischer GW, Lin HM, Krol M, et al. Noninvasive cerebral oxygenation may predict outcome in patients undergoing aortic arch surgery. *J Thorac Cardiovasc Surg*. 2011;141(3):815-821.

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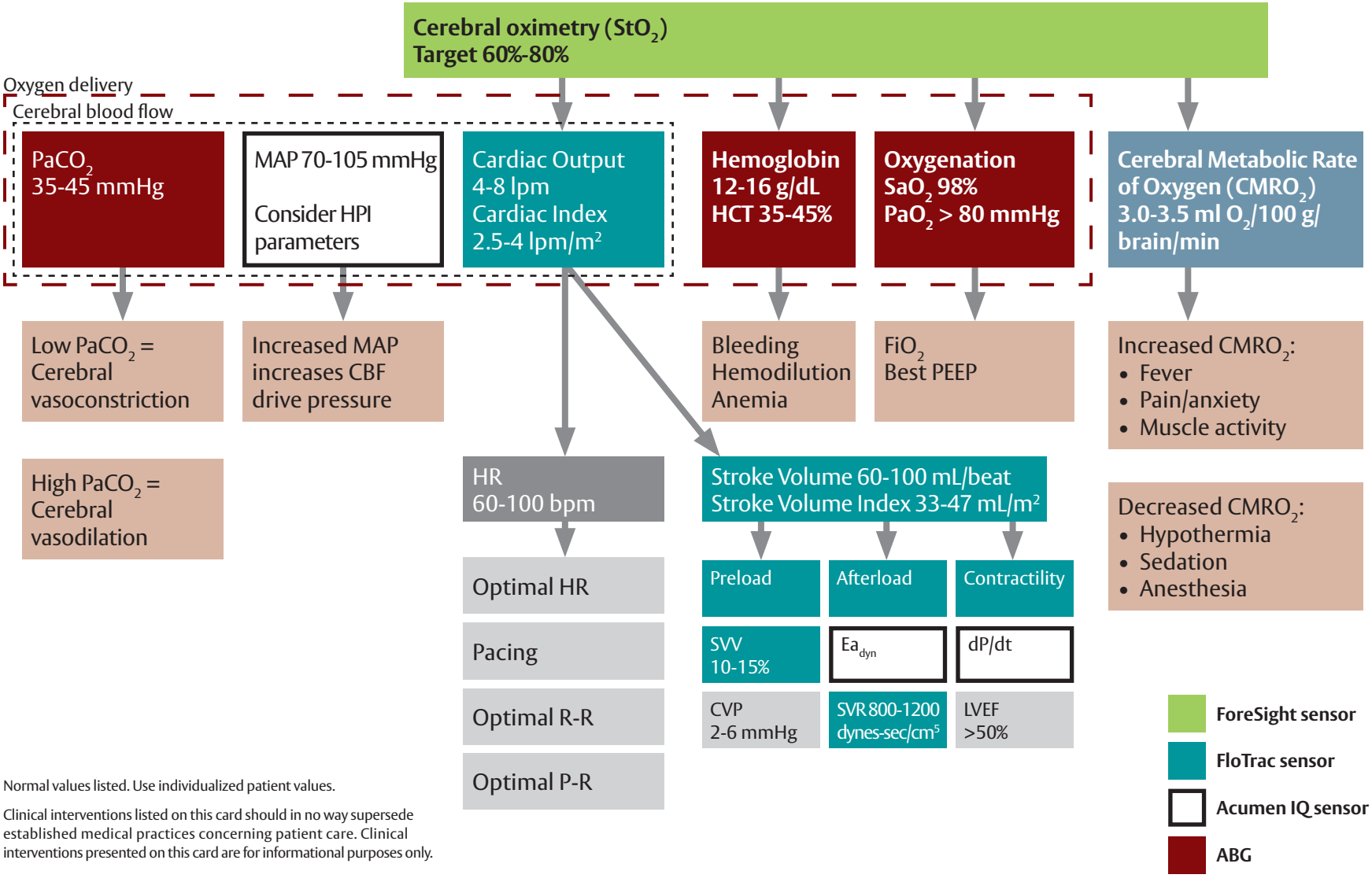
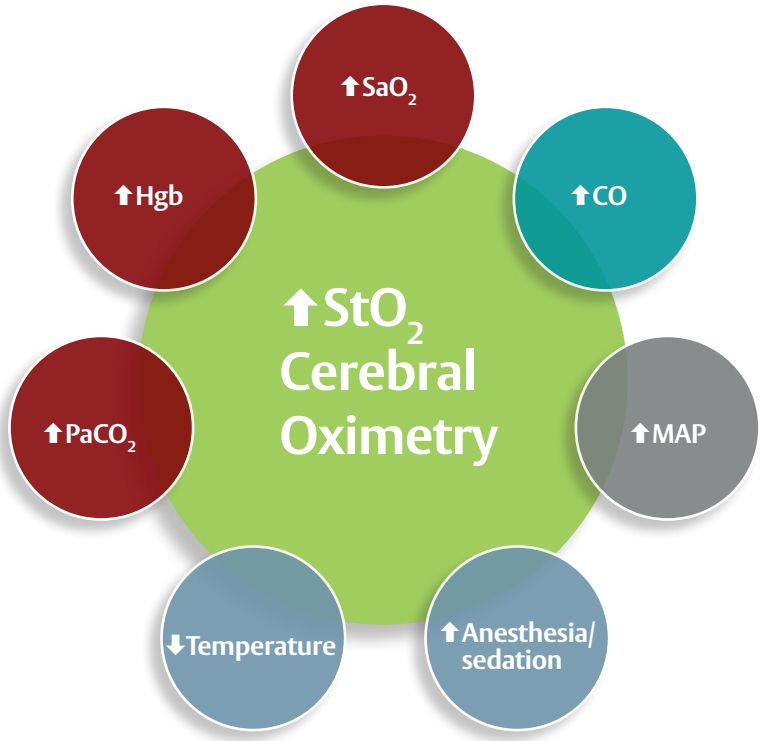
Cerebral oximetry (StO_2) physio-relationship graphic



Normal values listed. Use individualized patient values.

Clinical interventions listed on this card should in no way supersede established medical practices concerning patient care. Clinical interventions presented on this card are for informational purposes only.

Considerations to increase cerebral StO_2



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