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University of Gondar

Pediatrics Nursing
For BSc in Generic pediatrics nursing

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Pediatric nursing course syllabus

- **Program**: BSc in Surgical Nursing(generic)
- **Module Name: Clinical Nursing II**
- **Module Code: Nurs- M2113**
- **Module ECTS: 22**
- **Module Duration: 16 Weeks**
- **Course instructors**: Selam F. Kendalem A.

Course description:

- This course is designed to enable pediatrics Nursing students to be familiar with child health care, manage and prevent common child hood illness, including infectious disease and nutritional disorders.

Course Objectives:

- At the end of the course, the students will be able to *assess to nutritional status of children*, *manage common childhood problems* and *provide care* for the sick and healthy child.

Contents

- Introduction to pediatric nursing
- Child growth and development
- Care of Newborn
- Management of common childhood disease
- Introduction to IMNCI
- Management of systemic child hood disorders
- Expanded program of immunization
- Management of handicapped children
- HIV associated TB in children
- Nutrition in HIV children
- Palliative care

Teaching methods

- Interactive lecture
- Group discussion
- Case study
- Video show
- Reading Assignment

Teaching aids

- Lecture note and books
- National Pediatrics HIV/AIDS guidelines
- IMNCI chart booklets
- Audio visual
- Hand out
- ***Assessments*** **-** Continuous assessment =50%

  - Final exam=50%

Objectives

At the end of this session the students will be able to:

√ Define pediatric nursing

√ Describe the modern concepts of pediatric nursing care

√ Explain the basics of pediatric health assessment

√ Differentiate normal and abnormal V/S values

√ Identify common pediatric nursing procedures

Unit I: Introduction

- What is nursing?
- What is paediatrics nursing?
- Why paediatrics is given as a subject it self?

Definition of nursing

ANA

- "responses to actual or potential health problems"

WHO

- Nursing encompasses autonomous and collaborative care of individuals of all ages, families, groups and communities, sick or well and in all settings.
- It includes the promotion of health, the prevention of illness, and the care of ill, disabled and dying people.

Pediatrics

- Pediatric nursing - Paediatrics comes from the Greek words
- '**paedia**' ⟹ child,
- '**iatrike**' ⟹ treatment
- **ics** ⟹ branch of science
- Pediatrics means the science of child care and scientific treatment of childhood disease.
- Pediatrics is synonymous with child health.

Pediatrics nursing

- Pediatric nursing is specialty of nursing concerning the care of children during wellness and illness.
- It encompasses neonates, infants, toddlers, children, and their families to promote health throughout development and growth.
- It is the art and science of giving nursing care to children from birth through adolescent with emphasis on the physical growth, mental, emotional and psycho-social development

- Pediatric nursing covers routine immunizations and check-up appointments, as well as any illnesses or minor injuries that occur.
- It involves in giving assistance, care and support to the growing and developing to achieve their individual potential for functioning with **fullest capacity**.

Goals of pediatrics nursing care

- To provide skillful, intelligent, need based & comprehensive care for children
- To interpret the basic needs of children to their parents and families to guide them in child care.
- To promote growth and development
- To prevent disease and alleviate suffering

Quality of pediatrics nurses

- Love for children
- Patient
- Good interpersonal relationship
- Friendly and diligent
- Skill, scientific knowledge and experience.

Principle of pediatrics nursing

- Family centered care
- Prevent or minimize child separation from family
- Prevent or minimize bodily injury and pain

Hospital environment for the sick child

❖Pediatric unit consists of the following facilities.

- Few beds in a room
- Sinks & latrine should be child & adult size.
- Playroom and recreation facilities should be provided.
- Children should be placed in the ward according to their age and their disease.

Hospital environment for the sick child

- Small & critically ill children have placed very near to the nurse stations.
- Pediatric unit constructed easily seen of all children at the same time by nurse.
- It has consists of different bright Color painted walls.

Why pediatrics ... ?

1. The health problems of children differ from those adults in many ways
2. Children's response to an illness is influenced by age
3. Managements of childhood illness are significantly different from an adult
4. Children need special care since they are among the most vulnerable groups

Modern concepts of child care

- Previously the emphasis was on the care of the *ill child* as an individual
- Current emphasis:

√ Prevention of illnesses and accidents

√ Holistic nursing care

√ Interdisciplinary approach

NURSING FUNCTIONS

- I. Promoting Health and Wellness ii Preventing Illness

  - engage in attitudes & behaviors that enhance the quality of life , eg HW, EXE, H.nutrition…
- Curative activities - Pain/suffering alleviation &
- Restoring Health – helping client during recovery periods

Standards of Clinical Nursing Practice: ANA

- **Assessment**: the nurse collects patient health data.
- **Diagnosis**: the nurse analyzes the assessment data in determining diagnoses.
- **Planning**: the nurse develops a plan of care that prescribes interventions to attain expected outcomes.
- **Implementation**: the nurse implements the interventions identified in the plan of care.
- **Evaluation**: the nurse evaluates the patients progress toward attainment of outcomes.

Overview of Pediatric Health Assessment

Contents of Pediatric History

1. Personal details
2. C/C
3. HPI
4. Past medical History

...pediatric history

5. Family history
6. Immunization history
7. Nutritional history
8. Developmental history
9. Review of systems

Case study for group work

- A 7 months child with fever
- Comes from rural area
- Lives in a single room
- Currently stops feeding per mouth

Discussion questions

- Is this history complete?
- If you say no, suggest any point that you think important

N.B.

- 5 students per group
- 5 minutes for discussion
- A total of 5 minutes for reflections.

Pediatric Physical Examination

- The aim is the same as adults but the approach is different
- Both the techniques and interpretations vary according to the age of the patient
- **Be *opportunistic* in examining a child!**
- Gather much data from observation
- Order exam – from least distressing to most distersing
- Be honest – don't lie you lose credibility
- Understand the developmental stage eg. Stranger anxiety

V/S: PR, BP, & RR (Normal values)

Age	Heart rate, Beats/min	BP, mmHg	Respiratory rate, breath/minute
Premature	120-170	55-75/35-45	40-70
0-3 months	100-150	65-85/45-55	35-55
3-6 months	90-120	70-90/50-65	30-45
6-12 months	80-120	80-100/55-65	25-40
1-3 years	70-110	90-105/55-70	20-30
3-6 years	65-110	95-110/60-75	20-25
6-12 years	60-95	100-120/60-75	14-22

V/S: Temperature

- Normal body temperature: 36.5°C to 37.5°C (97.7-99.5°F)
- Hyperthermia: >37.5°C
- Hypothermia: <36.5°C

√ Mild hypothermia: 36-36.4°C

√ Moderate hypothermia: 32-35.9°C

√ Severe hypothermia: <32°C


GROWTH AND DEVELOPMENT

Objectives

- Define growth and development
- Principles of growth and development
- Mention types of growth and development
- Identify the stages of development based on age
- Growth monitoring

Growth and Development

Growth

- Growth refers to an increase in physical size of the whole body or any of its parts.
- It is simply a quantitative change in the child's body.
- It can be measured in Kg, pounds, meters, inches, ….. Etc

Development

- Development refers to a progressive increase in skill and capacity of function.
- It is a qualitative change in the child's functioning.
- It can be measured through observation.

Developmental Assessment

- Gross motor development
    - Gross muscular activity and neuro-development including posture, independent mobility and progress from head control to running
- Fine motor development (Manipulation)
    - The ability to reach for, grasp and manipulate objects
- Cognition and Social skill
    - Social smile, watching a mirror, waving goodbye, general alertness and curiosity about the surrounding
- Language

STAGES OF GROWTH AND DEVELOPMENT

I. PRENATAL
II. INFANCY
III. EARLY CHILDHOOD
IV. MIDDLE CHILDHOOD
V. LATE CHILDHOOD

Growth Spurt

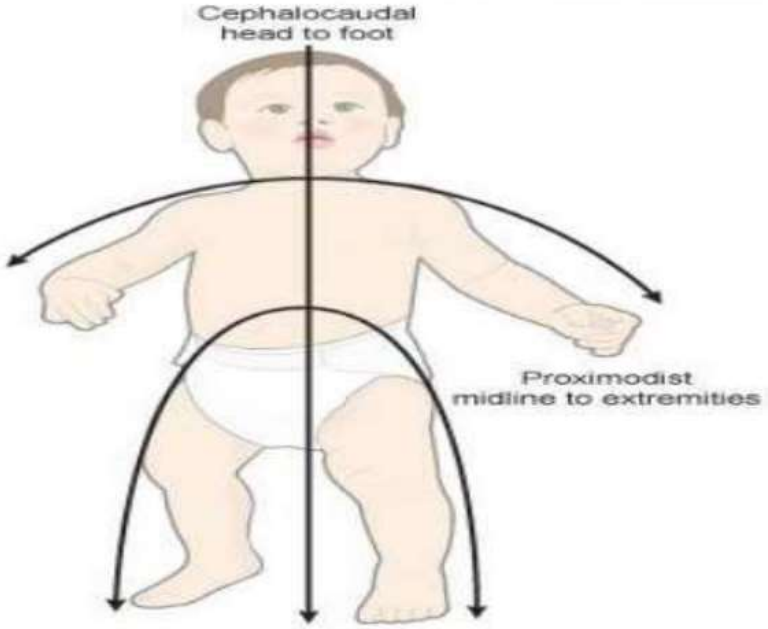
- Growth does not take place uniformly at all times
- There seems to be periods when a sudden acceleration of it occurs
- The timings of the growth spurts differ in boys and girls.
- Acceleration of growth (growth spurts):
  - First year
  - Adolescence

Developmental principles

- It is a continuous process
- Development is sequential(one skill can not be developed until the previous is achieved)
- Unique individual rates of growth and development but the sequence is same
- Depends on maturation and learning

Developmental Principles

- Development proceeds cephalo-caudal and proxy modal fashion



Developmental Principles

- Proceeds from general to specific
- Proceeds from simple to more complex

Factors affecting growth and development

1. **Hereditary/Genetic factors**

- The maximum possible growth and development potential is genetically determined

2. **Environmental factors**

- For full realization of genetic potential, a favourable environment is of paramount importance

Factors affecting growth and development

1. Intrauterine or prenatal factors

- Maternal nutrition
- Infections and Other illnesses during pregnancy
- Drugs & Radiation

2. Birth and natal factors

- Brain injury (physical or anoxia), for example

3. Postnatal factors

a. Adequate nutrition
b. Education and learning opportunity
c. Social and psychological or emotional factors

DEVELOPMENTAL MILESTONES

0-2 months

1. Physical growth
   - Average birth weight = 3.4kg
   - Average length = 50cm , (46-54cm)
   - Average head circumference= 35cm(32-37cm)
   - Weight may initially decrease 10% below birth weight in the 1st wk
   - Wt gain during 1st month is 30gm/d
   - This is the period of fastest postnatal growth

0-2 months

2. Neurodevelopment

Gross motor

- When held in sitting position- back bends
- Prone - momentarily holds chin off couch
- Pull to sit- almost complete head lag
- Ventral suspension- head and hip are flexed & limb hangs downward

Figure 2.1: - Prone. Head turned to side.

Figure 2.3: - Pulled to sit. Gross head lag.

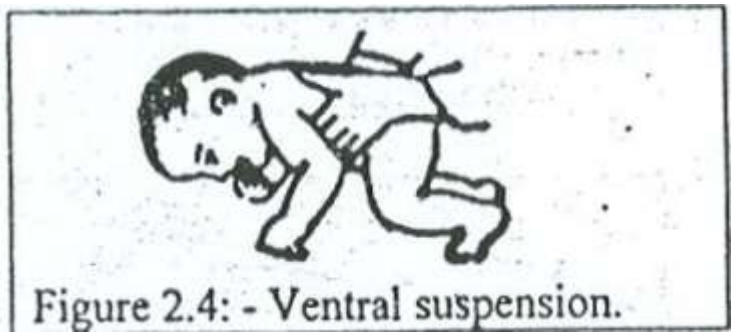


Figure 2.4: - Ventral suspension.

0-2 months

3. Language & social

- Hearing is well developed & prefers **high pitched** sound
- Near sighted with focal length of **20 - 30cm**
- Spontaneous smile

Infancy

1. Physical growth
   - Weight - Birth weight doubles by 5th mn and triples by11-12mn
   - Length - 75 cm at 12mn
   - Head circumference = increase by 12cm in 1st yr
     - increase by 2cm/mn in 1st 3mn
     - increase by 1cm/mn 3-6mn
     - increase by o.5cm/mn 6-12mn
2. Dentition - starts at age 5-6mn
   - then erupts 4 teeth every 4 month till 20 milk teeth

Infancy

3. Motor development

Gross motor

- At 2 months
  - ***Hold head erects*** in mid-position
- At 3 months
  - Prone- *lift head & chest off the table*
  - Hold object put in hand
- 4 months
  - ***Sit with adequate support***
  - ***Roll over*** from front to back
  - Hold head erect and steady while in sitting position
  - Bring hands together in midline and ***plays with fingers***
  - ***Grasp*** objects with both hands

Infancy

- 5 months
  - ***Sit with slight suppor***t
  - Pull feet up to mouth when supine
  - Hold one object while looking at another
- At 6 months
  - ***Sit alone briefly***
  - Turn completely over(abdomen to abdomen)
  - ***Lift chest and upper abdomen*** when prone

Infancy

- 7-8 months
  - Imitate simple acts of others
  - ***Drink*** from cup with assistance
  - ***Eat finger food*** that can be held in one hand
- 9 months
  - *Crawl* (i.e., pull body while in prone position)
  - Hold one bottle with *good hand-mouth coordination*
- 10 months
  - *Creep well* (use hands and legs)
  - *Walk but with help*

Infancy

- 11 months
  - *Walk holding on furniture*
- 12months
  - *Sit down* from standing position alone
  - *Walk in few steps with help or alone*

Fine motor

- **0-4mn –**move arms, bring hands to mouth
- **4-8 mn** –roll over to explore & get object,

-transfers object from one hand to the other

- **8-12 mn** –grasp and put objects in mouth

- Drop & pick up toys
- Wave/bye

Infancy

4. Language

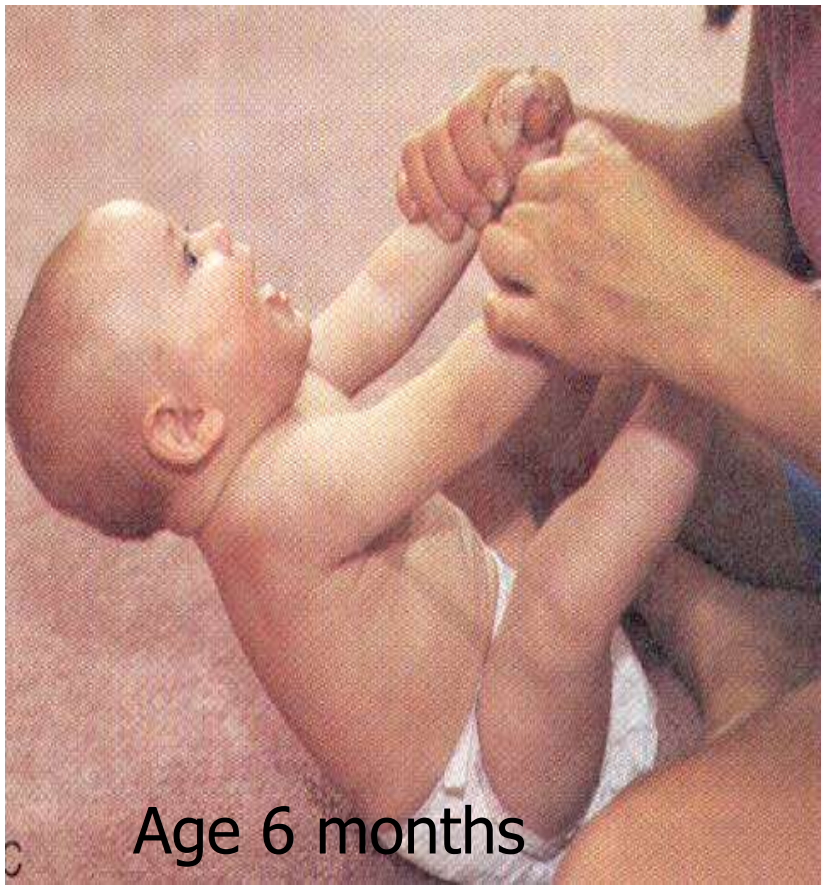
- 0-3 mn: crying, make soft exaggerated vowel sounds
- 3-4mn- start to make consonant sounds.
- 4-5mn- begin to put vowel and consonant sounds together
- 8-9 months: mama/dada *as sounds*
- 10-12 months: "*mama/dada specific*

5. Social development

- Learns that *crying brings attention*
- *Smiles* in response to smile of others
- ***7mn*** shows fear of stranger (*stranger anxiety).*
- *Responds* socially to his name

