

PREMATURITY

WHAT IS PREMATUREITY?

- A baby born **before 37 weeks of pregnancy** is considered premature, that is, born before complete maturity.
- Slightly fewer than **12 percent** of all babies are premature.



- The rate of premature single births is slightly increasing each year.

Of the babies born preterm:

- **84 percent** are born between **32 and 36** weeks of gestation (the time from conception to birth)
- about **10 percent** are born between **28 and 31** weeks of gestation

about **6 percent** are born at **less than 28 weeks of gestation**



Other terms often used for prematurity are


-preterm and "preemie."

Many premature babies also weigh less than **2,500 grams (5.5 pounds)** and may be referred to as low birthweight (LBW).


- Premature infants born **between 34 and 37 weeks** of pregnancy are often called **late preterm or near-term infants**.
- **Late preterm** infants are often much larger than very premature infants but may only be slightly smaller than full-term infants.




CLASSIFICATION BASED UPON GA

- **Late preterm birth — GA between 37-34 weeks**
 - **Very preterm birth — GA < 32 weeks**
 - **Extremely preterm birth — GA \leq 28 weeks**
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CLASSIFICATION BY BODY WEIGHT

- **Low birth weight (LBW) < 2500 g**
 - **Very low birth weight (VLBW) < 1500 g**
 - **Extremely low birth weight (ELBW) < 1000 g**
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- Late preterm babies usually appear healthy at birth but may have more **difficulties** adapting than full-term babies.
- Because of their smaller size, they may have trouble maintaining their **body temperature**.
- They often have difficulty with **breastfeeding** and bottle feeding, and may need to eat more frequently.
- They usually require **more sleep** and may even sleep through a feeding, which means they miss much-needed calories.

- Late preterm infants may also have **breathing difficulties**, although these are often identified before the infants go home from the hospital.
 - These infants are also at higher risk for **infections and jaundice**, and should be watched for signs of these conditions.
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CAUSES

WHAT CAUSES PREMATUREITY?

- There are many factors linked to premature birth.
- Some directly cause **early labor** and birth, while others can make the **mother or baby sick** and require early delivery.
- The following factors may contribute to a premature birth:

MATERNAL FACTORS:

- preeclampsia
- chronic medical illness (such as heart or kidney disease)
- infection (such as group B streptococcus, urinary tract infections, vaginal infections, infections of the fetal/placental tissues)
- drug use (such as cocaine)
- abnormal structure of the uterus
- cervical incompetence (inability of the cervix to stay closed during pregnancy)
previous preterm birth

FACTORS INVOLVING THE **PREGNANCY:**

- abnormal or decreased function of the placenta
- placenta previa (low lying position of the placenta)
- placental abruption
(early detachment from the uterus)
- premature rupture of membranes (amniotic sac), polyhydramnios (too much amniotic fluid)

FACTORS INVOLVING THE **FETUS**:

- when fetal behavior indicates the **intrauterine environment is not healthy**
- **multiple gestation** (twins, triplets or more)



COMPLICATIONS OF PREMATURITY

SOME OF THE PROBLEMS PREMATURE BABIES MAY EXPERIENCE INCLUDE:

temperature instability - inability to stay warm due to low body fat.

respiratory problems:

- **hyaline membrane disease/respiratory distress syndrome** a condition in which the air sacs cannot stay open due to lack of surfactant in the lungs.
- **chronic lung disease/bronchopulmonary dysplasia** - long-term respiratory problems caused by injury to the lung tissue.
- **air leaking** out of the normal lung spaces into other tissues
- incomplete lung development
- **apnea (stopping breathing)** - occurs in about half of babies born at or before 30 weeks

cardiovascular:

- patent ductus arteriosus (PDA) - a heart condition that causes blood to divert away from the lungs.
- too low or too high blood pressure
- low heart rate - often occurs with apnea

blood and metabolic:

- anemia - may require blood transfusion
- jaundice - due to immaturity of liver and gastrointestinal function
- too low or too high levels of minerals and other substances in the blood such as calcium and glucose (sugar)
- immature kidney function

gastrointestinal:

- **difficulty feeding** - many are unable to coordinate suck and swallow before 35 weeks gestation
- **poor digestion**
- **necrotizing enterocolitis (NEC)** - a serious disease of the intestine common in premature babies.


neurologic:

- **intraventricular hemorrhage** - bleeding in the brain.
- **periventricular leukomalacia** - softening of tissues of the brain around the ventricles (the spaces in the brain containing cerebrospinal fluid).

poor muscle tone

seizures - may be due to bleeding in the brain


retinopathy of prematurity - abnormal growth of the blood vessels in a baby's eye.

