

# Adaptation of the newborn to Extra-uterine Life



## Changes at Birth

The Birth process imposes a significant and unique physical challenge to the neonate. Life tasks necessary comprise

- **independent breathing**
- **the transition from fetal to neonatal circulation and the metabolic**
- **adaptation of thermoregulatory**
- **glucose homeostasis along with fluid balance.**

## Fetal Circulation

- ❖ The placenta acts as the organ of respiration for the fetus
- ❖ The umbilical vein carries oxygenated blood from the placenta to the fetal heart.
- ❖ Blood crosses through the fetal heart ducts in a right-to-left direction with only a small % of blood flow passing to the lungs.
- ❖ Blood is then carried via the umbilical artery to the rest of the body

## **Glucose homeostasis changes .**

**At birth, the baby has to switch from obtaining glucose from the mother via the placenta to independent glucose production.**

**Birth results in the newborn's blood glucose levels falling.**

**Provided a term baby is kept warm and fed within the first few hours of birth, they should be able to control their own blood glucose as they mount protective responses to falls in blood sugar and increased availability of alternative substrate or fuel for the brain if glucose is low**

**Surfactant** has been released into the newborns' lungs as depicted at the air-fluid interface on the surface of the alveoli, opening these up and reducing surface tension. Lung fluid has been absorbed.

### **Thermal regulatory changes**

Once the baby is born, they have to achieve thermal stability independently.

At birth, the intrauterine heat reservoir and heat exchange through the placenta is lost. They must adapt to this new environment by a process known as non shivering thermogenesis.

In healthy newborns, it is important to keep them warm and dry straight from delivery. However, if a newborn is allowed to become cold then the brown fat stores will deplete and the newborn will become hypoxic and hypoglycaemic.

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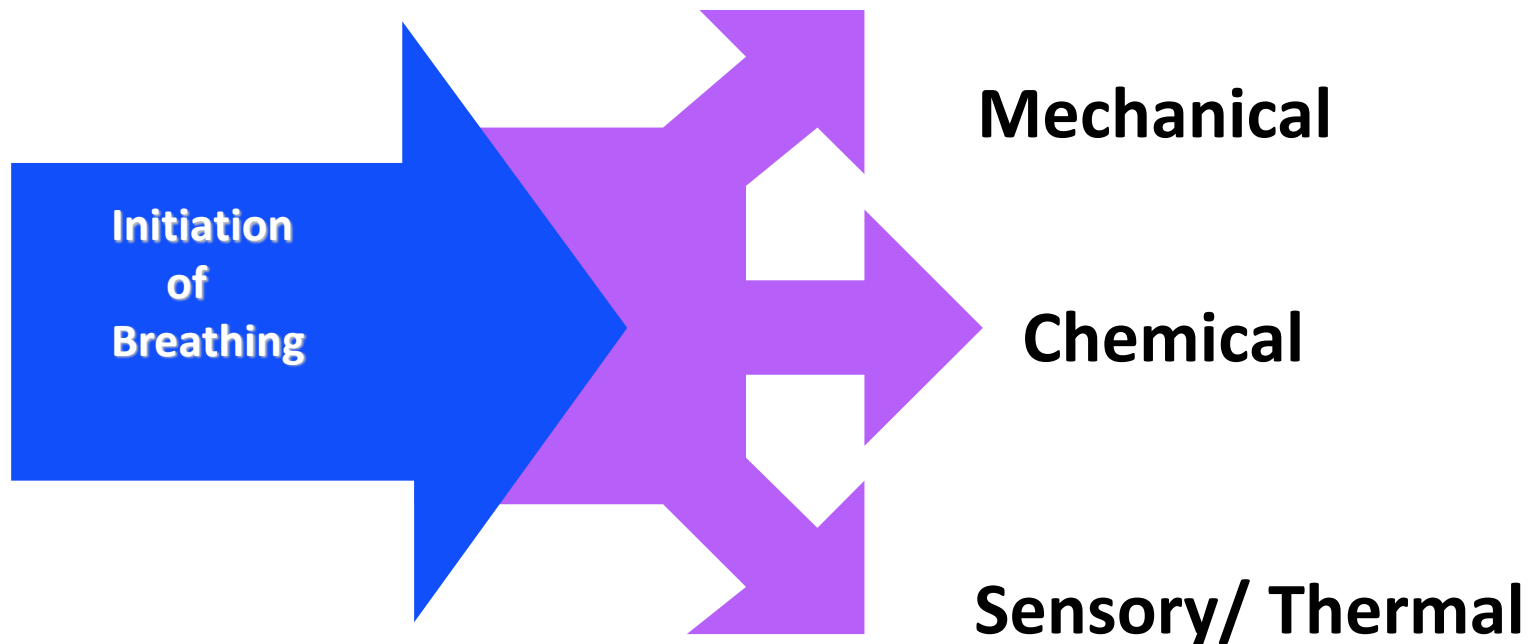
## **Fluid Balance changes :**

**In fetal life, there is** interplay between the urine, amniotic fluid and lung fluid production to maintain adequate fluid balance and lung tissue growth.

Fluid balance undergoes significant postnatal adaptive changes at birth. All newborns undergo extra-cellular fluid contraction after delivery and neonates will lost up to 10% of their birth weight.

# Respiratory Changes

Factors play in initiation of respirations  
in the neonate?





# Chemical Events

1. With cutting of the cord, remove oxygen supply

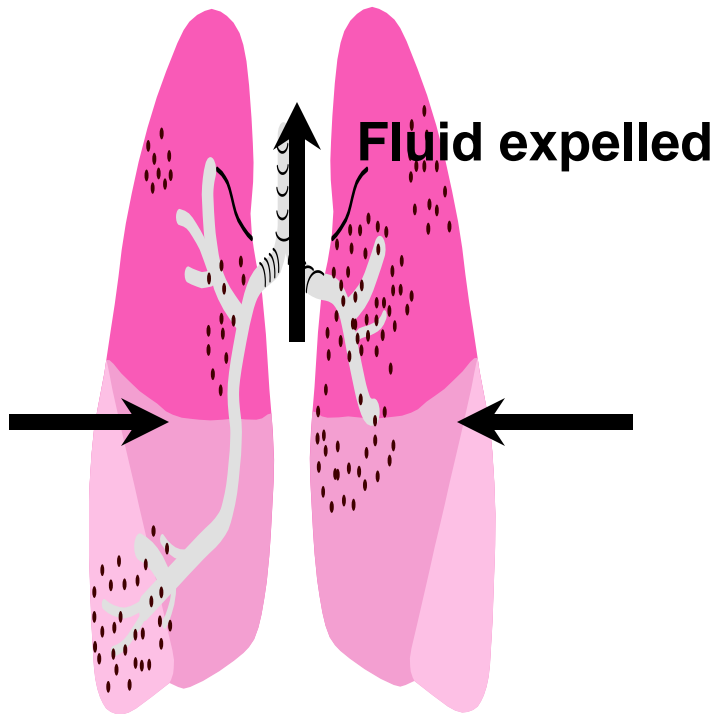
➤ 2. Asphyxia occurs

➤ 3.  $\uparrow$ CO<sub>2</sub> and O<sub>2</sub> $\downarrow$  and pH  $\downarrow$  = ACIDOSIS