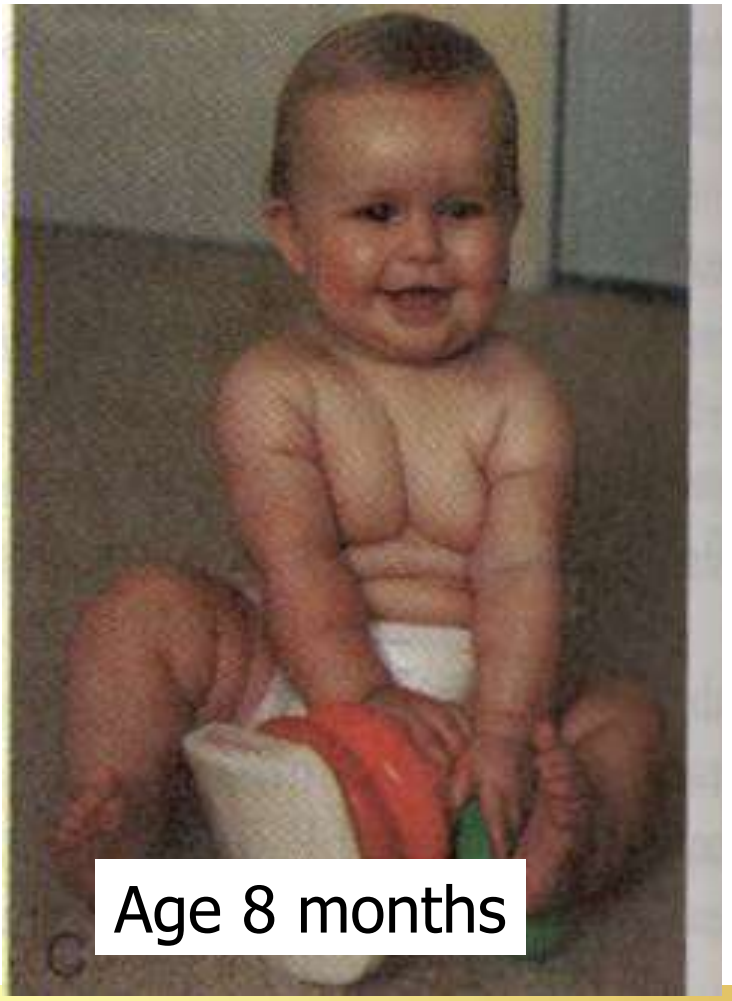
Head Control

Newborn

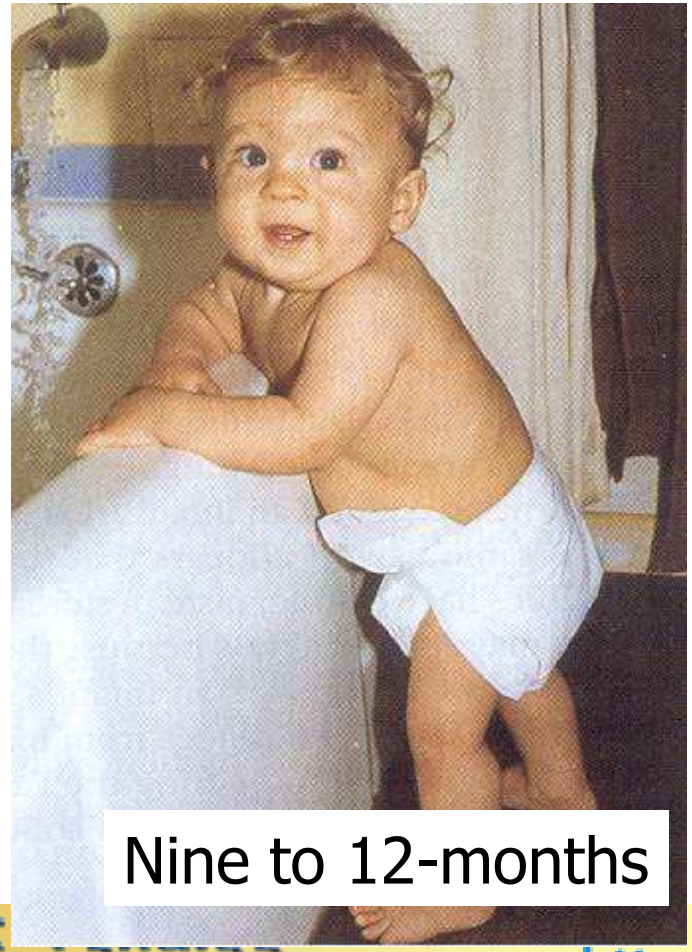


Age 6 months

Sitting Up



Ambulation



Nine to 12-months

13 month old

Fine Motor Development in infancy

Growth Monitoring

Growth monitoring

- Growth monitoring is regular check up the growth of the baby

What is the importance of growth monitoring

- It tells the *nutritional status* of children in a given community
- If it is done right time malnutrition can be *identified before* it affects the brain.

Methods

A. Anthropometry- practical use

B. Tissue growth assessment (SFT)

C. Dental Development

D. Skeletal assessment

What needs to be monitored at community level

- First 2 years
  - ✓ Length/age
  - ✓ Weight/age
  - ✓ Weight /height
  - ✓ Head circumference/age
- 2 –10 years
  - ❖ Height/age
  - ❖ Weight/age
  - ❖ BMI/age
- >10 years
  - ➢ Above in relation to pubertal development

Steps of Growth Monitoring

Step 1: Obtaining accurate measurements

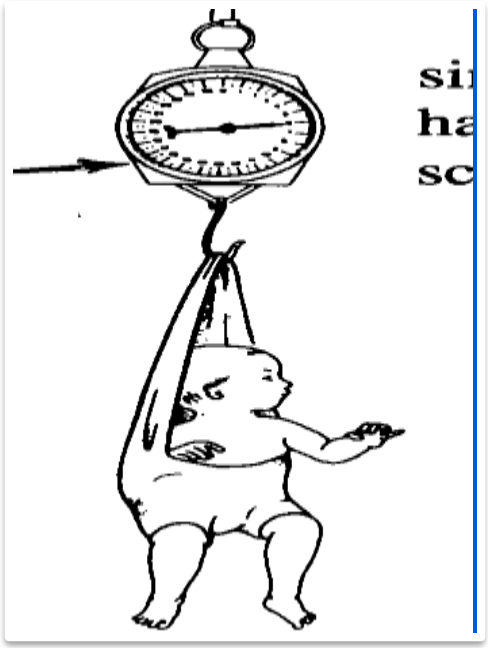
- Begins with measuring and charting weight, length and head circumference

Step 2: Using Growth Charts

Step 3: Interpreting the Finding

1. Weight

- To enhance accuracy of measurements:
  - ✓ Use same scale at each visit
  - ✓ Scale should be zeroed daily and calibrated weekly
  - ✓ Infant scales should be used for children < 20kg



Simple hanging scale

Weighing Infants

- Remove all clothing
- But you can weigh infant wearing a dry diaper
- Weigh infants supine

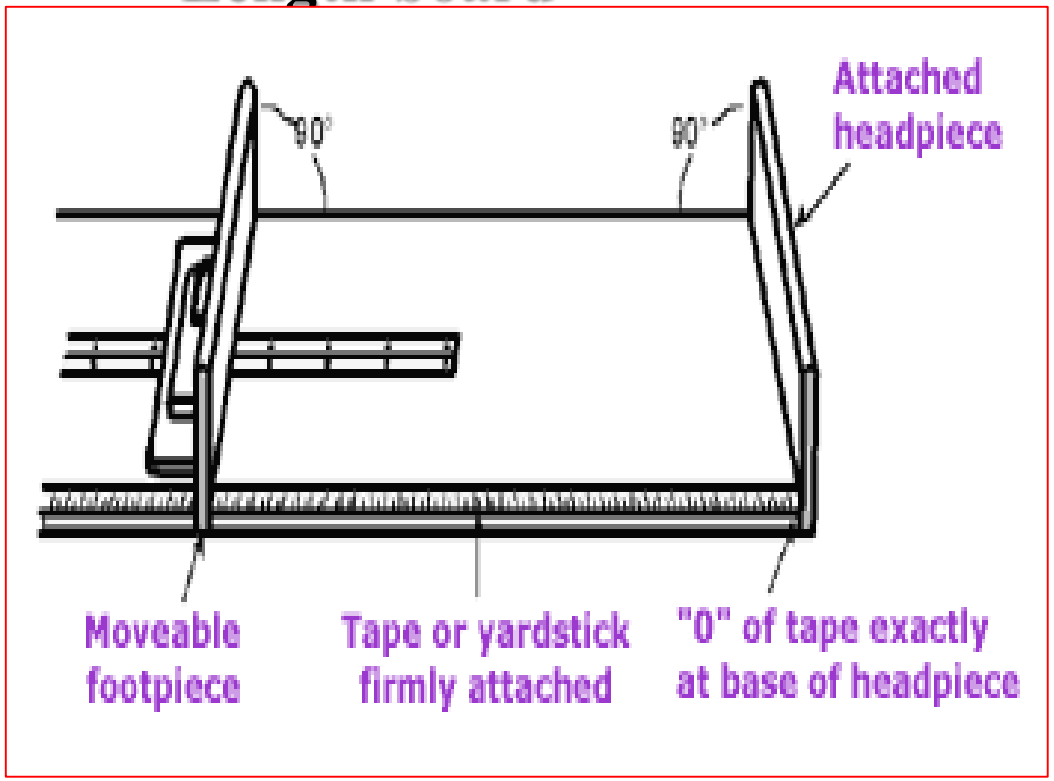
Weighing Infants

Weighing Older Children

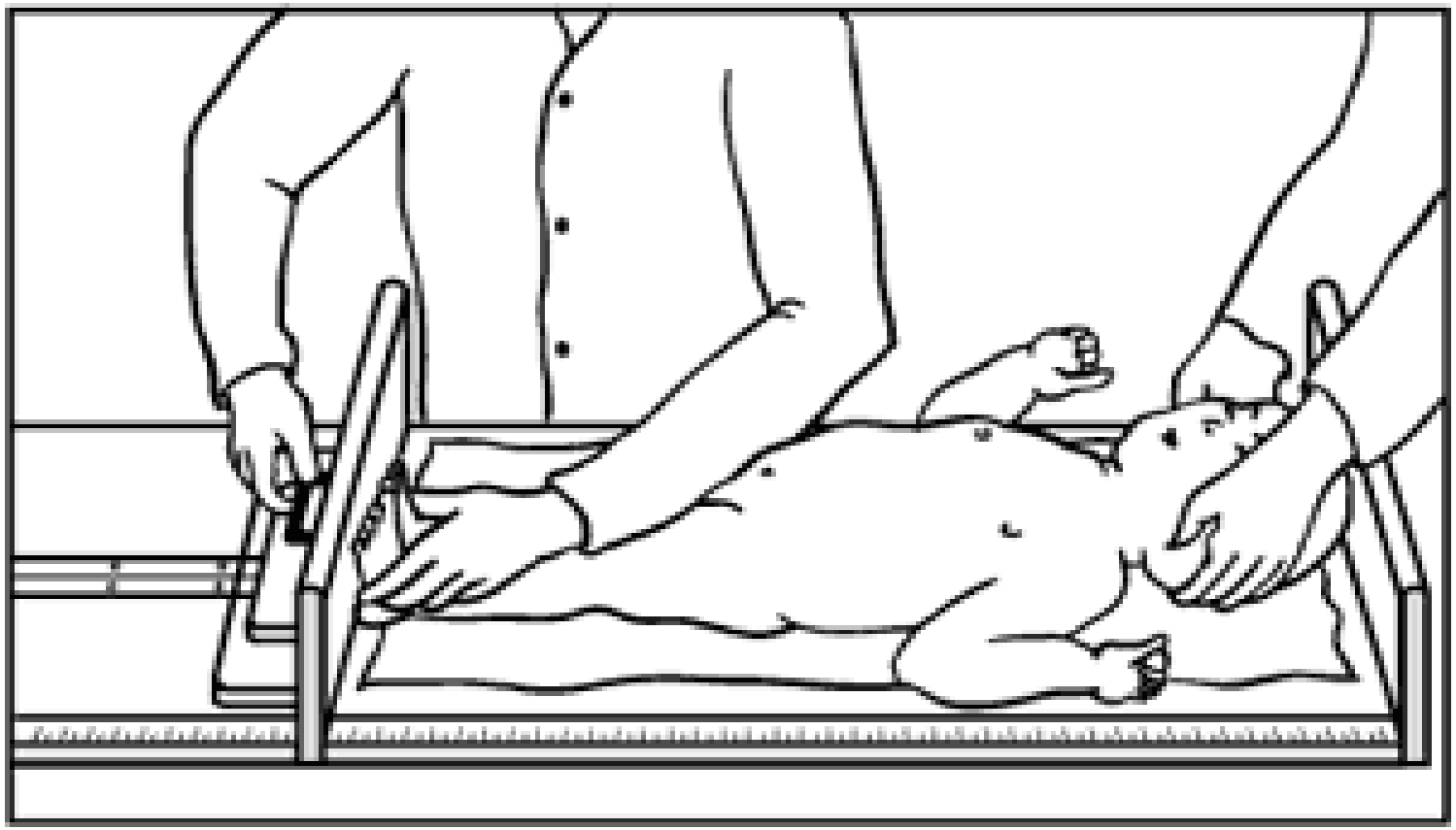
2. Length /Height

- ❑ >2 years : (standing) height
- ❑ <2 years: (recumbent) length
  - ❖ Measure length of children 0-2 years supine
  - ❖ Straighten knees and keep ankles in neutral
  - ❖ Record measurement to the nearest 0.5cm

- **Length board**



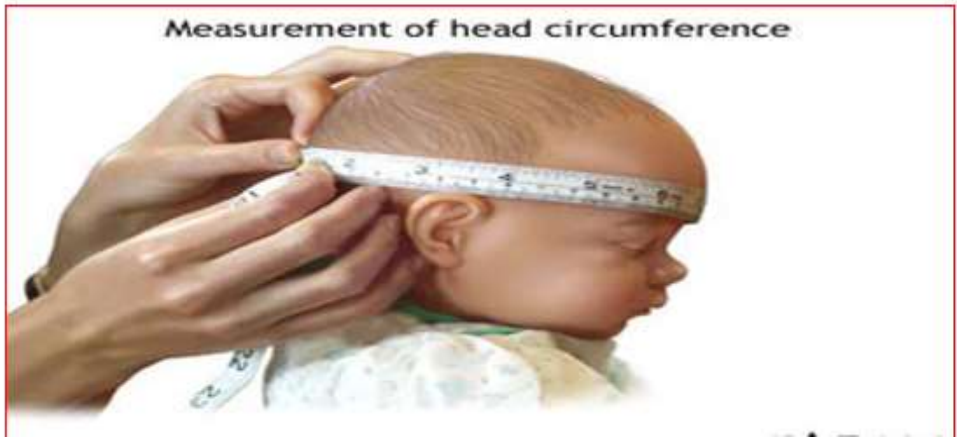
How to measure length …cont'd



3. Head circumference

- Measured using non stretchable tape.
- The tape should pass on the supra orbital ridges and on the ***occipital prominence***

Age	Birth	3m	6m	1yr	2yr	3yr	4yr	5yr
OFC	34	40	43	46	48	49	50	51(cm)



4. Head - chest circumference Ratio

- CC is measured at the level just below the nipples.
- At birth head circumference is larger than chest circumference by about 2.5cm
- At 9 to 12 months, both are equal.
- At 1st year, chest circumference tends to be larger by 2.5cm.
- At the age of 5years, it is more 5cm greater in size than the head circumference.

5. Mid-upper arm circumference (MUAC)

- Use full way to assess a child present nutritional status
- It also used to rapidly screening of all children in the community to sever malnutrition
- Measures mainly the lean body mass
- The candidates are from one year to five years old.
- MUAC below 11.5cm is an indicator of severe malnutrition in children 6-59 months of ages

MUAC…cont'd

RANGES

- Greater than 13.5 cm (**green**)--- Normal
- 12.5-13.5 cm (**yellow**)--- mild malnutrition
- 12.5 -11.5 cm **(Orange)**---moderate malnutrition
- less than 11.5 cm (**red**) ---Sever malnutrition

➔Using shakers tape with color indicators

6. Body mass index (BMI)

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

- Detects whether the weight of the individual is proportional to the height or not.
- BMI remains constant up to the age of 5 years
- For adults and adolescents

BMI…cont'd

RANGES

BMI :

- Greater than 30 obese
- 26-30 --over weight
- 18.5-25--normal weight
- 17-18.4 --mild PEM
- 16-16.9 --moderate PEM
- Less than 15-- severe PEM

Step 2:
Growth Charts

Growth Monitoring…cont'd

Growth chart

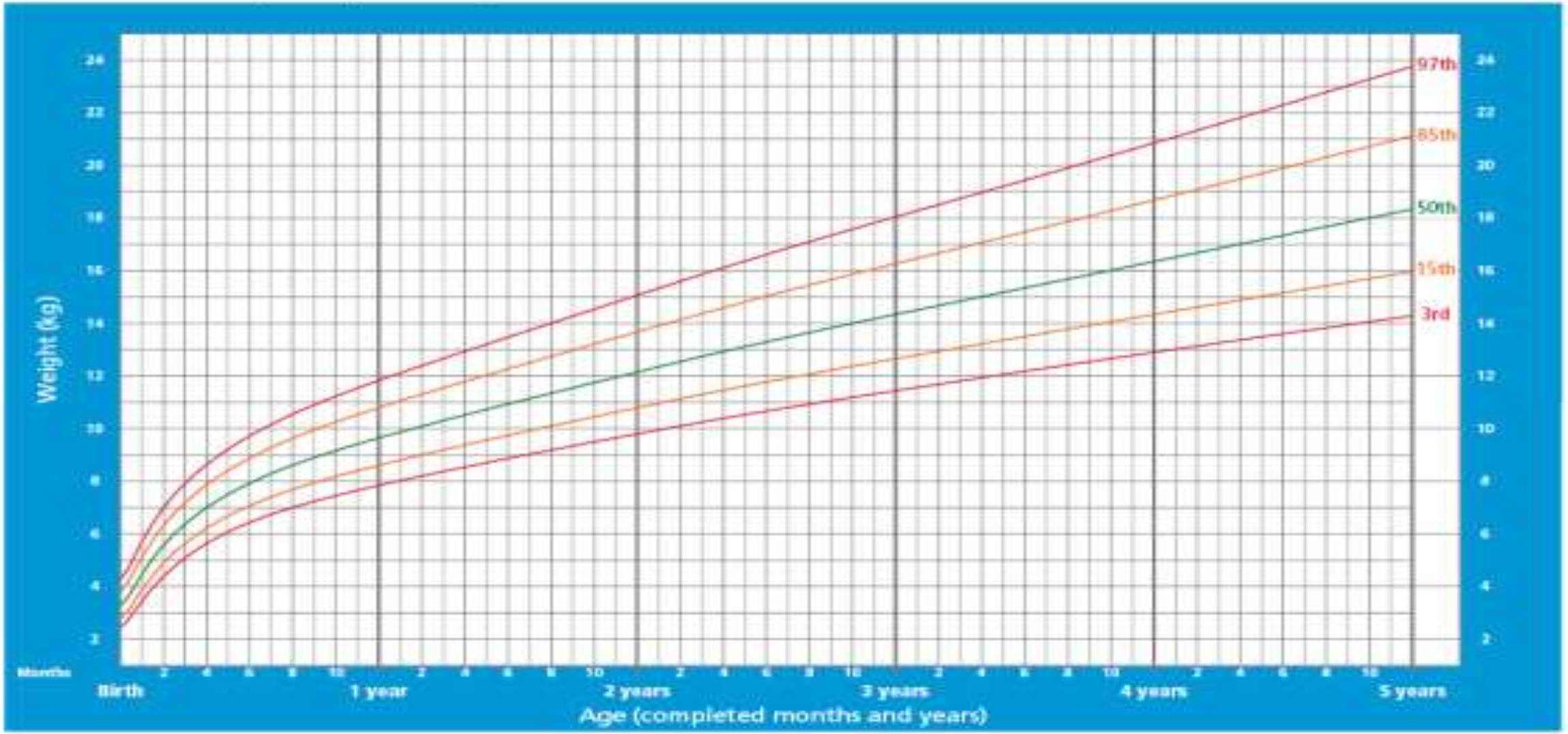
- Is a very important record, used to indicate the child illness and progress and has notes about nutrition.
- Growth chart offers a simple and inexpensive way of monitoring
- *Height and weight* should be plotted for all children, *head circumference* should be monitored for all children under 2 years of age.

