TRAINING

ON

NEONATOLOGY

SILVANA PARIS

RESUSCITATION IN DELIVERY ROOM

INTRODUCTION

THE GLOBAL

RESUSCITATION BURDEN

IN NEWBORN

136 MILL NEWBORN BABIES EACH YEAR
(WHO WORLD REPORT)

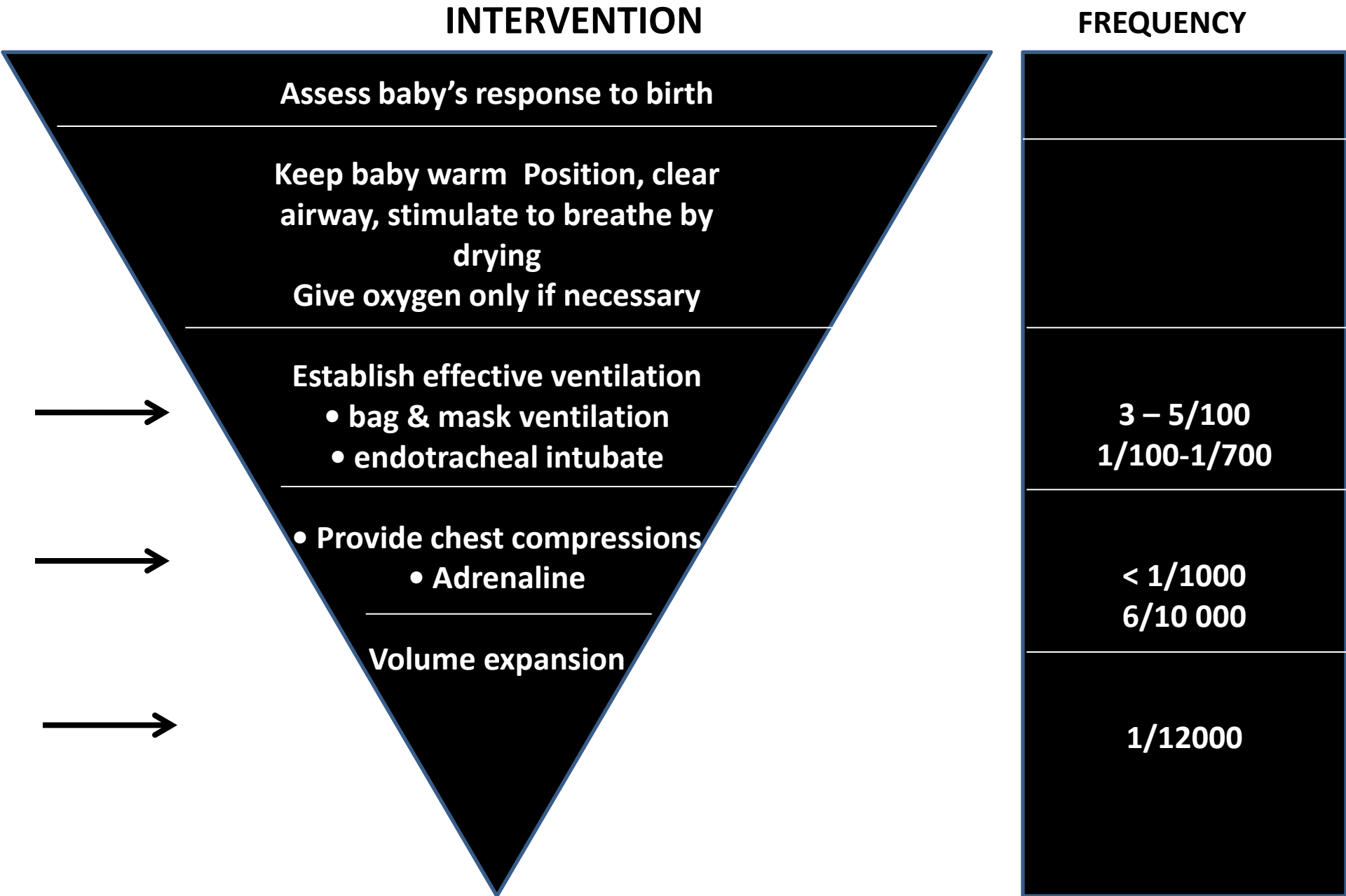
5-8 MILL NEWBORN INFANTS NEED RESUSCITATION
5% MODERATE RESUSCITATION

AND

1% (1,3 MILLION) EXTENSIVE RESUSCITATION

OPTIMAL RESUSCITATION METHODS MAY SUBSTANTIALLY REDUCE MORTALITY

INTERVENTIONS IN TERM OR NEAR TERM NEWBORN IN THE DELIVERY ROOM



P-BSL

P-ALS

P-BLS

PEDIATRIC BASIC LIFE SUPPORT

P-ALS

PEDIATRIC ADVANCED LIFE SUPPORT

DEFINITION

Basic Life Support

Has been defined like a method for

"…the preservation of life"

