CARDIOLOGY

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Hypertension			
BP >140/90 in 2 or more occasions 95% are primary (essential) HTN MCC of secondary is renovascular - Renal artery stenosis Resistant HTN → not responsive to 3 tx options & has to include diuretic.	MC asymptomatic - HA, CP, SOB, vision changes. Stage 1 BP: 140/90 - 159/100 Stage 2 BP: > 160/100t	Goal: Look for end-organ damage CBC/Hematocrit, UA, urine albumin-to-creatinine ratio, electrolytes, creatinine, glucose, calcium, ECG. Rule out secondary HTN - TSH, renal US - Carotid bruits; renal bruit - Fundoscopy: - Hemorrhage - Papilledema	Goal: BP < 140/90 or <130/80 for diabetes, renal dz, CV dz 1. Lifestyle modifications a. DASH diet; low salt b. Weight loss & exercise c. No smoking/drinking 2. Uncomplicated HTN → Diuretic 3. 2^{ndary} → Diuretic + another one 4. Diabetic/CKD → start with ACEi/ARB 5. CHF/CAD → BB or ACEI/ARB 6. Angina/migraines → BB/CCB 7. Hyperthyroid → BB 8. BPH → alpha blocker (-sin) 9. Raynaud's → CCB

	Thiazides	Beta-Blockers	ACE Inhibitors	ARBs	CCB
Drug Names	HCTZ, chlorthelidone	Atenolol, metoprolol	Captopril, enalapril, ramipril, lisinopril	Irbesartan, losartan, valsartan	Non-DHP: diltiazem, verapamil DHPs: amlodipine, felodipine, nifedipine
Adverse Effects	Hypokalemia, ED ↑insulin resistance, Hyperuricemia ↑TG	Bronchospasm, Depression/Fatigue ED ↑insulin resistance	Cough (10%) Hyperkalemia Renal failure	Less cough Hyperkalemia Renal failure	Non-DHP: Conduction defects Lower extremity edema
Indications for use as 1st line	**Most pts** as mono- or combo therapy - stage 1&2 HTN - **Osteoporosis** - **Kidney stones** - Recurrent stroke prevention	- MI - High CAD risk - Rate control for afib/flutter CHF	- **DM** - **MI** - CHF - Mild chronic renal failure	- DM - MI - CHF - Chronic renal failure - ACEI-related cough	Non-DHP: rate control for afib/flutter
Contraindications	Gout	Severe bronchospasm; High degree heart block Bradycardia	Pregnancy Mod-severe renal failure Caution in renal artery stenosis	Pregnancy Mod-severe renal failure Caution in renal artery stenosis	High degree heart block

<table>
<tr><th colspan="4">Coronary Artery Disease</th></tr>
<tr><td colspan="2">Ischemia d/t ↓coronary blood supply & ↑ demand.
- MCC atherosclerosis
RF
- Diabetes
- Smoking = most modifiable
- Hyperlipidemia (↑ LDL)
- HTN, Males, Age
- Fx</td><td colspan="2">Acute Coronary Syndrome = ACS
- MCC atherosclerosis, cocaine-induced coronary artery vasospasm, Prinzmetal
- TX = control risk factors, prevent with aspirin + statin, initial tx is MONA
- Antiplatelets → aspirin, clopidogrel (Plavix), Prasugrel, Ticagrelor, IIb/IIIa Inhibitors
- Plavix good w/ aspirin allergy
- Antianginal therapy → Nitrates, morphine, BB
- Anti-thrombotic therapy → enoxaparin (lovenox), unfractionated heparin, Fondaparinux</td></tr>
<tr><td>STABLE ANGINA</td><td>History!!!!!
- Exertional, poorly localized angina
- Pain relieved w/ rest or nitro
Dyspnea, sweating, numbness, fatigue
Epigastric or shoulder pain

DDx - prinzmetal variant (transient)</td><td>Initial → ECG
- ST depression
- T inversion

Most useful/noninvasive → Stress test
- CI w/ aortic stenosis & LBBB

Definitive/Gold standard → coronary angiography</td><td>Modify risk factors, Nitrates, BB
CCB -diltiazem, verapamil - if pt cant use BB

Outpt regimen: daily aspirin, sublingual nitroglycerin as needed, daily BB + statin

Definitive tx: revascularization
- PTCA → 1-2 vessels not left main
- CABG → left main artery, 3 vessels</td></tr>
<tr><td>UNSTABLE ANGINA (ACS)</td><td rowspan="3">Angina
- New onset
- Occurs w/ minimal exertion
- Worsens
- At rest
Tachycardia
S3/S4
HTN
Mitral regurgitation
Angina + bradycardia = inferior wall MI
Sympathetic stimulation → diaphoresis</td><td>EKG → ST depression or T inversion</td><td>Morphine
Oxygen
BB
Aspirin 325 mg</td></tr>
<tr><td>NSTEMI (ACS)</td><td>Cardiac markers → elevated
EKG: ST depression or T inversion</td><td>Aspirin
Heparin
Morphine
Oxygen
Nitrates
BB</td></tr>
<tr><td>STEMI (ACS)</td><td>Cardiac markers → elevated
EKG: ST elevation or Q waves
- New LBBB considered STEMi
Echo</td><td>MONA
tPA or angioplasty for persistent STE & angina</td></tr>
</table>

Peripheral Vascular disease

RF: - >40 - CAD - Hyperlipidemia - Smoking - HTN - DM	Claudication*** Resting leg pain → advanced dz Acute arterial embolism = 6 Ps - Paresthesias - Pain - Pallor - Pulselessness - Paralysis - Poikilothermia Gangrene Decreased/absent pulses +/- bruits, dec cap refill Atrophic skin changes Color changes to the skin Lateral malleolar ulcers → arterial insufficiency, painful, gray/yellow base, no pusles, tx w/ debridement/revasc	Ankle-brachial systolic pressure index (ABI) - Initial - + PAD if < 0.9 (.5 is severe) Arteriography → gold standard - Shows length, location, degree of occlusion Hand Held Doppler → ER	Platelet inhibitors - Cilostazol --. Intermittent claudication - Aspirin - Clopidogrel Revascularization → if limb is threatened - PTA - Fem-pop bypass Supportive - Foot care - Exercise - Stop smoking - Treat DM and HTN