❖ Any deviation from "normal" detected by comparison with **reference curves.**

Weight-for-age BOYS

Birth to 5 years (percentiles)

World Health Organization



WHO Child Growth Standards

Why Use Growth Curves? / Important of growth chart

- Easy and systematic way to follow changes in growth over time for an individual child
- Tells direction of growth
- Reveal significant change in growth pattern
- Help early detection of growth failure

NB. Height, weight and head circumference should be plotted at regular intervals

- Monthly till 6 months of age
- Quarterly till 18 months of age

Step3- Interpretation growth chart

- Anthropometric indices including:
- Weight –for-age –under wt (acute and chronic)
- Weight-for-height/L-wasting (acute)
- Height- for-age -stunting(chronic)
- BMI -wasting (acute)
- MUAC -wasting (acute)

Interpretation of the finding on growth chart…cont'd

Growth faltering

- Is *slower rate of growth* in childhood than the expected for age.
- If child weight is not increasing or increase more slowly than standard curve for more than **one month** in a baby less than 4 or **2 months** in older children, then the child has growth faltering
- Common in the first 2 years of life & may be the first sign of *inadequate feeding*
- The child may be *less active* than other of the same age
- Sometimes growth faltering is due to illness and when a child is ill weight may be decrease

Interpretation of the finding on growth chart…cont'd

Loss of weight

- ❖ If the child growth falling, the child may be ill with an infection,

  Ex. Tuberculosis or AIDS
- ❑ Acute malnutrition is the most likely cause for weight loss
- ❑ If there is no other complication, the child can manage in the community but if the child has any serious illness or danger sign he/ she has to be referred
- ❑ Close follow up is needed to ensure that the weight gain is achieved within two weeks

Interpretation of the finding on growth chart…cont'd

Rapid rise in the growth curve

- If a child has been ill or undernourished, a rapid raise is expected during the *re-feeding period*, that is experienced as *catch- up growth*
- A sharp increase may indicate *inappropriate feeding* practice that can lead to ***overweight***
- If a child has gained weight rapidly, it also important to ***look height***
- If only the **weight is increase**, this is a problem
- but if height is increase proportionally, it can be ***catch up growth*** from previous under nutrition and in this situation ***both the weight-for- age &height-for-age curve should be raised***

Intervention after growth monitoring

- ♣ Health education about nutrition
- ♣ Demonstration of mothers about nutrition
- ♣ Manage and treat health problem of child
- ♣ Refer all cases of sever malnutrition

Interpretation	child is growing well	Not gaining wt Find out why?	Losing wt Need care
Intervention	Compliment the mother	Instruct the mother Support her	Care full counseling Refer & admit

FEEDING RECOMMENDATIONS DURING SICKNESS AND HEALTH

Up to 6 Months of Age

- Breastfeed as often as the child wants, day and night, at least 8 times in 24 hours.
- Do not give other foods or fluids.

6 Months up to 12 Months

- Breastfeed as often as the child wants.
- Give adequate servings of:

  _____
  _____
  _____
  _____ ,

  - 3 times per day if breastfed plus snacks
  - 5 times per day if not breastfed.

12 Months up to 2 Years

- Breastfeed as often as the child wants.
- Give adequate servings of:

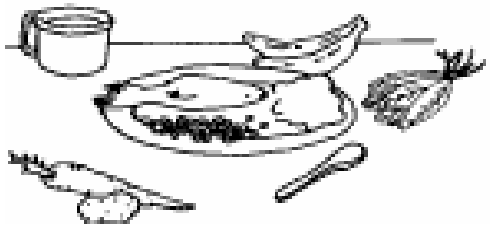
  _____
  _____
  _____ ,
  _____

  or family foods 3 or 4 times per day plus snacks.

2 Years and Older

- Give family foods at 3 meals each day. Also, twice daily, give nutritious food between meals, such as:

  _____
  _____
  _____
  _____
  _____



What age is each infant?

A- sits without support

B- just started walking

C- crawling

D- can lift chest off the table


QUESTION???

Reading Assignment

- Read and take short note about common pediatric nursing procedures by considering the following points when appropriate.

√ Indications, Contraindications, Steps with its rationale, Differences from the adult

Thank you so much!

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New Born Care

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Learning objectives

- **At the end of this unit, student will be able to:**
  - Define newborn
  - Discuss immediate care of newborn
  - Describe steps of neonatal resuscitation
  - Explain types of neonatal reflexes
  - Discuss management of babies with low birth weight
  - Discuss management of common neonatal disorders
  - Describe organization of neonatal unit

Definition

- In medical contexts, newborn or **neonate** (from Latin, neonatus, newborn) refers to an infant in the first 28 days after birth.
- **Classification**

1) **Gestational age**

A. Preterm – born before 37 complete weeks

B. Term baby – 37 -42 weeks

C. Post term – After 42 weeks

2) **Birth weight**

A. Extremely low birth weight infant (less than 1 kg)

B. VLBW <1.5kg

C. Low birth wt < 2.5 k.g (pre term or small for gestational age)

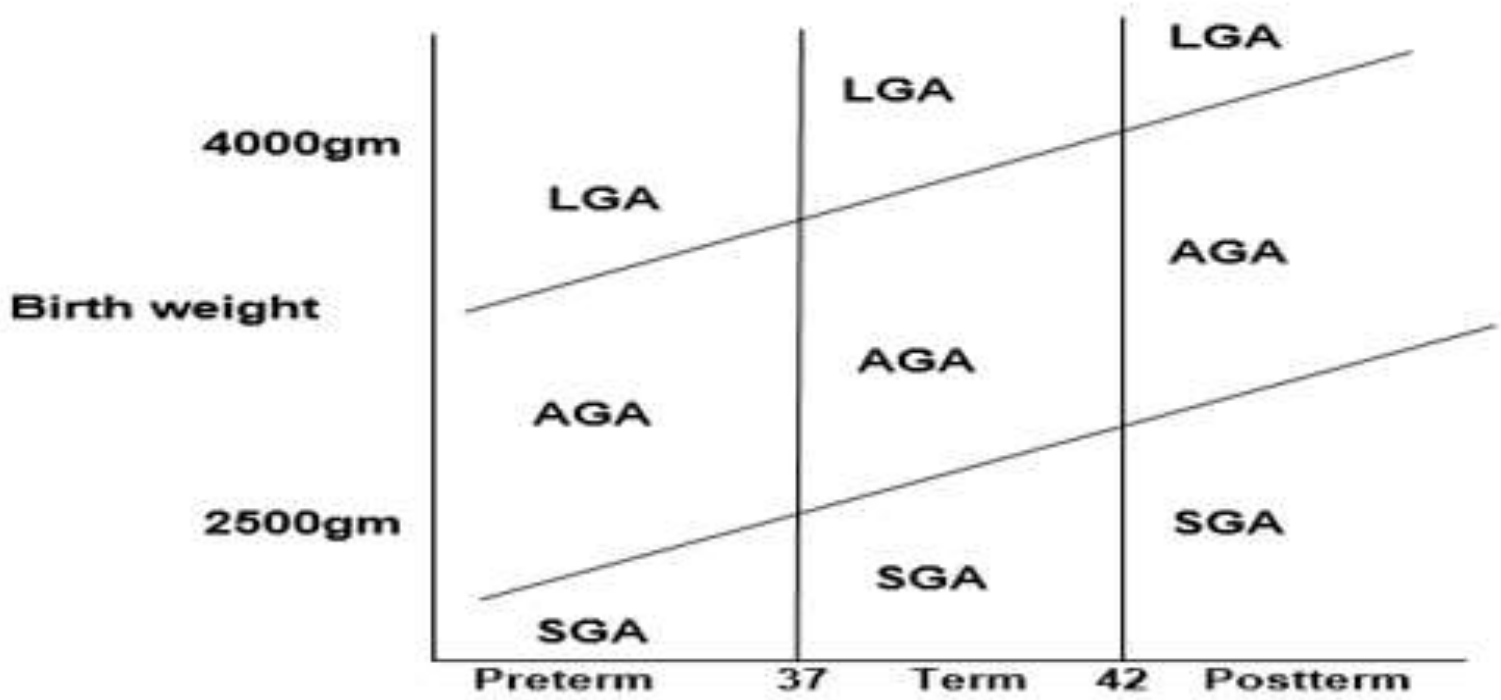
Classification of new born

3) **Weight Percentiles**

A. SGA

B. AGA

C. LGA



Assessment of new born

- Most neonate problem identified and managed based on:
  - ✓Accurate history
  - ✓Physical examination

1. Accurate history

- From the history, investigate about
  - ✓Prenatal hx – ANC follow up, illness & infection, exposure to smoking & alcohol
  - ✓Delivery hx – mode of delivery, duration of labor, home/hospital
  - ✓Postnatal hx - Apgar score and any resuscitation needed, BF, Urine and meconium passed, Any clinical problems, e.g. hypothermia, respiratory distress, hypoglycaemia.

2. Physical assessment

- Done in a warm, well lighted area and maintain body tempe.
- Assessment can performed systematically (from the head- to toe)

1) **Measurements:**
2) **General inspection:**
3) **Regional examination:**

Measurements	Normal	Abnormal
Birth weight	2500 g to 4000 g. Between 10th and 90th centile for gestational age.	Low birth weight (below 2500 g). Underweight (below 10th centile) or overweight (above 90th centile) for gestational age.
Head circumference	Between 10th and 90th centile for gestational age.	Small head (below 10th centile) or large head (above 90th centile for gestational age).
Gestational age	Physical and neurological features of term infants (37–42 weeks).	Immature features in preterm infant (below 37 weeks). Postterm infants (42 weeks and above) have long nails.

2. Physical assessment

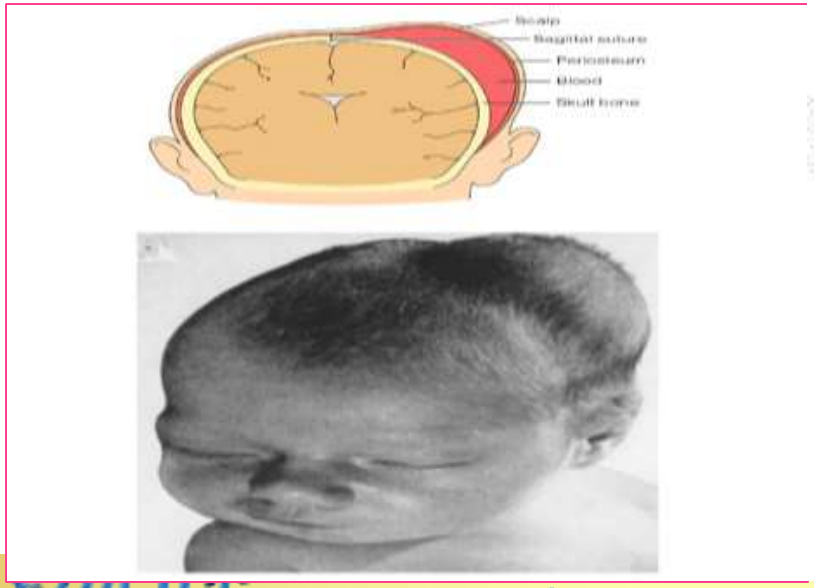
A. Temperature : temper. Will drop with in 10 min. as a result of exposure to cold (room air) and stabilizes 8-12 hrs

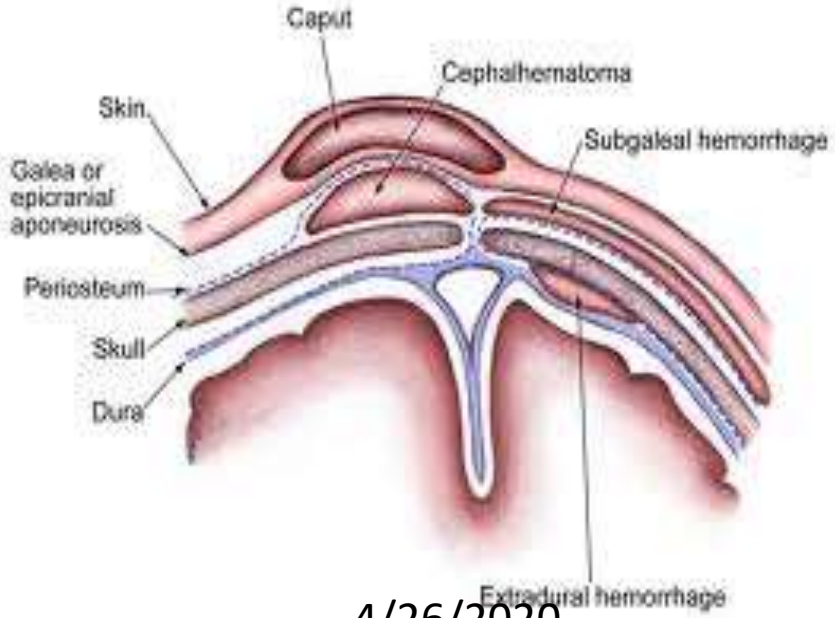
B. Skin characteristics:

- Pink color
- Yellowish
- **Acrocyanosis** may appear for 2-6 hrs due to poor peripheral circulation
- **Forceps mark,**
- **Vernix caseosa**
- **Lanugo:** Slight, downy distribution of fine hair over the body

Head :

- ❖ Moulding- w/h diminished a few days after birth
- ❖ Anterior fontanel and posterior fontanel:
- ❖ **Cephalohematoma** is *collection of blood due to rapture of blood vessels* in cranial bone can be bilateral or unilateral
- ❖ **Caput succedaneum** is *edema or swelling* on infants scalp





Physical assessment…cont'd

Face : normally symmetrical

Eye : the eye should be checked for size, pupil size, reaction to light, blink reflex to light or edema of eye lid,

Neck: for fracture of clavicles and injury to sternocleidomastoid muscle

Lungs

Chest shape	Symmetrical.	Hyperinflated or small chest.
Chest movement	Symmetrical.	Asymmetrical in pneumothorax and diaphragmatic hernia.
Recession	Mild recession in preterm infant.	Severe recession in respiratory distress.
Grunting		Expiratory grunt in respiratory distress.
Stridor		Inspiratory stridor a sign of upper airway obstruction

Heart

Pulses	Brachial and femoral pulses easily palpable. 120–160 beats per minute.	Pulses weak, collapsing, absent, fast or slow or irregular.
Capillary filling time	Less than 4 seconds over chest and peripheries.	Prolonged filling time if infant cold or shocked.
Blood pressure	Systolic 50 to 70 mm at term.	Hypertensive or hypotensive.
Precordium	Mild pulsation felt over heart and epigastrium.	Hyperactive precordium.
Apex beat	Heard maximally to left of sternum.	Heard best in right chest in dextrocardia.

Abdomen : should be cylindrical, protrude slightly and move with respiration. A scaphoid (hallow-shaped)appearance is abnormal.