- **infections** - premature infants are more susceptible to **infection** and may require **antibiotics**
 - Premature babies can have **long-term health problems** as well.
 - Generally, the more premature the baby, the more serious and long lasting are the health problems.
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The background consists of several overlapping geometric shapes. A large light blue triangle occupies the right side of the frame. An orange triangle is on the left side. A teal triangle is at the bottom left. The word 'FEATURES' is written in black, bold, uppercase letters, rotated 45 degrees counter-clockwise, and positioned in the white space between the orange and light blue triangles.

FEATURES


WHAT ARE THE CHARACTERISTICS OF PREMATURITY?

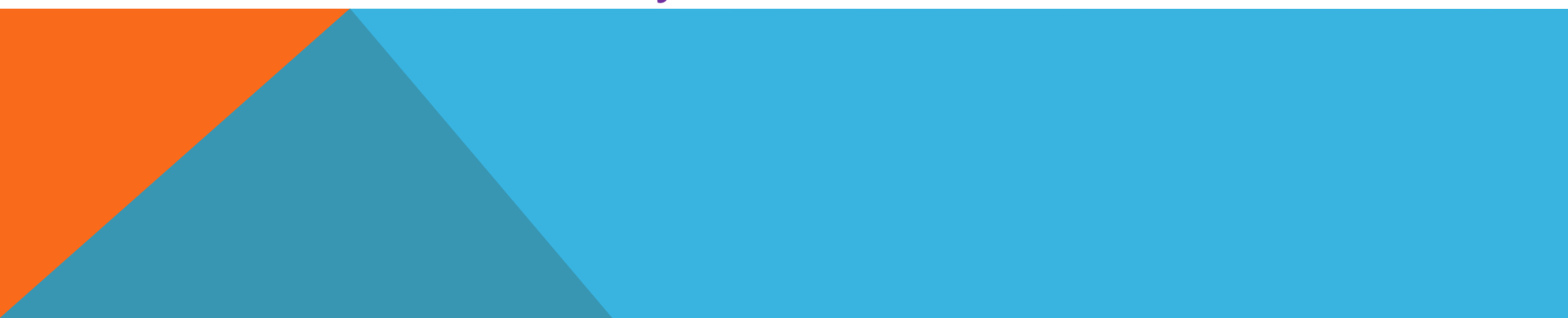
- The following are the most common characteristics of a premature baby. Characteristics may include:
 - **small baby**, often weighing less than 2,500 grams (5 pounds 8 ounces)
 - **pink or red skin**, able to see veins
 - **little body fat**
 - **little scalp hair**, but may have lots of soft body hair)
 - **weak cry and body tone**
 - **genitals** may be small and underdeveloped
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CARE

Care of premature babies:

- Monitoring of temperature, blood pressure, heart and breathing rates, and oxygen levels
 - Giving extra oxygen by a mask or with a breathing machine
 - Mechanical ventilators (breathing machines) to do the work of breathing for the baby
 - Intravenous (IV) fluids - when feedings cannot be given, or for medications
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- X-rays (for diagnosing problems)
 - Special **feedings** of breast milk or formula
 - **Medications** and other treatments for complications, such as antibiotics
 - Kangaroo Care - a method of caring for premature babies using **skin-to-skin contact** with the parent to provide contact and aid parent-infant attachment. **Studies** have found that babies who "kangaroo" may have shorter stays in the NICU.
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KANGAROO CARE

Kangaroo care is a technique practiced on newborn, usually preterm, infant is held, skin-to-skin, with an adult. **Kangaroo care** for pre-term infants may be restricted to **a few hours per day**, but if they are medically stable that time may be extended.



kangaroo care

the practice of holding or wearing a newborn skin-to-skin


benefits to baby

- helps regulate baby's body temperature
- more rapid brain development
- close hold enhances successful breastfeeding
- decreased crying
- earlier parent-child bonding
- warmth mimics calming environment of the womb

to practice kangaroo care in the Baby K'tan, simply remove your shirt and your infant's shirt, and place your newborn skin-to-skin in the kangaroo position.