Arrhythmias

- Diagnose all arrhythmias with an ECG

ATRIAL FLUTTER - "Saw-tooth" waves	- Rate is usually regular - Management - Stable → vagal maneuvers, BB or CCB - Unstable → direct current (synchronized) cardioversion - Definitive → radiofrequency ablation	**Anticoagulation risk stratification in nonvalvular atrial fibrillation** - Point is to assess pts risk for embolization and if that risk exceeds the risk of bleeding from this therapy. - Pg 14 PANCE CHADS VASc Criteria *** >2 =Moderate to HIgh risk - chronic oral anticoagulation recommended. 1 = low risk - Clinical judgement - Usually recommended 0 = very low risk - No anticoagulation needed CHADS2 Criteria >2 = warfarin - Maintain INR btw 2-3 1 = warfarin or aspirin 0 = none or aspirin
ATRIAL FIBRILLATION - Irregularly irregular rhythm	- MC chronic arrhythmia - Narrow QRS and no P waves - Complication: may cause thrombi to form which can embolize and cause stroke - Types - Paroxysmal → less than 24 hours - Persistent → Doesn't self-terminate, lasts > 7 days. Requires medical or electrical termination - Permanent → persistent AF > 1 year. Refractory to cardioversion - Lone → paroxysmal, persistent, or permanent w/o evidence of heart dz - Management of Stable - Rate control → preferred as initial management - BB: Metoprolol; cautious in pts with reactive airway dz - CCB: Diltiazem - Digoxin: pts w/ hypotension or CHF - Rhythm control → preferred for younger pts with lone A fib - Direct current (synchronized) cardioversion → after 48 hours or proof of no thrombi - Drugs: Ibutilide, Flecainide, Sotalol, Amiodarone - Radiofrequency ablation → permanent pacemaker - Management of Unstable → direct current (synchronized) cardioversion (DCC)	

LONG QT SYNDROME	- Etiology
	  - Congenital
	  - Acquired → macrolides, TCA, electrolyte abnormalities
	- S/Sx: recurrent syncope, arrhythmias, sudden cardiac death
	- Tx: discontinue drugs and correct imbalances
	  - Definitive management of congenital long QT = AICD

PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA	- HR > 100 bpm
	- Regular rhythm w/ narrow QRS complex
	- P waves hard to identify
	- Underlying mechanism → re-entry
	- Usually asymptomatic but may have palpitations, sweating, SOB and chest pain
	- RF → alcohol, caffeine, nicotine, stress, WPW
	- Tx of Stable w/ Narrow complex
	  - Initial → vagal maneuvers (valsalva)
	  - Normal BP → adenosine
	  - BB or CCB are next
	- Tx of Stable w/ Wide complex
	  - Amiodarone
	  - Procainamide if WPW
	- Tx of Unstable → direct current (synchronized) cardioversion
	- Definitive Management → radiofrequency ablation

VENTRICULAR TACHYCARDIA	- >3 consecutive PVCs at > 100 bpm
	- Monomorphic, polymorphic
	- Bidirectional = digoxin toxicity
	- Management
	  - Stable sustained VT --. Amiodarone
	  - Unstable VT w/ pulse → synchronized cardioversion
	  - VT w/o pulse → defibrillation + CPR
	  - Torsades de pointes → IV magnesium

VENTRICULAR FIBRILLATION	- Quivering heart resulting in cardiac arrest, LOC, no pulse - Coarse vs fine - Unsynchronized cardioversion/defibrillation + CPR - Epinephrine or amiodarone may be given if initial tx are not effective

ATRIOVENTRICULAR BLOCKS	- Interruption of the normal impulse from the SA node to the AV node
	- PR interval most helpful in determining its presence
	- 1st degree → constant, prolonged PR > .2 seconds followed by a normal QRS
	  - No treatment
	- 2nd degree → not every P has a QRS
	  - Mobitz I (Wenckebach): long, longer, dropped QRS
	  - Don’t treat unless symptomatic with atropine
	  - Mobitz II: normal PR intervals with occasional QRS dropped
	  - Can progress to 3rd degree
	  - Must be treated → atropine or temporary pacing
	- 3rd degree → AV dissociation → P waves not related to QRS. All P waves are not followed by QRS
	  - Treat with pacemaker

<table>
<tr><th colspan="4">Endocarditis</th></tr>
<tr>
<td>Valves: M > A > T > P
Acute Bacterial Endocarditis
- Normal valves
- Staph aureus
Subacute Bacterial Endocarditis
- Abnormal valves
- Strep viridans
IV Drug users
- Tricuspid valve
- SA/MRSA
Prosthetic Valve Endocarditis
- w/in 60 days
- Staph epidermidis
Gi procedures
- Enterococci
- Men 50yo
HACEK → large vegetations, hard to culture
- Haemophilus
- Actinobacillus
- Cardiobacterium
- Eikenella
- Klingella</td>
<td>Fever
Anorexia
Weight loss
Fatigue
ECG conduction abnormalities
Peripherals:
- Janeway lesions → painless, erythematous macule on palms and soles
- Roth spots → retinal hemorrhages w/ pale centers. Petechiae
- Osler Nodes → tender nodules on pads of the digits
- Splinter hemorrhage</td>
<td>Blood culture x 3
ECG → b/c pt is prone to arrhythmias
Echo → TTE first, than TEE
Labs → CBC, leukocytosis, anemia

Duke’s criteria for Diagnosis
- 2 major or 1 major + 3 minor or 5 minor
Major Criteria
- Sustained bacteremia in at least 2 cultures
- Endocardial involvement seen in a + echo or new valvular regurgitation
Minor Criteria
- Predisposing condition → abn valves, IVDA, catheters
- Fever
- Vascular & embolic phenomena → Janeway lesions, embolic
- Immunologic phenomena → Osler nodes, Roth spots, + rheumatoid factor
- + culture not meeting major criteria
- + echo for worsening an existing murmur</td>
<td>Acute
- Nafcillin + Gentamicin x 4-6 wks
- Vancomycin + Genta if MRSA or PCN allergy