Genitals:

- In female during the first wk may have vaginal discharge composed whitish mucus and changed with tinged with blood
- Look for any congenital anomalies/malformation. Eg. Hypospadias

Extremities :

- Arm and hand will exam for presence of
  - **Polydactyly -** Extra digits
  - **Syndactyly** - Fusion (webbing) of fingers and
  - Damage of the upper arm due to damage of 5 and 6 cervical nerve (brachial plexus)
- Leg and foot is checked for evidence of turning of foot to in ward

yndactyly | Children's Hospital of ...
hop.edu

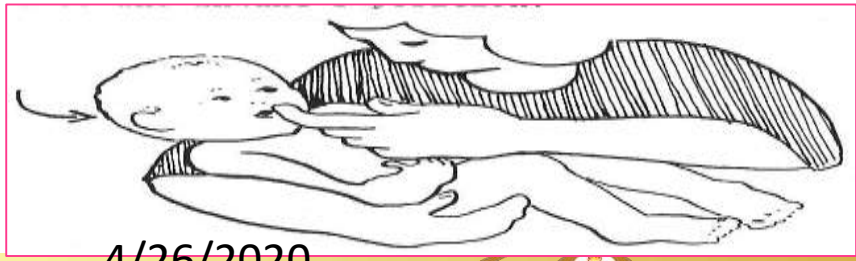
Neonatal reflexes

1. Sucking

- ✓ begins when a nipple or finger is placed in the mouth of a newborn.
- ✓ Elicited by the examiner stroking the lips of the infant; the infant's mouth opens and the examiner introduces their gloved finger and sucking starts.
- ✓ Persist through out infancy

2. Rooting

- ❖ Elicited by the examiner stroking the cheek or corner of the infant's mouth.
- ❖ The infant's head turns toward the stimulus and opens its mouth
- ❖ Disappear by 3-4mo but may persist upto 12 mo



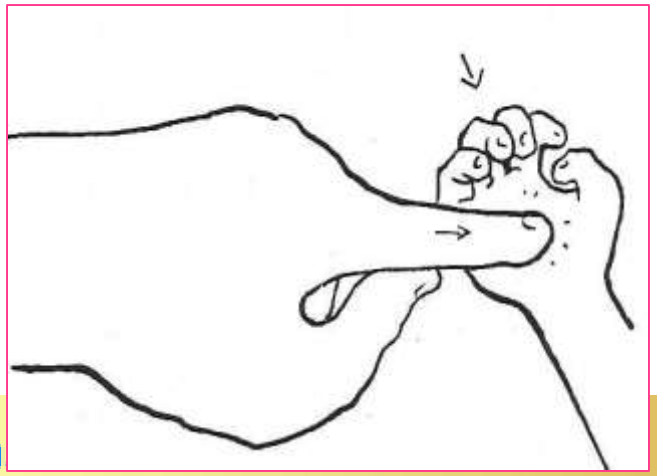
3. Palmar grasp

- Elicited by the examiner placing his finger on the palmar surface of the infant's hand and the infant's hand grasps the finger.
- Attempts to remove the finger result in the infant tightening the grasp.
- Lessen after 3mo

4. Tonic neck

- Elicited by rotating the infants head from midline to one side.
- The infant should respond by extending the arm on the side to which the head is turned and flexing the opposite arm.
- The lower extremities respond similarly.

By -SelamF



5. Moro

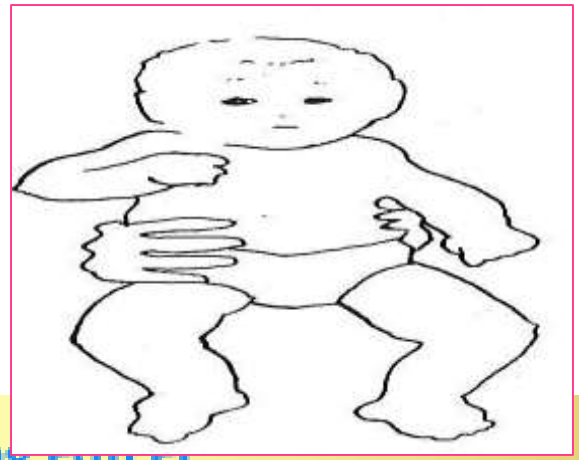
- The examiner holds the infant so that one hand supports the head and the other supports the buttocks.
- The reflex is elicited by the sudden dropping of the head in her hand
- The response is a series of movements: the infant's hands open and there is extension and abduction of the upper extremities.
- This is followed by anterior flexion of the upper extremities and and audible cry.

6. Stepping

- Elicited by touching the top of the infant's foot to the edge of a table while the infant is held upright.
- The infant makes movements that resemble stepping.

7. Galant

- ✓ The infant is held in ventral suspension with the chest in the palm of the examiner's hand.
- Firm pressure is applied to the infant's side parallel to the spine in the thoracic area.
- The response consists of flexion of the pelvis toward the side of the stimulus.



8. Babinski

❖ Elicited by stimulus applied to the outer edge of the sole of the foot.

❖ The infant responds by plantar flexion and either flexion or extension of the toes.

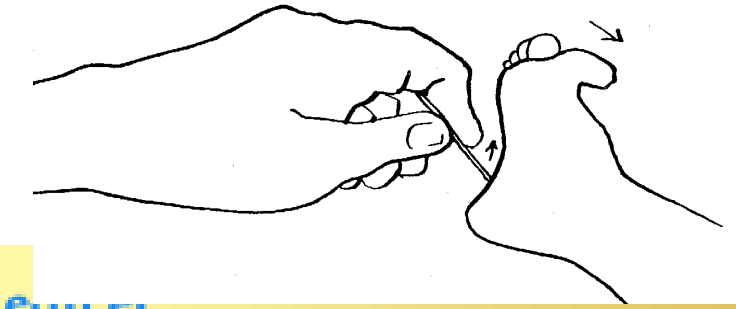
9. Plantar grasp

✓Infant's toes will curl downward when sole of foot is touched.

✓lesson by 8 mo

10. Startle

❖ a loud noise such as a hand clap will elicit the newborn to abduct his arms and flex his elbows.



Significance

- They are often protective and disappear as higher level motor functions emerge.
- They can provide information about the nervous system and muscle tone.
- Eg. An absent or inadequate Moro response on one side : **hemiplegia, brachial plexus palsy**, or **a fractured clavicle**
- reflex that is *still present* after the age when it would normally disappear can be a *sign brain or nervous system damage*
- Persistence beyond 5 months of age is : indicate severe **neurological defects.**

Danger signs

- Not feeding well
- Less active than before
- Fast breathing
- Moderate or severe chest in-drawing
- Grunting
- Convulsions
- Temperature >37.5^{0}C or <35.5^{0}C
- Umbilicus draining pus or
- Umbilical redness extending to skin
- Bleeding from umbilical stump

Immediate care of new born baby

1. Deliver baby on to mothers abdomen
2. Dry the baby with clean towel, keep in warm room & a way from draft
3. Quick check of newborn's breathing and color while drying(to assess the need of resuscitation, APGAR scoring)
4. Offer care of cord
5. Place the baby in skin to skin contact
6. Eye care
7. Provide Vit. K
8. Weight baby and classifying based on BWt and GA

Assigning Apgar score

- Is a commonly-used method to assess the newborn status
- Mainly related to the **Oxygenation status** of newborn after birth
- Therefore help to identify infants requiring resuscitation for hypoxic-acidosis (Asphyxia)
- APGAR
  - A - Appearance
  - P - Pulse rate
  - G- Grimace
  - A - Activity
  - R – Respiration

Assigning Apgar score…cont'd

- **Why APGAR score /Purposes?**
  - Evaluate the conditions of the baby at birth
  - Determine the need for resuscitation
  - Evaluate the effectiveness of resuscitative efforts
  - Identify neonates at risk for morbidity and mortality

- Is usually assigned at 1 and 5-min
- The 1- minute score signals, the need for immediate resuscitation
- The 5-minute score indicates the probability of successfully resuscitating the newborn
- Scores of 0-3 at 20 min predicate high mortality and morbidity

APGAR score

TABLE 33-1 The APGAR Score

Sign	0	1	2	Score	
				1 min	5 min
Appearance (Skin color)	Blue, pale	Body pink, extremities blue	Completely pink		
Pulse Rate (Heart Rate)	Absent	Below 100	Above 100		
Grimace (Irritability)	No response	Grimaces	Cries		
Activity (Muscle Tone)	Limp	Some flexion of extremities	Active motion		
Respiratory (Effort)	Absent	Slow and irregular	Strong cry		
			TOTAL SCORE =		

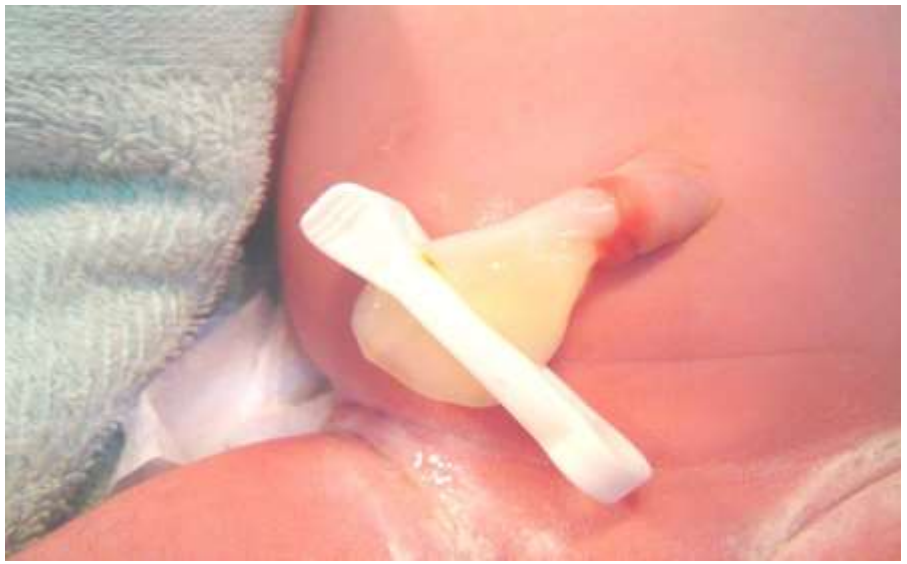
What to do if the Apgar score is:

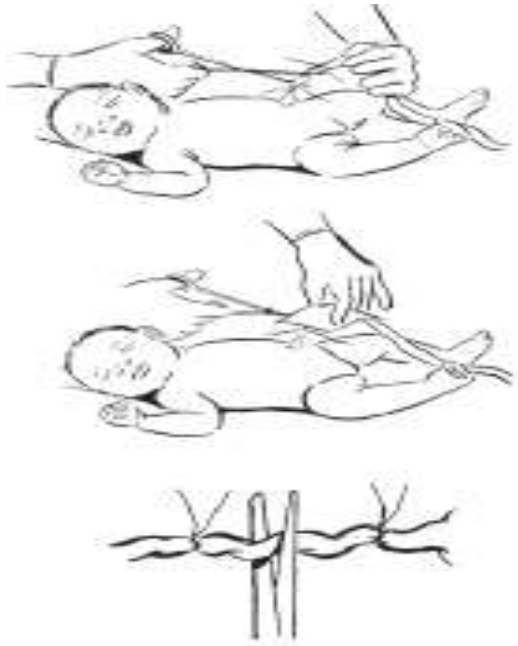
- **Apgar 7-10 (**Normal)
  - Dry the baby and keep warm
  - Using suction is not necessary if the baby cries vigorously
- **Apgar 4-6 (**Moderate Asphyxia)
  - Most of these babies are breathing
  - If so and have HR< 100/minute, quick and gentle clearing of the airway
  - If no improvement, the HR<100/minute
  - Move immediately to vigorous Rx (see Apgar 0-3)
- **Apgar 0-3 (**Sever Asphyxia)

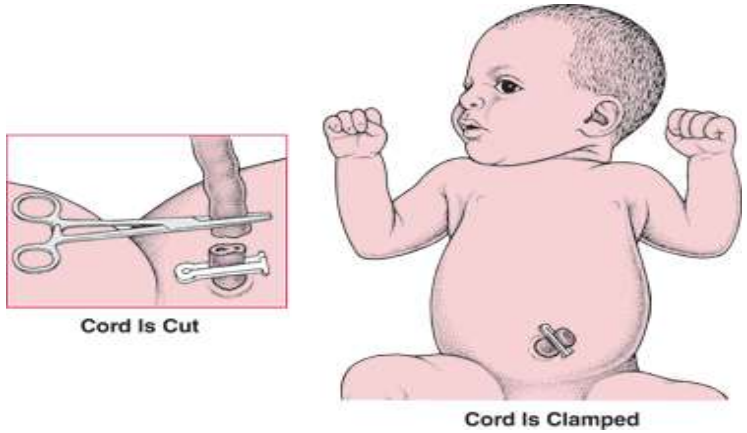
- Proceed in the following order quickly and as carefully as possible:
  - Note the time
  - Dry and cover the baby
  - Resuscitate

3. Cord care/Avoidance of infection

- ❑ Cut cord
- ❑ Observe for oozing blood.
- ❑ Do not apply any substance to the stump
- ❑ Do not bind or bandage the stump
- ❑ Leave the stump uncovered







5. Eye care

- Wipe the eyes and instill eye prophylaxis
  - Given within 1 hour after birth
  - Prevent ophthalmia neonatorum and Chlamydia trachomatis conjunctivitis
    - Erythromycin ointment 0.5%
    - Tetracycline ointment 1%
    - Silver nitrate drops 1%
- Do not wash away the eye antimicrobial

6. Provide Vit. K

- It prevents neonatal hemorrhage during first few days of life
- **Recommended route of administration: intramuscular**
- Dose:
  - 1mg being given at birth.
  - Preterm infants may receive 0.5mg.
- **Alternative Route: Oral**

  Dose:
  - 2mg orally at birth;
  - Repeat dose at 3-5 days and at 4-6 weeks of age.
  - Repeat dose if the infant vomits or regurgitates within 1 hour

➢Immunization

- At birth: BCG , OPV and HBV vaccine.

7. Weight baby and classifying based on BWt and GA

❑See the following summary

Resuscitation of the newborn baby

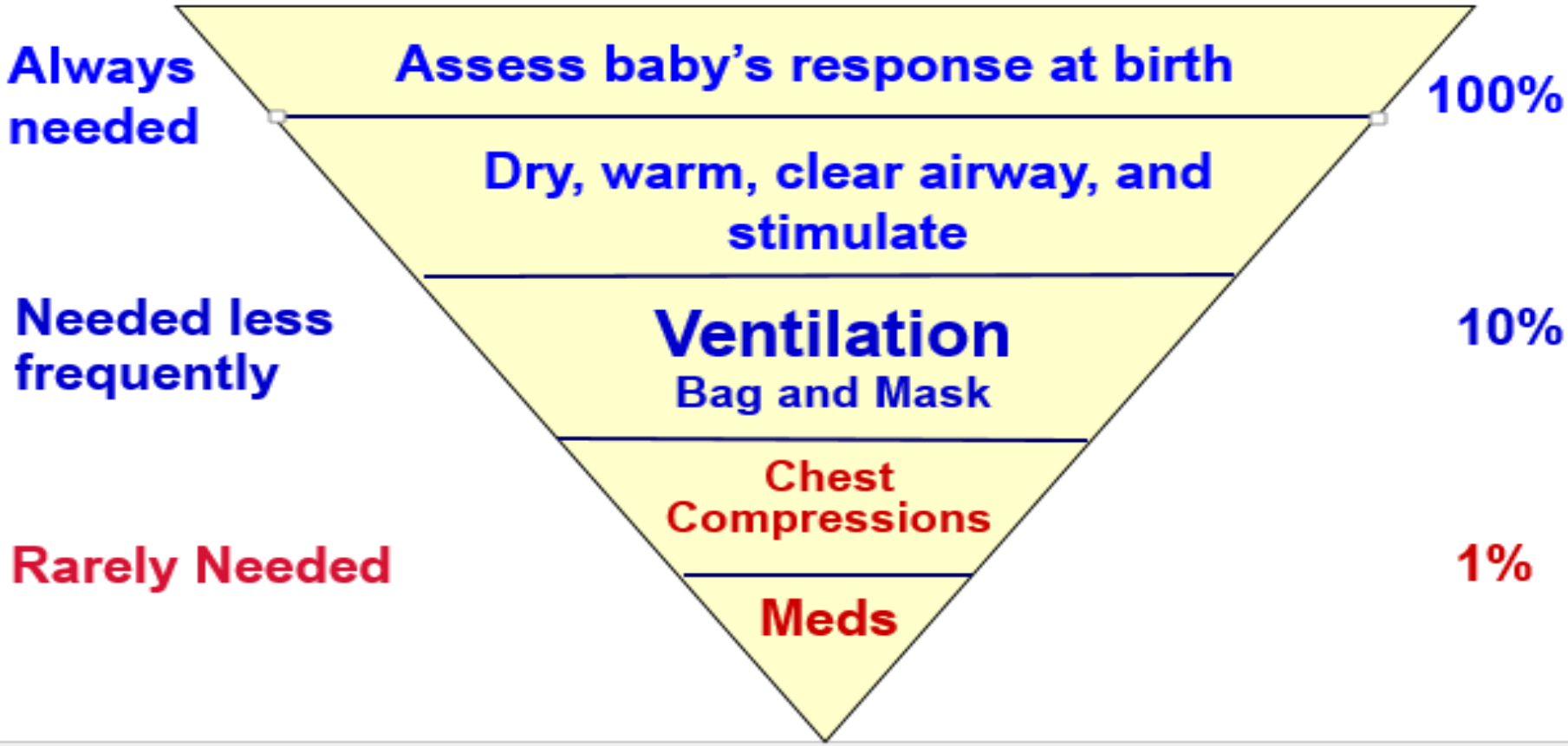
Introduction

- Approximately 10% of in hospital delivered newborns require resuscitation assistance to breathe at birth.
- Less than 1% require extensive resuscitation.

Goal of Resuscitation is to get a baby with:-

- ❑ Sustained regular respirations,
- ❑ Heart rate above100 beats per minute, and
- ❑ Pink color of the lips and central trunk

Basic Steps in Resuscitation



Normal Transition

- No meconium
- Breathing/crying
- Good muscle tone
- Term

Abnormal Transition

- Gasping, ineffective or no breathing
- Poor muscle tone
- Central cyanosis (blue)
- All need assisted ventilation!

Preparing for birth

❑**Wash your hands**

- warm room - temperature $\geq 25^0$C
- Clean, dry and warm delivery surface
- Radiant heater
- Two clean, warm towels/clothes
- Self inflating bag - newborn size
- Infant masks in two sizes - normal and small newborn
- Suction device
- Oxygen (if available)
- Clock

Check if all equipments are in working order


Suction
Equipment
Warmer &
Blankets
Bag, Mask,
& Oxygen
Laryngoscope
and ETT Tube

Clear the mouth and nose

Bulb syringe:

- **Suction mouth first, then nose ("m" before "n")**

No bulb syringe:

- **Clear secretions with clean, dry cloth**

No deep suctioning with bulb syringe or catheter!