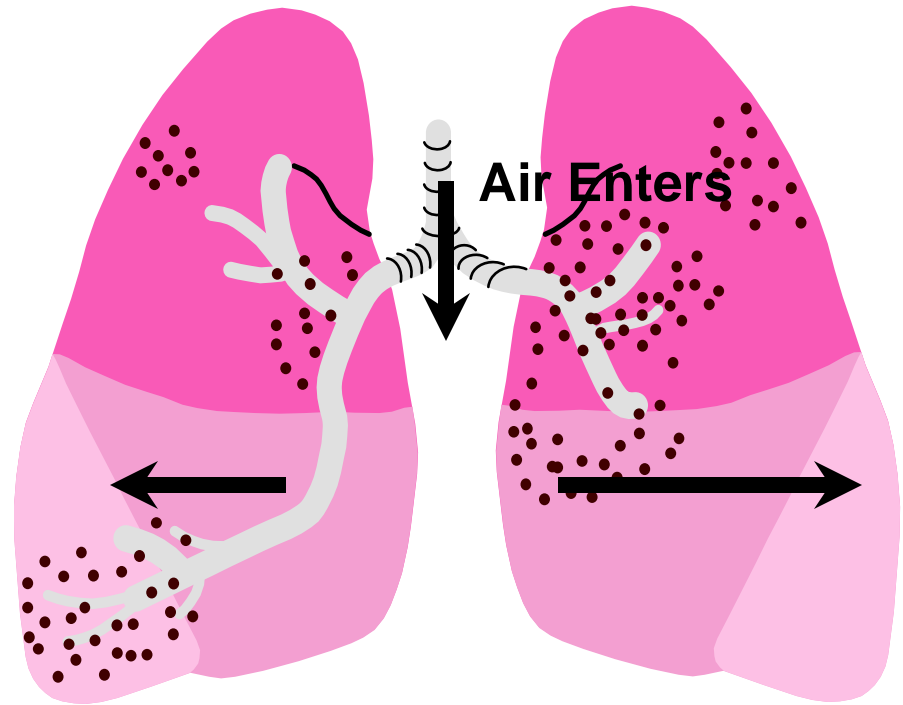
➤ 4. Acidotic state-- stimulates the respiratory center in the medulla and the chemoreceptors in carotid artery to initiate breathing

# Mechanical Events

- As the chest passes through the birth canal the lungs are compressed



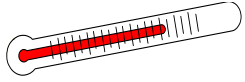
- Subsequent recoil of the chest wall produces passive inspiration of air into the lungs



# Mechanical Events

- ◆ About 60-110 ml. of fluid is squeezed out of the lungs as the chest is compressed
- ◆ The remaining fluid evaporates or is reabsorbed by the blood vessels and lymphatics surrounding the lungs.
- ◆ When a baby is delivered in a presentation other than vertex, it takes longer for the lungs to rid themselves of the fluid

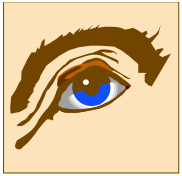
# Sensory / Thermal Events



**Thermal**--the decrease in environmental temperature after delivery is a major stimulus of breathing



**Tactile**--nerve endings in the skin are stimulated



**Visual**--change from a dark world to one of light

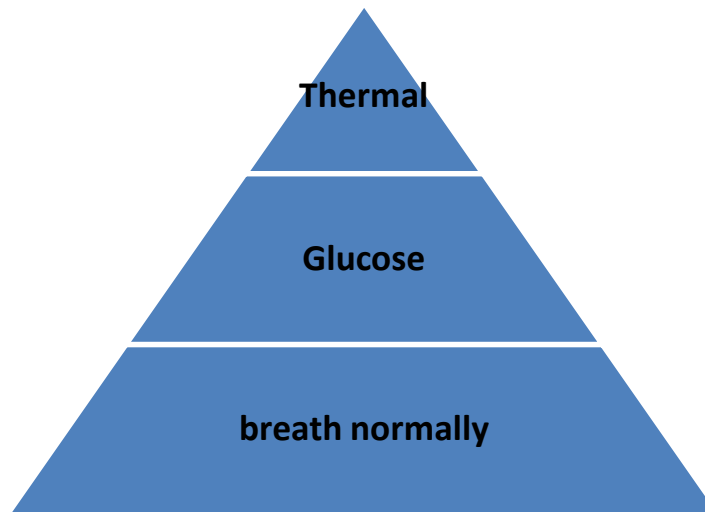


**Auditory**--sound in the extrauterine environment stimulates the infant

# **SUMMARY**

Overall, thermal and glucose homeostasis together with the ability to breathe normally without assistance are critical physiological functions that are closely interrelated.

A change or difficulty in one of these variables affects the other-The 'Metabolic Triangle'



**Characteristics of Normal neonate,**

**Full term,**

**Preterm,**

**Post term**

## **The preterm infant**

Define as a live born infant born before the end of 37 weeks of gestation.  
Or weight of less than 2500g (5 lb, 8oz) at birth.

## **Term infant**

born after 37<sup>th</sup> weeks. Term 38-42 weeks

## **Post term past 42 weeks**

LBW (Low birth weight) those born weighting 1500-2500 gram.

VLBW (very low birth weight) those weighting 1000-1500 gram.

EVLOW (extremely-very-low birth-weight) infants those born 500-1000 gram.

# ***Preterm infant***

## **Appearance**

1. **Appears small & under developed.**
2. **The head is disproportionately large (3 cm or greater than chest size).**
3. **Skin usually ruddy because the infant has **little** subcutaneous fat beneath & veins are easily noticeable & high degree of acrocyanosis may be present.**
4. **Covered with vernix caseosa.**
5. **Languo is usually extensive covering the back, forearms, forehead, & sides of the face.**
6. **Both anterior & posterior fontanelles are small.**
7. **No creases on the soles of the feet**



**8-** Eyes appears small, difficult to elicit papillary reaction is present.

**9-** Have varying degree of myopia (near-sightedness) because of lack of eye globe depth.

**10-**Cartilage of the ear is immature & allows the pinna to fall forward. The ears appear large in relation to the head. The level of the ears should be carefully inspected to rule out chromosomal abnormalities.

**11-** Neurological function in the preterm child is often difficult to evaluate.

Testing reflex such as sucking & swallowing will be absent if the infant's age is below 33 weeks, a chilliest tendon reflex are markedly diminished.

**12-** Less active and rarely cries & if cry a weak and high pitched.

**13-**possible to complicated hyperbilirubinemia, hypoglacemia, intracranial hemorrhage, apnea, pulmonary problem especially, and respiratory distress syndrome.

## **The post term infant**

Labor is not induced until week 43 of pregnancy or after, the pregnancy may result in post term infant.

### **Special risk because**

- placenta appears to only function effectively for 40 weeks.
- lose its ability to carry nutrients effectively to the fetus.
- placenta may die or develop post term syndrome.

## Characteristics of post term

-**Dry**, cracked from lack of fluid, and absence of vernix.

-**light weight** from a recent weight loss that occurred because of the poor placental function.

--The amount of **amniotic fluid may be less** at birth than normal and it may be meconium stained.

-**Finger nail** have grown.

-**Respiration difficulty** especially if there was **meconium aspiration, hypoglycemia, subcutaneous fat levels may also be low,**

- **temperature regulation may be difficult,** dehydration, polycythemia from decreased oxygenation in the final weeks.



## Characteristics of normal new born baby

- The average birth weight for a white mature, female new born in United State is **3.4kg (7.5lb)**, and for white mature male new born **3.5kg (7.7 lb)**. The arbitrary lower limit of normal **for all races is 2.5 kg (5.5 lb)**.
- Length the average birth length of a mature neonate is **53cm** for mature males is **54cm**. the lower limit of normal length is arbitrarily set at **46cm**.
- The Head circumference is **34-35 (13.5-14 inches)**.
- The Chest circumference is about **2cm** less than head circumference. It measure at the level of the nipple.