by the initial establishment of and /or maintenance of

airway, breathing and circulation,

in case of emergency care

For every step it' is need

EVALUATION → ***ACTION***

BLS/ALS SEQUENCE

CHECK FOR

- A AIRWAYS
- B BREATHING
- C CIRCULATION

BLS

- D DRUGS/DEFIBRILLATION

ALS

GENERAL PRINCIPLES

OF

NEONATAL RESUSCITATION

A *PERSON SKILLLED* IN RESUSCITATION OF THE NEWBORN SHOULD BE PRESENT AT THE DELIVERY OF ALL HGH-RISK INFANTS

THERE IS *NO TIME FOR INDECISION*, YET AN INCORRECT DECISION CAN BE TRAGIC

SUCCESSFUL PERFORMANCE IN THIS SITUATION INVOLVES *KNOWLEDGE* OF PERINATAL PHYSIOLOGY AND PRINCIPLES OF RESUSCITATION

GOALS

OF RESUSCITATION

→

EXPANSION OF THE LUNGS **(A AIRWAYS)**

BY CLEARING THE UPPER ARIWAY AND ENSURING A PATENT ROUTE TO THE TRACHEA

→

ALVEOLAR VENTILATION **(B BREATHING)**

INCREASING THE ARTERIAL PO2 BY PROVIDING OXYGEN IF NECESSARY

ADEQUATE CARDIAC OUT **(C CIRCULATION)**

MINIMIZE THE OXYGEN CONSUMPTION

BY REDUCING HEAT LOSSES IN THE IMMEDIATE POSTPARTUM PERIOD

STAFF FOR NEONATAL RESUSCITATION

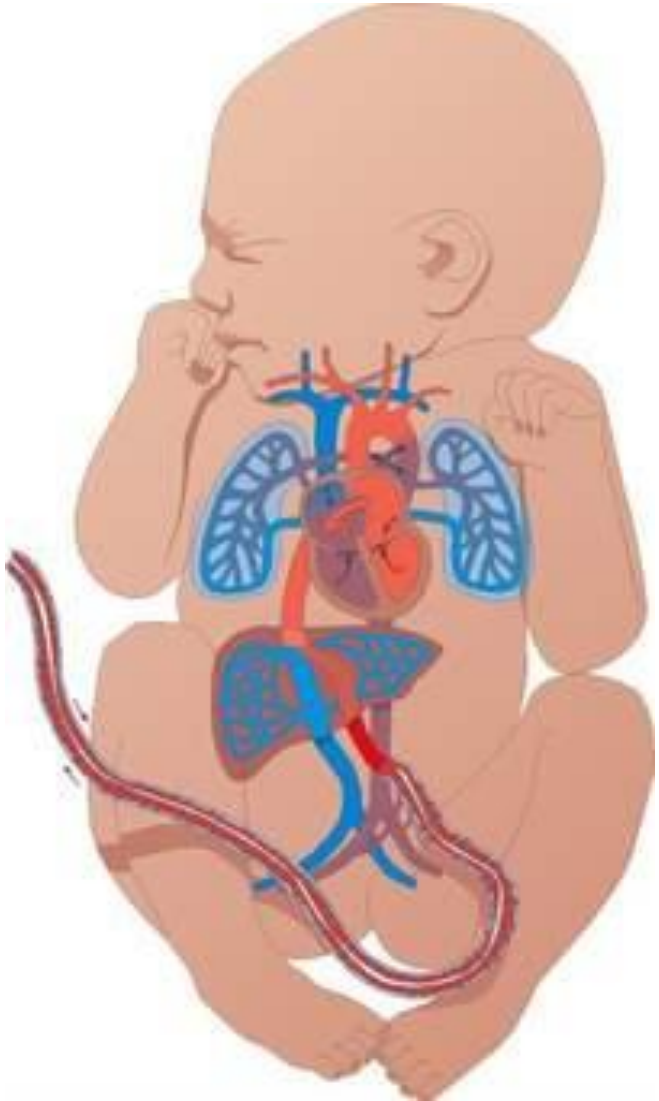
- ***MEDICAL OFFICERS***

- ***NEONATAL INTENSIVE CARE NURSES***

- ***MIDWIVES***

PHYSIOLOGY

FETAL-NEONATAL CIRCOLATION



ADULT BLOOD CIRCULATION

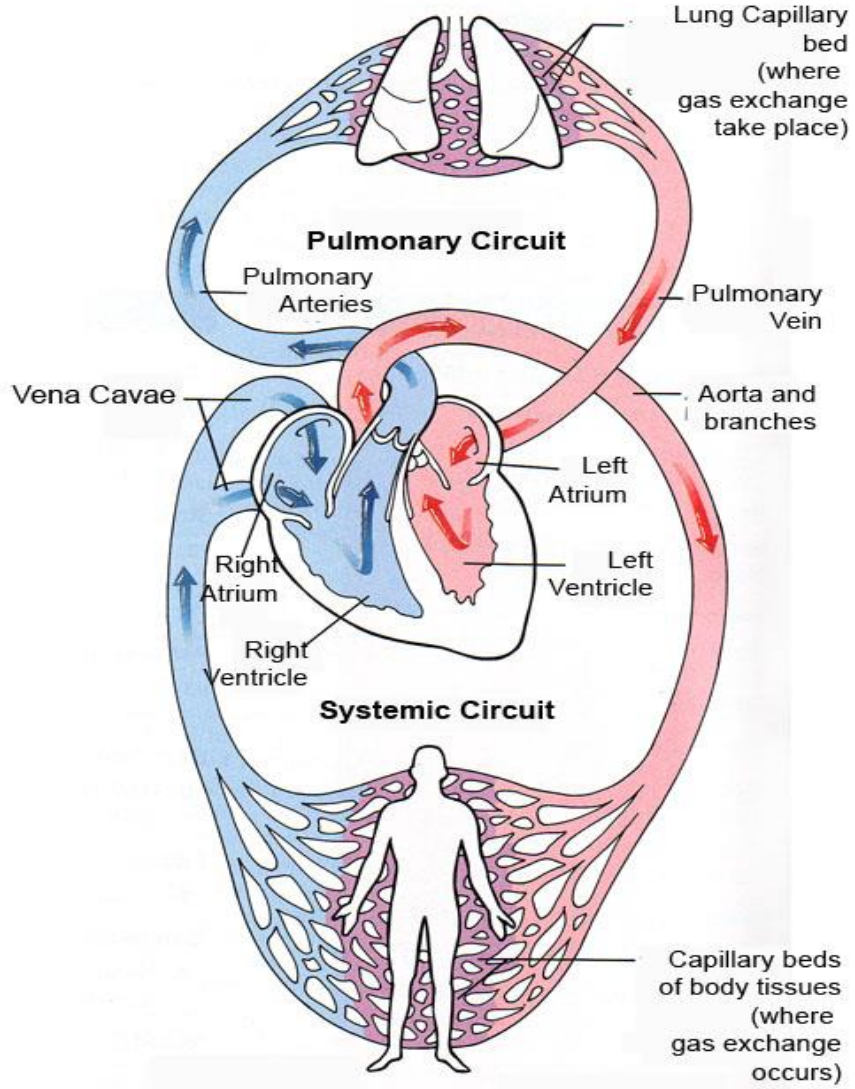


Image from **Human Anatomy** by Elaine.N.Marieb 4th edition

The heart pumps blood into two closed circuits – the systemic circulation and the pulmonary circulation with each beat. The two circuits are arranged in series: The output of one becomes the input of the other

The left side of the heart is the pump for the *systemic circulation*;

In systemic tissues, exchange of nutrients and gases occur at capillary bed level. Blood unloads oxygen and picks up carbon dioxide from tissues

