

Developmental Milestones in Newborns: Apgar Score and Low Birth Weight

[See online here](#)

APGAR score is a standard tool for the assessment of newborn babies. APGAR is an acronym for Appearance, Pulse, Grimace, Activity, Respiration. It is a short test performed at 1 and 5 minutes after the baby's birth that is done to determine the need for breathing aid and any heart trouble the newborn might be experiencing.



APGAR Score

APGAR score recorded at **1 minute** provides information about how well the baby has **tolerated the process of birth**. It also gives insights into the **physical health** of the newborn and tells whether or not any **immediate or future medical treatments** are required.

APGAR assessment at **5 minutes** provides information on how well the baby is **functioning outside their mother's womb**. If previous resuscitation attempts were made, APGAR assessment at 5 minutes determines how well the baby has **responded to such attempts**. While APGAR scores poorly correlate with the long-term outcome at 1 minute, it can help in identifying who needs urgent resuscitation. APGAR score at 5 minutes correlates with mortality and morbidity.

The maximum APGAR score is ten (10). Each of the following categories is scored with 0, 1 or 2 based on the criteria given below.

Appearance or Color:

- Most infants will score 1 for color because peripheral cyanosis is seen in almost all newborns.
- Score 0 is for the cyanosed or pale skin
- Score 1 is given for pink body and blue extremities.
- Score 2 is given if the entire skin of the baby is pink.

Pulse:

This is the most important assessment as it can help in determining who needs resuscitation. It needs to be assessed by a stethoscope.

- Score 0 is given if there is no heartbeat present.
- Score 1, for a heart rate of fewer than 100 beats per minute
- Score 2, for a heart rate greater than 100 beats per minute

Grimace response (reflex irritability):

- Score 0, for the absence of any response to stimulation like mild pinch
- Score 1, for a minimal response to stimulation
- Score 2, for grimacing, along with one or more of the following:
 - Cough
 - Sneeze
 - Vigorous cry

Activity (muscle tone):

- Score 0, for loose and floppy muscles
- Score 1, for flexed arms and legs
- Score 2, for active motion

Respiration:

- Score 0, if the infant is not breathing
- Score 1, for slow, gasping, weak or irregular respirations
- Score 2, for a vigorous cry

	Score 0	Score 1	Score 2
Appearance	Cyanotic infant or pale color	Blue extremities but pink central body	Pink all over the body
Pulse	Absent	<100 bpm	>100 bpm
Grimace	None	Poor	Good
Activity	None	Minimal	Vigorous
Respiration	None	Weak, irregular, or gasping	Vigorous

Normal results

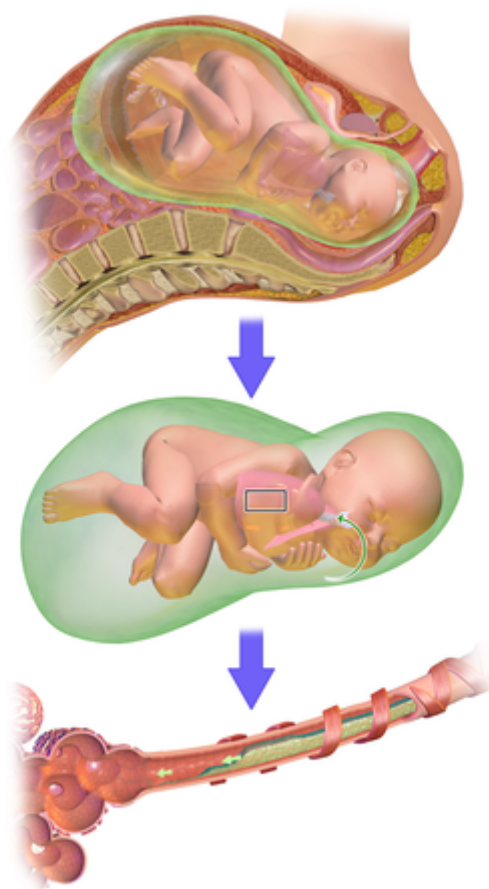
The APGAR score lies in the range of **1 to 10**. For higher scores, it can be said that the baby is doing better after birth. The full score is usually not seen because almost all the infants lose at least 1 point for the **cyanosed hands and feet**. However, cyanosis is normal after birth. 7, 8 and 9 score is a determinant of a newborn's good health. A reasonable score means that the infant needs only **routine post-delivery care**.

Abnormal results

Note: Per the most recent American college of obstetricians and gynecologists and the American academy of pediatrics guidelines, the need for initial resuscitation must be determined and appropriate interventions need to be carried out before obtaining the 1-minute APGAR score.

An APGAR score of **less than 7** is an indication that the newborn is in **need of medical attention**. The lower the score, the more the help needed to survive outside the womb of the mother. Scores **between 4 and 6** indicate the need for **breathing assistance**, and a score of **less than 4** is a call for **prompt, lifesaving measures**.

A lower APGAR score is not necessarily indicative of long-term health problems. It is not a predictor of the future health of the child.