Subacute → Penicillin/Ampicillin + Gentamicin
IVDA → Vancomycin
Prosthetic → Vancomycin + Gentamicin + Rifampin
Fungal → Amphotericin B + surgical intervention

Surgery in refractory CHF, persistent infection, prosthetic valve, and fungal infections

Prophylaxis → Amoxicillin
- Prosthetic heart valves
- Prior history
- Congenital heart dz
- Denta or respiratory surgery
- Skin procedures</td>
</tr>
<tr><th colspan="4">Hypertriglyceridemia</th></tr>
<tr>
<td><u>RE:</u> DM, ETOH, obesity, steroids, estrogen
Associated with CAD</td>
<td>Pancreatitis</td>
<td>TG > 150 mg/dL</td>
<td>Fibrates → best meds to lower elevated triglycerides
- Gemfibrozil
- Fenofibrate</td>
</tr>
<tr><th colspan="4">Angina - also refer to CAD</th></tr>
<tr>
<td colspan="2">Unstable Angina → Chest pain at rest</td>
<td colspan="2">Stable Angina → Chest pain upon exertion</td>
</tr>
<tr><th colspan="4">Chest Pain</th></tr>
<tr>
<td colspan="2">Substernal chest pain brought on by exertion due to decrease supply and increase in demand.</td>
<td colspan="2">Class 1 → angina only with unusually strenuous activity. No limitations of activity
Class 2 → angina with more prolonged or rigorous activity. Slight limitation of physical activity
Class 3 → angina with usual daily activity. Marked limitation of physical activity
Class 4 → angina at rest. OFten unable to carry out any physical activity</td>
</tr>
</table>

Hyperlipidemia

Causes: Hypercholesterolemia
RF: smoking, HTN, HDL < 40, Fx, men > 55, women > 65.

Screening PANCE
- Adults between 20-79 free of CVD assess for RF every 4-6 years.
- High risk = >1 RF → start at 25 for males and 35 for females
- Low risk → start at 35 for males and 45 for females

Screening BOARDS Book
- Every 5 years in men > 35 yo and women > 45 yo
- At age 20 with CAD risk factors or family history
- Not recommended in pts > 75 yo

Most LDL > 190 have genetic component
Most are asx
Development of Xanthomas or Xanthelasma

Lipid panel: TC, LDL, HDL, TG
- TC & HDL measured w/o fasting

Goals: weight reduction, exercise, decreased trans fatty acids and restriction of cholesterol/carbs

To lower LDL → statins
Lower triglycerides → fibrates
Increase HDL → niacin
Type 2 DM → fibrates and statin

Initiation of Statin therapy
- DM btw age 40-75
- >21 yo w/ LDL > 190 mg/dL
- Anyone w/ atherosclerotic dz

Statins MOA: inhibit HMG-CoA reductase
- Taken at bedtime when cholesterol peaks

Monitor labs: CPK, creatinine, LFTs, ALT, cholesterol
- d/c if transaminase inc 3x over baseline
- CI in liver dz, elevated transaminases, pregnancy
- SE: muscle injury

Primary prevention
- Atorvastatin → for renal impairment
- Pravastatin → for liver dz
- Simvastatin → can't take with antifungals or macrolides

Drug	LDL	HDL	TG	Side Effects	Best for	Monitor
Statins	↓	↑	↓	Gi distress, elevated LFT, myositis	Elevated LDL only; elevated LDL & TG	LFTs (CK if symptomatic)
Nicotinic acid (niacin)	↓	↑	↓	Flushing, gout, GI distress, elevated LFTs, pruritus, ↑ blood glucose	Elevated LDL & TG; low HDL (Jack of all trades)	LFTs
Bile acid-binding resins (cholestyramine)	↓	↑	↓	GI distress, ↑TG, ↓absorption of fat soluble vitamins	Elevated LDL only	
Fibrates (gemfibrozil)	↓	↑	↓	GI distress, myositis (especially with statins)	Elevated TG	LFTs

Congestive Heart Failure			

Acute **decompensated HF** with worsening of baseline sx characterized by:
- **Pulmonary congestion**
- Sympathetic activation
- CXR of congestion
 	
<u>Underlying cardiac disease</u>
- **Depress systolic ventricular function** w/ **<u>REDUCED EF</u> (**ejection fraction)
 	
- **Diastolic failure =** <u>PRESERVED EF</u> (ejection fraction)
	- **Dyspnea**
	- **Fatigue**
	  - Decreased perfusion of peripheral tissue
	- **Rales/Crackles**
	- **Orthopnea**
	- **Paroxysmal nocturnal dyspnea**
	- Pink frothy sputum
	
	<u>PHYSICAL EXAM</u>
	· **JVD**
	· **S3: HFrEF**/ volume overload cause
	· **S4: HEpEF**
	· Pulmonary congestion à rales, dullness over pleural effusion
	· Peripheral edema
	· Hepatomegaly
	· Ascites
	· Sinus tachycardia
		<u>CXR</u>
		- Cardiomegaly
		- Pulmonary Vascular Redistribution
		- Interstitial edema
		- Pleural effusions
		
		- PCWP 12-18
		  - <u>Cephalization of flow:</u> increased vascular flow to the apices from increased pulm venous pressure
		
		- PCWP 18-25
		  - <u>Kerly B Lines:</u> Short linear markings @ lung periphery of lower lung fields
		
		- PCWP >25
		  - <u>Butterfly (Batwing) pattern</u>
		
		<u>BNP:</u> Differentiates cardiac from pulmonary causes if **BNP is elevated**
		
		<u>Echo:</u> Facilitates EF calculation/ estimate
		Identify underlying cause
			“LMNOP”
			L: Lasix
			(removes fluid helping sx)
			M: Morphine
			(reduce preload—reducing heart strain)
			N: Nitrates
			(venodilators—reduce preload – reducing heart strain)
			O: Oxygen
			P: Position
			(Place upright to decrease venous return)
			
			<u>Nesiritide IV only</u>
			- Synthetic BNP
			- ↓RAAS ↑NA excretion
			- ↓ TBFV (tidal breathing flow volume)
			- ER/ inpatient severe case
			
			Restrict salt, avoid NSAIDs, immunize
			ACE inhibitors = vasodilator & ↓BP (don’t IF K+ >5.5)
			