Bradycardia (slowing of the heart rate) can result from deep suctioning

Drying the Infant

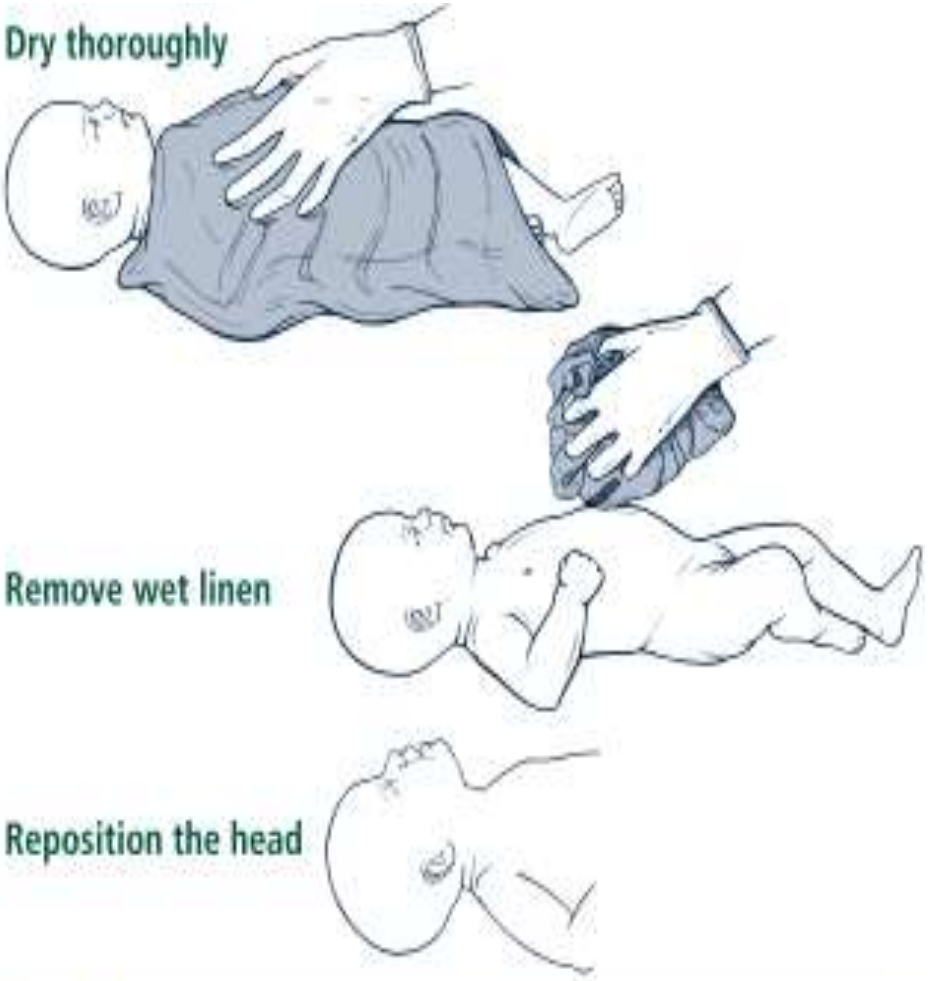


Figure 2.6. Drying and removing wet linen to prevent heat loss and repositioning the head to ensure an open airway

Tactile Stimulation

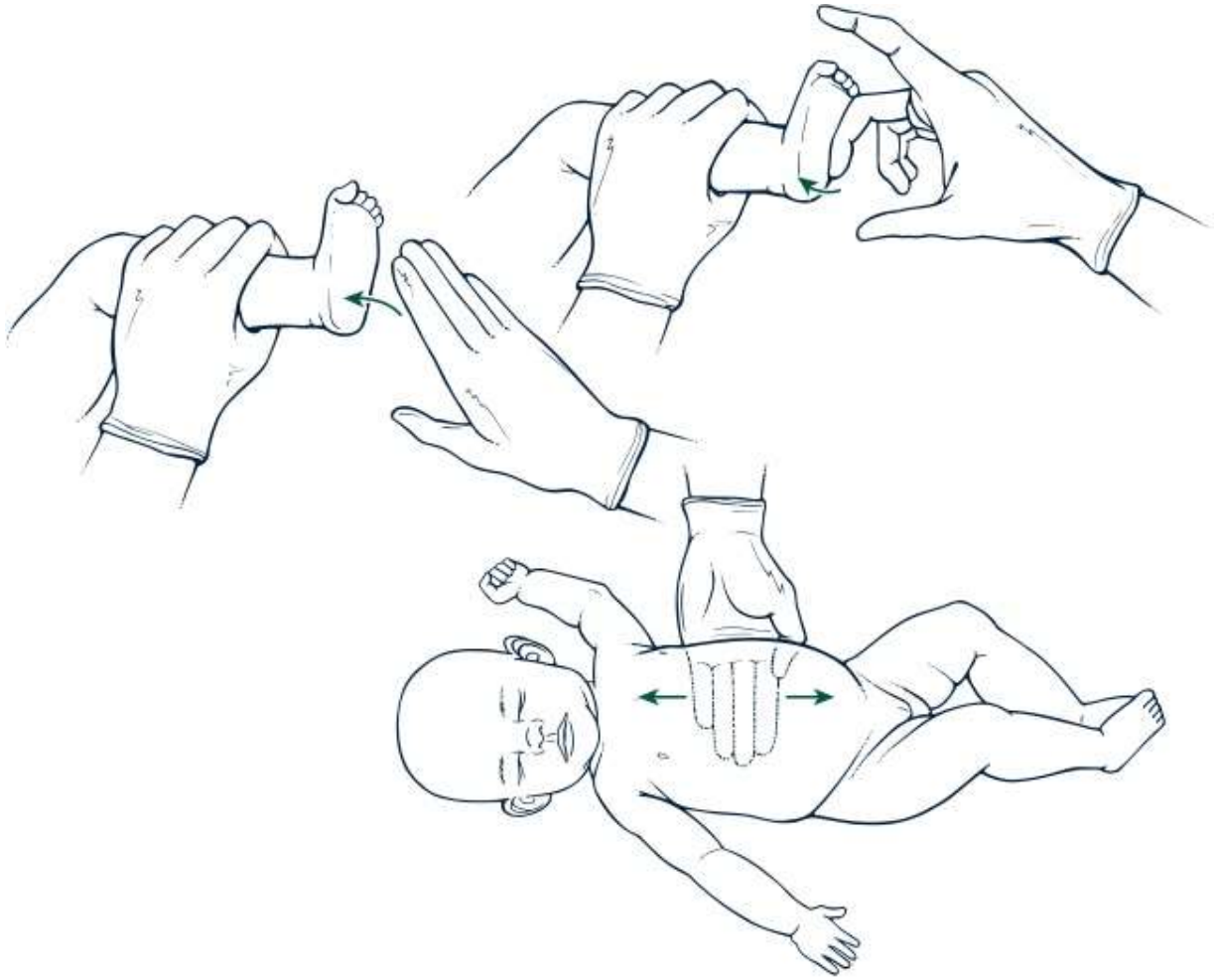
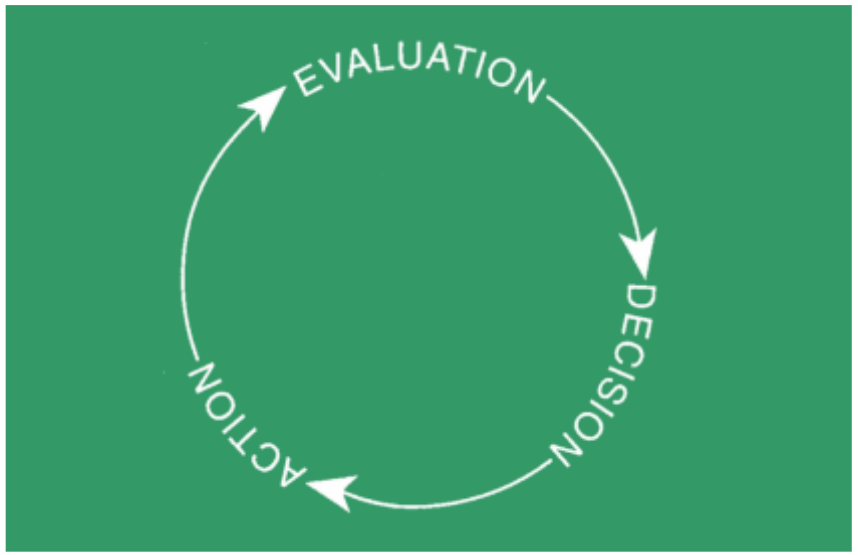


Figure 2.7. Acceptable methods of stimulating a baby to breathe

How to Prioritize Actions

Evaluation is based on:

- **Respirations (breathing/crying)**
- **Heart rate**
- **Color**



Evaluate Respirations

YES

- Unlabored breathing/crying
- Listen with stethoscope

NO

- If shallow breathing, gasping, or not breathing at all, give positive-pressure ventilation

Evaluate Heart Rate

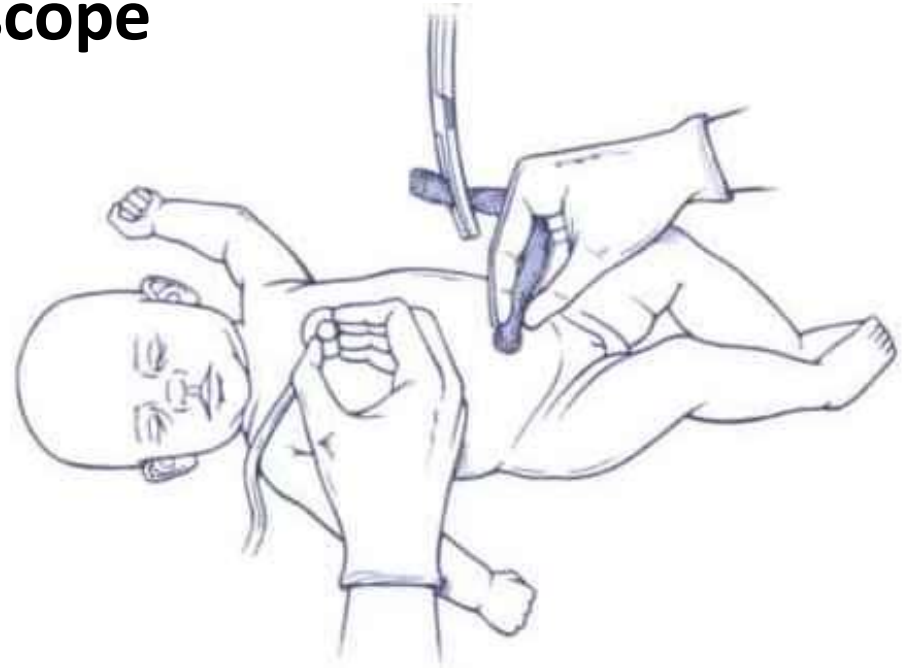
- Feel pulse at base of umbilical cord or listen with stethoscope
- Count for 6 seconds and multiply by 10

  Example:

  If you counted 13 pulsations in 6 seconds the baby's heart rate would be

  13 x 10 = 130

- Heart rate <100 requires positive-pressure ventilation



Evaluate Color

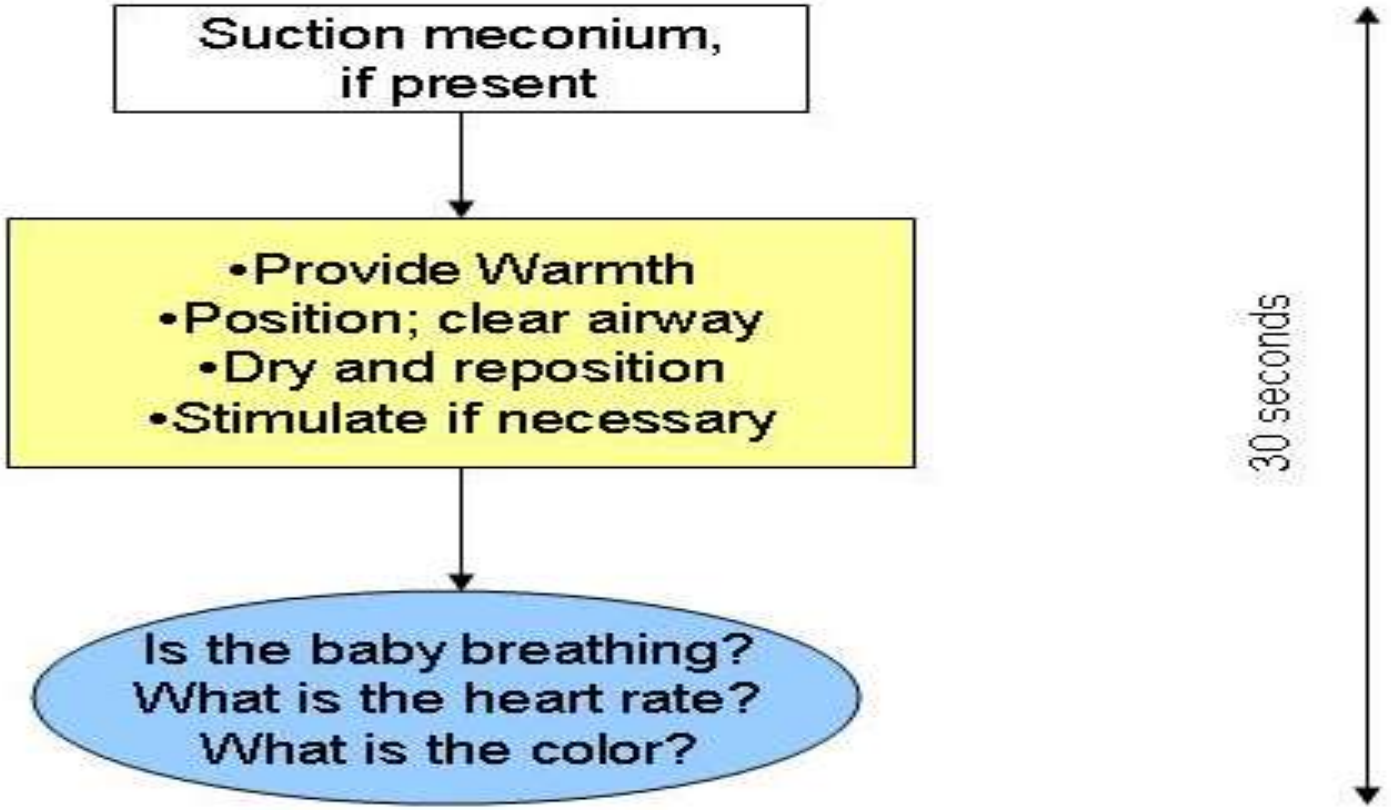
- **Peripheral cyanosis (a bluish color):**
  - Bluish color of hands and feet
  - Requires no further action
- **Central cyanosis:**
  - Bluish color of the trunk and limbs
  - Bluish color of lips and gums
  - Use free-flow oxygen, if available, or positive-pressure ventilation

Free-flow Oxygen

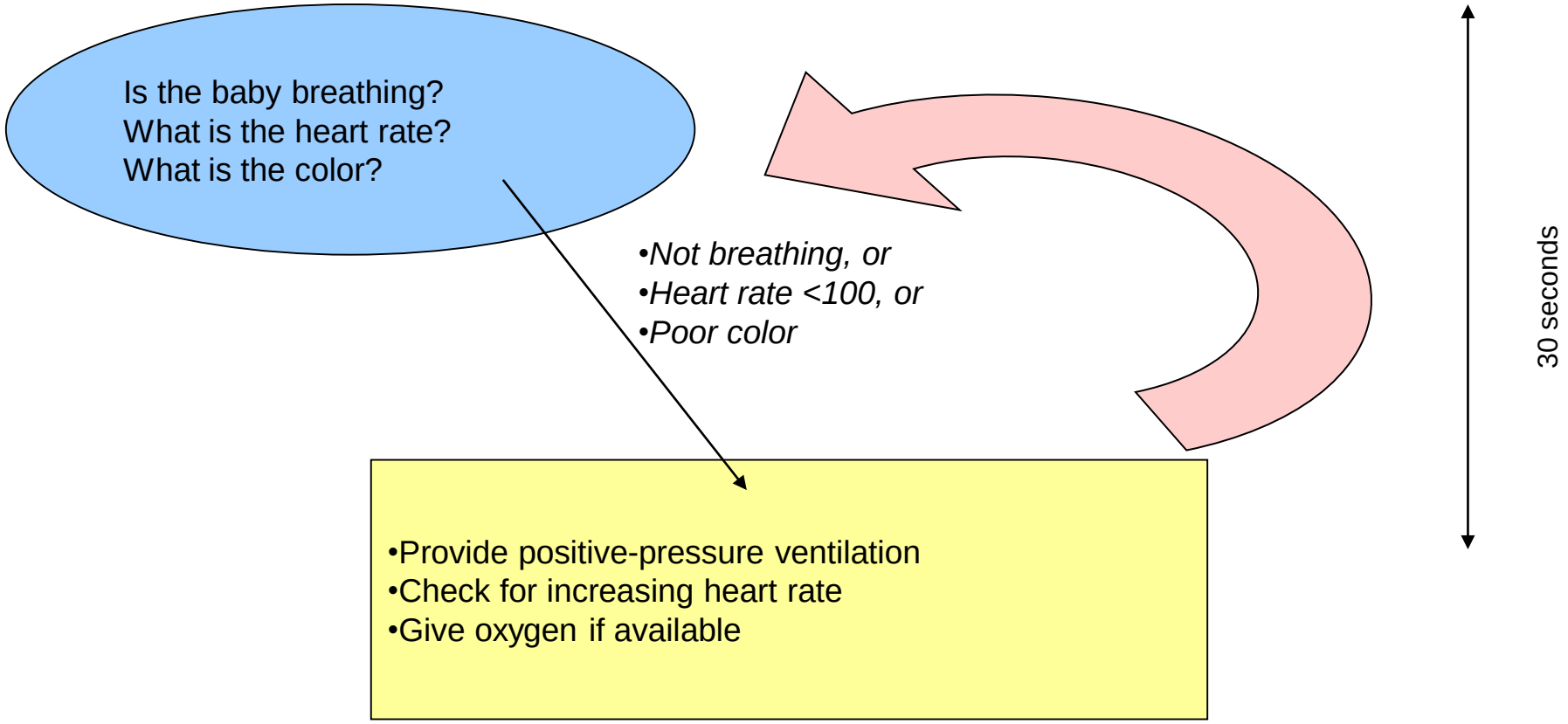
- If the infant is breathing but there is persistent central cyanosis, give free-flow oxygen.
- Flow rate at approximately 5-10 L/min
- If not available, use positive-pressure (bag-and-mask) ventilation