**1-Vital signs Temp. 37.2°C, Pulse 120-140bpm, Resp. 30-60 beat/minute.**

**2-Color** all infants appear **cyanotic** at the moment of birth. They grow **pink** with or shortly after the first breath.

**3-Vrenix Caseosa** a white cream cheese like substance that serves as a skin lubricant is usually noticeable on a newborn's skin at least in the skin folds.

**4-Laungo** covers the newborn's shoulders, back and upper arms.

**5-Head** appears disproportionately large because it is about **one fourth** of the total length.

**6-The fontanelle** are the spaces or opening where the skull bones join. Both anterior and posterior fontanel opened.

**7-Muscle tone** mature newborns hold the extremities **tightly flexed**, simulating their intrauterine position.

**8-Reflex** irritability the newborn's response to a suction catheter in the nostrils or the response to having the **soles of the feet slapped**. A baby whose mother received large amount of analgesia during labor or birth will have low score in this category.







## Gestational Age



**Care of the baby at the time of  
delivery**

**(until around 1 hour after birth)**

## **Care during labour and delivery this can achieve by:-**

- ✓-call out time of birth
- ✓-deliver baby onto the mother's abdomen or into her arm
- ✓-dry the baby with a warm, clean towel or piece of cloth
- ✓-wipe eyes
- ✓-assess the baby's breathing while drying
- ✓-make sure there is not a second baby by palpate the mother's abdomen,  
✓
- ✓- give IM oxytocin to the mother, and watch for vaginal bleeding.

- ✓-**change gloves** or if this is not possible **wash** the gloved hands.
- ✓
- ✓-**clamp and cut the umbilical cord**
- ✓-put the **baby between the mother's breasts for skin-to-skin care**
- ✓- **place an identity label in wrist and/or ankle. -cover the mother and baby** with a warm cloth and with a blanket if the room is less than 25°C
- ✓-**cover the mother and baby** with a warm cloth and with a blanket if the room is less than 25°C
- ✓-**put a hat on the baby's head**
- ✓-**encourage the initiation of breastfeeding.**

# The basic needs of All babies at birth and for the first few weeks of life

*To be protect*

*To breathe normally*

*To be worm*

*To be fed*

## ***To be protect***

**General preparations a health worker needs to make in the delivery area to meet the baby's needs at birth;-**

### **1- Universal precautions**

- use soap and warm water to wash and clean hands**
- wear gloves**

## *To be worm*

**There are four ways in which a newborn baby loses body heat:**

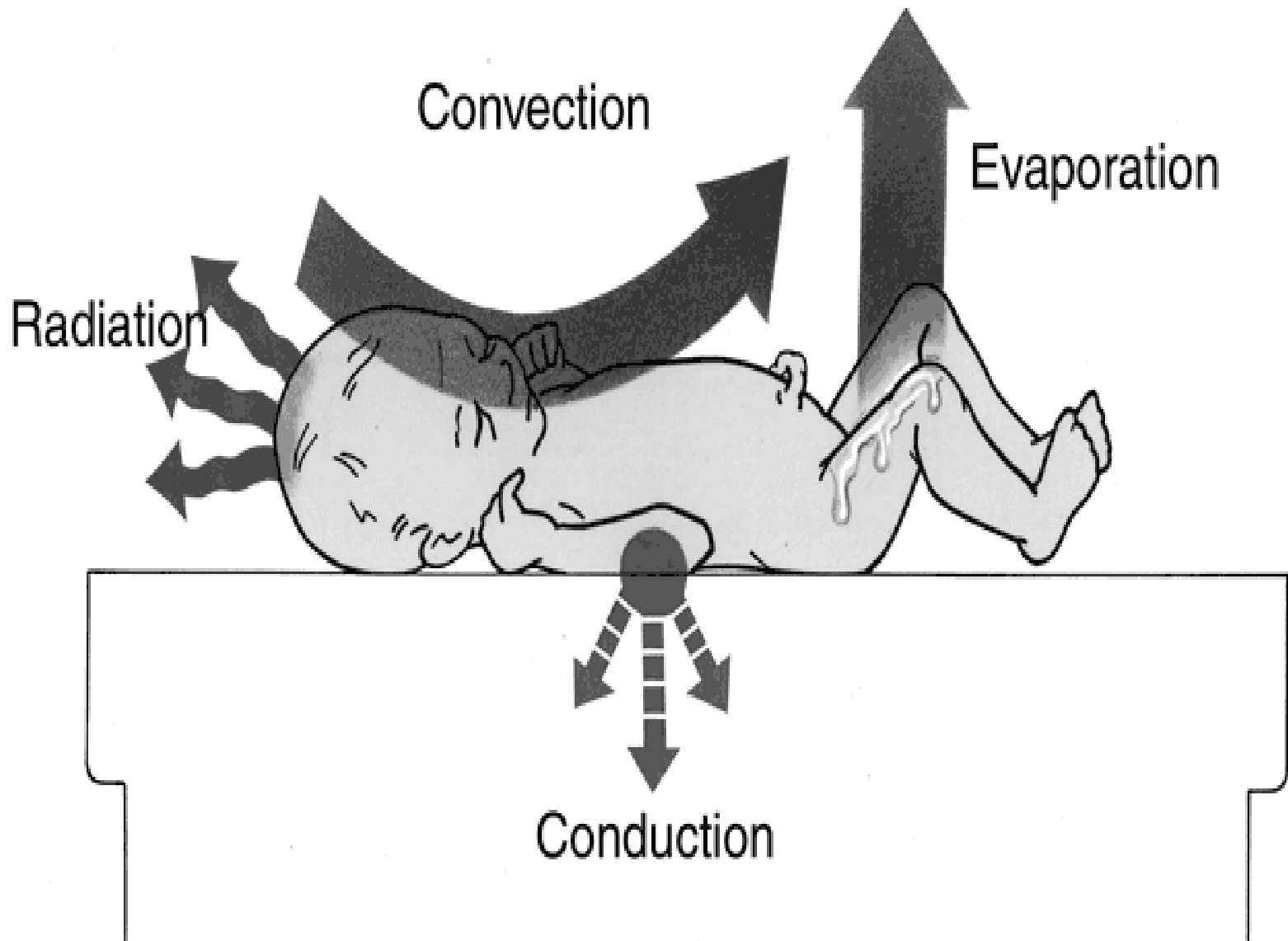
**Evaporation:** When amniotic fluid evaporates from the skin.

**Conduction:** When the baby is placed naked on a cooler surface, such as table, weighing scales, cold bed.

**Convection:** When the baby is exposed to cool surrounding air or to a draught from open doors and windows or a fan.

**Radiation:** When the baby is near cool objects, walls, tables, cabinets, without actually being in contact with them.





# THE WARM CHAIN

Early sign of hypothermia

- is feet that are cold to the touch.

- If hypothermia is allowed to continue, the skin becomes cold all over the body,

- the baby becomes less active, suckles poorly and has a weak cry.

In severely hypothermic babies

- the face and extremities may develop a bright red colour, even in non-white neonates.

- **Sclerema** — a hardening of the skin associated with reddening and oedema — may occur on the back and limbs or over the whole body.

-The baby becomes lethargic and develops slow, shallow and irregular breathing and a slow heart beat. Low blood sugar and metabolic acidosis, generalized internal bleeding (especially in the lungs) and respiratory distress may occur. Such a level of hypothermia is very dangerous and unless urgent measures are taken, the baby will die.

