

HESI Hints and NCLEX Gems

- Answering NCLEX questions
 - Maslow's Hierarchy of Needs
 - Physiologic
 - Safety
 - Love and Belonging
 - Esteem
 - Self-Actualization
 - Nursing Process
 - Assessment
 - Diagnosis
 - Planning
 - Implementation
 - Evaluation
 - ABCs
 - Airway
 - Breathing
 - Circulation
- Normal Values
 - Hgb
 - Males 14 – 18
 - Females 12 – 16
 - Hct
 - Males 42 – 52
 - Females 37 – 47
 - RBCs
 - Males: 4.7 – 6.1million
 - Females: 4.2 – 5.4 million
 - WBCs
 - 4.5 – 11K
 - Platelets
 - 150 – 400K
 - PT (Coumadin/Warfarin)
 - 11 – 12.5 sec
 - INR and PT TR = 1.5-2 times normal)
 - aPTT (Heparin)
 - 60 – 70 sec
 - BUN: 10 – 20
 - Creatinine: 0.5 – 1.2
 - Glucose: 70 – 110
 - Cholesterol: <200
 - Bilirubin newborn: 1 – 12
 - Phenylalanine
 - Newborn: <2
 - Adult: <6
 - Na: 135 – 145
 - K: 3.5 – 5.0
 - Hypokalemia: Prominent U waves, Depresses ST segment, Flat T waves
 - Hyperkalemia: Tented T waves, prolonged PR interval, wide QRS

- Calcium: 9 – 10.5
 - Hypocalcemia: muscle spasms, convulsions, cramping, tetany, pos Trousseau's, pos Chvostek's, prolonged ST interval, prolonged QT segments
- Mg: 1.5 – 2.5
- Cl: 96 – 106
- Phos: 3 – 4.5
- Albumin: 3.5 – 5
- Specific Gravity: 1.005 – 1.030
- HgbA1C:
 - Ideal = 4-6%
 - Ok (120 days) <7%
- Dilantin TR: 10 – 20
- Lithium TR: 0.5 – 1.5
- Arterial Blood Gas
 - pH = 7.35 – 7.45
 - CO₂ = 35 – 45
 - HCO₃ = 22 – 28
 - O₂ = 80 – 100
 - O₂ Sat = 95 – 100%
- Antidotes
 - Digoxin – Digiband
 - Coumadin – Vit K
 - Benzos – Flumzaemil (Tomazicon)
 - Heparin – Protamine Sulfate (Keep aPTT and PTT at 1.5-2 times normal)
 - Tylenol – Mucomyst (loading dose + 17 doses)
 - Opiates (narcotics analgesics, heroin, morphine) – Narcan (naloxone)
 - Cholinergic meds (myesthenic bradycardia) – Atropine
 - Methotrexate – Leucovorin
- Delegation
 - RN only
 - Blood products (2 RNs must check)
 - Clotting factors
 - Sterile dressing changes and procedures
 - Assessments that require clinical judgment
 - Ultimately responsible for all delegated duties
 - Unlicensed Assistive Personnel
 - Non-sterile procedures
- Precautions and Room Assignments
 - Universal (Standard) Precautions – HIV initiated
 - Wash hands
 - Wear gloves
 - Gowns for splashes
 - Masks and Eye protection for splashes and droplets
 - Don't recap needles
 - Mouthpiece of Ambu-bag for resuscitation
 - Refrain from giving care if you have skin lesions
 - Droplet (Respiratory) Precautions – wear mask
 - Sepsis, scarlet fever, strep, fifth disease (Parvo B19), pertusis, pneumonia, influenza, diphtheria, epiglottitis, rubella, rubeola, meningitis, mycoplasma, adenovirus, rhinovirus

- RSV (needs contact precautions too)
 - TB (Respiratory isolation)
 - Contact Precautions = universal + goggles, mask, and gown
 - No infectious patients with immunosuppressed patients
 - Clean with clean
 - Dirty with dirty
- Misc.
 - Rifampin (for TB) – rust/orange/red urine and body fluids
 - Pyridium (for bladder infection) ... Orange/red/pink urine
 - Glasgow Coma Scale ... < 8 = coma
 - Myasthenia Gravis
 - Myasthenic Crisis = Weakness with change in vitals (give more meds)
 - Cholinergic Crisis = Weakness with no change in vitals (reduce meds)
 - Diabetic Coma vs. Insulin Shock ... Give glucose first – If no help, give insulin
 - Fruity Breath = Diabetic Ketoacidosis
 - Acid-Base Balance
 - If it comes out of your ass, it's Acidosis.
 - Vomiting = Alkalosis
 - Skin Tastes Salty = Cystic Fibrosis
 - Lipitor (statins) in PMs only – No grapefruit juice
 - Stroke
 - Tongue points toward side of lesion (paralysis)
 - Uvula deviates away from the side of lesion (paralysis)
 - Hold Digoxin if HR < 60
 - Stay in bed for 3 hours after first ACE Inhibitor dose
 - Avoid Grapefruit juice with CCBs
 - Anthrax = Multi-vector biohazard
 - Pulmonary air embolism prevention = Trendelenberg (HOB down) + on left side (to trap air in right side of heart)
 - Head Trauma and Seizures – maintain airway = primary concern
 - Peptic Ulcers
 - Feed a Duodenal Ulcer (pain relieved by food)
 - Starve a gastric ulcer
 - Acute Pancreatitis
 - Fetal position, Bluish discoloration of flanks (Turner's Sign), Bluish discoloration of pericumbelical region (Cullen's Sign), Board like abdomen with guarding
 - Self digestion of pancreas by trypsin.
 - Hold tube feeding if residual > 100mL
 - In case of Fire – RACE and PASS
 - Check Restraints every 30 minutes – 2 fingers room underneath
 - Gullian-Barre Syndrome
 - Weakness progresses from legs upward – leads to Resp arrest
 - Trough draw = ~30 min before scheduled administration
 - Peak Draw = 30-60 min after drug administration.
- Mental Health and Psychiatry
 - Most suicides occur after beginning of improvement with increase in energy levels
 - MAOIs
 - Hypertensive Crisis with Tyramine foods
 - Nardil, Marplan, Parnate
 - Need 2 wk gap from SSRIs and TCAs to admin MAOIs

