

# Acute Respiratory Distress Syndrome (ARDS)

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## OPINION

Acute Respiratory Distress Syndrome (ARDS) is a type of acute respiratory sickness marked by bilateral chest radiographic opacities and severe hypoxia caused by non-cardiogenic pulmonary oedema. The COVID-19 pandemic has resulted in an upsurge in ARDS, highlighting the syndrome's problems, such as its unacceptably high mortality and lack of effective medication. We review current information on ARDS epidemiology and risk factors, differential diagnosis, and evidence-based clinical management of both mechanical ventilation and supportive care, as well as debates and continuing research. Despite the fact that the editorial focuses on ARDS caused by any source, we also explore the similarities and differences between COVID-19-associated ARDS and ARDS caused by other causes.

The sudden onset of hypoxia and bilateral pulmonary oedema caused by increased alveolocapillary permeability is known as Acute Respiratory Distress Syndrome (ARDS). Despite the fact that ARDS has a clinical definition known as the Berlin definition, which includes phases that assess mortality risk, there is no single test that can be used to confirm or rule out the diagnosis. The variety of ARDS, as seen by its etiology, manifestations, and therapeutic response, is a challenge to clinicians and scientists in terms of providing excellent supportive treatment and discovering new medicines. The present state of knowledge about ARDS epidemiology and risk factors, differential diagnosis, and clinical care is summarised in this editorial, which also highlights disputed subjects and active research. ARDS is more frequent than previously thought.

According to a 2016 research of patients in 459 Intensive Care Units (ICUs) from 50 countries, 10% of ICU patients and 23% of mechanically ventilated patients met ARDS criteria. The hospital mortality of 35–45 percent closely matched that described by the huge datasets used to validate the Berlin criteria, despite the fact that the survey was conducted during the winter virus season and included ARDS that cleared quickly. Even individuals with ARDS who recovered quickly had a 31% death rate. The incidence of ARDS is likely to be much greater, given that many patients with diffuse lung injury supported by a High-Flow Nasal Cannula (HFNC) do not fit the ARDS Berlin criterion, which requires positive pressure breathing. This issue has been highlighted by the COVID-19 epidemic, as many patients are treated without

mechanical ventilation. Although men are significantly more likely than women to have ARDS, the prognosis is virtually the same. Lung protective ventilator tidal volumes are less likely to be given to women and patients of shorter stature. Women exhibited a greater mortality rate than men in patients with severe chronic ARDS. Black people may have a lower risk of having ARDS, and in at least one study, Black and Hispanic patients with ARDS had a greater fatality rate, which appeared to be mediated by the severity of their sickness. Tobacco, alcohol, hypoalbuminemia, and chemotherapy within the last six months, and exposure to ambient air pollutants can raise the risk of ARDS, but patients with diabetes were found to be less likely to develop ARDS in some studies.

The death rate for ARDS remains alarming; observational studies frequently indicate hospital mortality rates of greater than 30%, with one large trial of moderate to severe ARDS revealing 43% in-hospital mortality at 90 days. The proportion of ARDS mortality that is attributable to the syndrome itself (as opposed to risk factors and comorbidities) has been challenging to determine, but was estimated for sepsis-associated ARDS at 27%–37%. Sepsis and multiple organ failure are more common causes of death than respiratory failure. Despite the fact that the majority of ARDS survivors regain normal or near-normal lung function, many continue to face functional limits due to muscle weakness, deconditioning, or the psychological effects of the illness. Cognitive damage is very widespread, impacting nearly half of survivors after two years.

ARDS has been recognized as a clinical condition that occurs in the context of numerous causes or risk factors from its initial description. Pneumonia and non-pulmonary sepsis are the most common risk factors, followed by aspiration of gastrointestinal contents. As ventilator, fluid, and transfusion management has improved, ARDS risk factors such as trauma and blood product transfusion have become less common, while new causes such as e-cigarette or vaping product use-associated lung damage have emerged. ARDS is commonly caused by bacterial and viral pneumonias, with rare spikes in worldwide ARDS incidence due to pandemic influenza and emerging viruses such as SARS-CoV-2 and the coronaviruses that cause SARS and MERS. The discovery of a specific aetiology for ARDS remains a critical treatment target for improving ARDS outcomes. Although the diversity with which clinical risk factors predict ARDS development and

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the consistent connection of several genetic variants with ARDS risk suggest genetic susceptibility to ARDS, the attributable risk of any single genetic variation to ARDS risk or outcome appears minimal. A diagnosis of ARDS cannot be confirmed or refuted by a single diagnostic test. Furthermore, it is important to remember that ARDS is a syndrome, not a distinct pathologic entity, and that

it is currently diagnosed using only clinical criteria. According to the Berlin definition, new or worsening respiratory distress and bilateral chest radiography abnormalities must have been present for 7 days or less, heart failure cannot entirely explain hypoxaemia and radiographic infiltrates, and the reduced oxygenation must be clinically severe.