either the healing process or fibrosis. In ARDS, the lungs become stiff as a result of surfactant inactivation; gas diffusion is impaired; and eventually, bronchiolar mucosal swelling and congestive atelectasis occur. The net effect is decreased functional residual capacity, pulmonary hypertension, and increased intrapulmonary right-to-left shunting of blood. Surfactant secretion is reduced, and the atelectasis and fluid-filled alveoli provide an excellent medium for bacterial growth. Hypoxemia or increased work of breathing may require ventilatory support.

The child with ARDS may first demonstrate only symptoms caused by an injury or infection, but as the condition deteriorates, hyperventilation, tachypnea, increasing respiratory effort, cyanosis, and decreasing SaO_2 occur. At times, the developing hypoxemia is not responsive to oxygen administration.

Treatment involves supportive measures to maintain adequate oxygenation and pulmonary perfusion, treatment of infection (or the precipitating cause), and maintenance of adequate cardiac output and vascular volume. After the underlying cause has been identified, specific treatment (e.g., antibiotics for infection) is initiated. Many patients require mechanical ventilatory support. This is usually achieved invasively (i.e., with endotracheal intubation), but occasionally noninvasive ventilation is used in milder cases. Patients requiring invasive mechanical ventilation usually require sedation, at least initially, to allow for ventilatory synchrony. Fluid administration to maintain adequate intravascular volume and end-organ perfusion must be balanced against the desire to decrease lung fluid to improve oxygenation. The provision of adequate nutrition, maintenance of patient comfort, and prevention of complications (such as gastrointestinal ulceration) are essential. Psychological support of the patient and family is also important.

It has been demonstrated that inappropriate use of mechanical ventilatory support may worsen the lung injury by causing volutrauma, barotrauma, atelectrauma, and biotrauma to the injured lungs. Protective ventilatory strategies using low tidal volumes (6 ml/kg ideal body weight) have been demonstrated to improve outcomes in adults and theoretically are also appropriate in children. PEEP is applied to decrease atelectasis and maintain an "open" lung. Permissive hypercapnia may also be used. Other