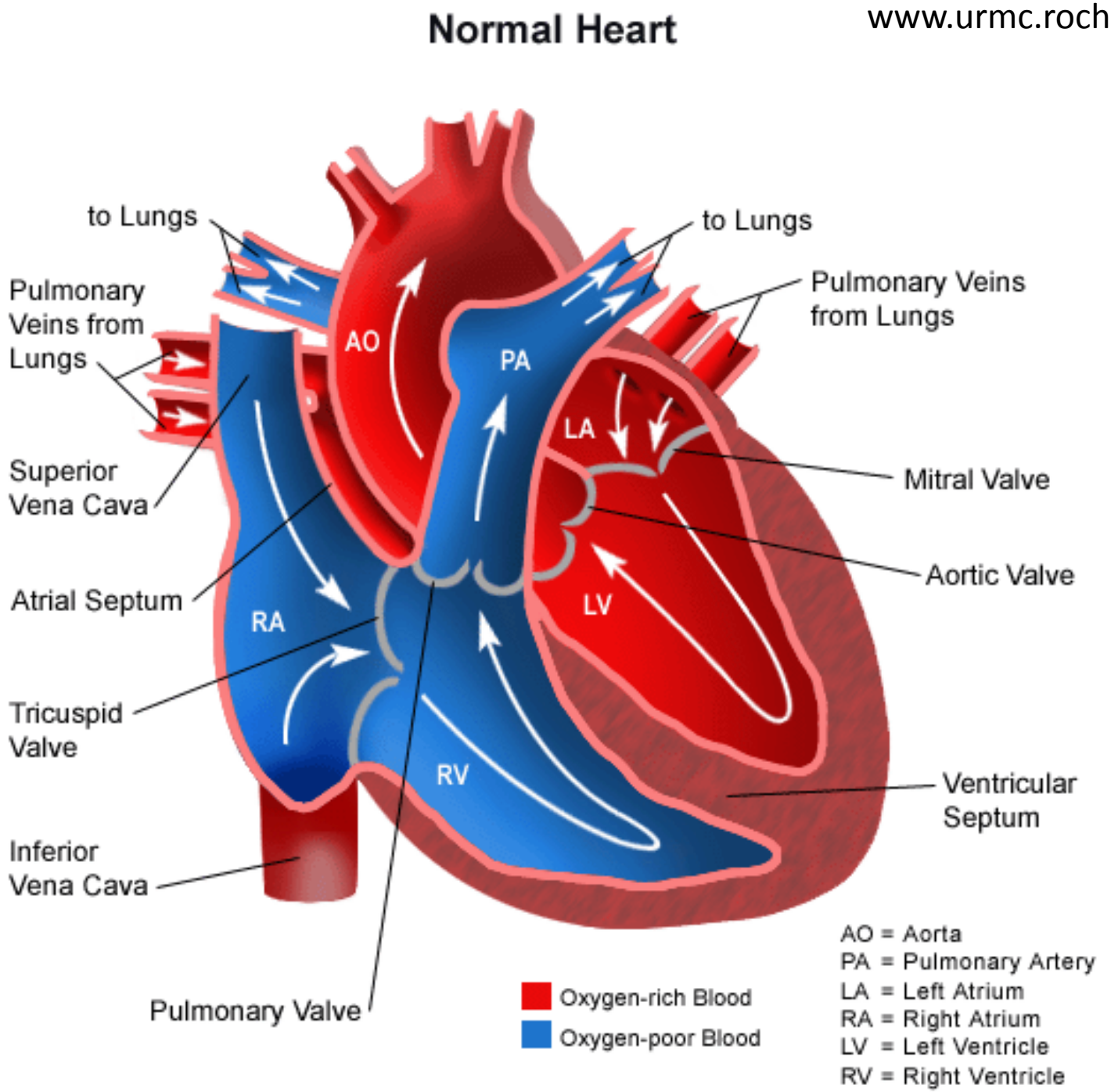
The right side of the heart is the pump for the *pulmonary circulation*; it receives all the dark red, deoxygenated blood returning from the systemic circulation.

Blood ejected from the right ventricle into the pulmonary arteries that carry it to the right and left lungs.

Gas exchange occurs across these capillaries, and newly oxygenated blood enters venules and progressively larger veins

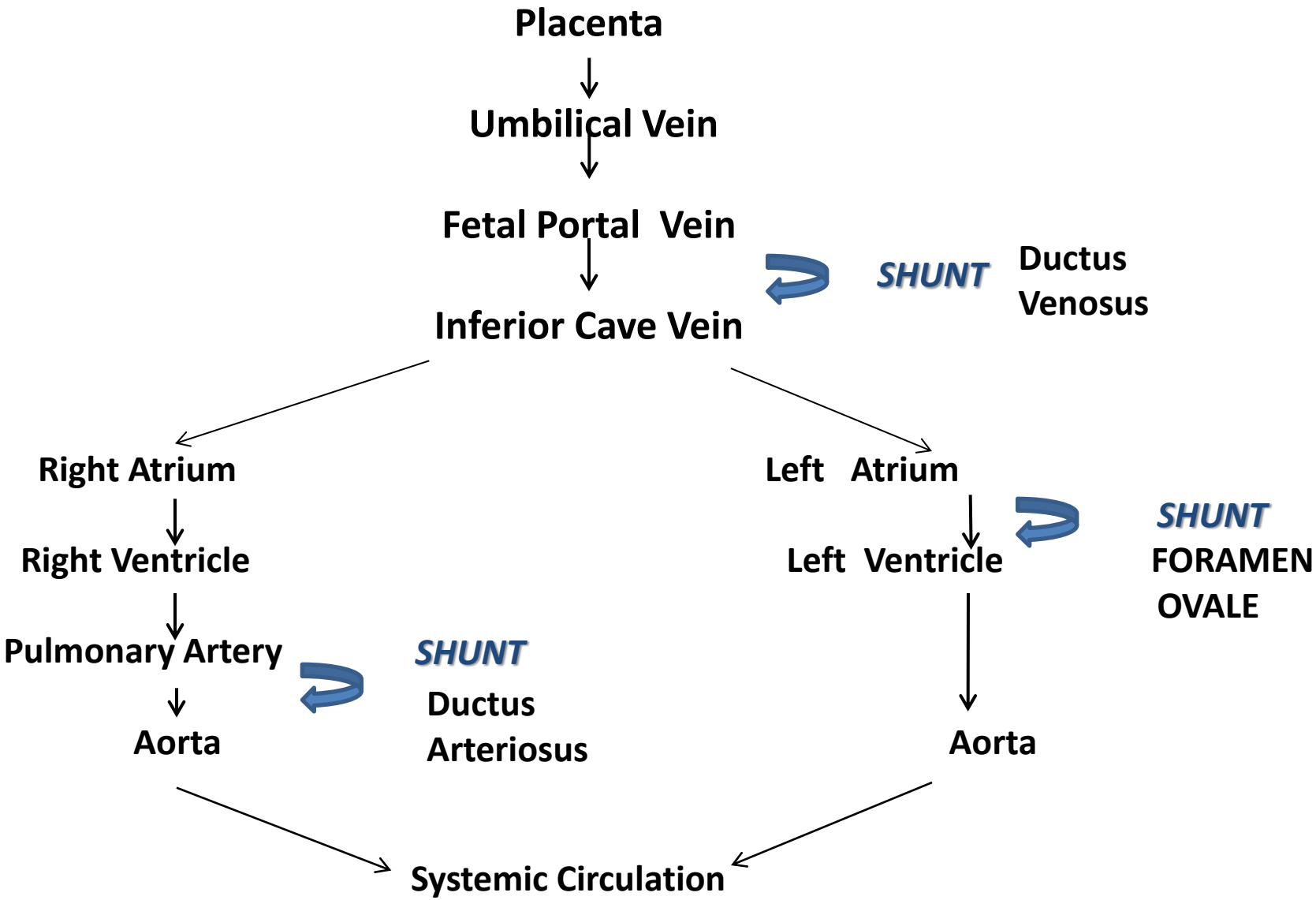
The freshly oxygenated blood flows into four pulmonary veins and return to the left atrium of the heart.