			Beta Blockers = ↓BP & ↓HR (don’t if HB, spasms)
			
			Aldosterone antagonist: AVOID if K+ >5 or creatinine >2.5

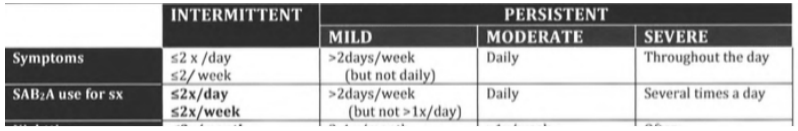
Valvular Disease			
AORTIC STENOSIS - > 70 yo → Degenerative = calcificied - < 70 yo → congenital= bicuspid Aov - Rherditis - Rheumatic heart dz → ass w/ AR	“Aortic Stenosis Complications” - Angina - Syncope - CHF → poor prognosis Dyspnea on exertion Systolic murmur → crescendo/decrescendo - RUSB - Harsh Pulsus parvus et tardus - Delayed carotid pulse w/ narrowed pulse pressure Normal AV area is 3-4cm → critical AS is < 0.8cm	Echo - Small aortic orifice during systole - LVH - Thick AoV ECG → LVH Cardiac catheterization→ definitive	Aortic valve replacement - Symptomatic or severe AS Medical mgmt if pt is not a candidate for sx - Mild = no restrictions - Severe = no physical activity, venodilators, or negative inotropes

AORTIC REGURGITATION/INSUFFICIENCY - Valve dz → rheumatic dz, endocarditis - Aortic root dz/dilation → HTN, Marfan syndrome, SLE, syphilis	Asx for decades → exertional dyspnea, angina, sx of HF Diastolic murmur → decrescendo (blowing) - LUSB - Increased intensity w/ squatting, sitting forward, handgrip, expiration - Valsalva dec intensity - + Austin Flint murmur Bounding pulses & wide pulse pressure	Echo → initial Catheterization → definitive	Medical therapy → afterload reduction w/ vasodilators (ACEI/ARB) Surgical therapy → definitive - If EF < 55%
TRICUSPID STENOSIS	Signs of venous HTN Mid-diastolic murmur LLSB		Diuretics & Na+ restriction Surgery → commisurotomy or replacement
TRICUSPID REGURGITATION - Dilation of the right atrium - Usually functional	JVD Right HF → ascities, edema, HSM Holosystolic murmur - Carvallo's sign: Inc intensity w/ inspiration	ECHO	Diuretics Exercise mgmt Possible surgery → repair > replacement
MITRAL STENOSIS - Rheumatic heart disease ****	Dyspnea, hemoptysis, pulmonary HTN, atrial fibrillation Mitral facies = flushed cheeks w/ facial pallor Loud S1 Opening Snap → severity - Short S2-OS interval - Prolonged diastolic murmur Early-mid diastolic rumble @ apex	Echo → narrowed valve ECG → left atrial enlargement	Surgery - Percutaneous balloon valvuloplasty → best in younger pts - Open mitral valvotomy if balloon unsuccessful - Mitral valve repair/replacement in symptomatic MS
MITRAL REGURGITATION - Mitral valve prolapse*** - Ischemia/infarction	Usually asx w/ DOE & fatigue Blowing, holosystolic/pansystolic murmur @ apex with radiation to axilla - Wide split S2 - Laterally displaced PMI	Echo → regurgitant & hyperdynamic	Surgery → repair > replacement Vasodilators for nonoperative symptomatic pts
MITRAL VALVE PROLAPSE Degeneration of valve, connective tissue dz - Young women	Asx +/- Anxiety, panic attacks, syncope Sx ass w/ MR progression Mid-late systolic ejection click @ apex	Echo → posterior bulging leaflets	Reassurance only d/t good prognosis BB only for autonomic dysfx symptoms
PULMONARY STENOSIS - Congenital → tet of fallot, congenital rubella syndrome - Ass w/ young	- Harsh midsystolic ejection murmur - Cresc-decrescendo - Radiates to neck - Systolic ejection click - Increases with inspiration and the longer the murmur the worse it is		Balloon Valvuloplasty
PULMONARY REGURGITATION - Iatrogenic - Pulmonary HTN	Grahm Steel murmur → brief decrescendo early diastolic murmur If sx → R sided failure symptoms		No tx, almost always congenital

PULMONOLOGY

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Asthma			

- **REVERSIBLE** obstructive dz
- Risk Factor = atopy
- Samter's Triad:
  - Asthma
  - Nasal polyps
  - ASA/NSAID allergy
- Associated w/ atopic dermatitis
Patho:
1. Airway hyperactivity
- Extrinsic = allergen triggered (IgE)
  - MC kids/adolescents
- Intrinsic = nonallergic triggers
  - Infection
  - Pharmacologic
  - Exercise
  - MC < 3 y/o OR > 30 y/o
2. Bronchoconstriction
- Airway narrowing → air trapping
- ↓expiratory airflow
- ↑airway resistance = ↑work of breathing
- V/Q mismatch
3. Inflammation
- d/t cellular infiltration
- ↑ histamine from mast cells (IgE)
	- Worse at night
	
	Classic Triad:
	- Dyspnea
	- Wheezing
	- Cough (MC @ night)
	
	- Prolonged expiratory wheezing
	- Hyperresonance to percussion
	- ↓ breath sounds
	
