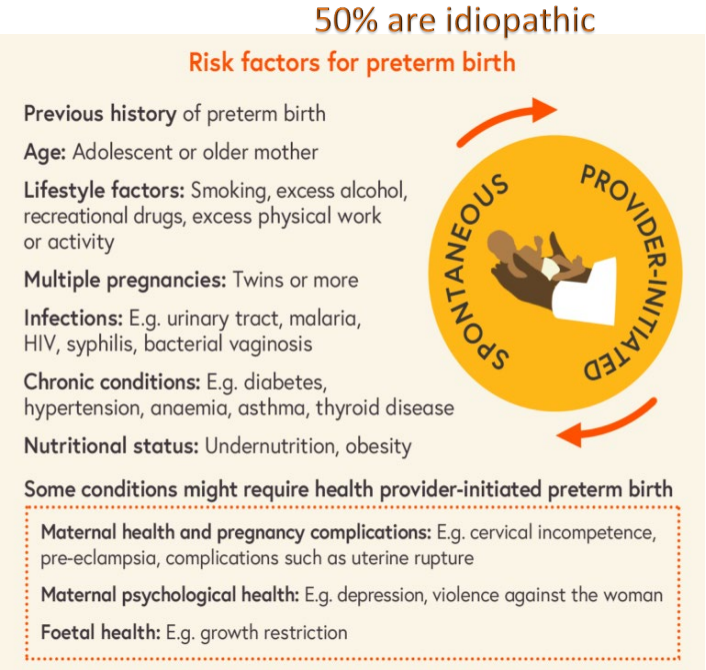
9. Preterm Baby

- Delivery before the **37th** week of gestation from the first day of LMP.
- Prematurity is the **2nd** leading cause of neonatal mortality in Jordan.
- The incidence of preterm is 8 – 12 %.

- Extreme prematurity: less than 28 weeks of gestation.
- Late-preterm infants: 34^{+0} to 36^{+6} weeks of gestation.
- Early term infants: 37^{+0} to 38^{+6}
- Full term: 39^{+0} to 40^{+6}
- Late term: 41^{+0} to 41^{+6}
- Post-term: > 42 weeks

- Large for gestational age: > 90th percentile.
- Small for gestational age: < 10th percentile.

- Low birth weight: < 2.5 kg
- Very low birth weight: < 1.5 kg
- Extreme low birth weight: < 1.0 kg



Characteristics of prematurity

- Small <2.5 Kg, Low body fat
- The skin is thin, gelatinous, pink or red, shiny, able to see veins
- Little scalp hair, Ear cartilages are poorly developed, soft and poor recoil
- Weak cry
- Weak body tone (extended posture)
- Weak reflexes (Moro, suckling, grasp)
- Small and underdeveloped genitals
- Breast nodule small or absent

Prevention

- Smoking cessation, Folic acid supplement
- Family planning and avoid implantation of multiple embryos
- Cervical cerclage, prior PTB, if the transvaginal ultrasound CL shortens to < 25 mm at < 24 weeks
- Steroids, Magnesium Sulphate (MgSO4)
- 17-a-hydroxyprogesterone, starting at 16-20 weeks until 36 weeks as it decreases the risk of recurrent preterm births by 33%

Management

- ✓ Tocolytics
- ✓ Antenatal corticosteroids
- ✓ Antibiotics for PROM
- ✓ Keep premature babies warm (24˚C)
- ✓ Transfer to pre-heated incubator
- ✓ Delay cord clamp by 30 – 60 seconds to maintain normal BP
- ✓ CPAP with pressure not more than 7 mmHg

Acute Complications

1. Hypothermia

- **Causes:**
  High surface area to volume ratio, Thin non-keratinized skin, Lack of insulating subcutaneous and thermogenic brown fat, Born wet at cold environment, Inability to shiver and Poor vasomotor response.
- **Consequences:**
  High O2 consumption ⟶ hypoxia, bradycardia
  High glucose usage ⟶ hypoglycemia / decreased glycogen stores
  High energy expenditure → reduced growth rate, lethargy, hypotonia, poor suck/cry
  Decease surfactant production ⟶ RDS
  Vasoconstriction ⟶ poor perfusion ⟶ metabolic acidosis
  Thermal shock ⟶ DIC ⟶ death