# Hypothermia in the newborn infant

**Hypothermia** occurs when the newborn's body **temperature drops below**

**-36.5°C (97.7°F) generally because the environment is too cold for the baby:**

**-36-36.4°C (96.8-97.5°F) is mild hypothermia - cold stress.**

**-32-35.9°C (89.6-96.6°F) is moderate hypothermia.**

**-Less than 32°C (89.6°F) is severe hypothermia.**

Hypothermic newborns, especially if they are **sick or of low birth weight**, are more at risk of developing health problems and of dying.

## Nursing management to prevent hypothermia

- ❑ keep the delivery room warm, close window. The delivery room temperature should be **at least 25°C**.
- ❑ Have Warm resuscitation equipment nearby
- ❑ Dry immediately after delivery with a clean warm towels/cloths/covers
- ❑ **Bathing and weighing postponed. Bathing the infant - if his temperature is normal - not before 6 hours after birth**
- ❑ Mother to wear clothes which make immediate skin-to-skin contact easy. **The naked baby is in a position between the mother's breasts. Stimulation of the breast by the baby causes the hormone oxytocin to be released by the brain, this helps breast milk to flow and causes the uterus to contract.**

**DO NOT** need to **separate the mother and baby during delivery of the placenta**, skin-to-skin contact can and should continue unless there are complications.

the baby should be **monitored** every 15 minute

the mother and baby **should remain** in the delivery room for **the first hour**

Warm transportation

## Preventing heat loss at the time of birth:



**Drying**



**wrapping**



**Skin-to-skin**



**Breast-feeding**

## Cord care

- Change gloves.** If not possible wash gloves hand.
- Clamp and cut the cord:**
  - Put ties tightly around the cord **at 2cm and 5cm from the baby's abdomen.**
  - Cut between the ties with a sterile instrument.**
  - **Observe for oozing of blood.**

## Physical Examination – Umbilical Cord



LOOKING AT THE CUT EDGE MORE CLEARLY SHOWS THE NORMAL VESSELS OF THE UMBILICAL CORD. THE TWO ARTERIES ARE TO THE LEFT AND THE VEIN, WITH A SPOT OF BLOOD IN ITS LARGE LUMEN, IS ON THE RIGHT.

Umbilical Cord



## Physical Examination – Umbilical Cord



This cord was stained by the presence of meconium in utero, which gives it a dark green color.

When an infant shows signs of meconium staining, it is evidence that meconium has been present in the amniotic fluid for some time.

**Meconium Stained**

## Eye care

- ❖ Eye care can be carried out **within one hour of birth**
- ❖ Eye care is given **to protect a baby's eyes from infection.**
- ❖ a baby's eye **should be wiped** as soon as possible after birth and an **anti-microbial eye medicine should be applied within one hour of birth**
- ❖ it should **not be** washed away.
- ❖ **Drug** which can be used **to prevent infection at the time of birth** include;
  - 1% silver nitrate eye drop**
  - 2.5% povidine-iodine eye drop**
  - 1% tetracycline ointment**

# In summary nursing diagnosis are

## **Nursing Diagnoses:**

- Ineffective airway clearance related to nasal and oral secretions from delivery.
- Ineffective thermoregulation related to environment and immature ability for adaptation.
- Risk for injury related to immature defenses of the newborn.
- Risk for infection related to immature immune system

# **Nursing management for high risk neonate**

## **Priority needs of high risk newborns**

- Initiation & maintenance of respirations
- Establishment of extra uterine circulation
- Control of body temperature
- Intake of adequate nourishment
- Establishment of waste elimination
- Prevention of infection
- Establishment of an infant-parent relationship

# ***Initiation & maintenance of respirations***

The prognosis of the high-risk newborn  
**depends**  
primarily on

## how the first moments of life are managed

**Most** infants are born with some degree of respiratory acidosis.



if respiratory activity does not begin immediately respiratory acidosis will increase

deaths occurring because of residual neurologic dysfunction because of cerebral hypoxia prompt



The blood PH & bicarbonate buffer system will fall.

Newborn defense mechanisms are inadequate to reserve the process.

Therefore the effort to establish respirations must be begun immediately after birth. By 2 minute the development of severe acidosis is already well under way.

## Nursing Management

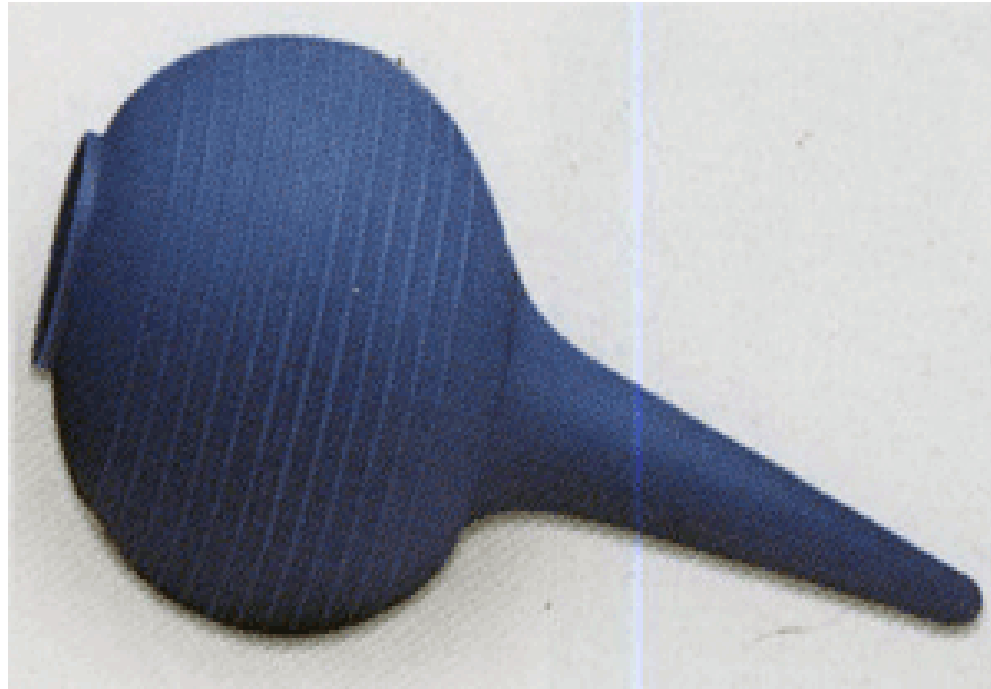
### A- Establishing an airway:-

- **Suction** the infant's mouth & nose with a bulb syringe. **Deeper suction for 10 seconds** at a time to avoid removing excessive air from an infant's lungs
- **Rub** the back to see if skin stimulation initiates respirations.
- Resuscitation by AMBO bag**
- Laryngoscope** to open the airway & tracheal suctioning performed endotracheal tube can be inserted &
  - oxygen can be administered.**
- The sound of a baby **crying** is proof that lung expansion is good
- Need **oxygen by bag & mask** to aid lung expansion.