www.urmc.rochester.edu/Encyclopedia



ADULT BLOOD CIRCULATION

FETAL CIRCULATION



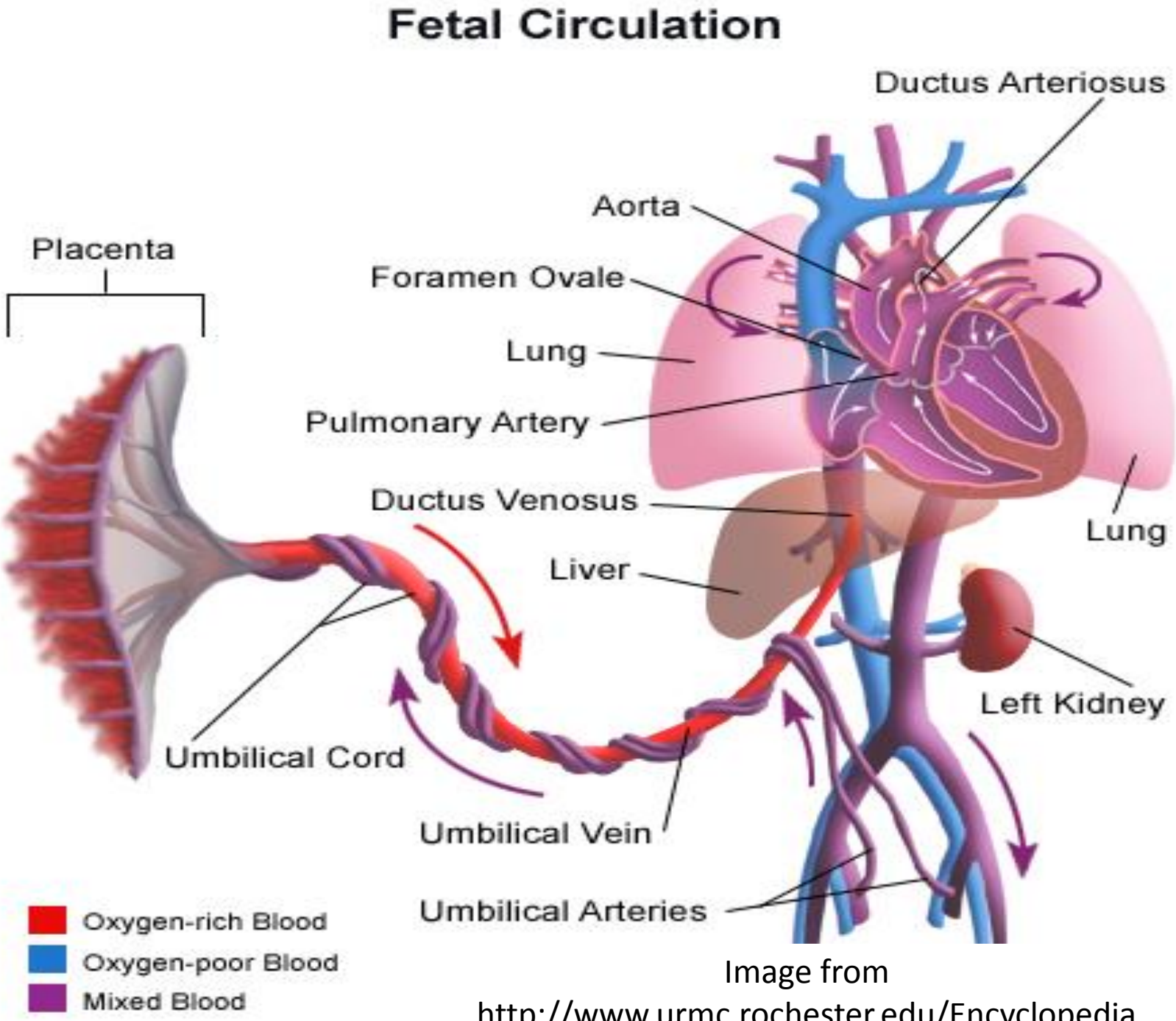


Image from
http://www.urmc.rochester.edu/Encyclopedia

THE PHYSIOLOGICAL CHANGES DURING TRANSITION

FROM

FETAL LIFE

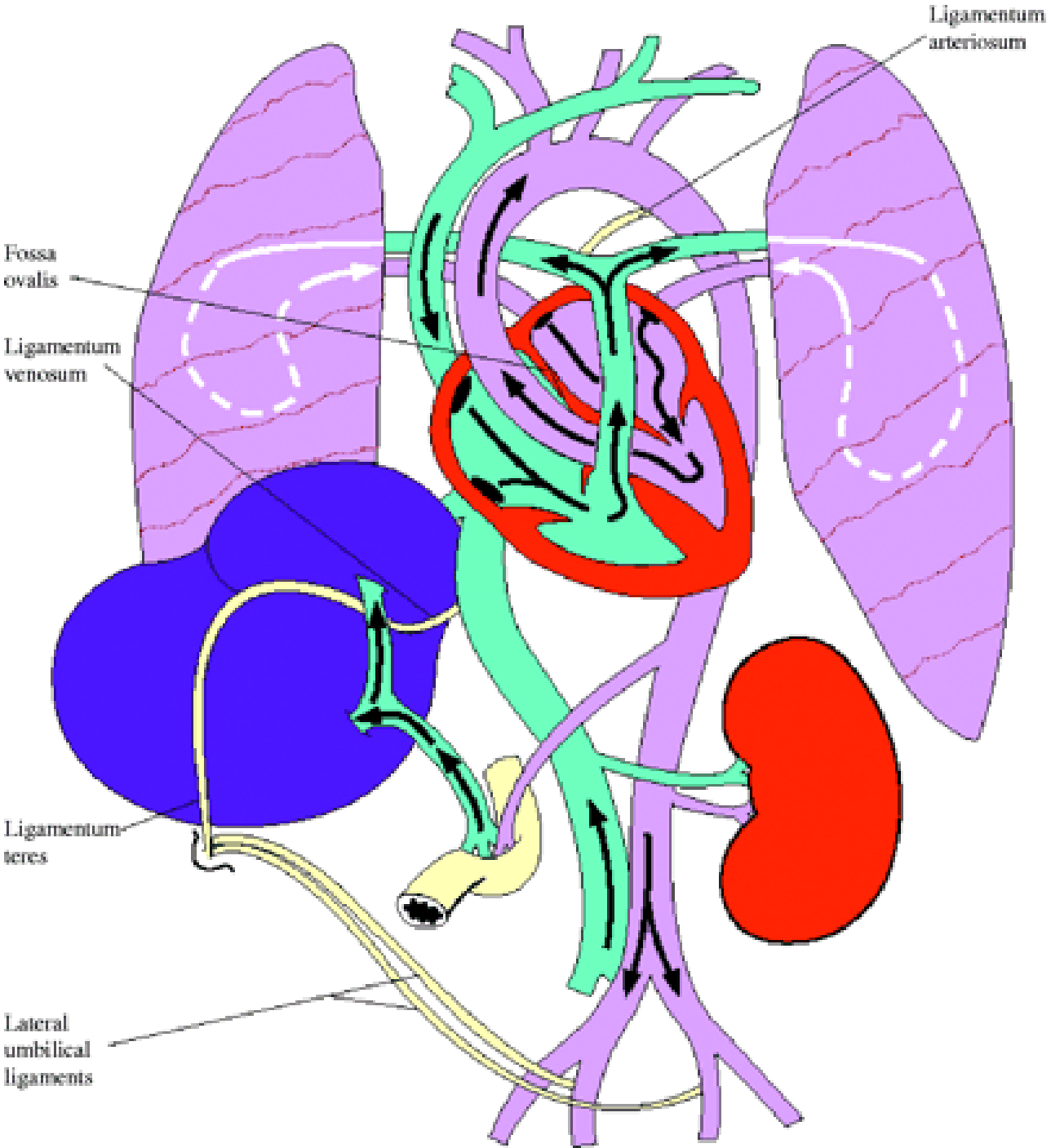
TO

NEONATAL LIFE

CIRCULATORY CHANGES

When ***cord is clamped*** and placenta is no longer part of system

- **LEFT HEART PRESSURE *INCREASE***
- **RIGHT HEART PRESSURE *DROPS***
- **SHUNTS CLOSE**
- **EXPANSION OF THE LUNGS**
- **ESTABLISHMENT OF AFFECTIVE AIR EXCHANGE**