Newborn Resuscitation Flowchart

Initial Steps

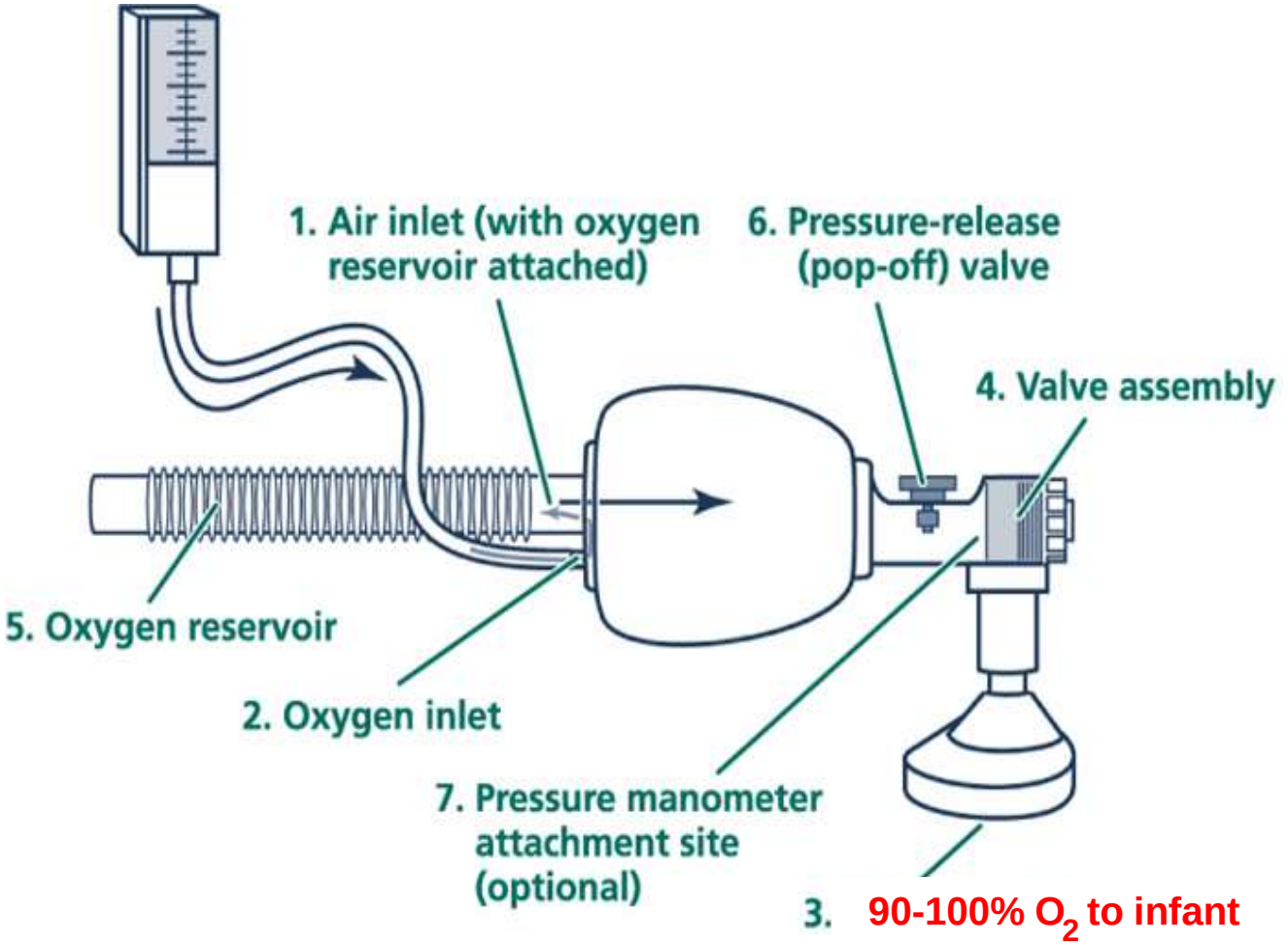


If the evaluation is NOT normal

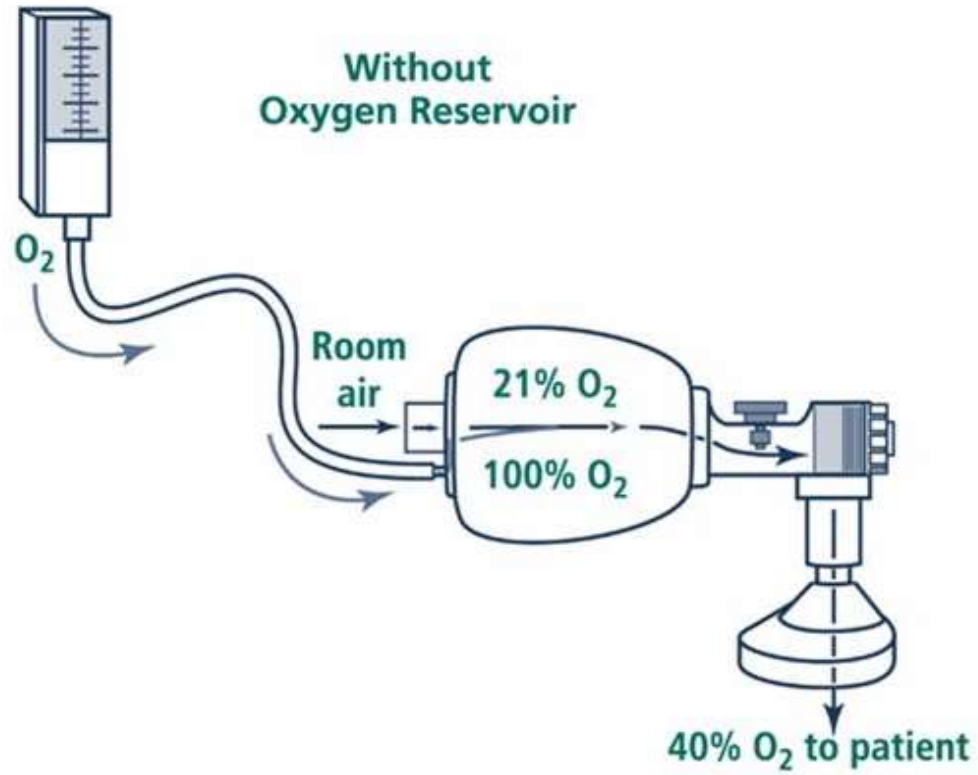


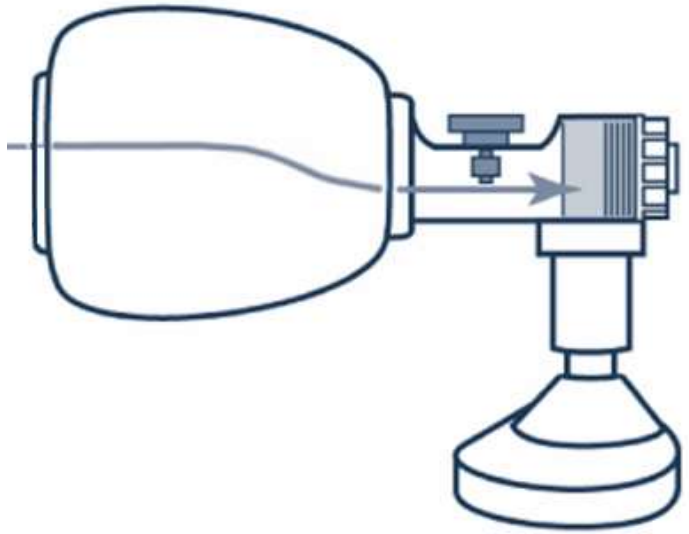
Ventilation of the lungs is the single most important and effective step of resuscitation.

Basic Parts of Bag and Mask



Room air may be used for resuscitation





Room air to infant

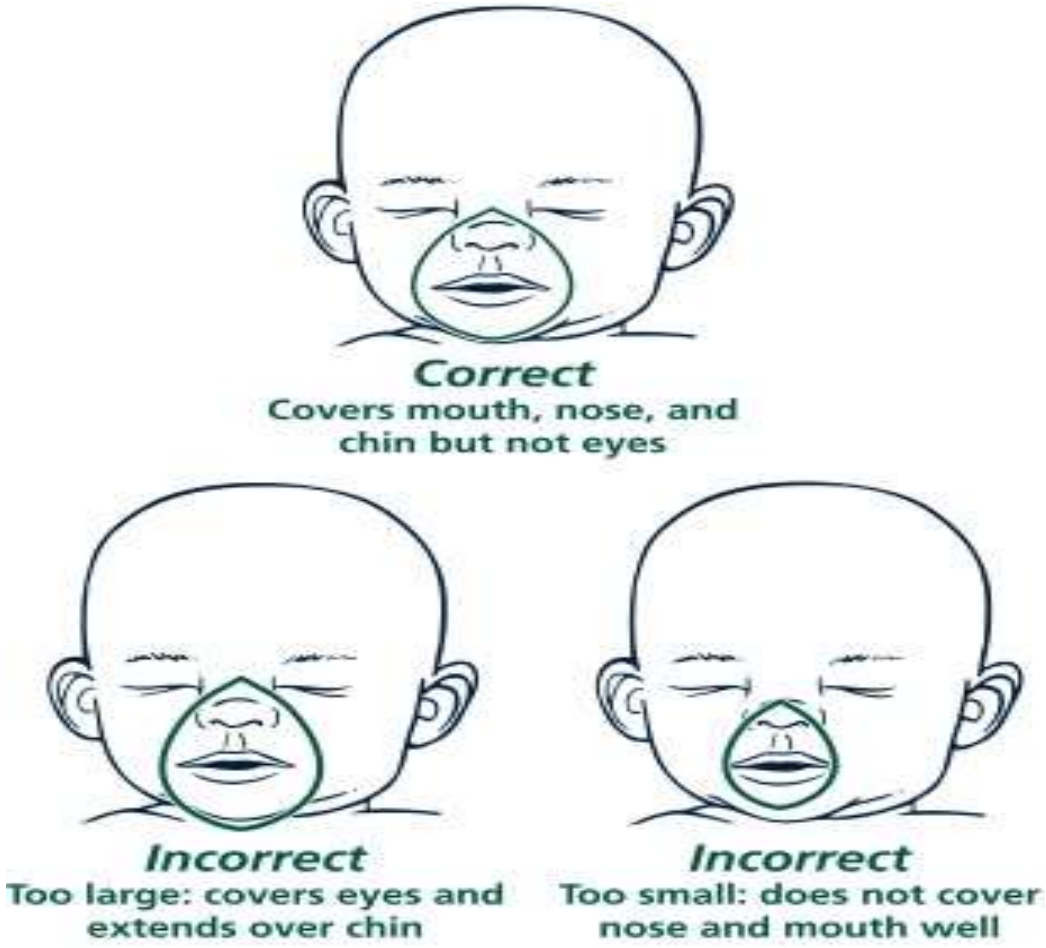
Face Mask Placement

Correct: Covers mouth, nose, and chin

Incorrect:

Too large - covers eyes and extends over chin

Too small - does not cover nose and mouth



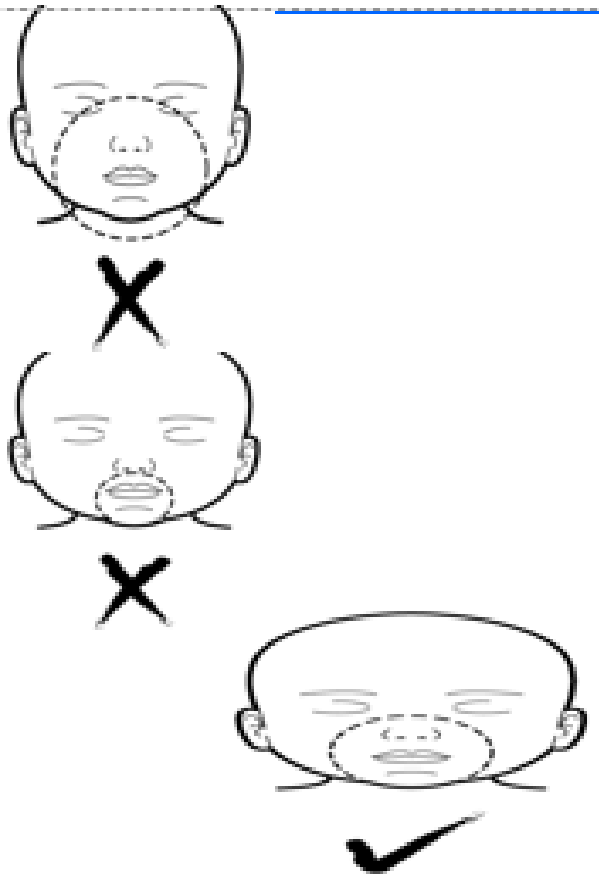
Face Mask Placement

❑Fitting a face mask:

- A face mask that is too LARGE
  - Covers the eyes
  - Extends over the tip of the chin
- A face mask that is too SMALL
  - Does not cover the nose
  - Does not cover the mouth effectively

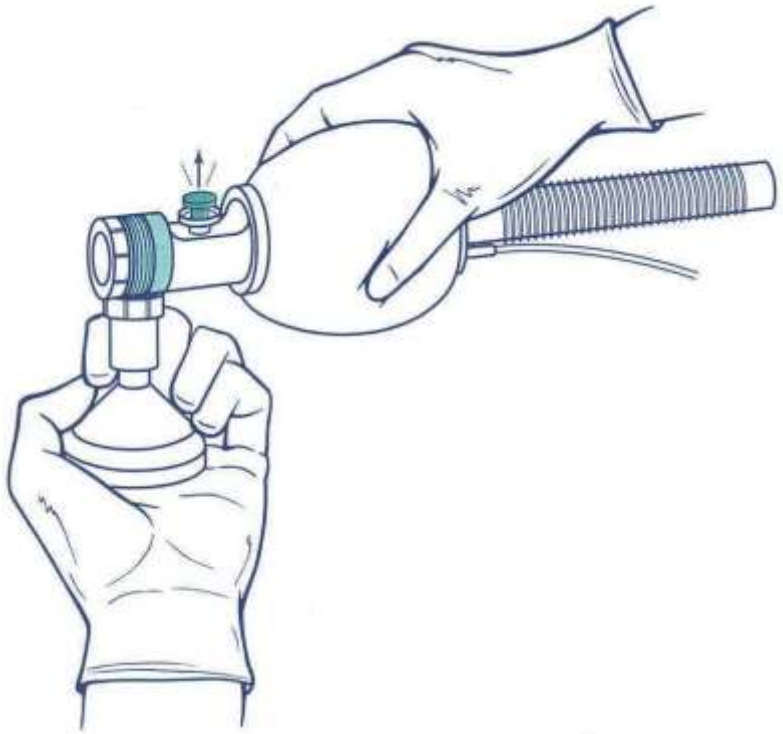
❑ Use the CORRECT size face mask that covers:

- The nose
- The mouth
- The tip of the chin but not the eyes



Testing Bag and Mask

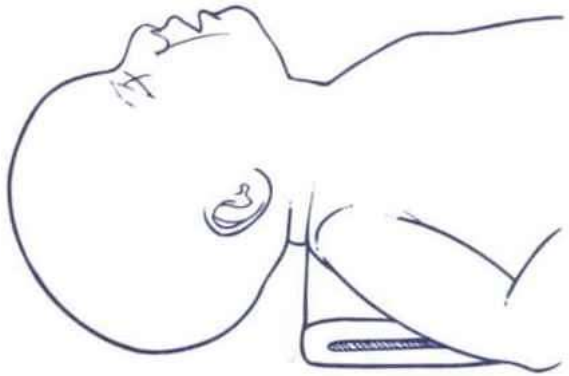
- **Pressure against your hand?**
- **Pressure-release valve opens?**



Face Mask Placement

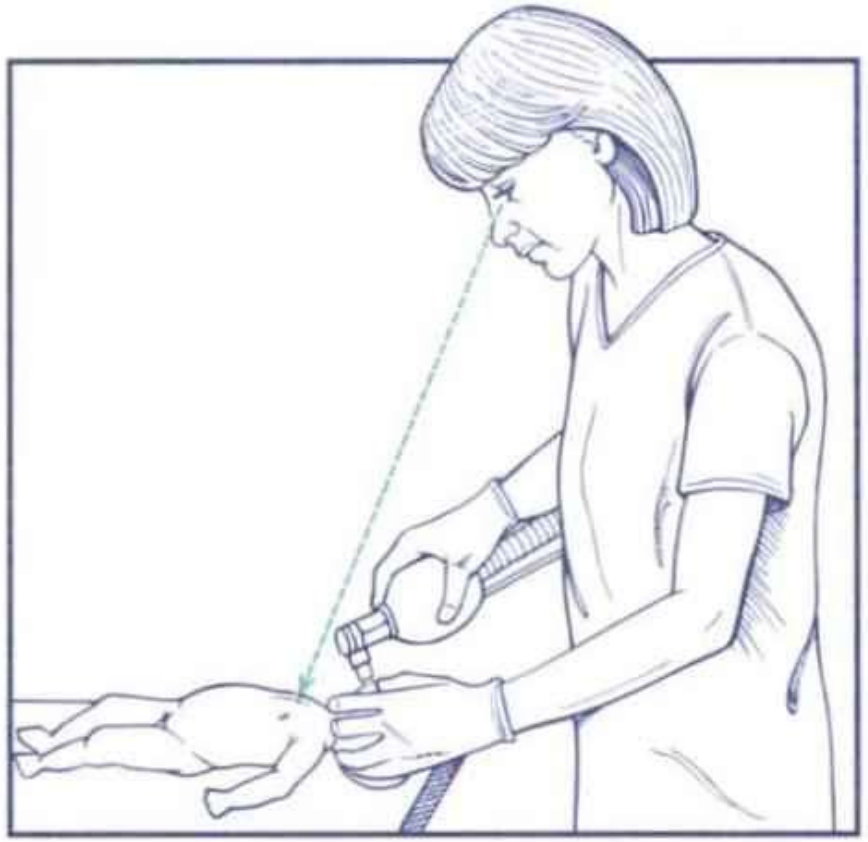
- **Correct Positioning: Cover mouth, nose, and tip of chin, but not the eyes**

