CONDITION

Neonatal respiratory distress syndrome

Neonatal respiratory distress syndrome is breathing difficulty in newborns whose lungs do not yet make enough surfactant.

WHAT IT IS
Newborn breathing condition caused by too little lung surfactant

BODY SYSTEM
Lungs and breathing

MAIN SYMPTOMS
Fast breathing, grunting, chest pulling inward, blue-grey skin

WHAT CAUSES IT
Immature lungs making too little surfactant

HOW IT IS DIAGNOSED
Clinical assessment, oxygen measurements, and chest X-ray

MAIN TREATMENT
Breathing support, oxygen, and surfactant replacement

CAN IT BE CURED?
Yes - usually resolves as lungs mature

IS IT AN EMERGENCY?
Yes - breathing difficulty after birth needs immediate care

LONG-TERM OUTLOOK
Most recover; extreme prematurity raises long-term health risks

Overview

Neonatal respiratory distress syndrome is a breathing condition that begins shortly after birth. It mainly affects babies born prematurely, meaning before 37 weeks of pregnancy.

The lungs contain millions of tiny air sacs called alveoli. These air sacs need a slippery substance called surfactant to stay open between breaths. A premature baby may not yet make enough surfactant. The air sacs can then collapse, making it harder for oxygen to enter the blood and for carbon dioxide to leave.

The earlier a baby is born, the greater the chance that their lungs will be immature. However, not every premature baby develops respiratory distress syndrome, and full-term babies can occasionally be affected.

This condition needs prompt care in a neonatal unit. Treatment supports breathing while the lungs mature and may replace the missing surfactant. Many babies improve over several days, although very premature or seriously unwell babies may need support for longer.

Symptoms

Symptoms usually appear at birth or within the first few hours. A baby may:

Low oxygen can make the lips, tongue, or skin look blue, grey, pale, or unusually dark. Colour changes may be harder to see on some skin tones, so the care team also uses an oxygen sensor rather than relying on appearance alone.

Symptoms can become more noticeable during the first day or two. This happens because the baby may use up the small amount of surfactant present at birth before their lungs can make enough more.

Several newborn conditions cause similar signs. Fast breathing does not by itself show that a baby has respiratory distress syndrome.

- Breathe faster than expected
- Make a grunting sound when breathing out
- Flare their nostrils
- Pull the skin inward between or below the ribs
- Have pauses in breathing
- Need extra oxygen to maintain a safe blood oxygen level

Causes and risk factors

The main cause is a lack of surfactant due to immature lungs. Surfactant begins developing before birth, but the lungs usually produce more of it later in pregnancy.

The most important risk factor is premature birth. The condition is particularly likely in babies born very early.

Other factors that can increase the risk include:

Respiratory distress syndrome is not usually an inherited condition. Rare genetic disorders affecting surfactant can cause severe or persistent breathing problems, including in full-term babies, but these are different from the usual form linked to prematurity.

Nothing a parent does after birth causes this condition.

- A sibling who previously had neonatal respiratory distress syndrome
- Maternal diabetes
- Birth by caesarean before labour, especially earlier in pregnancy
- Complications that reduce blood flow or oxygen around the time of birth
- Multiple pregnancy, such as twins or triplets, partly because early birth is more common

Diagnosis

The neonatal team assesses how the baby is breathing, when symptoms started, how early the baby was born, and how much oxygen or breathing support is needed.

A small sensor placed on the hand or foot measures blood oxygen. Blood tests may measure oxygen, carbon dioxide, acidity, blood sugar, and signs of infection.

A chest X-ray can support the diagnosis. Respiratory distress syndrome often gives the lungs a fine, hazy appearance because many small air sacs are not fully open. The X-ray also helps doctors look for other causes of breathing difficulty.

The team may investigate for conditions that can look similar, including temporary fast breathing after birth, pneumonia, infection, meconium aspiration, an air leak around a lung, or a heart problem. An ultrasound scan of the heart may be used when a heart or circulation problem is possible.

If breathing problems are unusually severe, continue longer than expected, or occur in a full-term baby without a clear explanation, further tests may be considered.

Treatment and management

Treatment takes place in a neonatal unit. The aim is to keep the air sacs open, maintain safe oxygen levels, and support the baby until the lungs make enough surfactant.

Many babies receive continuous positive airway pressure , often called CPAP. Soft prongs or a small mask deliver gentle air pressure through the nose. This helps stop the air sacs from collapsing between breaths.

Extra oxygen may be added. The team checks oxygen levels continuously because both too little and too much oxygen can be harmful, particularly for very premature babies.

A baby who is struggling despite CPAP may need mechanical ventilation. A breathing tube is placed into the windpipe, and a ventilator helps move air into and out of the lungs. The team

uses only as much support as needed and reduces it when the baby improves.

Surfactant replacement can be delivered into the lungs through a thin tube or breathing tube. It spreads across the air sacs and can improve their ability to stay open. Some babies need more than one treatment.

Other care may include:

A baby who is working hard to breathe may not initially be able to feed safely by breast or bottle. Expressed breast milk can often be given through a feeding tube when the baby is ready. Parents can usually take part in care, including skin-to-skin contact, once the neonatal team considers it safe.