	Status Asthmaticus:
	- Silent chest = no air exchange
	- Tripod position
	- AMS
	- Pulsus paradoxus = pulse weaker w/ inhalation and stronger w/ exhalation
		- Pulmonary fxn test (spirometry) = GOLD STANDARD
		  - **↓FEV1**
		  - **↓FEV1/FVC**
		- Bronchoprovocation: challenge tests if pulmonary fxn nondiagnostic
		  - Methacholine (↓FEV1)
		  - Bronchodilator (↑FEV1)
		  - Exercise (↓FEV1)
		  - Histamine
		- Peak Expiratory Flow Rate (PEFR) → used for **monitoring & in ED**
		  - Nml = 400 - 600
		  - PEFR > 15% from initial = response to treatment
		- CXR: ± hyperinflation
		- ABG: hypoxia or hypercapnia
		- CBC: may show eosinophilia
			<u>Rescue Drugs:</u>
			1. SABA: 1st line for acute
			- **Albuterol**, Terbutaline
			- Bronchodilators esp. peripherally
			- AE: tachy/arrhythmias, muscle tremors, CNS stimulation
			2. Anticholinergics (antimuscarinics): Ipratropium → central bronchodilator
			- Most useful in 1st hr
			- AE: dryness, blurred vision, acute glaucoma, BPH
			3. Corticosteroids (**Short** course): Prednisone, Methylprednisolone, Prednisolone
			- Decrease relapses
			- AE: immunosuppression, hyperglycemia, growth delay
			<u>Long Term (Chronic Control):</u>
			1. Inhaled corticosteroids(ICS): Flunisolide, Beclomethasone, Triamcinolone
			- **DOC for long term**, **persistent**
			- AE: thrush (use spacer)
			2. LABA: Salmeterol
			- Prevents si/sx's (nocturnal asthma)
			- ONLY IF persistent asthma NOT controlled with ICS
			- NOT used alone (w/ ICS)
			- NOT a rescue drug
			- Once controlled, step off
			3. Mast Cell Modifiers: Cromolyn, Nedocromil
			- Prophylaxis only
			- Inhibits acute phase response to cold air and exercise
			4. Leukotriene Modifiers (LTRA): Montelukast, Zileuton, Zafirlukast
			- Asthmatics w/ allergic rhinitis or ASA induced asthma
			- Prophylaxis only
			5. Phosphodiesterase inhibitor: Theophylline
			- **Narrow TI** (toxicity = arrhythmias, seizures)
			- Smokers ↑ dose
			6. Adjuncts
			- IV magnesium in severe asthma
			- Omalizumab: anti-IgE Ab → severe, uncontrolled



	INTERMITTENT	PERSISTENT		
		MILD	MODERATE	SEVERE
Symptoms	≤2 x /day ≤2/ week	>2days/week (but not daily)	Daily	Throughout the day
SAB_2A use for sx	**≤2x/day** **≤2x/week**	>2days/week (but not >1x/day)	Daily	Several times a day

Bronchitis

- Inflammation of trachea/bronchi
- Often follows URI, MC by virus
  - Adenovirus, influenza, parainfluenza, coxsackie

- **Cough** (± productive in acute)
- Dyspnea is rare
- ± rales, crackles, wheezing

- Clinical dx w/o imaging
- CXR: nml or unspecific

Chronic bronchitis
- Productive cough > 3 months for 2 consecutive years

- TOC: treat symptoms
  - Fluids, rest
  - Bronchodilators
  - Antitussives in adults
- No antibiotics UNLESS pt is compromised (elderly, COPD, immunocompromised)

Chronic Obstructive Pulmonary Disease

- IRREVERSIBLE airflow obstruction
- COPD = emphysema & chronic bronchitis
- > 55y

Risk Factors
- **Smoking** or exposure to smoke
- α-1 antitrypsin deficiency
  - < 40y
  - Antitrypsin protects elastin in lungs

Emphysema Patho
- Enlarged airspace d/t destruction of alveolar septa
- Chronic inflammation ± ↓α-1 antitrypsin → alveolar capillary and wall destruction → ↓gas exchange surface area → **loss of elastic recoil** + ↑ compliance = airway obstruction that **inc. air trapping**

Chronic Bronchitis Patho
- Chronic airway inflammation → mucus, airway narrowing → **inc. airway resistance** → airway obstruction
- Mucus plugging, ↓ mucociliary movement = pts prone to infection

Emphysema
- MC **dyspnea**
- Tachypnea
- "Pink puffer" = **pursed lip breathing**
- Cachectic
- Barrel chest
- **↓/- breath sounds**, prolonged expiration
- **Hyperresonance** to percussion
- MILD cough

Chronic Bronchitis
- **Productive cough = hallmark**
  - Thick, yellow
- "Blue bloaters" = obese + cyanotic
- Rales, rhonchi, wheezing
- ± cor pulmonale
- Dyspnea on exertion

- Pulmonary fxn test/spirometry = GOLD STANDARD
  - FEV1 < 1L = inc. mortality
  - Obstruction: ↓FEV1, ↓FVC, ↓FEV1/FVC < 70%
  - Hyperinflation: ↑RV, TLC, RV/TLC, ↑FRC
- CXR/CT scan
  - Emphysema: **flat diaphragm**, ↑AP diameter, **↓vascular markings** ± bullae
  - CB: ↑AP diameter, enlarged right border
- ECG
  - **Cor pulmonale** from CB
  - ± multifocal atrial tachy
- ABG/Labs
  - Emphysema: respiratory alkalosis (acidosis in acute)
  - CB: Respiratory acidosis, ↑Hct/RBC (d/t hypoxia)
- V/Q mismatch
  - Emphysema: matched defects
  - CB: severe mismatch

* **smoking cessation MOST important***

<u>Bronchodilators</u> = TOC in stable COPD

1. Anticholinergics
   - Tiotropium, Ipratropium
   - Preferred over SABA for COPD
   - AE: dryness, urinary retention, blurred vision
   - CI: BPH, glaucoma
2. B2 Agonist
   - Albuterol, Terbutaline, Salmeterol
   - AE: B1 cross reactivity = arrhythmias, muscle tremor, CNS stimulation
3. Theophylline
   - Refractory only
   - Narrow TI (arrhythmias, seizures)
   - Higher doses in smokers

*anticholinergic + B2 agonist is best

<u>Corticosteroids</u>
- NOT monotherapy
- May be added to LABA if responsive after a trial of ICS
- AE: thrush, hyperglycemia, inc. infections

<u>Oxygen</u>
- Only therapy proven to ↓ morality
- Indicated for pts w/ cor pulmonale or O2 < 88% or PaO2 < 55 mmHg
- O2 goal > 90%

<u>Preventative</u>
- Vaccines = pneumococcal, flu
- Pulmonary rehab
- Lung reduction surgery → Improves dyspnea by removing damaged lung
- Lung transplant