- Lithium Therapeutic Range = 0.5-1.5
- Phenothiazines (typical antipsychotics) – EPS, Photosensitivity
- Atypical Antipsychotics – work on positive and negative symptoms, less EPS
- Benzos (Ativan, Lorazepam, etc) good for Alcohol withdrawal and Status Epilepticus
- Antabuse for Alcohol deterrence – Makes you sick with OH intake
- Alcohol Withdrawal = Delirium Tremens – Tachycardia, tachypnea, anxiety, nausea, shakes, hallucinations, paranoia (DTs start 12-36 hrs after last drink)
- Opiate (Heroin, Morphine, etc.) Withdrawal = Watery eyes, runny nose, dilated pupils, NVD, cramps
- Stimulants Withdrawal = Depression, fatigue, anxiety, disturbed sleep
- Medical-Surgical
 - Hypoventilation = Acidosis (too much CO₂)
 - Hyperventilation = Alkalosis (low CO₂)
 - No BP or IV on side of Mastectomy
 - Opiate OD = Pinpoint Pupils
 - Lesions of Midbrain = Decerebrate Posturing (Extended elbows, head arched back)
 - Lesions of Cortex = Decorticate Posturing (Flexion of elbows, wrists, fingers, straight legs, mummy position)
 - Urine Output of 30 mL/hr = minimal competency of heart and kidney function
 - Kidney Stone = Cholelithiasis
 - Flank pain = stone in kidney or upper ureter
 - • Abdominal/scrotal pain = stone in mid/lower ureter or bladder
 - Renal Failure – Restrict protein intake
 - Fluid and electrolyte problems
 - Watch for HyperK⁺ (dizzy, wk, nausea, cramps, arrhythmias)
 - Pre-renal Problem = Interference with renal perfusion
 - Intra-renal Problem= Damage to renal parenchyma
 - Post-renal Problem = Obstruction in UT anywhere from tubules to urethral meatus.
 - Usually 3 phases (Oligouric, Diuretic, Recovery)
 - Monitor Body Wt and I&Os
 - Steroid Effects = Moon face, hyperglycemia, acne, hirsutism, buffalo hump, mood swings, weight gain
 - Spindle shape, osteoporosis, adrenal suppression (delayed growth in kids) (Cushing’s Syndrome symptoms)
 - Addison’s’ Crisis = medical emergency (vascular collapse, hypoglycemia, tachycardia)
 - Admin IV glucose + corticosteroids
 - No PO corticosteroids on empty stomach
 - Potassium sparing diuretic = Aldactone (Spironalactone)
 - Watch for hyperK⁺ with this and ACE Inhibitors.
 - Cardiac Enzymes
 - Troponin (1 hr), CKMB (2-4 hr), Myoglobin (1-4 hr), LDH1 (12-24 hr)
 - MI Tx
 - Nitro – Yes
 - NO Digoxin, Beta blockers, Atropine
 - Fibrinolytics = Streptokinase, Tenecteplase (TNKase)
 - CABG = Coronary Artery Bypass Graft
 - PTCA = Percutaneous Transluminal Coronary Angioplasty
 - Sex after MI okay when able to climb 2 flights of stairs without exertion
 - Take nitro prophylactically before sex
 - BPH Tx = TURP (Transurethral Resection of Prostate)
 - Some blood for 4 days, and burning for 7 days post-TURP.

- Only isotonic sterile saline for Bladder Irrigation
- Post Thyroidectomy – Keep tracheostomy set by the bed with O₂, suction and Calcium gluconate
- Pericarditis
 - Pericardial Friction Rub, Pain relieved by leaning forward
- Post Strep URI Diseases and Conditions:
 - Acute Glomerulonephritis
 - Rheumatic Fever – Valve Disease
 - Scarlet Fever
- If a chest-tube becomes disconnected, do not clamp – Put end in sterile water
- Chest Tube drainage system should show bubbling and water level fluctuations (tidaling with breathing)
- TB
 - Treatment with multidrug regimen for 9 months
 - Rifampin reduces effectiveness of OCs and turns urine orange
 - Isoniazide (INH) increases Dilantin blood levels
- Use bronchodilators before steroids for asthma
 - Exhale completely, Inhale deeply, Hold breath for 10 seconds
- Ventilators
 - Make sure alarms are on
 - Check every 4 hours minimum
- Suctioning
 - Pre and Post oxygenate with 100% O₂
 - No more than 3 passes
 - No longer than 15 seconds
 - Suction on withdrawal with rotation
- COPD:
 - Emphysema = Pink Puffer
 - Chronic Bronchitis = Blue Bloater (Cyanosis, Right sided heart failure = bloating/edema)
- O₂ Administration
 - Never more than 6L/min by cannula
 - Must humidify with more than 4L/hr
 - No more than 2L/min with COPD – CO₂ Narcosis
 - In ascending order of delivery potency: Nasal Cannula, Simple Face Mask, Nonrebreather Mask, Partial Rebreather Mask, Venturi Mask
 - Restlessness and Irritability = Early signs of cerebral hypoxia
- IVs and Blood Product Administration
 - 18-19 gauge needle for blood with filter in tubing
 - Run blood with NS only and within 30 minutes of hanging
 - Vitals and Breath Sounds
 - Before, during and after infusion (15 min after start, then 30 min later, then hourly up to 1 hr after)
 - Check Blood: Exp Date, clots, color, air bubbles, leaks
 - 2 RNs must check order, pt, blood product – Ask Pt about previous transfusion Hx
 - Stay with Pt for first 15 minutes – If transfusion reaction – Stop and KVO with NS
 - Pre-medicate with Benadryl PRN for previous urticaria reactions
 - Isotonic Solutions
 - D5W
 - NS (0.9% NaCl)
 - Ringers Lactate
 - NS only with blood products and Dilantin