- Keeping the baby warm
- Providing fluids and nutrition through a vein or feeding tube
- Monitoring blood pressure, blood sugar, and urine output
- Treating pauses in breathing
- Giving antibiotics like amoxicillin or doxycycline when infection is suspected, until test results are clear

Complications

Some complications come from severe breathing difficulty, while others are linked to premature birth or intensive treatment.

An air leak can occur if air escapes from the lungs into the space around them. This is called a pneumothorax. A small leak may only need observation, while a larger one may need urgent drainage.

Babies needing oxygen or ventilation for a long time may develop bronchopulmonary dysplasia , also called chronic lung disease of prematurity. They may continue to need oxygen after the original respiratory distress syndrome has improved.

Very premature babies are also at risk of problems affecting the brain, eyes, gut, hearing, growth, and development. These are not always caused directly by respiratory distress syndrome. Prematurity itself and periods of serious illness contribute to the risk.

Severe respiratory distress syndrome can be life-threatening, especially after extremely premature birth. Modern neonatal breathing support, surfactant treatment, and careful monitoring have improved outcomes.

Prevention

Respiratory distress syndrome cannot always be prevented because premature labour and birth cannot always be avoided.

When early delivery is expected, corticosteroid medicines given to the pregnant parent can speed up surfactant production and lung development before birth. Whether there is enough time and whether treatment is suitable are medical decisions based on the pregnancy and expected timing of delivery.

When possible, a planned early birth is managed in a hospital with an appropriate neonatal unit. This allows specialist breathing support to begin quickly if needed.

General pregnancy care, including avoiding smoking and attending prenatal appointments, may reduce some causes of premature birth. It cannot guarantee that respiratory distress syndrome will not occur.

Living with it and what to expect

Respiratory distress syndrome is usually most active during the first few days after birth. As the lungs mature and begin producing more surfactant, breathing often becomes easier. Support is gradually reduced based on the baby's breathing effort, oxygen levels, and blood test results.

A baby born moderately early may need support for days. A baby born extremely early may need breathing or oxygen support for weeks or months. The length of a neonatal stay is often shaped by prematurity as a whole, including the ability to breathe, maintain body temperature, feed, and gain weight.

The original surfactant shortage does not usually become a lifelong condition. However, babies who develop chronic lung disease may breathe faster, tire during feeds, or need oxygen after leaving hospital. Respiratory infections can affect them more strongly during infancy.

Follow-up may monitor:

Many babies who recover, especially those born later in pregnancy, have no lasting breathing problems. Babies born extremely early have a higher chance of ongoing lung or developmental difficulties, but one baby's early course cannot predict their future with certainty.

- Growth and feeding
- Breathing and oxygen needs

- Hearing and vision
- Movement and muscle development
- Learning, communication, and other developmental skills

When to get medical help

Breathing distress in a newborn is an emergency. In hospital, neonatal staff monitor the baby continuously. Tell the bedside nurse immediately if you notice a new colour change, longer pauses in breathing, unusual limpness, or a sudden change in responsiveness, even if monitors have not sounded.

After leaving hospital, call emergency services if your baby:

Seek urgent medical assessment for worsening fast breathing, poor feeding, repeated vomiting, fewer wet nappies, unusual sleepiness, fever, or an unusually low temperature. Newborns can become unwell quickly, and these symptoms may have causes other than respiratory distress syndrome.

Routine follow-up is different from urgent care. Keep scheduled neonatal, breathing, growth, eye, hearing, and developmental appointments. Contact the follow-up team between visits if feeding, growth, oxygen use, or breathing is changing gradually.

- Stops breathing or has repeated long pauses
- Has blue or grey lips or tongue
- Is struggling for each breath or has marked chest pulling
- Is very difficult to wake, limp, or unresponsive

Common questions

How long does neonatal respiratory distress syndrome last?

The surfactant shortage often improves over several days as the lungs mature. Very premature babies may need breathing support for much longer because their lungs and breathing control are still developing. Ongoing oxygen needs may reflect chronic lung disease rather than continuing surfactant deficiency.

Can a full-term baby have respiratory distress syndrome?

Yes, but it is less common. Full-term babies with breathing difficulty are also checked for infection, temporary retained lung fluid, meconium aspiration, heart conditions, air leaks, and

rare surfactant disorders.

Is it the same as temporary fast breathing after birth?

No. Temporary fast breathing, called transient tachypnoea of the newborn, is usually caused by fluid remaining in the lungs after birth. Respiratory distress syndrome is mainly caused by too little surfactant. The symptoms can overlap, so examination and testing are needed.

Will my baby have asthma later?

Respiratory distress syndrome does not automatically lead to asthma. Children born prematurely, especially those who develop chronic lung disease, are more likely to have wheezing or other breathing problems. Many have no persistent symptoms.

Can I hold or feed my baby during treatment?

Often, yes, once the baby is stable enough. The neonatal team can help with skin-to-skin contact while protecting breathing tubes and monitoring lines. Feeding may begin through a tube if breast or bottle feeding would require too much effort.

Could this happen in another pregnancy?

A previous premature birth can raise the chance of another premature birth, and earlier birth raises the risk of respiratory distress syndrome. This does not mean it will happen again. Pregnancy care can focus on individual risks and planning for early delivery if needed.

Sources

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