Antibiotics only used in bacterial exacerbations → azithromycin

Pneumonia

MC route of infection = aspiration of oropharyngeal secretions

General Diagnosis
- CXR/CT
  - Silhouette Sign
  - ± pleural effusion
  - Abscess = S. aureus
  - Upper lobe + bulging fissures, cavitations = klebsiella
- Sputum (gram stain + culture)
  - Rusty/blood tinged = Strep. Pneumoniae
  - Currant jelly = klebsiella
  - Green = H. flu, pseudomonas
  - Foul smelling = anaerobes

PCV13 Pneumococcal Conjugate Vaccine Prevnar)
- **Childhood vaccine**
  - Healthy children < 24m → 4 doses: 2, 4, 6 and 12-15m of age
  - High risk children ≥ 2y → same as above PLUS PPSV23 at least 8 weeks after last PCV13 series
- Contains 13 antigenic polysaccharides

PPSV23 Pneumococcal Polysaccharide Vaccine (Pneumovax)
- Contains capsular polysaccharides of 23 of the MC pneumococcal types
- ≥ 65yo → receive dose; if received dose before 65, next dose after 5 years
- ≥ 2 - 64 → ind. w/ chronic dz (cardiac, pulm, diabetes, liver, immunocompromised, sickle); revaccination ≥ 5y
- AE: mild local pain, erythema @ site, fever, myalgias
- CI: anaphylaxis to prior dose, caution with ill patients

Bacterial		Viral	Fungal
Streptococcus Pneumoniae - **MCC of CAP** - Gram (+) pair	Staphylococcus Aureus - Often seen after viral illness - **Hospital-acquired (esp. MRSA)** - Bilateral w/ multilobar infiltrates or abscesses - Gram (+) cocci cluster	RSV & Parainfluenza - MC viral in **infants/small children**	Pneumocystis jirovecii - Compromised host
Haemophilus Influenzae - **2nd MCC of CAP** - Gram (-) rod - Risk: COPD, bronchiectasis, cystic fibrosis, < 6y	Klebsiella Pneumoniae - Severe in **alcoholics** or chronic aspirators (**community acquired for alcoholics**) - Assoc. w/ cavitary lesions - Gram (-) rods	Influenza - MC viral in **adults**	Histoplasma capsulatum - Mississippi and Ohio River valley → soil contaminated from bat/bird droppings
Chlamydophila Pneumoniae - Atypical - Intracellular parasite	Anaerobes - Peptostreptococcus, bacteroides, fusobacterium - **Aspiration pneumonia** - MC in R lower lobe	Cytomegalovirus - Transplant and AIDS pts	
Legionella Pneumophila - Contaminated water supplies (air conditioner) - NOT person-to-person - Gram (-) rod	Pseudomonas Aeruginosa - **Hospital-acquired pneumonia** - Immunocompromised, cystic fibrosis, bronchiectasis - Gram (-) rod w/ slime coat	Varicella Zoster - Severe in adults	
Mycoplasma Pneumoniae - **MCC of atypical (walking) pneumonia** - Lack cell wall → **don't respond to beta-lactams** - Risk: college students, military recruits			

Drugs

B-lactam	**Ceftriaxone**, cefotaxime, ampicillin/sulbactam (unasyn), ertapenem (invanz)
Anti-pseudomonal B-lactam	**Piperacillin/tazobactam** (Zosyn), Cefepime, Imipenem, Meropenem, Ceftazidime
Macrolides	Clarithromycin, azithromycin
Respiratory Fluoroquinolone	Levofloxacin, moxifloxacin, gemifloxacin * Ciprofloxacin is NOT part of this but it can be used for pseudomonas or legionella
Aminoglycoside	Amikacin, gentamicin, tobramycin

Community Acquired Pneumonia

- Can be an ambulatory pt that develops pneumonia 48 hrs within admission	Outpatient → 1st line = Macrolide or doxycycline Inpatient → B-lactam + macrolide/doxy or broad spectrum fluoroquinolone ICU → B-lactam + macrolide OR B-lactam + broad fluoroquinolone

Hospital Acquired Pneumonia

- Occurs > 48 hours after hospital admission
- Often pseudomonas, MRSA

Typical Pneumonia	Atypical Pneumonia
S. pneumoniae, H. influenzae, Klebsiella, S. aureus	**Mycoplasma pneumoniae**, chlamydophila, legionella, viral
CXR = LOBAR	CXR: DIFFUSE, patchy interstitial or reticulonodular infiltrates
Clinical Manifestation: - Sudden fever - **Productive, purulent cough** - Pleuritic chest pain - **Rigors** (esp. S. pneumo) - Tachycardia, tachypnea PE: - Bronchial breath sounds - Dullness on percussion - ↑ tactile fremitus, egophony - Inspiratory rales	Clinical Manifestation: - Low grade fever - **Dry, nonproductive** cough - **Extrapulmonary sx** (myalgias, malaise, sore throat, HA, N/V/D) Chlamydophila: Hoarseness, fever Mycoplasma: - Ear pain - Bullous myringitis - Erythematous pharynx/tympanic membrane Legionella: GI sx, ↑ LFTs, Hyponatremia PE: Often nml- no signs of consolidation

- Antipseudomonal B-lactam + antipseudomonal aminoglycoside or fluoroquinolone
- MRSA suspected → add vanco or linezolid
- Legionella suspected → add levofloxacin or azithromycin
- Pneumocystis jirovecii suspected → add Bactrim ± corticosteroids

Aspiration (anaerobes)
- Clindamycin or metronidazole or amoxicillin/clavulanic acid

Tuberculosis

- Infxn by Mycobacterium tuberculosis → granuloma formation
- High mortality if untreated
- At risk populations = health care workers, immigrants from prevalent areas, homeless, immunodeficient **(HIV)**

Patho

- Inhalation of **airborne droplets** → alveolar macrophages ingest → TB remains viable in macrophage

Stages

Primary TB: initial infection = self-limiting

- Active initial infxn = primary rapidly progressive TB → **Contagious**

Chronic (Latent) TB:

- Caseating granulomas
- PPD + 2 - 4 wks after infxn
- **NOT contagious**

Secondary (Reactivation) TB:

- D/t ↓ immune defenses in latent pts
- MC apex/upper lobes w/ cavitary lesions
- **Contagious**

