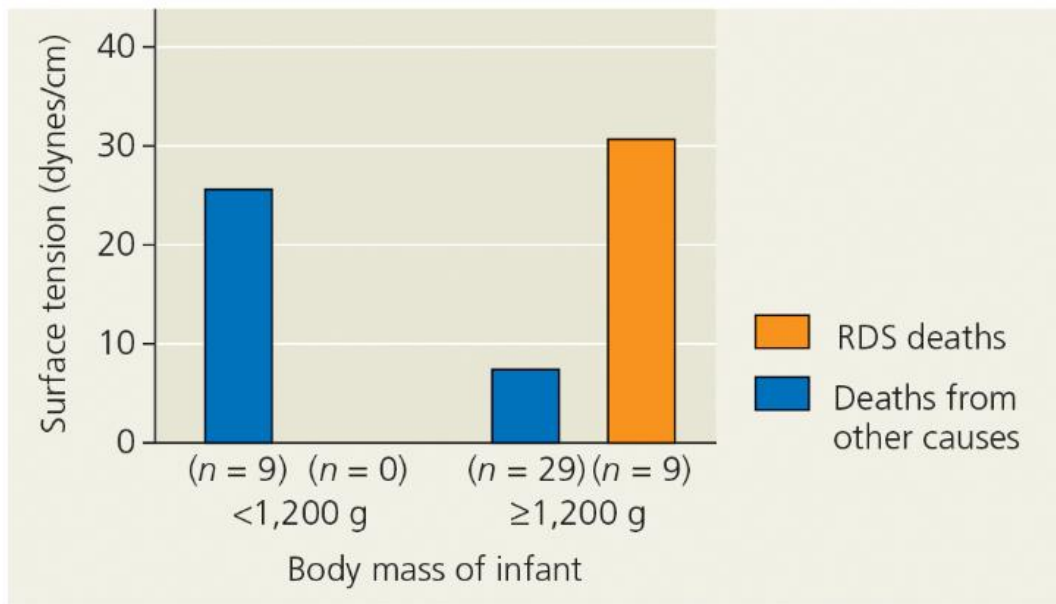


## What Causes Respiratory Distress Syndrome?

Respiratory distress syndrome (RDS) is a common breathing disorder that affects newborns. RDS occurs most often in babies born preterm, affecting nearly all newborns who are born before 28 weeks of pregnancy. Less often, RDS can affect full term newborns. The lungs of an affected infant collapse and the newborn has to work hard to breathe. He or she might not be able to breathe in enough oxygen to support the body's organs. Most babies who develop RDS show signs of breathing problems and a lack of oxygen at birth or within the first few hours that follow. The lack of oxygen can damage the baby's brain and other organs if not treated promptly.

1. Explain why babies with RDS are unable to breathe in enough oxygen.
2. You might have noticed that when a plastic bag is wet, the bag sticks to itself and is difficult to open.
  - a) Identify the property of water that causes the wet plastic bag to be difficult to open.
  - b) Make a claim about the cause of the lungs collapsing.

Mary Ellen Avery, a research fellow at Harvard University, hypothesized that a lack of surfactant caused respiratory distress syndrome (RDS) in preterm infants. To test this hypothesis, she obtained autopsy samples of lungs from infants who had died of RDS or from other causes. She extracted material from the samples and let it form a film on water. Avery then measured the tension (in dynes per centimeter) across the water surface and recorded the lowest surface tension observed for each sample. Avery noted a pattern when she grouped the samples based on the body mass of the infant: less than 1,200 g (2.7 pounds) and 1,200 g or greater.



3. Describe the relationship between surface tension and RDS deaths.
4. Make a claim about the cause of RDS.
5. Avery concluded that surfactant is not normally produced by a fetus until it reaches a mass of 1,200 g. Justify her conclusion.
6. If the researchers had measured the amount of surfactant in lung samples from the infants, predict the relationship you would expect between the amount of surfactant and infant body mass.