### Complications of poor respiration

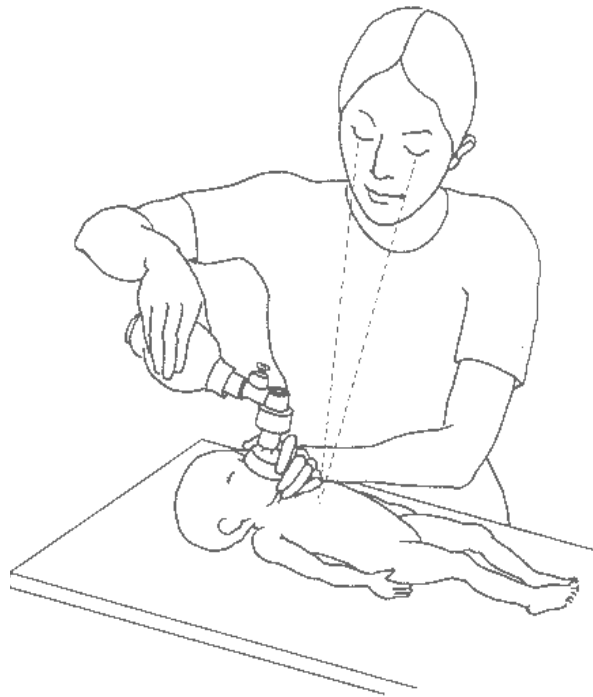
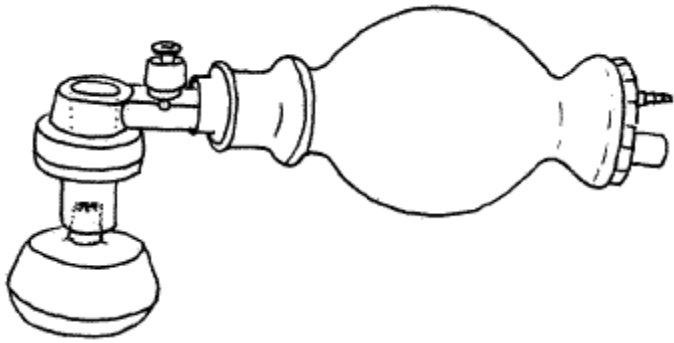
- Acidosis**
- Hypoglycemia** because breathing is ineffective & circulatory shunts. **Struggling to breathe & circulate blood, an infant uses available serum glucose quickly.**