Pulmonary TB

- Chronic, productive cough
- Chest pain (pleuritic)
- Hemoptysis if advanced
- Night sweats
- Fever/chills
- Fatigue
- Anorexia, weight loss

Extra-pulmonary TB (any other organ)

- Pott's dz = vertebral
- Scrofula = lymph nodes
- TB meningitis

PE

- Signs of consolidation
- Rales, rhonchi
- Dullness

- Acid-fast smear & sputum culture x 3 days = GOLD STANDARD
- CXR to exclude active TB or yearly screening in pts w/ known TB
  - Reactivation: apical fibrocavitary
  - Primary TB: middle/lower consolidation
  - Miliary TB: millet-seed like nodular lesions
  - TB pleurisy: effusion
  - Granuloma: **Ghon's complex** = lesion; **Ranke complex** = lesion + calcified lymph node
- Interferon Gamma Release Assay

Latent TB diagnosis

- Asx person who is PPD (+) with no evidence of active infxn on CXR/CT scan

- Hospitalize pts if high risk of noncompliance
  - Negative pressure isolation
- Pt no longer contagious after 2 wks of tx

Initial

- 2 months of **RIPE/RIPS** + culture
  - Rifampin, isoniazid, pyrazinamide, ethambutol or streptomycin

After initial 2 months

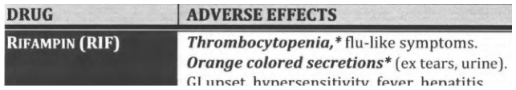
- If culture shows sensitivity to both isoniazid and rifampin → STOP ethambutol/streptomycin → **continue 4 months w/ rifampin and isoniazid only**
- Pyrazinamide is usually stopped after first 2 months regardless of culture

Latent TB

- Isoniazid sensitive pt = isoniazid + pyridoxine x 9 mo
- HIV (+) pt = isoniazid + pyridoxine x 12 mo
- Isoniazid resistant pt = rifampin + pyrazinamide x 4 mo

Purified Protein Derivative (PPD): *examine 48-72h for TRANSVERSE INDURATION (redness not considered positive).*

REACTION SIZE	PERSONS CONSIDERED TO HAVE ⊕ TEST
>5 mm	- *HIV ⊕ or immunosuppressed* (ex. Prednisone 15mg/day >1 month)



DRUG	ADVERSE EFFECTS
RIFAMPIN (RIF)	***Thrombocytopenia,**** flu-like symptoms. ***Orange colored secretions**** (ex tears, urine). GI upset, hypersensitivity, fever, hepatitis

Lung Cancer

Pulmonary Nodules

- Nodule = < 3 cm, mass = > 3 cm

Etiology
- Granulomatous = **MC TB**, histoplasmosis, coccidioidomycosis
- Inflammation = RA, **sarcoidosis**, wegener's granulomatosis
- Mediastinal = **MC thymoma tumor**

Typical Characteristics
Benign: round, smooth
- Slow growing
- Calcifications present
- Cavitary usually seen

Malignant: irregular, speculated
- Rapid growth
- No calcifications
- Cavitary + thick walls

- Pt hx
  - TB, smoking hx think cancer
- Transthoracic needle aspiration for peripheral lesions
- Bronchoscopy for central lesions

- Observation
  - Monitor growth
- Resection with biopsy if high malignant probability

Bronchial Carcinoid Tumors

- Rare **neuroendocrine** tumor → well differentiated low-grade malignancy
- **Slow growth**, rarely metastasizes
- 2nd MC site (GI 1st)
- ± secretion of serotonin, ACTH, ADH, melanocyte stimulating hormone
- < 60y

- Most **asymptomatic**
- ± cough, wheezing, hemoptysis
- **Carcinoid syndrome** (↑serotonin)
  - Flushing
  - Tachycardia
  - Diarrhea
  - Difficulty breathing
  - Acidosis

- **Bronchoscopy**
  - pink/purple well-vascularized central tumor
- CT/octreotide scintigraphy to localize tumor

- **Surgical excision = definitive**
- Resistant to chemo and radiation
- **Octreotide** for symptom management

Bronchogenic Carcinoma

- Leading cause of cancer death
- 50s - 60s
- MCC = **SMOKING** (85%)
  - 2nd MCC asbestosis
- METS → brain, bone, liver, lymph nodes, adrenals

Non Small Cell Carcinoma (85%)
1. Adenocarcinoma (35%): MC type in smokers, women, nonsmokers
   - Peripheral → from mucous glands
   - High chance of METS
   - Bronchioloalveolar = rare subtype; best prognosis
2. Squamous Cell (20%): Bronchial
   - "CCCP": **C**entral
     Cavitary lesions
     Hyper**C**alcemia
     Pancoast syndrome
3. Large Cell (Anaplastic)(10%) very aggressive

Small Cell Carcinoma(13%):central, aggressive
- Metastasizes early → presentation d/t METS

- Cough, hemoptysis, dyspnea
- Anorexia, **weight loss**

Pancoast syndrome → tumors @ apex
- Shoulder pain
- Horner's syndrome (miosis, ptosis, anhidrosis)
- Atrophy of hand/arm muscles

MC w/ small cell
- SVC syndrome
  - Dilated neck veins
  - Prominent chest veins
- SIADH
- Hyponatremia
- Cushing's syndrome
- Lambert-Eaton syndrome
  - Weakness that improves with muscle use

MC w/ adenocarcinoma → gynecomastia

MC w/ squamous → hypercalcemia

- CT used for staging
- **Bronchoscopy** and sputum cytology for central lesions
- **Transthoracic needle biopsy** for peripheral lesions

Non Small Cell Carcinoma
- **TOC = Surgical resection**

Small Cell Carcinoma
- **TOC = chemotherapy** ± radiation
- Surgery not recommended