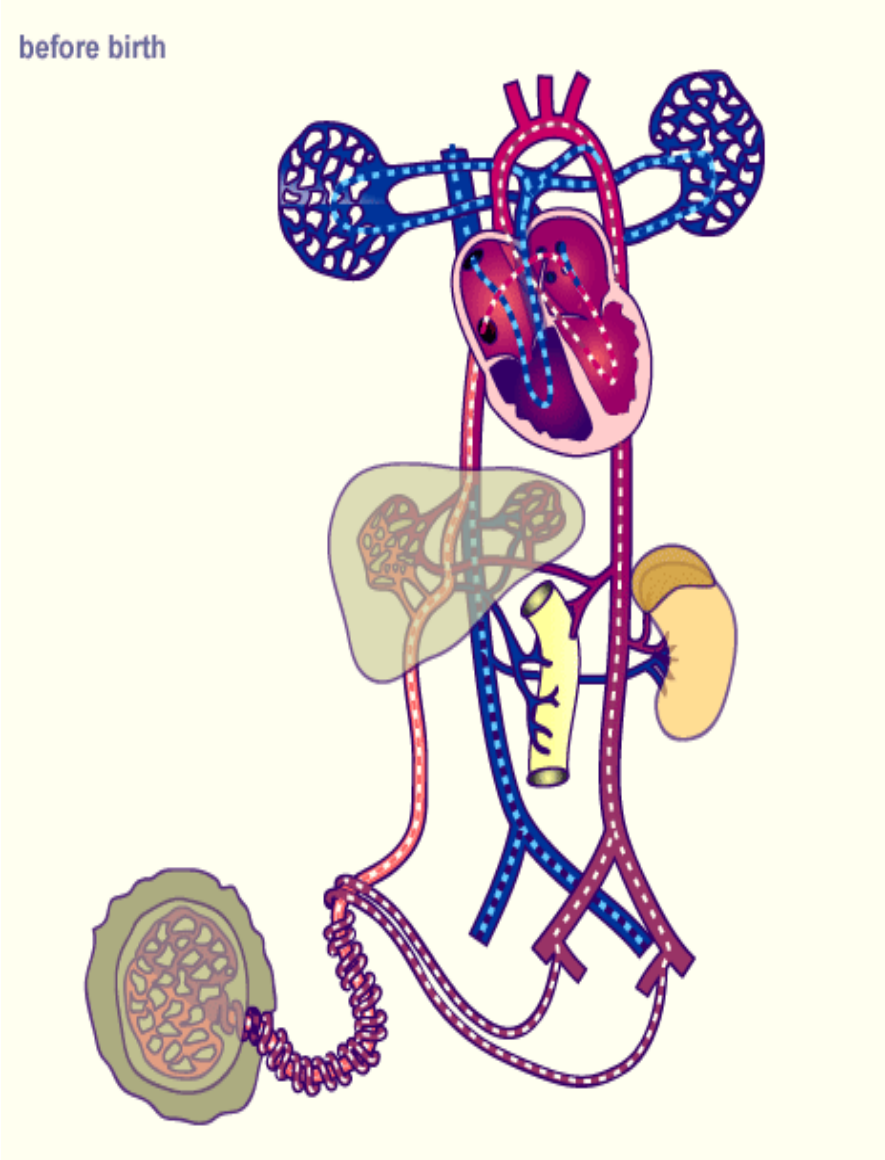


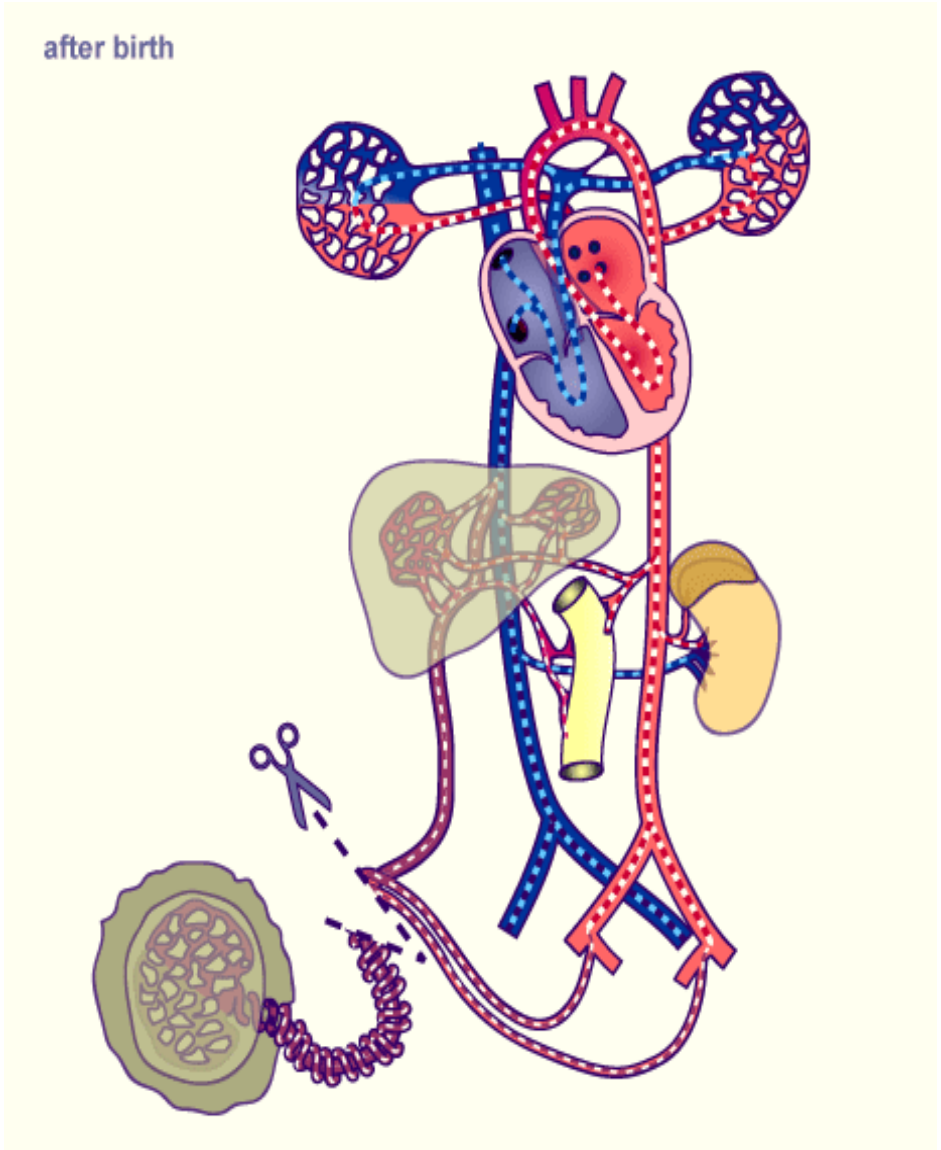
POSTNATAL CIRCULATION

IMAGE FORM
OXFORD JOURNAL.ORG

PRE-POST NATAL CIRCULATION

IMAGES FROM WWW.EMBRYOLOFY.CH





THE CHANGE FROM FETAL TO POSTNATAL CIRCULATION HAPPENS VERY QUICKLY
CHANGES ARE INITIATED BY BABY'S FIRST BREATH

FORAMEN OVALE	***CLOSES SHORTLY AFTER BIRTH, FUSES COMPLETELY IN FIRST YEAR***
DUCTUS ARTERIOUSUS	***CLOSES SOON AFTER BIRTH, BECOMES LIGAMENTUM ARTERIOUSUM IN ABOUT 3 MONTHS***
DUCTUS VENOSUS	**LIGAMENTUM VENOSUM**
UMBILICAL ARTERIES	**MEDIAL UMBILICAL LIGAMENTS**
UMBILICAL VEIN	**LIGAMENTUM TERES**

WHEN THE INFANT IS BORN

A CONTINUAL PROCESS

OF EVALUATION

AND EVENTUALLY

RESUSCITATION BEGINS

NO ASPHYXIA
APGAR OF 8 TO 10

➢ ***ROUTINE CARE***

MILD ASPHYXIA
APGAR SCORE OF 5 TO 7

- ✓ **INFANTS MILD DEPRESSED**