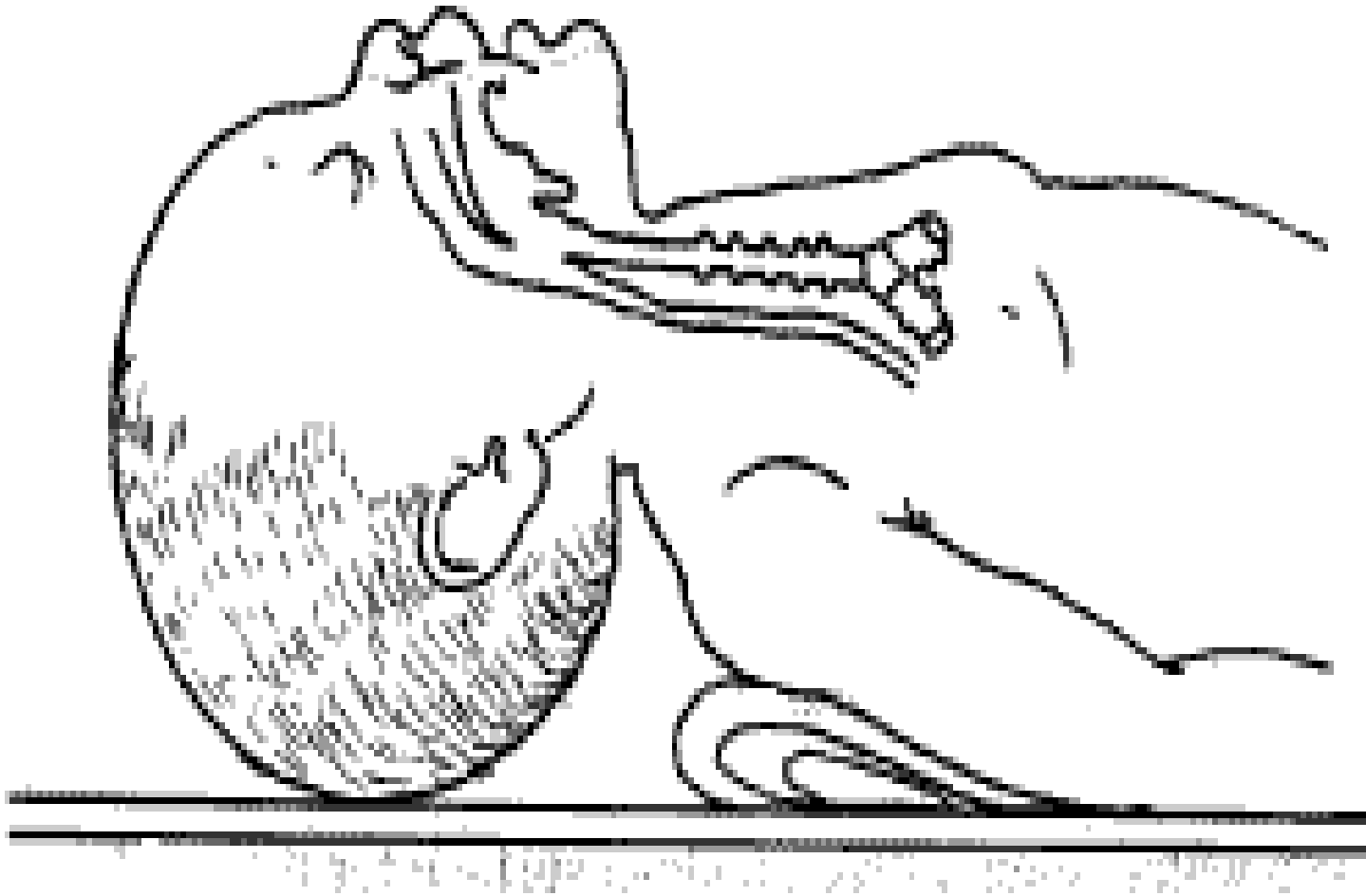


## Resuscitation by AMBO bag

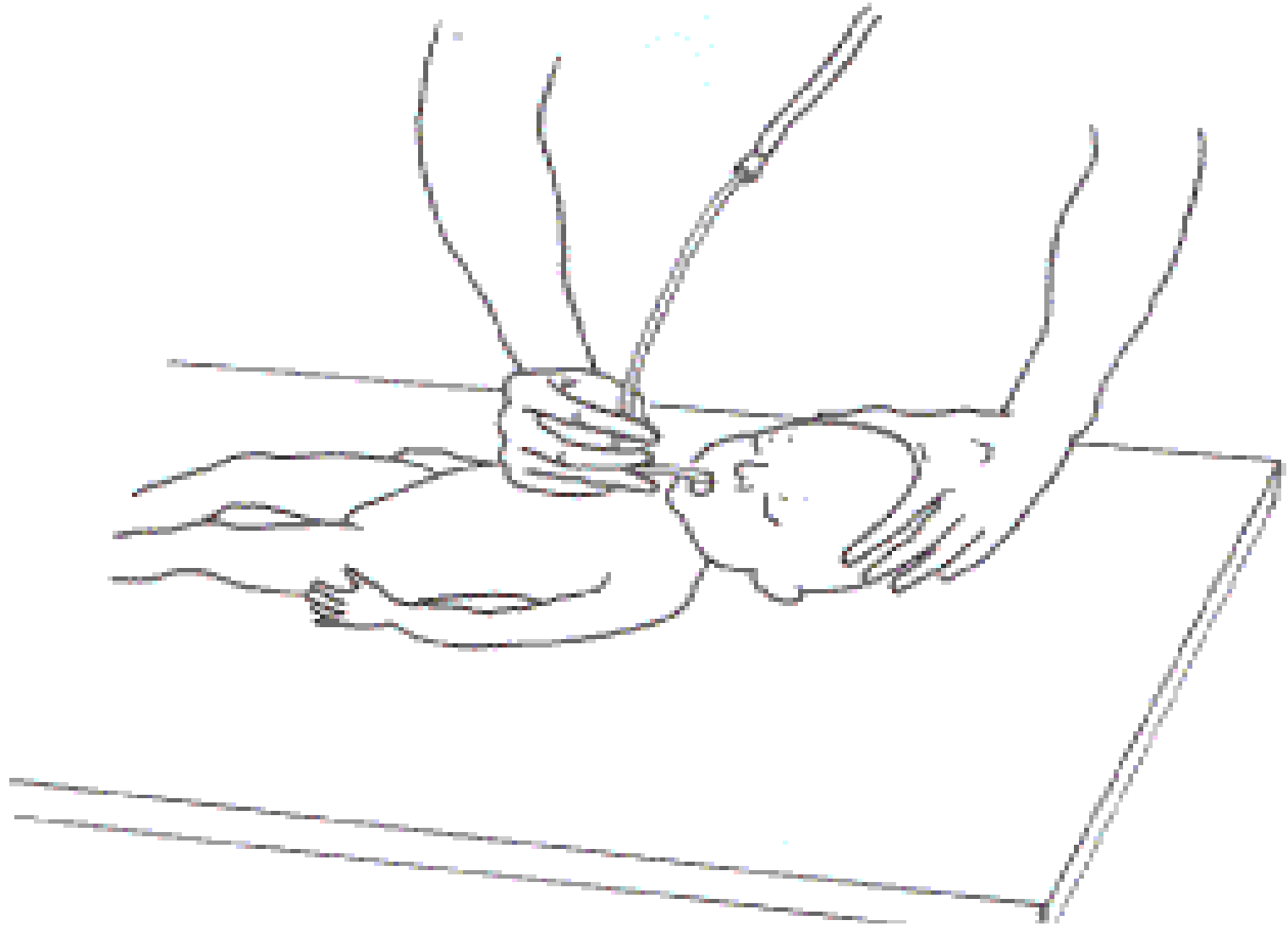


**All equipment should be present at the birth & must be fit to newborn**

## Suctioning the mouth and nose



## Suctioning the mouth and nose



# Expanding the lung

- **by crying**

- oxygen **by AMPO bag** & mask,

-give **oxygen by mask without pressure** if newborn's amniotic fluid was meconium stained it maybe push meconium down in to the infant's airway.

- Maintaining **effective ventilation** (continued respiration) it should be carefully observed in the next few hours to be certain that respirations are maintained.

-**Positioning the infant on the back with the head of the mattress elevated approximately 15 degree allows abdominal contents to fall away from the diaphragm affording optimal breathing space.**

## **Establishment of extrauterine circulation**

**if there is no audible heart beat or if the cardiac rate is below 80 bpm:-**

**-Closed chest massage** should be started.

**-Lung ventilation** at **a rate of 20 times** per minute should be continued & interspersed with **the cardiac massage**.

- Continue to monitor transcutaneous oxygen or **pulse oximetry** to evaluate respiratory function & cardiac efficiency with palpation of femoral pulse.

**-endotracheal** tube to stimulate cardiac function.

If still difficult initiating cardiac function it need to transferred **to high risk nursery**.

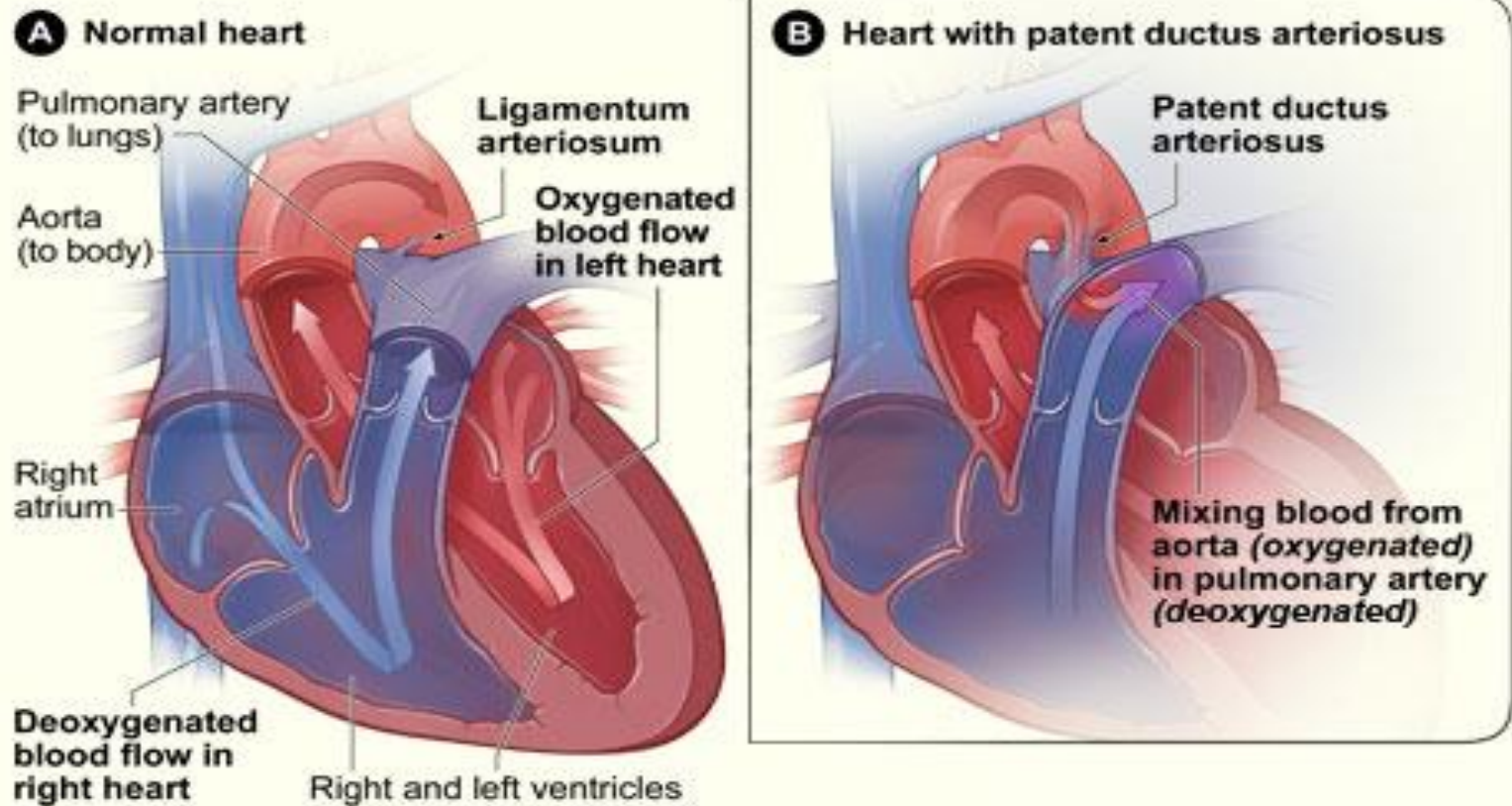




# **Fluid & electrolyte balance**

- assessment of serum glucose because of hypoglycemia
- Maintain fluid & electrolyte level because of **increase of water & fluid loss from rapid respirations & dehydration.**
- Urine output & urine specific gravity must be monitored elevated specific gravity** because of dehydration & by inappropriate antidiuretic hormone secretion or kidney failure due to primary illness.
- Administered plasma or albumin to increase blood volume.**
- Control the rate carefully to prevent heart failure, patent ductus arteriosus or intracranial hemorrhage from fluid pressure overload.**

# Patent Ductus Arteriosus



Patent ductus arteriosus (PDA) is a heart problem that occurs soon after birth in some babies. In PDA, abnormal blood flow occurs between two of the major arteries connected to the heart. Before birth, the two major arteries—**the aorta and the pulmonary** (PULL-mun-ary) artery—are connected by a blood vessel called the ductus arteriosus. This vessel is an essential part of fetal blood circulation. Within minutes or up to a few days after birth, the vessel is supposed to close as part of the normal changes occurring in the baby's circulation.