Meconium Aspiration Syndrome

Image: "Meconium aspiration syndrome (MAS)," by Bruce Blaus - Own work. License: [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)

Low APGAR score reasons

Common causes for a low APGAR score are:

- Cesarean section
- Difficulty in the birth process
- Meconium aspiration syndrome (MAS)

Medical aid for low APGAR score babies

Low APGAR score babies need the following help:

- Clearing out the airway to assist in breathing
- Placing the newborn in the infant incubator
- Physical stimulation for a healthy heart beating rate

Persistently low APGAR score

If the APGAR assessment at 5 minutes gives a score of less than 7, the test is repeated at 5-minute intervals, four more times. The persistently low APGAR score at 20 minutes of age is related to **high morbidity and mortality rates**.

The risk of **poor neurologic outcomes** also increases when the APGAR score is 3—or less—at 10-to-20 minutes of birth. An APGAR score that remains at 0 after 10 minutes might be indicative of terminating resuscitative efforts.

Limitations of APGAR Score

APGAR score limitations are important to recognize. This score is an indication of the physiological condition of the newborn at **one point in time**. Certain factors can have an impact on the APGAR score, such as:

- Maternal anesthesia
- Gestational age
- Trauma during birth
- [Congenital malformations](#)
- Large **inter-rater** variability. Therefore, the same person who performed the APGAR score at 1 minute should repeat any re-assessments.

Regular transitional variations may also influence the scores. It is inappropriate to use an APGAR score alone to diagnose **asphyxia**. Babies rarely get a perfect score on this test. It is not a predictor of a baby's future behavior or intellect.

Low Birth Weight

When the weight of a baby at the time of birth is **less than 2,500 grams**, the baby is said to have a low birth weight. There is an epidemiological observation that newborns who weigh less than 2,500g have a **20 times greater chance to die** than those babies who are born with appropriate weight.

A birth weight that is less than **1,500 grams** (3.3 pounds) is categorized as **very low birth weight**, and the one below **1,000 grams** (2.2 pounds) is considered **extremely low birth weight**.

What Causes Low Birth Weight?

Low birth weight is commonly seen in cases of **preterm delivery**, i.e., birth before 37 weeks of pregnancy. The shorter the gestation, the smaller the baby and the higher the morbidity, disability, and death risk.

Another cause is **intrauterine growth restriction**. It may be because of problems with

the placenta, the mother's health or the baby's health. Babies with intrauterine growth restrictions can be both premature and full-term. Low birth weight due to restricted intrauterine fetal growth affects the person throughout life and is associated with **poor growth in childhood** and a **higher incidence of adult diseases**, such as [type 2 diabetes](#), [hypertension](#), and cardiovascular disease.

Other than premature birth and IUGR, factors that affect the pregnant mother can also increase the chances of having a low-birth-weight baby. Some of these factors are as follows:

- Not gaining enough weight during pregnancy
- Infection during pregnancy
- History of a low-birth-weight baby
- Alcohol consumption
- Drug usage
- A very young mother
- Age of more than 35
- African-American background
- Lack of nutrition during pregnancy
- Smoking
- Living in high altitudes
- Malaria, [HIV](#), [syphilis](#) during pregnancy
- [Hypertension](#)
- Deprived socio-economic conditions
- Physically-demanding work during pregnancy
- [Twin babies](#) have a greater chance of being low birth weight-
- Genetic factors

Complications of Low Birth Weight

Low-birth-weight babies have tiny bodies, and their rate of growth and development is not always similar to other babies. Low birth weight is often related to **neonatal mortality and morbidity, inhibited growth and cognitive development** and **chronic diseases later** in life.

Following are the complications in case of a low-birth baby:



- [Image](#): "Baby in the neonatal intensive care unit." By Jacoplane (well, his parents anyway) - Own work. License: [CC BY-SA 3.0](#)

Breathing difficulties at the time of birth

Hands and feet are usually cold

- Lag on feeding [milestones](#)
- Difficulty gaining weight
- Recurrent infections
- [Infant respiratory distress syndrome](#)
- Neurological disorders such as intraventricular hemorrhage
- Gastrointestinal problems such as necrotizing enterocolitis
- [Sudden infant death syndrome](#) (SIDS)
- Retinopathy of prematurity or Terry syndrome
- [Patent ductus arteriosus](#)

Long-term complications in low-birth babies:

These babies may have certain health conditions in later life such as:

- [Cerebral palsy](#)
- Blindness
- Deafness
- [Diabetes](#)
- Heart diseases
- Developmental delay in both motor and social category
- High blood pressure
- Metabolic syndrome
- Obesity
- Learning disabilities
- Having smaller babies when low-birth-weight girls become mothers

Summary

Possible causes	Prematurity or intrauterine growth restriction (IUGR)
Associated risks	Sudden infant death syndrome (SIDS), overall mortality
Other problems	Impaired thermoregulation and immune function, hypoglycemia, polycythemia (high Hct), impaired neurocognitive/emotional development

Low-Birth-Weight Treatment

Treatment depends upon the symptoms, age and general health of the baby. It includes:

- Temperature-controlled bed
- The babies are kept in a neonatal intensive care unit (NICU)
- If the baby cannot suck, the feed is given through IV line or a nasogastric tube

The lower the birth weight, the more severe are the complications, and more intensive care is needed. Such babies need to have **regular follow-ups** for growth and development assessment. They usually do fine if there are no complications other than low birth weight, though being a low-birth-weight baby is a **disadvantage**.

References

[Very low birth weight](#) via [urmc.rochester.edu](#)

[Apgar score](#) via [medlineplus.org](#)

[Your Child's First Test: The APGAR](#) via americanpregnancy.org

[APGAR Score](#) via ncbi.nlm.nih.gov

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