- Diabetes and Insulin
 - When in doubt – Treat for Hypoglycemia first
 - First IV for DKA = NS, then infuse regular insulin IV as Rx'd
 - Hypoglycemia ... confusion, HA, irritable, nausea, sweating, tremors, hunger, slurring
 - Hyperglycemia ... weakness, syncope, polydipsia, polyuria, blurred vision, fruity breath
 - Insulin may be kept at room T for 28 days
 - Draw Regular (Clear) insulin into syringe first when mixing insulins
 - Rotate Injection Sites (Rotate in 1 region, then move to new region)
 - Rapid Acting Insulins
 - Lispro (Humalog) and Aspart (Novolog)
 - O: 5-15 min, P: .75-1.5 hrs
 - Short Acting Insulin
 - Regular (human)
 - O: 30-60 min, P: 2-3 hrs (IV Okay)
 - Intermediate Acting Insulin
 - Isophane Insulin (NPH)
 - O: 1-2 hrs, P: 6-12 hrs
 - Long Acting Insulin
 - Insulin Glargine (Lantus)
 - O: 1.1 hr, P: 14-20 hrs (Don't Mix)
 - Oral Hypoglycemics decrease glucose levels by stimulating insulin production by beta cells of pancreas, increasing insulin sensitivity and decreasing hepatic glucose production
 - Glyburide, Metformin (Glucophage), Avandia, Actos
 - Acarbose blunts sugar levels after meals
- Oncology
 - Leukemia
 - Anemia (reduced RBC production)
 - Immunosuppression (neutropenia and immature WBCs)
 - Hemorrhage and bleeding tendencies (thrombocytopenia)
 - Acute Lymphocytic – most common type, peds, best prognosis
 - Testicular Cancer
 - Painless lump or swelling in testicles
 - STE in shower >14 y.o.
 - Common ages – 15-35 y.o.
 - Prostate Cancer
 - Age - >40 y.o.
 - PSA elevation
 - DRE
 - Metastasis to spine, hips, and legs
 - Elevated PAP (Prostate Acid Phosphatase)
 - TRUS - Transurethral US
 - Post Op – monitor of hemorrhage and cardiovascular complication
 - Cervical and Uterine Cancer
 - Laser, cryotherapy, radiation, conization, hysterectomy, exoneration
 - Chemotherapy = no help
 - Pap smears should start within 3 yrs of intercourse of by age 21
 - Ovarian Cancer
 - Leading cause of death from gynecological cancers
 - Breast Cancer

- Leading cause of cancer in women
 - Upper outer quadrant, left > right
 - Monthly SBE
 - Mammography – baseline at 35 y.o., annually at 50 y.o.
 - Metastasis to lymph nodes, then lungs, liver, brain, spine
 - Mastectomy – radical mastectomy = lymph nodes too (but no mm resected)
 - Avoid BP measurements, injections, and venipuncture on surgical side
- Anti-emetics given with Chemotherapy Agents (Cytosan, Methotrexate, Interferon, etc.)
 - Phenergan (Promethazine HCl)
 - Compazine (Prochlorperazine)
 - Reglan (Metoclopramide)
 - Benadryl (Diphenhydramine)
 - Zofran (Ondansetron HCl)
 - Kytril (Granisetron)
- Sexually Transmitted Diseases
 - Syphilis (*Treponema pallidum*)
 - Primary Stage (90 days) = Chancre + red painless lesion
 - Secondary Stage (up to 6 mo) = Rash on palms and soles + Flu-like symptoms
 - Tertiary Stage (10-30 yrs) = Neurologic and Cardiac destruction
 - Treated with Penicillin G IM
 - Gonorrhea (*Neisseria Gonorrhoea*)
 - Yellow green urethral discharge (The Clap)
 - Chlamydia (*Chlamydia Trachomatis*)
 - Mild vaginal discharge or urethritis
 - Doxycycline, Tetracycline
 - Trichomoniasis (*Trichomonas Vaginalis*)
 - Frothy foul-smelling vaginal discharge
 - Flagyl
 - Candidiasis (*Candida Albicans*)
 - Yellow, cheesy discharge with itching
 - Isoniazole, Nystatin, Clotrimazole (Gyne-Lotrimin)
 - Herpes Simplex 2
 - Acyclovir
 - HPV (Human Papillomavirus)
 - Acid, Laser, Cryotherapy
 - HIV
 - Cocktails
- Perioperative Care
 - Breathing Es taught in advance (before or early in pre-op)
 - Remove nail polish (need to see cap refill)
 - Pre Op
 - Meds as ordered, NPO X 8 hrs, Incentive Spirometry & Breathing is taught in advance, Void, No NSAIDS X 48 hrs
 - Increased corticosteroids for surgery (stress)
 - May need to increase insulin too
 - Post Op restlessness may mean hemorrhage, hypoxia
 - Wound dehiscence or extravasation
 - Wet sterile NS dressing, Call Dr.
 - Call Dr. post op if < 30 mL/hr urine, Sys BP < 90, T > 100 or < 96