## Temperature regulation

Difficulty maintaining a normal temperature because:-

- high-risk infant
- stress from an illness or immaturity, the infant's body is often exposed during such procedures as resuscitation & blood drawing.

**if the environment is too hot they must decrease metabolism** to cool their body.

If it is **too cold they must increase metabolism to warm body cells.**

If the infant should become **chilled this requires increased oxygen to raise the metabolic** rate without this oxygen available body cells become hypoxic.

## Complications temperature regulation

- **hypoxia** because of oxygen decrease available to body cells
- **Vasoconstriction** of blood vessels occurs if this process continue for too long, pulmonary vessels become affected and pulmonary perfusion is decreased.

**The infant's  $PO_2$  (Partial Pressure of Oxygen) level falls &  $PCO_2$  Partial Pressure of Carbon Dioxide increases.**

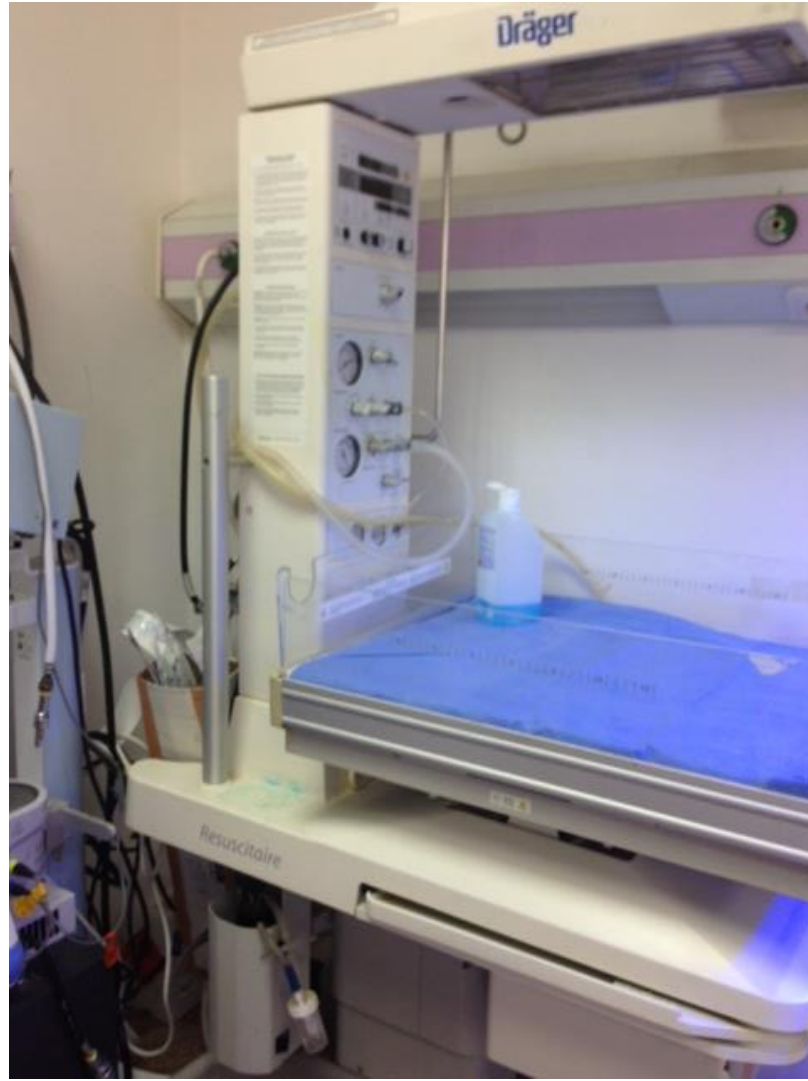
The decreased  $PO_2$  level may open fetal right-to-left shunts again Surfactant production may halt which may **further interfere with lung function.**

-**Acidosis** to supply glucose to maintain increased metabolism, the infant begins anaerobic glycolysis which pours acid into the blood stream.

-**Kernicterus** (invasion of brain with unconjugated bilirubin) as more bilirubin binding sites are lost and more bilirubin is free to pass out of the blood stream into brain cells.



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## Nursing care

- wipe the infant dry
- cover the head with a cap
- place the baby immediately under a pre warmed radiant warmer
- warmed isolate (square acrylic sided warmer)
- not placed directly on cool x-ray tables
- placing it in direct sunlight or near a warm radiator
- Kangaroo care, skin-to-skin contact to maintain body heat & encourages child interaction.