- **Correct position for assisted ventilation**



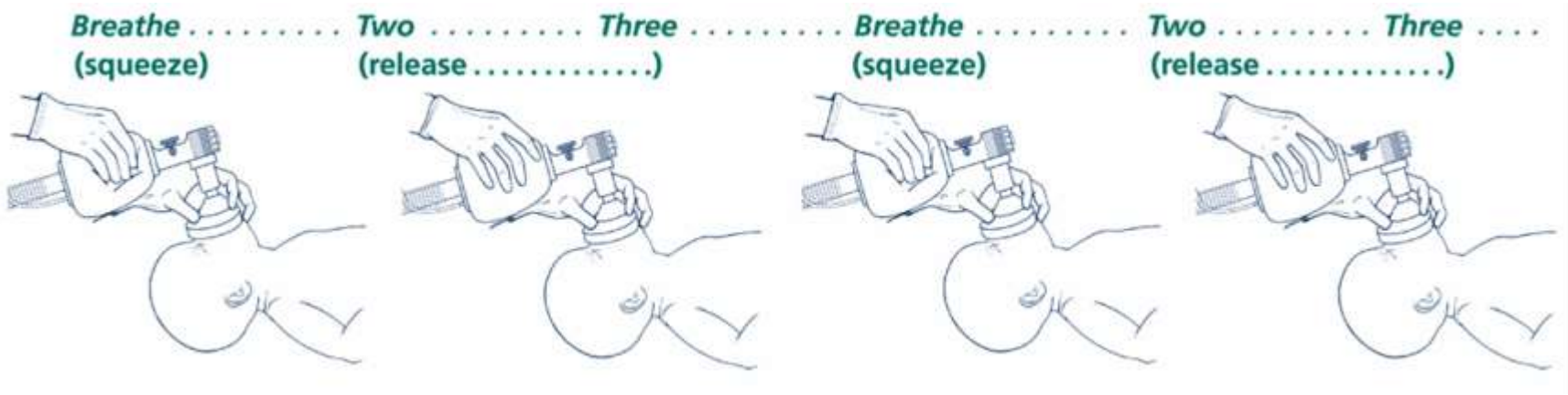
Preparing for Positive Pressure Ventilation

- Select correct-sized mask
- Clear airway
- Position head
- Position yourself at side or head of baby



How often should you squeeze the bag?

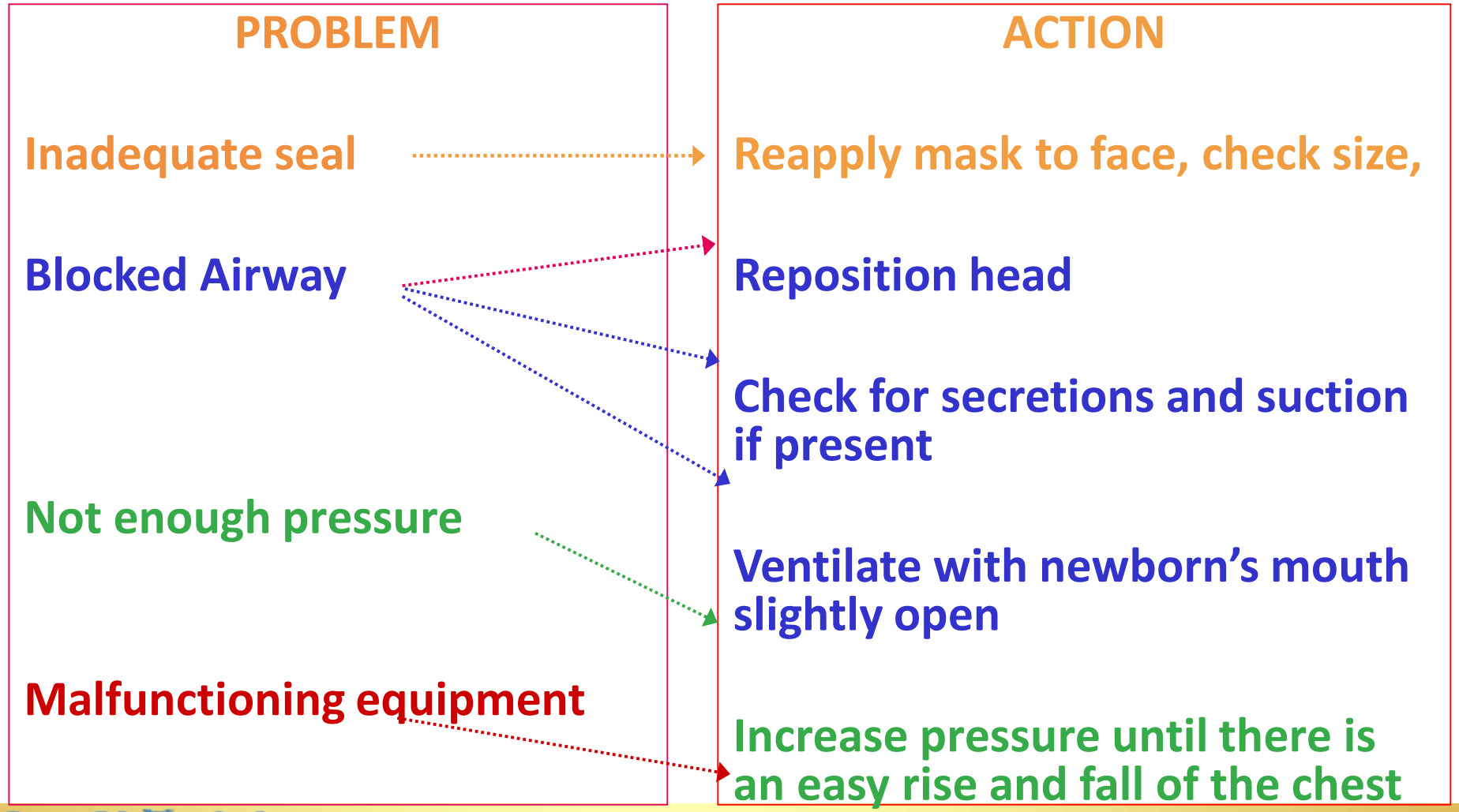
40-60 breaths per minute
Count out loud: “Breathe—two—three”



Signs of Improvement

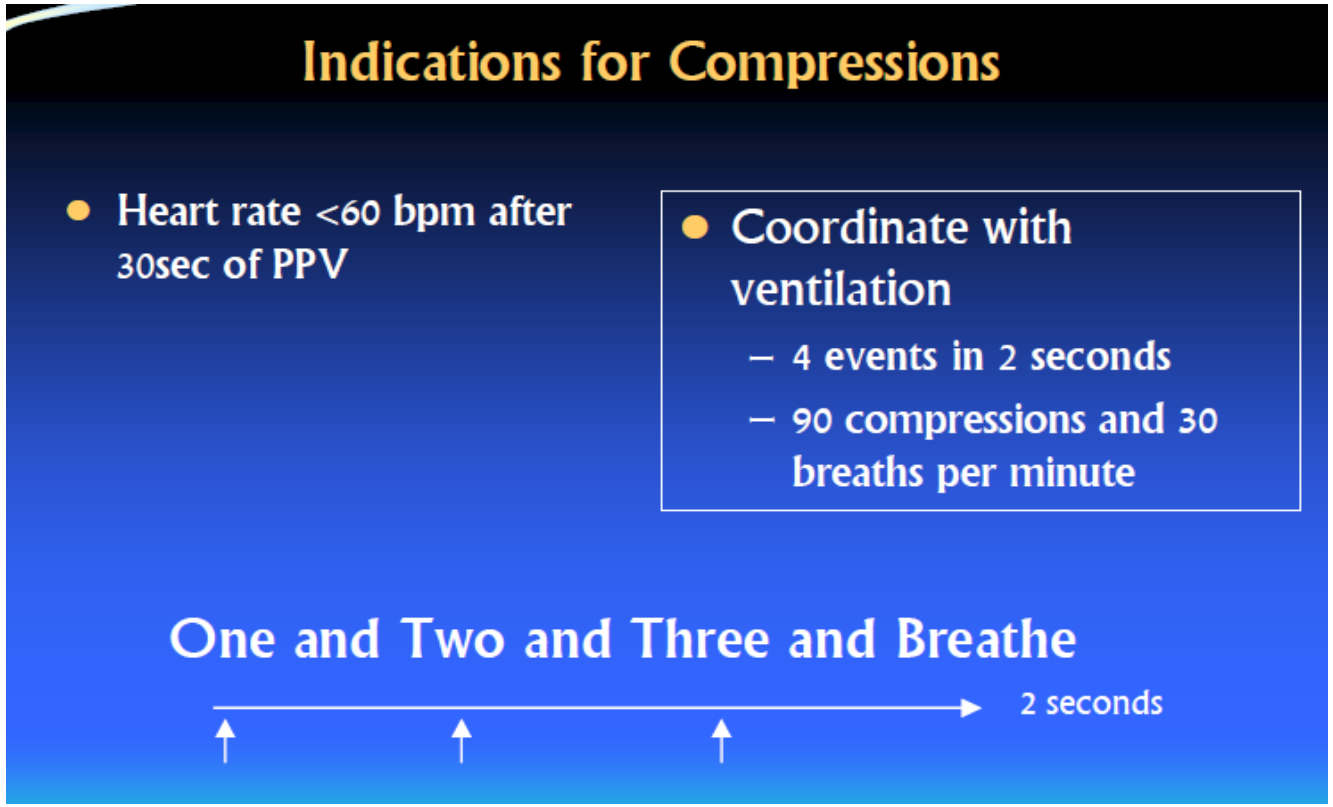
1. Increasing Heart Rate (>100)
2. Improving color
3. Spontaneous breathing or crying
4. Improving muscle tone

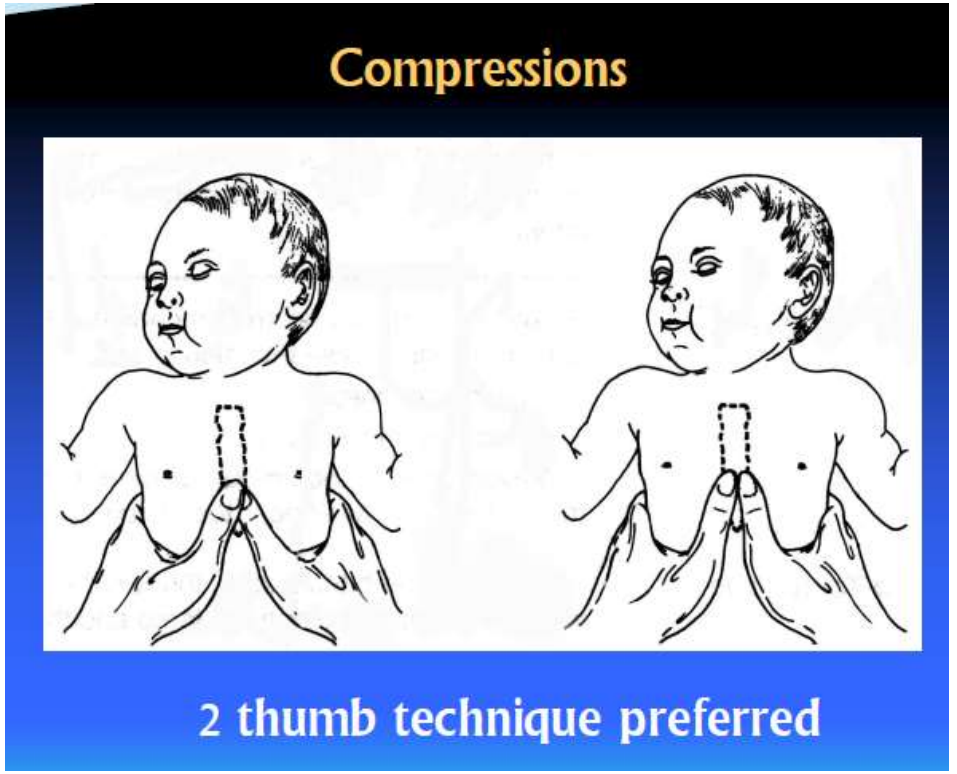
Inadequate Chest Expansion



- Start compression - If heart rate < 60/ min
  - Continue ventilation with bag
  - make sure the chest is moving adequately
  - every 1-2 min stop & see if the pulse or breathing has improved
  - stop compression once the HR >100/ min
  - stop bagging when respiratory rate >30 / min
  - continue oxygen until pink and active

- 90 compression coordinated with 30 breath /min (3 compression 1 breath every 2 second
- place thumbs just below the line connecting the nipples on the sternum
- compress *1/3 the A-P diameter* of the chest





Medications:

Epinephrine

- Indication: Heart rate <60 after 30 sec of *coordinated ventilation and compressions*
- 1:10,000 (0.1mg/ml)
- Route: IV
- 0.1-0.3 ml/kg
  - 1ml →Term
  - 0.5ml →Preterm
  - 0.25ml→ Extreme preterm

When to stop ventilating

When to stop ventilating

- If baby is crying;
- If breathing >30/min, and
- NO chest in-drawing:

❖ If after 20 minutes of resuscitation the baby is not breathing and pulse is absent explain to the mother that the baby has died

Care after resuscitation

- Keep the baby warm
- Monitor every 15 minutes
- Start breastfeeding as soon as possible
- Do not separate the mother and baby unless the baby has difficult breathing

Common neonatal problems

- Hypothermia
- Hypoglycaemia
- Neonatal sepsis
- Jaundice
- Birth asphyxia
- Low birth weight & prematurity

Thermal protection of the newborn

- **Thermal protection** is the series of measures taken at birth and during the first days of life.
- To ensure that the newborn baby does not become either too *cold (hypothermia) or too hot (hyperthermia)* and maintains a normal body temperature.

Thermal protection ...

- Newborn babies cool down or heat up much quicker than adults because they cannot regulate body temperature as desired
- In general, newborns need a warmer environment than adults
- A naked newborn exposed to a room temperature of 23^{o}C suffers the same heat loss as a naked adult does at 0^{o}C

Thermal protection ...

- The neonate has a large surface area for small body mass, and its heat loss is relatively greater
- At birth, the skin and core temperatures of the baby fall by 0.1 and 0.3^{o}C/minute respectively.
- This is equivalent to loss of 200 Kcal per kilogram body weight per minute

Mechanism of heat loss

1. **Convection**:

- Heat is lost from the skin to moving air

2. Conduction:

- If a body is in contact with another solid body

3. Radiation:

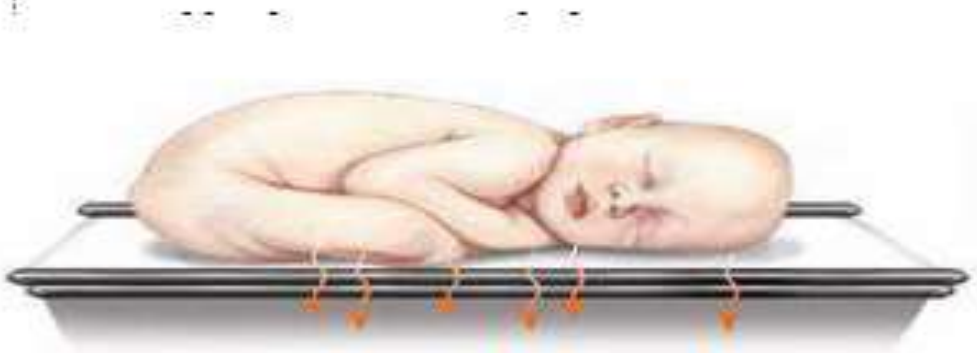
- It is the transfer of heat between objects of higher temperature to the next solid object of lower temperature

Mechanism of ...

4. Evaporation:

- This is a major source of heat loss in a newborn baby immediately after birth and while giving bath
- A baby loses as much heat when water is evaporated from his skin, same as evaporation from boiling water
- Large surface area of contact, greater wind velocity and most important thinner stratum corneum of the baby are associated with higher evaporative heat loss

Mechanism of heat loss and production....



A. Conduction

B. Convection

C. Evaporation

D. Radiation

Mechanism of heat production

1. Muscular activity:

- Increased muscular activity during restlessness & crying
- Conservation of heat by assuming flexed position

2. Metabolic thermogenesis

Brown fat

... heat production

❑ **The role of CNS in metabolic thermogenesis**

- Cold skin → afferent neurons → heat regulating center in the anterior hypothalamic area → neurogenic efferent pathway → brown fat → trigger the local release of noradrenalin so that triglycerides are oxidize to glycerol & fatty acids

➢ The blood level of glycerol rises but fatty acids are locally consumed for the generation of heat

... heat production

- Effective metabolic thermogenesis demands:
  - Integrity of CNS pathways
  - Adequacy of brown fat
  - Availability of glucose & oxygen
  - Normal birth weight & term gestational age

Optimal thermal environment

- Heat loss can be minimized by keeping infants in neutral-thermal environment
- **Thermo-neutral environment**: the narrow range of environmental temperature at which a given baby can maintain normal body temperature
- A fall in the environmental temperature by 2^{o}C below the neutral range can trigger infant's metabolic machinery to generate 25% of additional heat

Thermo-neutral environment

Age	Weight in gram			
	<1,200	1,200-1,500	1,501-2,500	>2,500
1st day	35.0±0.5	34.3±0.5	33.4±1.0	33.0±1.0
2nd day	34.5±0.5	33.7±0.5	32.7±1.0	32.2±1.0
3rd day	34.0±0.5	33.5±0.5	33.0±1.0	32.0±1.0
4th day	33.5±0.5	32.8±0.5	32.2±1.0	31.5±1.0

By- Selam F

Thermo-neutral ...