- Post Op Monitoring VS and BS
 - Every 15 minutes the first hour
 - Every 30 min next 2 hours
 - Every hour the next 4 hours
 - Then Every 4 hours PRN
- 1-4 hrs Post Op = Immediate Stage
- 2-24 hrs Post Op = Intermediate Stage
- 1-4 days Post Op = Extended Stage
- Total Hip Replacement – No adduction past midline, no hip flexion past 90 degrees
- Supratentorial Sx – HOB 30-45 degrees (semi-fowlers)
- Infrantentorial Sx – Flat
- Phlebitis – Supine, elevate involved leg
- Harris Tube – right, back, left – to advance tube in GI
- Miller Abbott Tube – Right side for GI advancement into small intestine
- Thoracentesis – unaffected side, HOB 30-45 degrees
- Enema – Left Sims (flows into sigmoid)
- Liver Biopsy – Right side with pillow/towel against puncture site
- Cataract Sx – Opposite side, Semi-Fowlers
- Cardiac Cath – Flat (HOB no more than 30 degrees), leg straight 4-6 hours, bed rest 6-12 hours
- Burn autograph – elevate and immobilize 3-7 days
- Amputation – supine, elevate stump for 48 hours
- Large Brain Tumor Resection – On non-operative side
- Incentive Spirometry
 - Inhale slowly and completely to keep flow at 600-900
 - Hold breath for 5 sec
 - Do 10 times per hour
- Post Op Breathing Exercises
 - Sit up straight
 - Breath in deeply thru nose and out slowly thru pursed lips
 - Hold last breath for 3 sec
 - Then cough 3 times (unless abdominal wound – reinforce/splint if cough)
- Watch for stridor after any neck/throat Sx – keep Trach kit at bedside
- Staples and sutures removed in 7-14 days – Keep dry until then
- No lifting over 10 lbs for 6 weeks (in general)
- If chest tube is disconnected, put free end in container of sterile water
- Removing chest tubes
 - Valsalvas or deep breath and hold
- If chest tube stops fluctuating, the lung has re-inflated (or there is a problem)
- Keep scissors by bed if patient has S. Blakemore Tube (for esophageal varices)
 - Sudden respiratory distress – Cut inflation tubes and remove
- Trach patients
 - Keep Kelly clamp and obturator (used to insert into trachea then removed leaving cannula) at bedside
- Turn off NG suction for 30 minutes after PO meds
- NG Tube removal
 - Take a deep breath and hold it
- Stomach contents pH = <4 (gastric juices aspirated)
- NG Tube insertion
 - If cough and gag – back off a little, let pt calm down, advance again with pt sipping water from straw

- NG Tube length
 - End of nose to ear lobe to xyphoid process (about 22-26 inches)
- Decubitus (Pressure) Ulcer Staging
 - Stage 1 – Erythema only
 - Stage 2 – partial thickness
 - Stage 3 – full thickness to SQ
 - Stage 4 – full thickness and involving muscle or bone
- Acute Care
 - CVA – Hemorrhagic or Embolic
 - A-fib and A-flutter = thrombus formation
 - Dysarthria – verbal enunciation/articulation
 - Apraxia – perform purposeful movements
 - Dysphasia – speech and verbal comprehension
 - Aphasia – speaking
 - Agraphia – writing
 - Alexia – reading
 - Dysphagia – swallowing
 - Left Hemisphere Lesion – aphasia, agraphia, slow, cautious, anxious, memory intact
 - Right Hemisphere Lesion – unable to recognize faces, loss of depth perception, impulsive behavior, confabulates, poor judgment, constantly smiles, denies illness, loss of tonal hearing
 - Head Injuries
 - Even subtle changes in mood, behavior, restlessness, irritability, confusion may indicate increased ICP
 - Change in level of responsiveness = most important indicator of increased ICP
 - Watch for CSF leaks from nose or ears – leakage can lead to meningitis and mask intracranial injury since usual increased ICP symptoms may be absent
 - Spinal Cord Injuries
 - Respiratory status paramount – C3-C5 innervates diaphragm
 - 1 wk to know ultimate prognosis
 - Spinal Shock – Complete loss of all reflex, motor, sensory, and autonomic activity below the lesion = Medical emergency
 - Permanent paralysis if spinal cord is compressed for 12-24 hours
 - Hypotension and bradycardia with any injury above T6
 - Bladder infection = common cause of death (try to keep urine acidic)
 - Burns
 - Infection = primary concern
 - HyperK⁺ due to cell damage and release of intracellular K⁺
 - Give meds before dressing changes – painful
 - Massive volumes of IV fluid given due to fluid shift to interstitial spaces and resultant shock
 - First Degree = epidermis (superficial partial thickness)
 - Second Degree = Epidermis and Dermis (deep partial thickness)
 - Third Degree = Epidermis, Dermis, and SQ (full thickness)
 - Rule of 9s
 - Head and Neck – 9% (4.5% each side)
 - Upper extremities – 9% each
 - Lower extremities – 18% each
 - Front trunk – 18%
 - Back trunk – 18%
 - Singed nasal hairs and circumoral soot/burns = smoke inhalation burns

- Fractures
 - Report abnormal assessment finding promptly
 - Compartment Syndrome may occur = permanent damage to nerves and vessels
 - 5 Ps of neurovascular status (important with fractures)
 - Pain, Pallor, Pulse, Paresthesia, Paralysis
 - Provide age-appropriate toys for children in traction
- Special Tests and Pathognomonic Signs
 - Tensilon Test = Myasthenia Gravis (pos = Myasthenia crisis, neg = cholinergic crisis)
 - ELISA and Western Blot = HIV
 - Sweat Test = Cystic Fibrosis
 - Cheilosis = sores on sides of mouth = Riboflavin deficiency (B2)
 - Trousseau's Sign (carpal spasm induced by BP cuff) = Hypocalcemia/hypoparathyroidism
 - Chvostek's Sign (facial spasm after facial nerve tap) = Hypocalcemia/hypoparathyroidism
 - Bloody diarrhea = ulcerative colitis
 - Olive-shaped mass in epigastric region and projectile vomiting = Pyloric Stenosis
 - Current jelly stool (blood and mucus) and sausage-shaped mass in RUQ = Intussusception
 - Mantoux Test for TB is positive if 10mm induration 48hr post admin
 - 5mm induration is positive for immunocompromised pts
 - Previous BCG vaccine recipients will test positive
 - Butterfly Rash = SLE (avoid direct sunlight)
 - 5 Ps of NV functioning ... Pain, paresthesia, pulse, pallor, paralysis
 - Cullen's sign (periumbelical discoloration) and Turner's sign (blue flank) = Acute Pancreatitis
 - Murphy's sign (right costal margin pain on palpation with inspiration) = GB or Liver disease
 - Headache more severe on wakening = Brain Tumor (remove benign and malignant)
 - Vomiting nor associated with nausea = Brain Tumor
 - Elevated ICP = increased BP, widened pulse pressure, increased temp
 - Pill-Rolling Tremor = Parkinson's (Tx with Levodopa, Carbidopa)
 - Fall precautions
 - Rigid, stooped, shuffling
 - IG Bands on Electrophoresis = MS
 - Weakness starts in upper extremities
 - Bowel/bladder affected in 90%
 - Demyelination
 - Tx with ACTH, corticosteroids, Cytoxan, and other immunosuppressants
 - Reed-Sternberg Cells = Hodgkin's
 - Koplik Spots = Rubeola (Measles)
 - Erythema Marginatum = Rash of Rheumatic fever
 - Gower's sign = Muscular Dystrophy (pushes up on floor and legs to stand up straight if sitting on floor)
 - Like Minor's sign (walks up stairs with legs and hands)
- Pediatrics
 - Benchmarks
 - Birth wt doubles at 6 months, triples at 12 months
 - Birth length increases by 50% at 12 months
 - Posterior fontanel closes by 8 weeks
 - Anterior fontanel closes by 12-18 months
 - Moro reflex disappears at 4 months
 - Steady head control achieved at 4 months
 - Turns over at 5-6 months
 - Hand to hand transfers at 7 months