- ✓ **THE GOAL IS TO INDUCE THE BABY TO TAKE A SPONTANEOUS BREATH TO ACHIEVE LUNG EXPANSION AND ESTABLISH A FUNCTIONAL RESIDUAL CAPACITY (FRC)**

➢ ***STIMULATION***

➢ ***OXYGEN***

IF IT IS NEED

MODERATE ASPHYXIA
APGAR SCORE OF 3 TO 4

✓ **HEART RATE**

< 100 BEATS /min > 60 BEATS/ min

(DESPITE STIMULATION AND FACIAL OXYGEN)

➢ **BAG AND MASK VENTILATION SHOULD BE STARTED**

SEVERE ASPHYXIA
APGAR SCORE OF 0 TO 2

THESE INFANTS REQUIRE IMMEDIATE AND VIGOROUS RESUSCITATION

THIS PROCESS REQUIRES AT LEAST THREE TRAINED PEOPLE WORKING TOGETHER SWIFTLY AND EFFICIENTLY

SEVERE ASPHYXIA

APGAR SCORE OF 0 TO 2

HR <60/min

(DESPITE THE BAG VENTILATION)

START

- **CHEST COMPRESS**

AND

- **DRUGS IF IT IS NEED**

EXENTIAL RESUSCITATION DRUGS

- **ADRENALINE 1:10,000**
- **VOLUME EXPANDERS:**

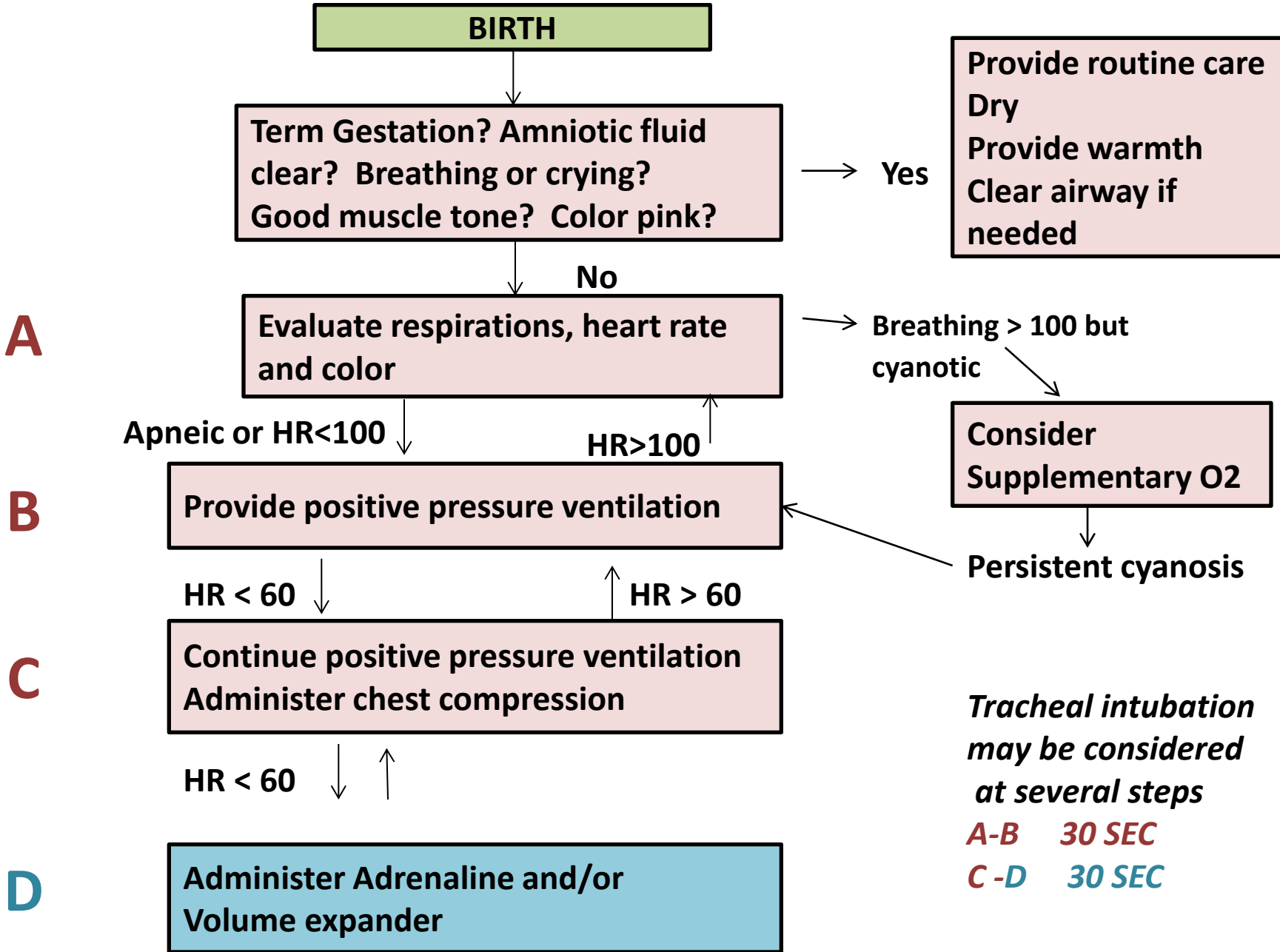
NORMAL SALINE / (BLOOD O-NEG)