WHEN CAN A PREMATURE BABY GO HOME FROM THE HOSPITAL?

- Serious illnesses are resolved
 - Stable temperature - able to stay warm in an open crib
 - Taking all feedings by breast or bottle
 - No recent apnea or low heart rate
 - Parents are able to provide care including medications and feedings
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PREVENTIONS

PREVENTION OF PREMATURITY:

- Identifying mothers at risk for preterm labor
 - Prenatal education of the symptoms of preterm labor
 - Avoiding heavy or repetitive work or standing for long periods of time which can increase the risk of preterm labor
 - Early identification and treatment of preterm labor
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**ASSESSMENTS &
EXAMINATIONS**

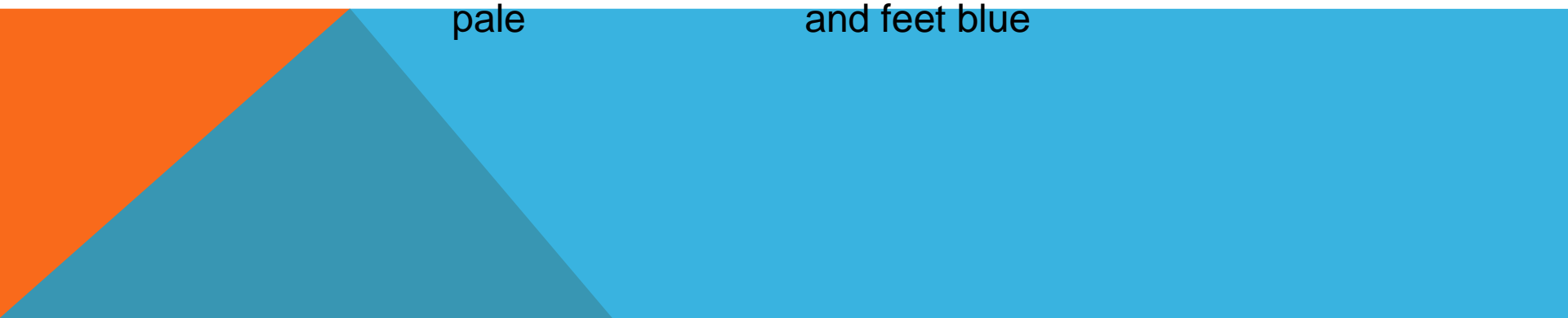
ASSESSMENTS FOR NEWBORN BABIES


Each newborn baby is carefully checked at birth for signs of problems or complications

Assessment may include:

- **Apgar scoring:**
- The Apgar score is one of the first checks of your new baby's health.
- The Apgar score is assigned in the first few minutes after birth to help identify babies that have difficulty breathing or have a problem that needs further care.
- The baby is checked at one minute and five minutes after birth for heart and respiratory rates, muscle tone, reflexes, and color.

Sign	Score = 0	Score = 1	Score = 2
Heart Rate	Absent	Below 100 per minute	Above 100 per minute
Respiratory Effort	Absent	Weak, irregular, or gasping	Good, crying
Muscle Tone	Flaccid	Some flexion of arms and legs	Well flexed, or active movements of extremities
Reflex/Irritability	No response	Grimace or weak cry	Good cry
Color	Blue all over, or pale	Body pink, hands and feet blue	Pink all over



- **Birthweight and measurements:**
 - A baby's **birthweight** is an important indicator of health.
 - The average weight for term babies (born between **37 and 41 weeks gestation**) is about 7 lbs. (3.2 kg).
 - In general, small babies and very large babies are at greater risk for problems.
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Measurements:

Other measurements are also taken of each baby. These include the following:

- **Head circumference** (the distance around the baby's head) - is normally about **one-half the baby's body length plus 10 cm**
- Abdominal circumference - the distance around the abdomen
- **length** - the measurement from crown of head to the heel


Physical examination:

A complete physical examination is an important part of newborn care. Each body system is carefully examined for signs of health and normal function. The physician also looks for any signs of illness or birth defects. Physical examination of a newborn often includes the assessment of the following:

■ vital signs:

- **Temperature** - able to maintain stable body temperature 98.6° F (37° C) in normal room environment
- **Pulse** - normally 120 to 160 beats per minute
- breathing rate - normally 30 to 60 breaths per minute

Gestational assessment:

- Assessing a baby's **physical maturity** is an important part of care.
 - Maturity assessment is helpful in meeting a baby's needs if the **dates of a pregnancy are uncertain**.
 - For example, a very small baby may actually be more mature than it appears by size, and may need different care than a premature baby.
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BALLARD EXAMINATION

- An examination called The Ballard Examination for Gestational Age is often used. A baby's gestational age often can be closely estimated using this examination.
- The Ballard Examination evaluates a baby's appearance, skin texture, motor function, and reflexes.
- The **physical maturity** part of the examination is done in the **first two hours of birth**. The **neuromuscular maturity** examination is completed **within 24 hours** after delivery.

Physical maturity:

The physical assessment part of the Ballard Examination looks at **physical characteristics** that look different at different stages of a baby's gestational maturity. **Babies who are physically mature usually have higher scores than premature babies.**

Points are given for each area of assessment, with a low of -1 or -2 for extreme immaturity to as much as 4 or 5 for postmaturity.

- **skin textures** (i.e., sticky, smooth, peeling).
- (the **soft downy hair** on a baby's body) - is absent in immature babies, then appears with maturity, and then disappears again with postmaturity.
- **plantar creases** - these creases on the soles of the feet range from absent to covering the entire foot, depending on the maturity.
- **breast** - the thickness and size of breast tissue and areola (the darkened ring around each nipple) are assessed.
- **eyes and ears** - eyes fused or open and amount of cartilage and stiffness of the ear tissue.
- **genitals, male** - presence of testes and appearance of **scrotum**, from smooth to wrinkled.
genitals, female - appearance and size of the clitoris and the labia.

Neuromuscular maturity:

Six evaluations of the baby's neuromuscular system are performed. These include:

- **posture** - how does the baby hold his/her arms and legs.
- **square window** - how far the baby's hands can be flexed toward the wrist.
- **arm recoil** - how far the baby's arms "spring back" to a flexed position.
- **popliteal angle** - how far the baby's knees extend.
- **scarf sign** - how far the elbows can be moved across the baby's chest.
- **heel to ear** - how close the baby's feet can be moved to the ears.

EAR:

THE **PRETERM** INFANT'S EAR CARTILAGES ARE POORLY DEVELOPED, AND THE EAR MAY FOLD EASILY; THE HAIR IS FINE AND FEATHERY, AND MAY COVER THE BACK AND FACE.

THE **MATURE** INFANT'S EAR CARTILAGES ARE WELL FORMED, AND THE HAIR IS MORE LIKELY TO FORM FIRM, SEPARATE STRANDS.



SOLE—THE SOLE OF THE FOOT OF THE **PRETERM** INFANT APPEARS MORE TURGID AND MAY HAVE ONLY FINE WRINKLES. THE **MATURE** INFANT'S SOLE (FOOT) IS WELL AND **DEEPLY CREASED**.



FEMALE GENITALIA—THE PRETERM FEMALE INFANT'S CLITORIS IS PROMINENT, AND LABIA MAJORA ARE POORLY DEVELOPED AND GAPING. THE MATURE FEMALE INFANT'S LABIA MAJORA ARE FULLY DEVELOPED, AND THE CLITORIS IS NOT AS PROMINENT.