- Sit unsupported at 8 months
- Crawls at 10 months
- Walks at 10-12 months
- Cooing at 2 months
- Monosyllabic babbling at 3-6 months
- Links syllables at 6-9 months
- Mama, Dada plus a few words at 9-12 months
- Throws a ball overhand at 18 months
- Daytime toilet training at 18-24 months
- 2-3 word sentences at 24 months
- 50% of adult ht at 24 months
- Birth length doubles at 4 yrs
- Uses scissors at 4 yrs
- Ties shoes at 5 yrs
- Girls' growth spurt as early as 10 y.o.
- Boys catch up around 14 y.o.
- Finish growing – girls around 15 (2yrs after menstruation begins), boys around 17
- Autosomal Recessive Diseases
 - CF, PKU, Sickle Cell Anemia, Tay-Sachs, Albinism
 - 25% chance if: AS (trait only) x AS (trait only)
 - 50% chance if: AS (trait only) x SS (disease)
- Autosomal Dominant Diseases
 - Huntington's, Marfans, Polydactyl Achondroplasia, Polycystic Kidney Disease
 - 50% if one parent has the disease/trait (trait = disease in autosomal dominant)
- X-Linked Recessive Diseases
 - Muscular Dystrophy, Hemophilia A
 - Females are carriers (rarely have the disease)
 - 50% chance sons will have the disease (not carrier = can't pass it on)
 - This translates to an overall 25% chance that each pregnancy will result in a child that has the disease
- Scoliosis
 - Milwaukee brace – 23 hrs/day, log rolling after Sx
- Down Syndrome = Trisomy 21
 - Simian creases on palms
 - Hypotonia
 - Protruding tongue
 - Upward slant of eyes
- Cerebral palsy
 - Scissoring = legs extended, crossed, feet plantar flexed
- PKU
 - Leads to MR
 - Guthrie test
 - Aspartame has phenylalanine in it and should not be given to PKU patients
- Hypothyroidism
 - Leads to MR
- Prevent neural tube disorder with Folic Acid during pregnancy
- Myelomeningocele – cover with moist sterile water dressing and keep pressure off
- Hydrocephalus – signs of increased ICP are opposite of shock
 - Shock = increased pulse and decreased BP
 - Increased ICP = decreased pulse and increased BP (pos altered LOC = Most sensitive sign)

- Infants with increased ICP – bulging fontanel, high pitched cry, increased head circum, sunset eyes, wide suture lines, lethargy
 - Treat with peritoneal shunt – don't pump shunt
 - Older children with increased ICP – widened pulse pressure
 - Increased ICP cause by suctioning, coughing, straining, and turning – try to avoid
- Muscular Dystrophy
 - X-linked Recessive
 - Waddling gait, hyper lordosis, Gower's sign, Minor's sign, fat pseudohypertrophy of calves
- Seizures
 - Nothing in mouth, turn head to side, maintain airway, don't restrain, keep safe
 - Treat with Phenobarbital (Luminal), phenytoin (Dilantin: TR=10-20; gingival hyperplasia), fosphenytoin (Cerebyx), valproic acid (Depakene), carbamazepine (Tegretol)
- Meningitis (bacterial)
 - Lumbar puncture shows increased WBCs, protein, increased ICP, and decreased glucose
 - May lead to SIADH – water retention, fluid overload, dilutional hyponatremia
- CF
 - Taste salty
 - Need enzymes sprinkled on their food
- Children with Rubella
 - Threat to unborn siblings
 - May require temporary isolation from mom during pregnancy
- Pain in children is measured with the FACES scale
- No MMR immunizations for children with Hx of allergic reaction to eggs or neomycin
- Immunization Side Effects
 - T < 102
 - Redness and soreness at injection site for 3 days
 - Give Tylenol and bike pedal legs (passively) for child
 - Call physician if seizure, high fever, or high-pitched cry after immunizations
- Poisonings
 - CALL POISON CONTROL
 - NO IPECAC
- Epiglottitis = H. Influenza B
 - Child sits upright with chin out and tongue protruding (maybe tripod position)
 - Prepare for intubation or trache
 - DO NOT put anything into the child's mouth
- Isolate RSV patient with Contact Precautions
 - Private room is best
 - Use Mist Tent to provide O2 and Ribavirin – flood tent with O2 first and wipe down inside of tent periodically so you can see the patient
- Acute Glomerulonephritis
 - Usually after Strep
 - Antigen-antibody complexes clog up in glomeruli and reduce GFR
 - Dark urine, proteinuria
- Wilm's Tumor
 - Large kidney tumor
 - DO NOT PALPATE
- TEF = Tracheoesophageal Atresia
 - 3 Cs of TEF = Cough, choking, cyanosis