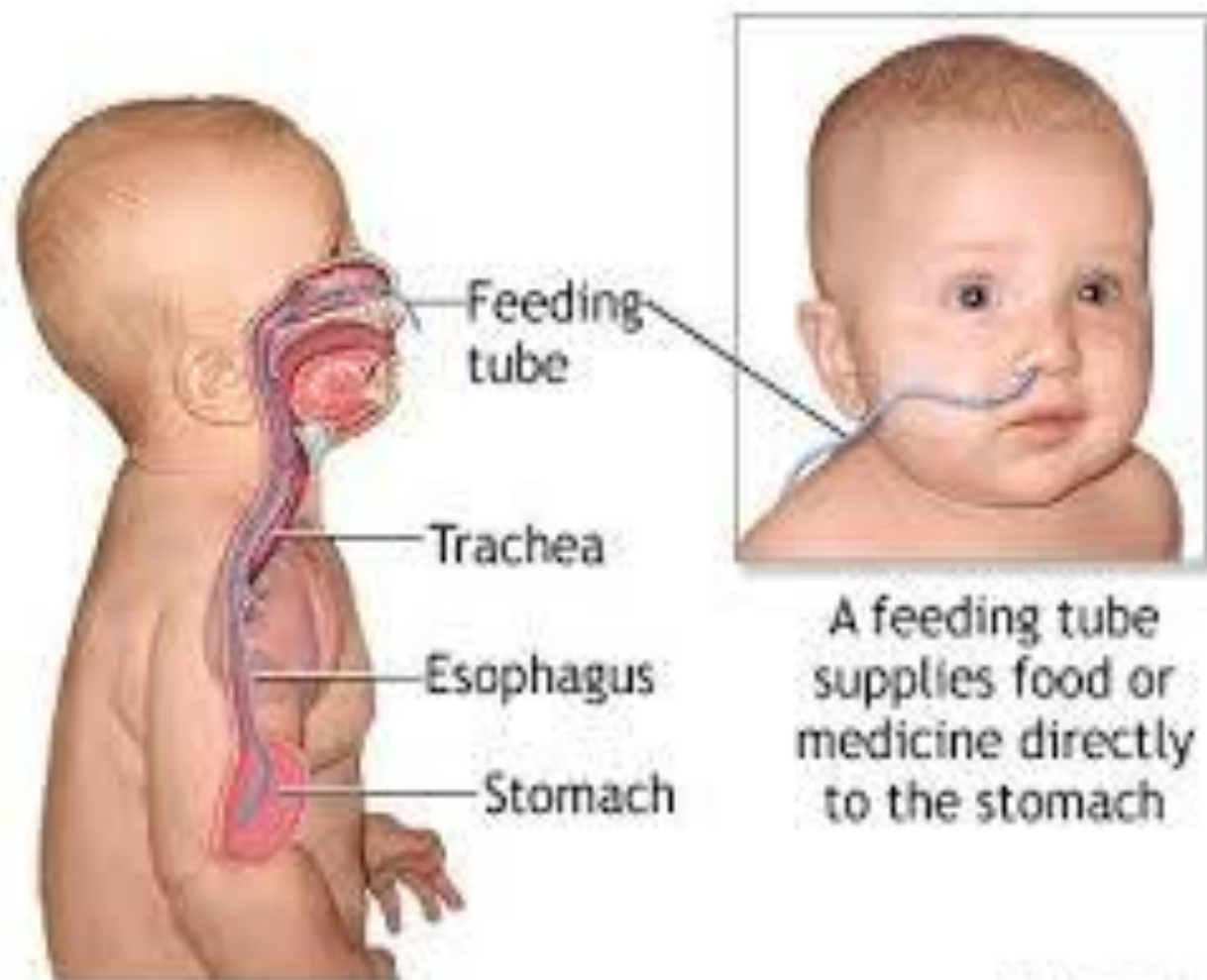


## ***Establishing adequate nutritional intake***

An infant who experienced severe asphyxia at birth usually receives:-

- gavage feeding** with expressed breast milk
- intravenous feeding**
- **gastrostomy**

preterm infants should be breastfeeding if possible



A feeding tube supplies food or medicine directly to the stomach

## **Preventing infection**

- contracting an infection would further complicate a high-risk newborn's ability to adjust to extrauterine life
- Infection increase metabolic oxygen demands which the newborn may not be able to meet
- Infection stresses the immature immune system & already stressed defense mechanism of the high-risk newborn
- Preterm rupture of the membranes or infection (e.g. pneumonia or skin lesion) that places the infant in a high risk category.

## **Infection may be:-**

### **\*Prenatal**

Viruses to affect infants in utero are:-

cytomegalo viruss, toxoplasmosis viruses infant may be born with congenital anomalies

**\*Perinatal infections** are these contracted from the vagina during birth are:-  
group B streptococcal septicemia, candid infection & herpes

**\*Postnatal infection** transmitted to newborn from health care personal

### **Nursing care**

All persons in contact with or caring for infants must observe **good hand washing technique.**

**Skin care to prevent skin break down & portal of entry.**

## **Establishing parent-infant bonding**

- parent should be **kept informed** of what is happening
- be able **visit** the special nursing unit to wash, gown,
- **hold & touch** the child. This helps to make child's birth more real to them. Only when both birth & death seem real can parents begin to work through their feeling & accept these events.
- The parents need to **spend time** with infant in the intensive care nursery as the infant improves it may be for months before the parents of infant who has been ill since birth can handle the baby comfortably & confidently.
- They need **to access** the health care personnel after discharge to help them in caring for their child at home.
- If the infant dies parents may **need to see** their newborn without equipment to reassure themselves that their newborn was a normal baby in every other way except lung function or whatever the infant's disorder. This may give them confidence to plan for other children or to continue their lives after such stressful experience.
- **Educate & referral** to home care agency as a following high-risk infant after discharged home.

# **Nursing management for daily neonatal care**



## 1- Initial feeding

-A term newborn who is to be **breastfed** may be fed immediately after birth.

- A baby who is to be **formula-fed** may receive a first feeding at about 2-4 hours of age both feeding do best on a demand schedule many need to be fed as often as every 2 hours for the first few days of life.

## 2- Bathing

▪ Newborns receive a complete bath to wash away vernix caseosa after **an hour after birth**. This procedure may **be limited** to washing only the baby's face, diaper area, and skin folds once a day.

▪ Wear gloves to avoid exposing your hands to body secretions.

**Baby of HIV- positive mothers should be bathed immediately to decrease the possibility of HIV transmission.**

▪ It may be done by nurse at mother's bedside or by one of the parents.

▪ Bathing should be take place before not after a feeding to prevent spitting up or vomiting & possible aspiration.

▪ Clean most soiled area of the body that is from the eyes and face to the trunk & extremities & last to the diaper area.

▪ Don't apply powder or lotion to newborns because some infants are allergic to these procedures. If infant's skin is dry a lubricant such as Nivea oil add to the bath water or apply directly to baby's skin.

### **3- Sleeping position**

The newborn should be positioned either on the side or back for sleeping.

### **4- Diaper area care**

- Washed area with each change of diapers with clear water & dried well to prevent the ammonia in urine from irritating the infant's skin & causing a diaper rash.
- After cleaning a mild ointment such as petroleum jelly may be applied to the buttocks to keep ammonia away from skin and also facilitates the removal of meconium which sticky & tarry.
- For diaper area care wear gloves as a part of standard precaution.

### **5- Metabolic screening tests**

Infant must be screened for phenylketonuria (PKU; A disease of defective protein metabolism) a simple blood test requiring 3 drops of blood from the heel dropped onto a special piece of filter paper baby should have received formula or breast milk for 24 hrs. Before taking the blood sample.

## **6- Hepatitis B vaccination**

Vaccination against hepatitis B within 12 hrs. after birth a second dose is administered at 1 month & a third at 6 months.

## **7- Vitamin K administration**

❖ Newborn are at risk for bleeding disorders during the 1<sup>st</sup> week of life because their **gastrointestinal tract is sterile at birth and unable to produce vitamin K necessary for blood coagulation.**

❖ Vitamin K stimulates the liver to produce factors II, VII, IX and X.

❖ A **single dose of 0.5 to 1 mg of vitamin K** is administered **I.M within the 1<sup>st</sup> hour of life** to prevent this. It is important to remember that infants born outside a hospital also should receive this important protection.

## **8- Parent need to feel confident with newborn care they need to hold & give care to newborn in the hospital.**

Encourage them to spend as much as possible with the newborn & to allow parents to have maximum contact with their new baby.

## 9- Circumcision

- ❑ **Circumcision is the surgical removal of the penis foreskin the foreskin in only a few males**, is so constricted that it obstructs the urinary medical opening; otherwise there is no valid medical indication for circumcision.
- ❑ The procedure should **not be done immediately** after birth because the infant's vitamin K level which would prevent hemorrhage.
- ❑ It is best performed during the 1<sup>st</sup> or 2<sup>nd</sup> day of life after the baby has synthesized enough vit. K to reduce the chances of faulty blood coagulation.
- ❑ Infant must be observed closely for bleeding every 15 minutes for the 1<sup>st</sup> hour and for voiding.
- ❑ Wrapped the penis with a strip of petroleum gauze to keep the diaper from adhering & also to ensure blood coagulation.  
If the petroleum gauze become soiled it can be removed & the penis covered with petroleum ointment for about 3 days until healing is complete.
- ❑ Check if any redness or tenderness or if baby cries as if constant pain.
- ❑ Circumcision sites appear red but should never have a strong odor or discharge.
- ❑ A film of yellowish mucus after covers the glands by the 2<sup>nd</sup> day after surgery. This should not be washed away a yellow color is from accumulated serum.