



# Management of respiratory failure in pregnancy

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Respiratory failure during pregnancy is relatively uncommon, due to conditions such as pulmonary edema (due to preeclampsia or cardiac disease), amniotic fluid embolism or more common conditions such as pneumonia. The COVID-19 pandemic has dramatically increased the number of pregnant patients requiring support for respiratory failure.

A major concern with management of pregnant women with critical illness is the lack of pregnancy-specific data. Pregnant patients have been excluded (or simply not mentioned) from most large critical care and mechanical ventilation trials. Our management therefore relies on an understanding and application of basic physiological principles.

Intubation during pregnancy carries an increased risk due to upper airway changes and the rapid decrease in oxygen saturation. Non-invasive ventilation therefore has a role in the management of conditions expected to require a short duration of ventilator support. Invasive mechanical ventilation is usually carried out using the same protocols as in the non-pregnant patient. Tidal volume is restricted to 6ml/kg/PBW (based on height). As chest wall compliance is reduced, slightly higher ventilator pressure may be accepted. Little information is available to direct oxygen and carbon dioxide targets during pregnancy. Oxygen delivery to the fetus is dependent on oxygen saturation, placental blood flow and hemoglobin concentration. Although oxygen saturation >95% is often suggested, the fetus may tolerate lower levels in the hemodynamically stable mother. Hyperoxygenation is known to have fetal adverse effects. In terms of CO<sub>2</sub>, the normal level in pregnancy is in the range 3.7 – 4.3 kPa. However, this level may be difficult to achieve with safe tidal volumes in the pregnant patients with ARDS, resulting in permissive hypercapnia. Although there is little data, pregnant women likely tolerate mild hypercapnia. On the other hand, hypocapnia due to overventilation will reduce uterine and placental blood flow and be harmful to the fetus.

Little data are available to direct prolonged sedation of the ventilated pregnant patient. Usual protocols are often followed, including drugs such as fentanyl, propofol and midazolam, with neuromuscular blockade if need. Sedation should be as little as possible, and if sudden delivery occurs, the fetus may be sedated or paralysed, requiring ventilatory support.