- Cleft Lip and Palate
 - Post Op – place on side, maintain Logan Bow, elbow restraints
- Congenital Megacolon = Hirschsprung's Disease
 - Lack of peristalsis due to absence of ganglionic cells in colon
 - Suspect if no meconium within 24 hours or ribbon-like, foul smelling stools
- Iron Deficiency Anemia
 - Give iron on EMPTY stomach with citrus juice (vitamin C enhances absorption)
 - Use straw or dropper to avoid staining teeth
 - Tarry stools
 - Limit milk intake to <32 oz/day
- Sickle Cell Disease
 - Hydration is MOST important
 - SC crisis = fever, abdominal pain, painful edematous hands and feet (hand-foot syndrome), arthralgia
 - Tx: rest, hydration
 - Avoid high altitude and strenuous activities
- Tonsillitis
 - Usually strep
 - Get PT and PTT
 - Pre-op (ask about bleeding)
 - Suspect bleeding post op if frequently swallowing, vomiting blood, or clearing throat
 - No red liquids, no straws, ice collar, soft foods
 - Highest risk for hemorrhage = 1st 24hrs and 5-10 days post-op (sloughing of scabs)
- Primary meds in ER for respiratory distress
 - Sus-phrine (Epinephrine HCl)
 - Theophylline (Theo-dur)
 - Bronchodilators (Albuterol)
- Must know normal respiratory rates for children. Respiratory disorders are the primary reason for most medical/ER visits for pediatric patients
 - Newborn – 30-60
 - 1-11 months – 25-35
 - 12-36 months – 20-30
 - 3-5 years – 20-25
 - 6-10 years – 18-22
 - 11-16 years – 16-20
- Cardiovascular Disorders
 - Acyanotic – VSD, ASD, PDA, Coarctation of the Aorta, Aortic Stenosis
 - Antiprostaglandins cause closure of PDA (aorta-pulmonary artery)
 - Cyanotic – Tetralogy of Fallot, Truncus Arteriosus (one main vessel gets mixed blood), TVG (Transposition of Great Vessels)
 - Polycythemia is common in cyanotic disorders
 - 3 Ts of Cyanotic Heart Diseases – Tetralogy, Truncus, Transposition
 - Tetralogy of Fallot – unoxygenated blood pumped into aorta
 - Pulmonary stenosis
 - VSD
 - Over-riding aorta
 - Right Ventricular Hypertrophy
 - TET spells – hypoxic episodes that are relieved by squatting or knee-chest position
 - CHF can result – use Digoxin (TR = 0.8-2.0 for peds)
 - Ductus Venosus = Umbilical Vein to Inferior Vena Cava

- Ductus Arteriosus = Aorta to Pulmonary Artery
- Rheumatic Fever ... Acquired Heart Disease ... Affects aortic and mitral valves
 - Preceded by beta hemolytic strep infection
 - Erythema Marginatum = Rash
 - Elevated ASO titer and ESR
 - Chest pain, shortness of breath (Carditis), migratory large joint pain, tachycardia (even during sleep)
 - Treat with Penicillin G = Prophylaxis for recurrence of RF
- Maternity – Pregnancy and Labor
 - Conception
 - Day 1 of cycle = first day of menses (bleeding)
 - Ovulation on Day 14
 - Total cycle days – 28 days
 - Sperm – 3-5 days; Eggs – 24 hrs
 - Fertilization in Fallopian Tube
 - Signs of Pregnancy
 - Chadwick's Sign = Bluish of vagina (early as 4 weeks)
 - Hegar's sign = Softening of isthmus of cervix (8 weeks)
 - Goodell's Sign = softening of the cervix
 - Pregnancy Nutrition
 - Pregnancy total wt gain = 25-30 lbs (11-14 kg)
 - Increased calorie intake by 300 calories/day during pregnancy
 - Increase protein 30 g/day
 - Increase iron, calcium, folic acid, and Vit A&C
 - Hyperemesis gravidarum = uncontrollable nausea and vomiting
 - May be related to H. pylori
 - Reglan to stop
 - Dangerous infections with pregnancy
 - TORCH – Toxoplasmosis, other, rubella, cytomegalovirus, HPV
 - Amniotic fluid = 800-1200 mL
 - <300 mL = oligohydramnios = fetal kidney problems
 - Polyhydramnios and macrosomia (large fetus) with Diabetes
 - Umbilical cord – 2 arteries, 1 vein
 - Vein carries oxygenated blood to fetus (opposite of normal)
 - FHR = 120-160
 - Folic Acid Deficiency = Neural Tube Defects
 - TPAL= Term, Pre-term births, Abortions (spontaneous and induced), Living Children
 - Pre-term = 20-37 weeks
 - Term = 38-42 weeks
 - Post-term = ≥42 weeks
 - Gravida = number of pregnancies, regardless of outcome
 - Para = number of deliveries (not children) after 20 weeks gestation
 - Nagele's Rule – Add 7 days to first day of last period, subtract 3 months, add 12 months = EDC
 - Hgb and Hct are slightly lower during pregnancy due to hyperhydration
 - Side-lying is best position for uteroplacental perfusion (either side, but LEFT side is more traditional)
 - 2:1 Lecithin:Sphingomyelin Ratio = fetal lungs are mature
 - AFP in amniotic fluid = possible neural tube defect
 - Need a full bladder for amniocentesis early in pregnancy (but not later in pregnancy)
 - Lightening = fetus drops into true pelvis
 - Nesting instinct = burst of energy just before labor