2. Respiratory

- **Immature alveoli and vascularization of the Lungs**
- **Immature musculature and insufficient calcification of bony matrix**
- **Pulmonary hemorrhage**
  - Rare bleeding into the lungs that occurs mainly 2-4 days after birth which increases the need for ventilatory support.
  - Predisposing factors: mechanical ventilation, immaturity and PDA.
- **Hyaline membrane disease (RDS)**
  - Surfactant deficiency due to immaturity of surfactant producing type II alveolar cells → Decreased compliance and decreased functional residual capacity.
  - Treatment: IV fluids, O2, mechanical ventilation, **antenatal steroids, exogenous surfactant.**

- **Apnea of prematurity:** [STABLE STAGE]
  - The cessation of breathing for > 20 seconds (apnea) or < 20 seconds if it is accompanied by bradycardia or oxygen (O2) desaturation.
  - Treatment: Rule out and treat underlying cause, if central apnea treat with caffeine, theophylline or aminophylline, if obstructive consider CPAP.

3. **Cardiovascular**

- **Patent ductus arteriosus PDA**
  - Premature infants at risk AT 24-48 hours
  - PDA shunts blood so increase flow through pulmonary circulation and decrease systemic circulation
  - Echo will confirm the diagnosis
  - Clinical picture: Apnea, Tachypnea, Heart failure, Failure to thrive
  - Treatment: Fluid restriction, NSIAD, Paracetamol, interventional catheter closure (rare surgical ligation)
- **Hypotension** Due to cardiac dysfunction, hypovolemia or sepsis

4. **Gastrointestinal**

- **Difficulty in self-feeding**: No coordination between sucking and swallowing before 34 weeks, Poor digestion
- Decrease enzymes, decrease motility >> **increase GERD**
- **Necrotizing Entero-colitis** (NEC) [STABLE STAGE]

5. **Neurological**

- **Intraventricular hemorrhage** [STABLE STAGE]: Rupture of germinal matrix due to its fragility which can lead to Post Hemorrhagic Hydrocephalus (PHH)

6. **Metabolic**

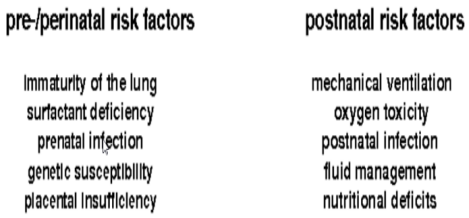
- **Dehydration** due to **fluid loss through skin** (thin skin, no Keratin, Rapid Respiratory rate, from warmer and large Surface area) and **immature kidney** (that cannot concentrate or regulate electrolytes and the buffer well)
- **Electrolyte imbalances** (Na, Ca, K)
- **Glucose imbalance** →Hyper/Hypoglycemia

7. **Infection**

- **Decrease IGs, Complement , T cell and B cell dysfunction**

Later Complications

1. **Retinopathy of prematurity (ROP)**
    - Incomplete retinal vascularisation, <32 weeks and low weight.
    - International Classification of Retinopathy of Prematurity (ICROP) according to Zone, Extent and Stage:
        1) Demarcation line
        2) Ridge
        3) Extaretinal Fibrovascular Proliferation
        4) Partial Retinal Detachment
        5) Total Retinal Detachment
2. **Chronic lung disease CLD or Broncho pulmonary dysplasia BPD**
    - **Risk Factors → Pulmonary inflammatory Response → Distorted alveolarization and Impaired vasculgenesis**



3. **Metabolic bone disease of preterm (MBDP)**
    - Decreased bone mineral content occurs mainly as a result of lack of adequate Ca & P utero supply (mainly last trimester) or intake in extra uterine life.
    - **Inestigations:** Low P, High Alk P and PTH, osteopenia, Fraying, Fracture on X-ray.
    - **Management:** Fortification of BREAst milk, Vitamin D, steroid, caffien, frusimide.PPI, Physical therapy.
4. **Periventricular leukomalacia**
    - Softening of tissues of brain around ventricles, Ischemic brain injury
5. **Anemia of prematurity**
    - **Blood loss** due to ↑ blood tests
    - **Shortened RBC lifespan** (40-60 days)
    - **Decreased RBC production** due to ↓ erythropoietin

When can a premature baby go home from the hospital?

1) Serious illnesses are resolved
2) Stable temperature
3) Taking all feedings by breast or bottle
4) No recent apnea or low heart rate
5) Parents are able to provide care including medications and feedings
6) > 35 weeks and > 1.8-2 kg