- The environmental temperature at which the metabolic response becomes necessary is called **critical temperature**
- Hypothermia is caused more by **lack of knowledge** rather than lack of equipment
- Hypothermia can be prevented by strictly following **the warm chain system.**

Warm chain system

- It is a system of keeping a baby in a thermo-neutral environment,
- immediately after delivery,
- in the delivery room, postpartum ward,
- during transportation and
- while nursing the baby at home

Warm chain system ...

- **Components**

1. Immediate drying
2. Warm resuscitation
3. Skin-to-skin contact with the mother
4. Immediate initiation of breast-feeding
5. Bathing & weighting postponed
6. Appropriate clothing & bedding
7. Warm transportation

Hypothermia

- **Hypothermia** in a newborn baby is defined as skin temperature of <36.5^{o}C or core temperature of <35.5^{o}C
- **Classification**

1. Mild hypothermia (cold stress): 36-36.4^{o}C
2. Moderate hypothermia: 32-35.9^{o}C
3. Severe hypothermia (neonatal cold injury): less than 32^{o}C

Causes of hypothermia

- Cold environment
- Wet or naked baby
- During transportation
- Bath too early
- Deficiency of brown fat
- Problems in CNS pathway
- Relatively large surface area,
- Inability to reduce the effective surface area by assuming flexed posture

Core S/S of hypothermia

- Acrocyanosis
- Cold extremities
- Lethargy, Poor feeding, Apnoea & bradycardia
- Hypoglycaemia
- Metabolic acidosis
- Hypoxia
- Tachypnea
- Respiratory distress

Management of hypothermia

- **Warm the baby**:
  - Warming using the Kangaroo Mother Care system (KMC)
  - Warming in an open care
  - Warming in an incubator
- **Treat hypoglycemia & hypoxia**
- **Other symptomatic treatments**

Hypoglycemia

- is defined as blood glucose concentration **< 40mg/dl (**irrespective of gestational age and day of life).

Emergency management of hypoglycemia

- If the child is able to drink-→ give the child therapeutic milk, 50ml glucose 10% glucose, or 50ml of drinking water plus 10g sugar.
- If the child is unconscious or has convulsion-→ 5ml/kg 10% glucose by IV or NGT

Hypoglycemia

- ❖ Continue frequent feeding
- ❖ Treat infection

Prevent Hypoglycemia

- ➢ By initiation of early breast feeding
- ➢ Frequent small feeds (day and night)

Neonatal jaundice

- **Jaundice-** Is yellowish discoloration of the skin, sclera, mucous membranes , nails and body fluids due to hyperbilirubinaemia
- **Hyperbilirubinemia**
  - Is an excessive level of accumulated bilirubin in the blood and is characterized by jaundice

Types of jaundice

1. Physiological jaundice

- Appears after *24 hours* usually b/n 48-72 hours of age usually
- Serum level less than 15 mg / dl
- Clinically not detectable after 14 days
- Does not extend to palms and soles, &
- Disappears without any treatment

Types of jaundice

2. Pathologic jaundice

- ❖ Occurs with in 24hrs of birth and persists beyond 14 days age
- ❖ Serum bilirubin > 15 mg / dl
- ❖ The unconjugated and/or conjugated fractions of bilirubin are ↑sed
- ❖ Extends to palms and soles and
- ❖ Requires urgent attention

Neonatal bilirubin metabolism

Destruction RBCs ---------- ***Non RBC comp.***

Hemoglobin — Cytochrome, Myoglobin, Heme containing Globin

↓

HEME

<----------Heme oxygenase enzymes

↓

biliverdin

<---------- biliverdin reductase

↓

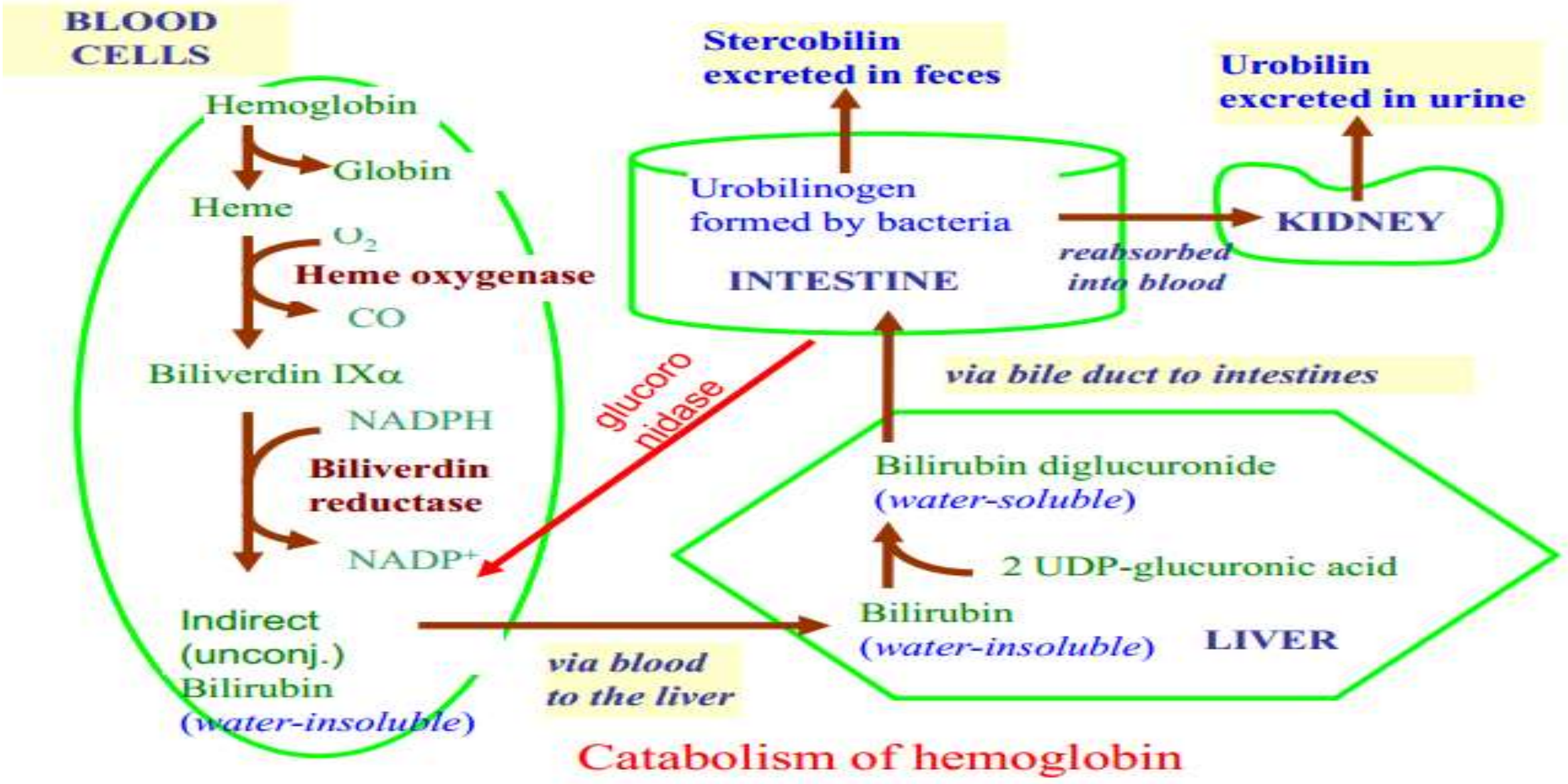
bilirubin (unconjugated or indirect)

↓

Uridine diphosphate glucornyl transferase ---------- INSIDE LIVER

↓

Bilirubin glucuronide (conjugated bilirubin or direct bilirubin)



Catabolism of hemoglobin

Mechanism of neonatal jaundice

- 1.Increased bilirubin load – due to high hemoglobin concentration
  - ❖The normal newborn infants
  - ❖Hemolysis
  - ❖Cephalohematoma or bruising , polycythemia

2. Problem in bilirubin conjugation
   - ❖Decreased UGT(uridine glucuronyl activity)
   - ❖Deficiency UGT enzyme

3. Defective bilirubin excretion

Types of bilirubin

- I. Unconjugated bilirubin(indirect)

➢ Binds to albumin

➢ Fat soluble

➢ Can cross blood brain barrier

➢ Toxic in high level to brain

- *II. Conjugated bilirubin(Direct)*

➢ Conjugated with glucoronic acid

➢ Water soluble

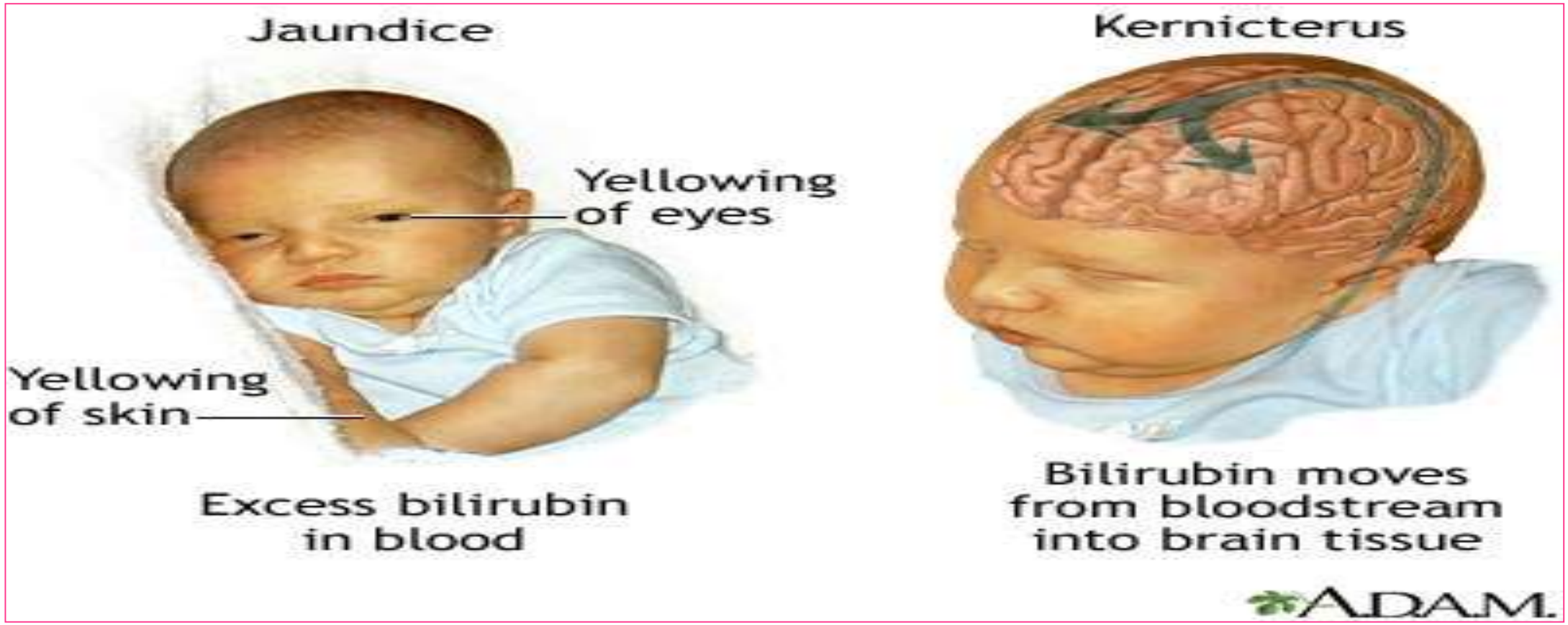
➢ Excreted in urine & stool

➢ Non toxic

Investigations

- Bilirubin measurement
- CBC
- Hgb
- Blood group & RH factor

Clinical Manifestation



Treatment

- **Phototherapy**

- **Exchange transfusion**: if the bilirubin level is highly elevated
- **Antibiotics**
- **Anti-malarias**

Neonatal sepsis

- **Sepsis:** any *systemic bacterial infection* in the first 28 days of life documented by a positive culture
- **ETIOLOGY** – Escherchia coli, GBS, Listeria monocytogenes
- Others include s.pneumonia, klebsiella, pseudomonas aeruginosa..

Classification

I. According to the time of onset:

1. Early onset neonatal sepsis (EONS): from birth to 120 hours (5 days)
2. Late onset neonatal sepsis (LONS): after 5 days to 2 months

II. According to culture result:

1. Proved or confirmed sepsis: clinical findings with positive culture
2. Suspected or probable sepsis: sign & symptom of sepsis but negative culture

Classification ...

III. According to the severity of sepsis (staging)

1. Systemic inflammatory response syndrome (SIRS)

- **Characteristics**
  - ✓ Temperature ≥ 37.5ºc or ≤36.5ºc
  - ✓ AHB ≥160 beats/minute
  - ✓ RR ≥60/minute
  - ✓ WBC ≥20x10^3 & Increased ESR

2. Sepsis: SIRS + positive culture

Classification ...

3. Grave sepsis or septicemia:

- Sepsis + serious S/S of sepsis like:
- Metabolic disorder (acidosis, persistent hypoglycemia, etc.)
- Fluid & electrolyte imbalance
- Neurological impairment
- Poor perfusion
- Bleeding disorder (anemia, thrombocytopenia, pancytopenia, DIC, etc

Classification ...

4. Septic shock: grave sepsis (septicemia) + hypotension or shock associated with organ dysfunction (could respond to proper therapy)
5. Overwhelming sepsis: septic shock + multiple organ failure which does not respond to any therapy

Early Onset Neonatal Sepsis (EONS)

- EONS is caused by organisms prevalent in the *maternal genital tract* or in the labor room and maternity operation theatre
- In developing countries most cases are due to E coli, GBS, Klebsiella, group D and other Entrobacter species

EONS-risk factors

- Gestational age: more in *premature* neonates but does not exclude term neonates
- Birth weight: more common in *LBW*, *VLBW*, *ELBW* but does not exclude normal weights or overweights
- Prenatal maternal history: fever, vaginosis, UTI, etc
- Perinatal conditions: lots of manipulation, prolonged labor, etc
- Chrioamnionitis

EONS- sign & symptoms

- Hypothermia or hyperthermia
- Hypoglycemia
- Failure to suck
- Respiratory distress, apnoea, cyanotic episodes
- Unexplained jaundice
- Skin rashes
- Seizure, and in severe cases bleeding disorders

Investigations

- Ward routine: blood group, RH factor, blood glucose, Hct, Hgb
- CBC with differentials (specially absolute neutrophil count)
- Blood culture
- Chest X-ray
- Electrolytes & blood gas

Management

1.General management:

- Maintenance of normal body T^0 (kangaroo mother care).
- Oxygen administration
- Careful regulation of fluids, electrolyte or acid-base imbalance.
- Blood transfusion may be needed to correct anemia, and shock.

Management ...

2. Antibiotics

❑ **Indications**

- Any neonate with risk factors & clinical features of sepsis

❑ **Initially:** 1st line antibiotics (GBS, E. Coli, Listeria)

- Ampicillin 100 to 200mg/kg/dose every 12 hours
- Gentamycin 3 to 7.5mg/kg/d in two divided doses

Antibiotics ...

- **After 24 hours:** review clinical progress & microbiology results
  a. If cultures negative, consider stopping therapy
  b. Continue therapy if cultures positive or sepsis very likely
  c. Add **Metronidazole** if suspicion of anaerobic infection (e.g. Intra-abdominal sepsis, NEC)
  d. Consider **Vancomycin** for Coagulase negative Staphylococcal sepsis, especially if neonate is very sick
  e. Change to **Cefotaxime** if there is neonatal meningitis

Antibiotics ...

Infection type	Duration (days) of therapy
Pneumonia	5-7
Septicemia	7-10
UTI	7-10
Meningitis	14-21
Skin conditions	5-14
Conjunctivitis	5-7
Oral thrush	7-10

Consecutive follow up

- Record daily progress of S/S
- Control temperature
- Control fluid and electrolyte balance
- Monitor input & output, weight, glycaemia
- Control Hct
- Oral feeding

Late Onset Neonatal Sepsis (LONS)

- **Types**

1. Community acquired infections
2. Hospital acquired infections

- **Causes**

- S. aureus ,GBS, gram negatives like E. Coli & Klebsiella, Streptococcus pneumonia, Neisseria meningitides, Listeria, Candida albicans, etc

Common presenting clinical diseases

- Acute gastro enteritis (AGI)
- Pneumonia
- Skin infection
- Meningitis
- UTI

Investigations

- CBC with ESR
- Blood culture
- CSF analysis
- According to the clinical presentation: gram stain of different specimen (urine, stool, CSF, pus or other fluid)
- According to onset or clinical stage: blood gas analysis, BUN and creatinine, LFT , and electrolytes

Management

- General management and follow up are the same as EONS
- Specific management depends on:
  - ✓Culture & sensitivity result
  - ✓Condition of the neonate
- All suspected cases of meningitis should be treated with high dose of proper antibiotics
- If there are skin infections, start *cloxacillin* immediately
- If the neonate looks critical, treat with 2nd line antibiotics

Assignment 1

Read and take note about

I. LBW & prematurity

– The cause, characteristics & nursing care

II. Organization of NICU


QUESTION???

Thank you so much!