- True labor = regular contractions that intensify with ambulation, LBP that radiates to abdomen, progressive dilation and effacement
- Station = negative above Ischial spines, positive below
- Leopold Maneuver tried to reposition fetus for delivery
- Laboring maternal vitals – pulse <100 (usually a little higher than normal with pregnancy), BP is unchanged, temp <100.4
- Non-stress test – reactive = healthy (FHR goes up with movements)
- Contraction Stress Test (Oxytocin Challenge Test)
 - Positive = late decels noted = unhealthy
 - Indicative of UPI
 - Negative = no late decels noted = healthy
- Pre-Eclampsia = HTN + Edema + Proteinuria
- Eclampsia = HTN + Edema + Proteinuria + Seizures and Coma
 - Suspect if severe HA + visual disturbances
- Magnesium sulfate used to reduce preterm labor contractions and prevent seizures in Pre-Eclampsia
 - Mg replaces Ca⁺⁺ in the smooth muscle cells resulting in relaxation
 - Can lead to hyporeflexia and respiratory depression (diaphragmatic inhibition)
 - Must keep calcium gluconate (antidote) by bed when administering during labor
 - Monitor for:
 - Absent DTR's
 - Respirations <12
 - Urinary output <30cc/hr
 - Fetal bradycardia
- Pitocin (Oxytocin) use for dystocia
 - If uterine tetany develops, turn off Pitocin, admin O2 by face mask, turn pt on side
 - Pitocin can cause water intoxication owing to ADH effects
- Suspect uterine rupture if woman complain of sharp pain followed by cessation of contractions
- No Coumadin during pregnancy (Heparin is OK)
- Insulin demands drop precipitously after delivery
- No oral hypoglycemic during pregnancy – Teratogenic – insulin only for control of DM
- FIRSTS
 - Fetal heart beat – 8-12 weeks by Doppler, 15-20 weeks by fetoscope
 - Quickening = fetal movement – 14-20 weeks
 - Showing = 14 weeks
 - Braxton Hicks contractions = 4 months and onward (common during pregnancy)
- FHR during Labor
 - Early Decels = head compression – OK
 - Variable Decels = cord compression – NOT GOOD
 - Late Decels = utero-placental insufficiency = BAD!!!
 - If variable or late decels – change maternal position, stop Pitocin, administer O2, notify physician
- Fundal Heights
 - 12-14 weeks – at level of symphysis
 - 20 weeks – 20cm = level of umbilicus
 - Rises about 1cm/week
- Stages of Labor
 - Stage 1 = beginning of regular contraction to full dilation and effacement
 - Stage 2 = 10cm dilation to delivery
 - Stage 3 = delivery of placenta
 - Stage 4 = 1-4 hrs following delivery

- Anesthetic Blocks
 - Pudendal block = decreases pain in perineum and vagina – no help with contraction pain
 - Epidural block = T10-S5
 - Blocks all pain
 - First sign = warmth or tingling in ball of foot or big toe
 - Regional blocks often result in forceps or vacuum assisted births because they affect the mother's ability to push effectively
- Tears
 - 1st degree – Dermis
 - 2nd degree – mm/fascia
 - 3rd degree – anal sphincter
 - 4th degree – rectum
- Placenta
 - Abruptio Placenta = dark red bleeding with rigid, board-like abdomen
 - Placenta Previa = painless bright red bleeding
 - Placenta Separation
 - Lengthening of cord outside of vagina, gush of blood, full feeling in vagina
 - Give oxytocin after placenta is out – NOT BEFORE
 - Schultz Presentation = shiny side outside (fetal side of placenta)
- Postpartum
 - Postpartum VS Schedule
 - Every 15 min for 1 hr
 - Every 30 min for next 2 hrs
 - Every hour for the next 2-6 hrs
 - Then every 4 hrs
 - BM for mom within 3 days = normal
 - Lochia
 - No more than 4-8 pads/day and no clots >1cm
 - Fleshy smell is normal
 - Foul smell = infection
 - Massage boggy uterus to encourage involution – empty bladder ASAP
 - May need to catheterize
 - Full bladder can lead to uterine atony and hemorrhage
 - DIC – Tx with Heparin (safe in pregnancy) – fetal demise, abruptio placenta, infection
 - WBC counts are elevated up to 25,000 for about 10 days post-partum
 - C-section can lead to paralytic ileus – early ambulation helps
 - Postpartum infection common in problem pregnancies – anemia, DM, traumatic birth
 - Postpartum Hemorrhage = leading cause of maternal death.
 - Risk factors include: dystocia, prolonged labor, overdistended uterus, abruptio placenta, infection
 - Tx includes: fundal massage, count pads, VS, IV fluids, oxytocin, notify physician
- Newborn
 - Babies born without vaginal squeeze more likely to have respiratory difficulty initially
 - APGAR = HR, RR, mm tone, reflect irritability, color
 - 1 and 5 minutes
 - 7-10 = Good; 4-6 = moderate resuscitative efforts; 1-3 mostly dead
 - Eye care = E-mycin + Silver nitrate – for gonorrhea
 - Rho(D) immune globulin (RhoGAM) is given to Rh- mothers who deliver Rh+ children
 - Not given if mom has a positive Coombs test – she already has developed antibodies.... Too late
 - Caput Succedaneum = edema under scalp – crosses suture line

- Cephalhematoma = blood under periosteum – does not cross suture lines
- Suction mouth FIRST, then nostrils
- Moro Reflex = startle reflex – abduction of all extremities (up to 4 months)
- Rooting reflex – up to 4 months
- Babinski reflex – up to 18 months
- Palmar Grasp reflex – lessens by 4 months
- Ballard Scale used to estimate gestational age
- Heel Stick – lateral surface of heel
- Physiologic Jaundice is normal at 2-3 days
 - Abnormal is before 24 hrs or lasting longer than 7 days
 - Unconjugated bilirubin is the culprit
- Vit K is given to help with formation of clotting factors due to the fact that the newborn guy lacks the bacteria necessary for Vit K synthesis initially
 - Given in the vastus lateralis mm IM
- DIC – clotting factors used up by intravascular clotting
 - Hemorrhage and increased bleeding times result
 - Associated with fetal demise, infection, and abruption placenta
- Hypothermia can lead to hypoxia and acidosis
 - Keep warm and use bicarb PRN to treat acidosis in newborn
- Lay baby on right side after feeding – helps move stomach contents into small intestine
- Jaundice and high bilirubin can cause encephalopathy
 - <12 = normal
 - Phototherapy decomposes bilirubin via oxidation
 - Protect eyes, turn every 2 hrs and watch for dehydration
 - The dangerous bilirubin is the unconjugated indirect type
- Jitteriness is a symptom of hypoglycemia and hypoglycemia in the newborn
 - Hypoglycemia – tremors, high-pitched cry, seizures
- Increased ICP = high-pitched cry + bulging fontanels
- Nutrition
 - K+ - bananas, dried fruits, citrus, potatoes, legumes, tea, peanut butter
 - Vit C – citrus, potatoes, cantaloupe
 - Calcium – milk, cheese, green leafy veggies, legumes
 - Sodium – salt, processed foods, seafood
 - Folic Acid – green leafy veggies, liver, citrus
 - Iron – Green leafy veggies, red meat, organ meat, eggs, whole wheat, carrots
 - Use Z-tract for injections to avoid skin staining
 - Magnesium – whole grains, green leafy veggies, nuts
 - Thiamine (B1) – pork, beef, liver, whole grains
 - B12 – organ meats, green leafy veggies, yeast, milk, cheese, shellfish
 - Deficiency = big beefy red tongue, anemia
 - Vit K – Green, leafy veggies, milk, meat, soy
 - Vit A – Liver, orange and dark green fruits and veggies
 - Vit D – dairy, fish oil, sunlight
 - Vit E – veggie oils, avocados, nuts, seeds
 - BMI – 18.5-24.9 = normal (higher = overweight or obese)
- Gerontology
 - Essentially everyone does to Hell in a progressively degenerative hand-basket
 - Thin skin, bad sleep, muscle wasting, memory loss, bladder shrinks, incontinence, delayed gastric emptying, COPD, hypothyroidism, diabetes