- **NALOXONE**

ILCOR/AHA RESUSCITATION ALGORHYTM

A **Airways**	**Initial steps of stabilisation (assess the airways, positioning, stimulating, dry and provide warmth)**
B **Breathing**	**Ventilation** **(including bag-mask or bag -tube ventilation)**
C **CirculatIon**	**Chest compressions**
D **Drugs**	**Medications or volume expansion**

RESUSCITATION ALGORHYTM



CESSATION OF RESUSCITATION

If after *20 minutes* of resuscitation the baby is

Not breathing and pulse is absent

cease efforts

Explain to the mother that the baby has died, and give it to her to hold if she wishes

POST RESUSCITATION

CARE

REPORT AND RECORD EVENTS ACCURATELY

NEWBORNS *INTUBATED AND EXTUBATED AT DELIVERY*
REQUIRES *OBSERVATION FOR AT LEAST 2 HOURS*

NEWBORNS WHO *RECEIVED NALOXONE AT BIRTH REQUIRE*
OBSERVATION FOR AT LEAST 4 HOURS

NEWBORNS WHO *REQUIRED RESUSCITATION* ARE AT RISK
MONITOR VITAL SIGNS AND HYPOGLYCAEMIA, CONSIDER
NEED FOR ANTIBIOTICS

INSERT AN OROGASTRIC TUBE (SIZE 8 FG) TO ASPIRATE AND DECOMPRESS THE STOMACH OF ANY NEWBORN THAT REQUIRED PROLONGED VENTILATION

NEONATAL RESUSCITATION DRUGS

ADRENALINE 1:10,000 SOLUTION

ADRENALINE

1:10,000 solution = 0.1ml contains 10mcg of adrenaline

Dose: 0.1- 0.3ml/kg of 1:10,000 IV

Repeat intravenously, when indicated *at 3-minute cycle*

Flush 1 ml Normal Saline after each intravenous administration

It is indicated when the heart rate remains <60 after 30 seconds of adequate ventilation and chest compressions solution administered via the endotracheal route until the intravenous route is established

VOLUME EXPANDERS I

NORMAL SALINE

Dose: 10ml/kg IV

Slow push over 5-10 minutes

(optimally via free-flowing umbilical venous catheter)

It is indicated in an infant where there is suspected blood loss or the infant appears pale, poor perfusion, weak pulse and has not responded adequately to other resuscitative measures

EMERGENCY O-NEG BLOOD

it is indicated for emergency transfusion in the setting of massive blood loss

NALOXONE 0.4mg/ml SOLUTION

NALOXONE

Dose: 0.1mg/kg of a 0.4mg/ml solution IM/IV

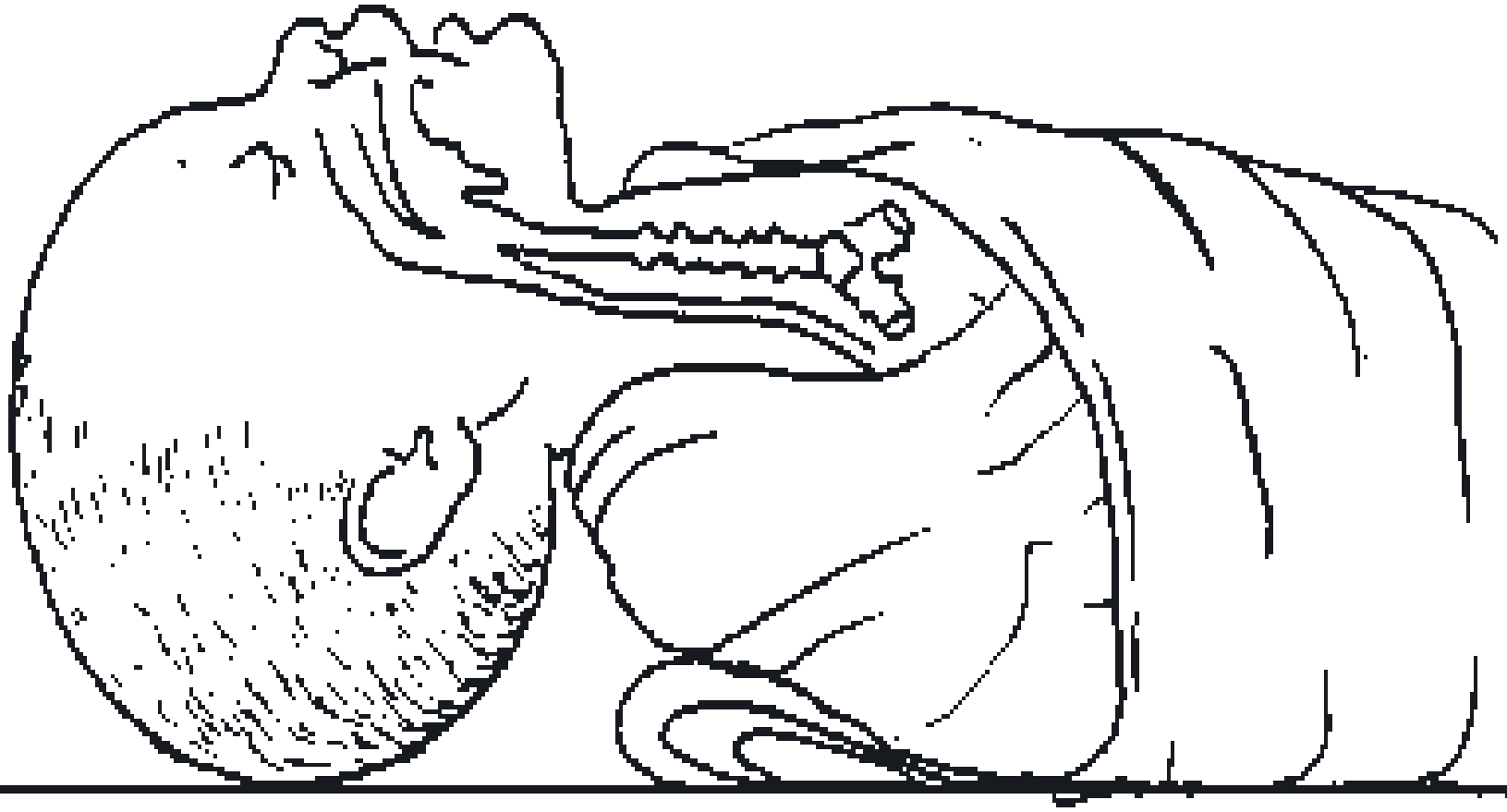
It is indicated to reversal of respiratory depression in a newly born infant whose *mother received narcotics*