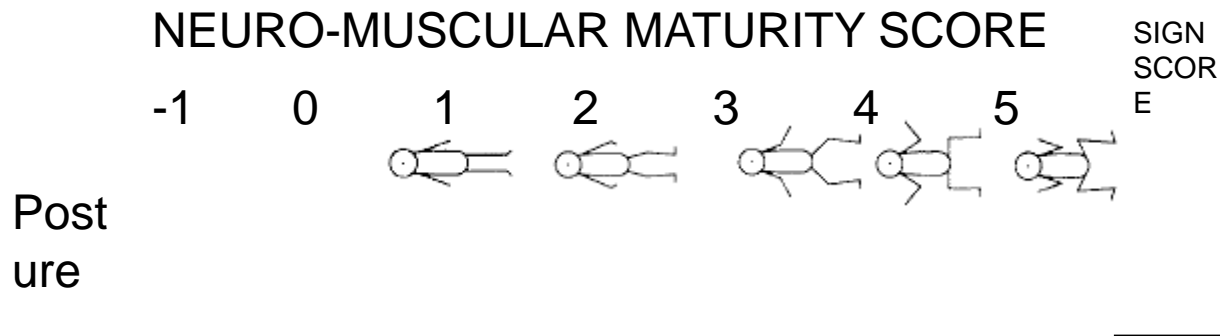
MALE GENITALIA—THE PRETERM MALE INFANT'S SCROTUM IS UNDEVELOPED AND NOT PENDULOUS;
AND THE TESTES MAY BE IN THE INGUINAL CANALS OR IN THE ABDOMINAL CAVITY. THE TERM MALE INFANT'S SCROTUM IS WELL DEVELOPED, PENDULOUS, AND THE TESTES ARE WELL DOWN IN THE SCROTAL SAC.

GRASP REFLEX—THE PRETERM INFANT'S GRASP IS WEAK; THE TERM INFANT'S GRASP IS STRONG, ALLOWING THE INFANT TO BE LIFTED UP FROM THE MATTRESS.









1. POSTURE

Total body muscle tone is reflected in the infant's preferred posture at rest and resistance to stretch of individual muscle groups



2. SQUARE WINDOW






Wrist flexibility and/or resistance to extensor stretching are responsible for the resulting angle of flexion at the wrist.

SIGN	NEURO-MUSCULAR MATURITY SCORE							SIGN SCORE
	-1	0	1	2	3	4	5	
Square Window								



ARM RECOIL

This maneuver focuses on passive flexor tone of the biceps muscle by measuring the angle of recoil following very brief extension of the upper extremity.

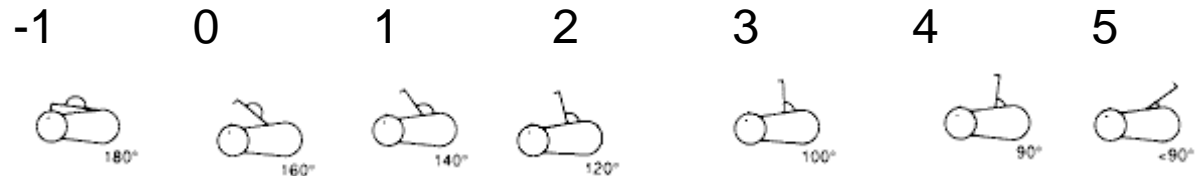
	NEURO-MUSCULAR MATURITY SCORE						SIGN SCORE	
	-1	0	1	2	3	4	5	RE
Arm Recoil		 180°	 140°-180°	 110°-140°	 90°-110°	 <90°		



POPLITEAL ANGLE

This maneuver assesses maturation of passive flexor tone about the knee joint by testing for resistance to extension of the lower extremity

NEURO-MUSCULAR MATURITY SCORE



SIGN
SCOR
E



SCARF SIGN

This maneuver tests the passive tone of the flexors about the shoulder girdle.

NEURO-MUSCULAR MATURITY SCORE

-1

0

1

2

3

4

5

SIGN
SCO
RE





HEEL TO EAR

This maneuver measures passive flexor tone about the pelvic girdle by testing for passive flexion or resistance to extension of posterior hip flexor muscles.

-MUSCULAR MATURITY SCORE



SIGN
SCORE



Thank you



Appearance, Pulse, Grimace, Activity, Respiration

Each of the above criteria are scored from 0 through 5, in the original Ballard Score. The scores were then ranged from **5 to 50**, with the corresponding gestational ages being **26 weeks and 44 weeks**.

An increase in the score by **5 increases the age by 2 weeks**. The New Ballard Score allows scores of -1 for the criteria, hence making negative scores possible. The possible scores then range from -10 to 50, the gestational range extending up to 20 weeks. **(A simple formula to come directly to the age from the Ballard Score is $\text{Age} = (2 * \text{score} + 120) / 5$)**