- Common Ailments
 - Delirium and dementia
 - Cardiac dysrhythmias
 - Cataracts and glaucoma
 - CVA (usually thrombolytic, TIAs common)
 - Decubitus ulcers
 - Hypothyroidism
 - COPO (usually a combo of emphysema and CB)
 - UTIs and Pneumonia – can cause confusion and delirium
 - Memory loss starts with recent – progresses to full
 - Dementia = irreversible (Alzheimer's) – depression, Sundowning, loss of family recognition
 - Medication Alert! – Due to decreased renal function, drugs metabolized by the kidneys may persist to toxic levels
 - When in doubt on NCLEX – answer should contain something about exercise and nutrition
- Advanced Clinical Concepts
 - Erickson – Psychosocial Development
 - 0-1 yr (Newborn) – Trust vs. Mistrust
 - 1 – 3 years (Toddler) – Autonomy vs. Doubt and Shame
 - Fear intrusive procedures
 - Security objects are good (blanket, stuffed animal)
 - 3 – 6 years (Pre-school) – Initiative vs. Guilt
 - Fear mutilation
 - Band-Aids are good
 - 6 – 12 years (School Age) – Industry vs. Inferiority
 - Games are good
 - Peers are important
 - Fear of loss of control of their bodies
 - 12 – 19 years (Adolescent) – Identity vs. Role confusion
 - Fear body image distortion
 - 20 – 35 years (Early Adulthood) – Intimacy vs. Isolation
 - 35 – 65 years (Middle Adulthood) – Generativity vs. Stagnation
 - Over 65 (Older Adulthood) – Integrity vs. Despair
 - Piaget – Cognitive Development
 - Sensorimotor Stage (0-2 y.o.) – Learns about reality and object permanence
 - Preoperational Stage (2-7 y.o.) – Concrete thinking
 - Concrete Operational Stage (7-11 y.o.) – Abstract Thinking
 - Formal Operational Stage (11-adult) – Abstract and Logical Thinking
 - Freud – Psycho-sexual Development
 - Oral Stage (birth to 1 year) – self gratification, Id is in control and running wild
 - Anal Stage (1-3) – control and pleasure wrt retention and pooping – toilet training in this stage
 - Phallic Stage (3-6) – pleasure with genitals, Oedipus complex, SuperEgo develops
 - Latency Stage (6-12) – sex urges channeled to culturally acceptable level, growth of Ego
 - Genital Stage (12 and up) – gratification and satisfying sexual relations, Ego rules
 - Kohlberg – Moral Development
 - Moral development is sequential, but people do not automatically go from one stage to the next as they mature
 - Level 1 = Preconventional – Reward vs. Punishment orientation
 - Level 2 = Conventional Morality – conforms to rules to please others

- Level 3 = Post-conventional – right, principles, and conscience (Best For All is a concern)
- Calculations Rules and Formulas
 - Round final answer to tenths place
 - Round drops to nearest drop
 - When calculating mL/hr, round to the nearest full mL
 - Must include 0 in front of values <1
 - Pediatric doses rounded to the nearest hundredth – round down for peds
 - Calculating IV flow rates:
 - $\text{Total mL} \times \text{Drop Factor} / 60 \times \text{\#hrs} = \text{Flow Rate in ggts/min}$
 - Calculating Infusion Times:
 - $\text{Total mL} \times \text{Drop Factor} / \text{Flow Rate in ggts/min} \times 60 = \text{hrs to infuse}$
- Conversions
 - 1t = 5mL
 - 1 T = 3t = 15mL
 - 1 oz = 30 mL/2 T
 - 1 gr = 60 mg
 - 1 mg = 1000 mcg
 - 1 kg = 2.2 lbs
 - 1 cup = 8 oz = 240 mL
 - 1 pint = 2 cups = 16 oz = 480 mL
 - 1 quart = 2 pints = 4 cups = 32 oz = 960 mL
 - $F = (1.8 \times C) + 32$
 - $C = (F - 32) / 1.8$
 - 37 C = 98.6 F
 - 38 C = 100.4 F
 - 39 C = 102.2 F
 - 40 C = 104
- Fall Precautions
 - Room closes to nurses station
 - Assessment and orientation to room
 - Get help to stand (dangle feet if lightheaded)
 - Bed low with side rails up
 - Good lighting and reduce clutter in room
 - Keep consistent toileting schedule
 - Wear protective non-slip footwear
 - At home...
 - Paint edges of stairs bright color
 - Bell on cats and dogs
- Neutropenic (Immunosuppressed) Precautions
 - No plants or flowers in room
 - No fresh fruits or veggies
 - Fully cooked foods only
 - Avoid crows and infectious persons
 - Meticulous hand-washing and hygiene to prevent infection
 - Report fever > 100.5 (immunosuppressed pts may not manifest fever with infection)
- Bleeding Precautions
 - Soft-bristled toothbrush
 - Electric razors only
 - Handle gently

- Limit contact sports
- Limit needle sticks, use small bore needles, maintain pressure for 5 min on venipuncture sites
- No straining – check stools for occult blood (stool softeners PRN)
- No salicylates, NSAIDs, or suppositories
- Avoid blowing or picking nose
- Do not change Vit K intake if on Coumadin