within 4 hours of birth. It is important to establish and maintain adequate ventilation and circulation before administration of naloxone

- ***DO NOT* administer Naloxone to infants born to women suspected of narcotic dependence. This may cause abrupt withdrawal and seizures**

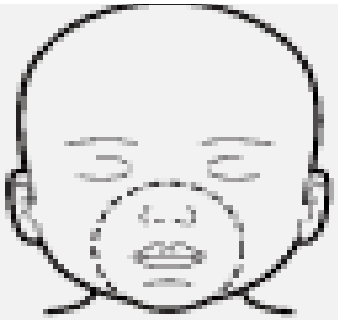
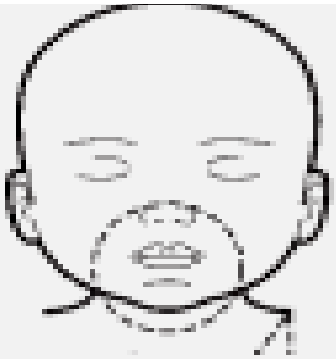
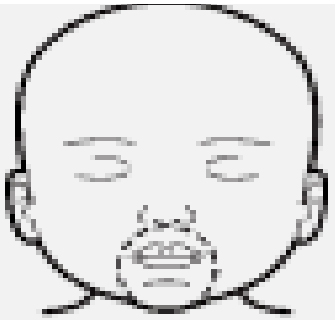
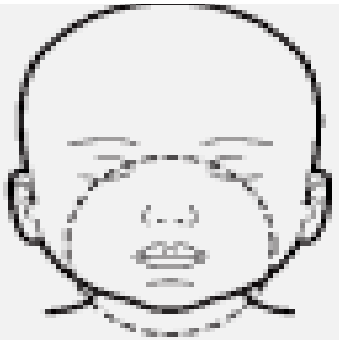
Correct position of the head for ventilation

<neutral position>



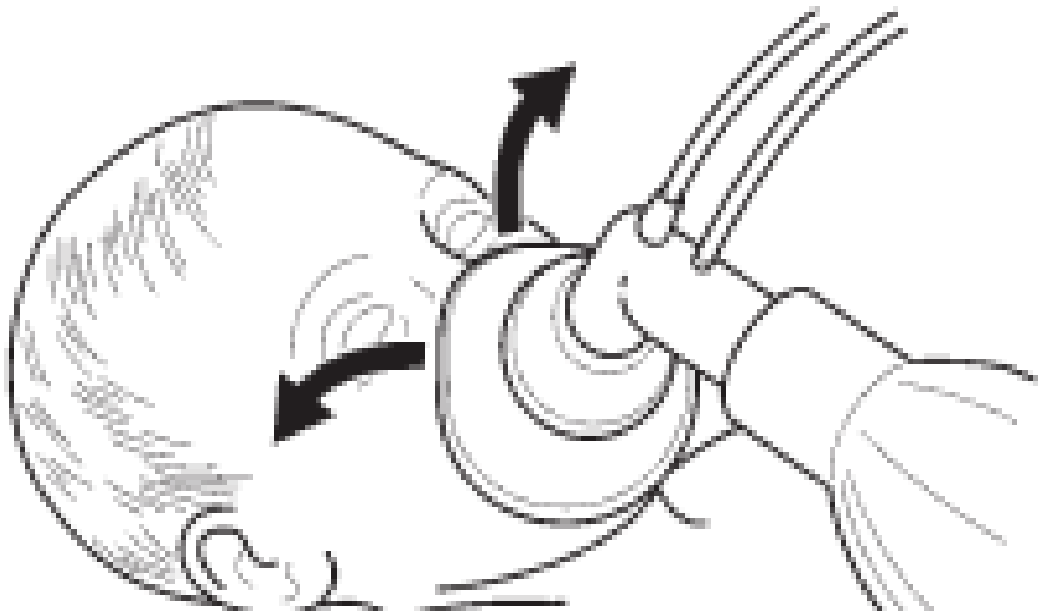
FROM WHO POCKET BOOK

Fitting mask over face

right size and position of mask	mask held too low	mask too small	mask too large
			
right	**wrong**	**wrong**	**wrong**

FROM WHO POCKET BOOK

Inadequate seal
If you hear air escaping from the mask, form a better seal. The most common leak is between
the nose and the cheeks



FROM WHO POCKET BOOK

Ventilating a neonate with bag and mask
Pull the jaw forward towards the mask with
the third finger of the hand holding the mask
Do not hyperextend the neck

FROM WHO POCKET BOOK

KEY TO SUCCESSFUL RESUSCITATION

- ANTICIPATE (EQUIPMENT)
- BE PREPARED (RECOGNIZE RISK FACTORS)
- KNOW WHAT TO DO (BE GENTLE AND FAST)
- IN WHAT ORDER (ABCD SUPPORT)
- BE ABLE TO WORK QUICKLY IN COORDINATION
- DOCUMENT/RECORD
- MAINTAIN HYGIENE
- REMEMBER MOTHER

ILCOR Guidelines Newborn Resuscitation
Changes from 2005 -2010

- **Timing the first 60 seconds only**
- **Progression to the next step following initial evaluation is defined by heart rate and respiration**
- **For babies born at term it is best to begin resuscitation with air rather than 100% oxygen**
- **Evidence does not support or refute routine endotracheal suctioning of infants born through meconium-stained amniotic fluid, even when the newborn is depressed**
- **Chest compression - ventilation ratio 3:1 unless the arrest is known to be of cardiac etiology. Then higher ratio should be considered (15:2)**
- **Hypothermia in moderate to severe HIE**

THNKS FOR ATTENTION