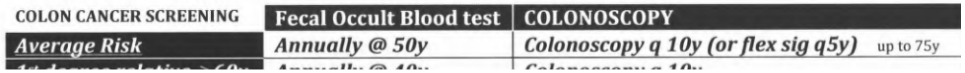
<table>
<tr><th colspan="4">Sleep Disorders</th></tr>
<tr><th colspan="4">Sleep Apnea</th></tr>
<tr>
<td>- Central sleep apnea: d/t reduced CNS respiratory drive
- Obstructive sleep apnea: d/t physical obstruction</td>
<td>- Snoring
- Unrestful sleep → daytime sleepiness
- Nocturnal choking
PE
- Large neck diameter
- Crowded oropharynx
- Micrognathia</td>
<td>- In-lab polysomnography = first line test
- ≥ 15 events/hr (apnea, hypopneas, respiratory effort arousals)
- Labs
- Polycythemia (d/t hypoxia)
- Epworth sleepiness scale</td>
<td>- TOC = Continuous positive airway pressure (CPAP)
- Weight loss, exercise, no alcohol
- Surgical
- Tracheostomy = definitive tx</td>
</tr>
<tr><th colspan="4">Tobacco use/Dependence</th></tr>
<tr>
<td>Tobacco is the most modifiable risk factor

Puts you at risk of….
- Asthma
- COPD
- Bronchogenic Carcinoma
- MC adenocarcinoma</td>
<td colspan="2">Nicotine Withdrawal:
- Restlessness
- Anxiety
- Irritability
- Sleep abnormalities
- Depression
- Nicotine craving</td>
<td>- Counseling, support
- Nicotine tapering therapy (gum, nasal sprays, transdermal patches, inhaler, lozenges)
- Bupropion (antidepressant)
- Varenicline (blocks nicotine receptors)</td>
</tr>
</table>

GASTROINTESTINAL/NUTRITION

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Colonic Polyps			

- Pseudopolyps/inflammatory → due to IBD, **not cancerous**
- Hyperplastic → low risk for malignancy (90% of all polyps)
- Adenomatous polyps → 10-20y before becoming cancerous (esp >1cm)
  - Tubular adenoma: non pedunculated (MC & **least risk**)
  - Tubulovillous: intermediate risk
  - Villous adenoma: **highest risk** of becoming cancerous			

Colorectal Cancer			
- 3rd MCC of cancer related death in US - Progression of adenomatous polyp → malignancy - MC site of metastasis = **liver** <u>Risk Factors</u> - **Familial adenomatous polyposis** - Lynch syndrome - **Peutz-Jehgers** - Age >50 - Ulcerative colitis - Diet (low fiber, high in red/processed meat)	- Iron deficiency anemia - **CRC MCC of lrg bowel obstruction in adults** - Right sided: Rectal bleeding, diarrhea - Left sided: bowel obstruction, present later	- **Colonoscopy w/biopsy: diagnostic test of choice** - Barium enema: **apple core lesion** classic - ↑ CEA: levels are monitored during tx as well - CBC → anemia	- Localized (stage I-III): surgical resection - Stage III & metastatic: chemo is mainstay of tx. Ex: 5FU/Fluorouracil
			
Anal Fissure			
- Due to low fiber diets, passage of large, hard stools or other anal trauma - Painful linear tear/crack in distal anal canal - Involves epithelium but may be full thickness	- **Severe painful rectal pain** & bowel movements causing patient to refrain from having BM, → **constipation, bright red blood** per rectum - PE: skin tags MC **posterior midline**		- >80% **resolve spontaneously** - Supportive measures: warm water sitz baths, stool softeners, high fiber - 2nd line: Topical vasodilators: Nitro

Peptic Ulcer Disease			
- Decreased mucosal protective factors in GU - Increased damaging factors in DU - **MCC: H. pylori** - **2nd MCC: NSAIDS** - Suspect GI malignancy (ZES, gastric cancer) in non healing GU <u>Complications</u> - Bleeding - Perforation - Penetration - Obstruction	- **Dyspepsia** = epigastric pain, worse at night - Worse before meals or 2-5h after meals → DU - Pain on eating or 1-2 hrs after meals → GU - **GI bleed: PUD is MCC**	- **Endoscopy is GS**, biopsy to rule out cancer for GU - Upper GI series if can't do endoscopy - Urea breath test or rapid urease test for H. pylori - + H. pylori stool antigen (HpSA) used for diagnosing & confirming eradication after therapy - + serologic antibodies: confirms infection not eradication	- **H. pylori: Clarithromycin + Amoxicillin + PPI** - Quad therapy: PPI + Bismuth + Tetracycline + Metronidazole - H. pylori (-): **PPI**, H2 blocker, misoprostol, antacids, bismuth - Refractory: parietal cell vagotomy or **Billroth II**
Gastritis			
Superficial inflammation/irritation of the stomach mucosa w/mucosal injury - Imbalance between ↑ aggressive & ↓ protective mechanisms - MCC: H. pylori - 2nd MCC: NSAIDS/ASA	- **MC asymptomatic** - If sx → epigastric pain - Bleeding is minimal	- **Endoscopy is GS** - H. pylori testing	- H. pylori (+) : Clarithromycin + Amoxicillin + PPI. Metronidazole if PCN allergic - H. pylori (-) : acid suppression w/ PPI, H2 blocker, antacids, sucralfate
Gastroenteritis			

- MCC overall in US = Norovirus
- Rotavirus → common in winter
  - Children 3mo - 2y
- Adenovirus → year round
- Bacteria may also cause
	- Diarrhea ± vomiting
	- Fever
	- Malaise
		- Stool cultures
		  - Blood or leukocytes → inflammatory infxn
			- Fluids
			- Early refeeding

Constipation			
Due to: - Disordered movement of stool - Slow colonic transit: idiopathic, motor disorder - Hirschsprung's dz - Side effect of many drugs (ex: verapamil, opioids) - Hypercalcemia	- **Infrequent bowel movement (<2 per week)** - Straining, hard stool - Feeling of incomplete evacuation	- Clinical	- **Fiber** - **Bulk forming laxatives**: Psyllium, methylcellulose - **Osmotic laxatives**: Polyethylene glycol, lactulose, milk of magnesia - Also used in hepatic encephalopathy - **Stimulant laxatives**

Diarrhea

	NON-INVASIVE DIARRHEAS	INVASIVE DIARRHEAS
Pathophysiology:	Enterotoxins increase GI secretion of electrolytes ⇨ *secretory diarrhea*	Cytotoxins cause mucosal invasion & cell damage.

Noninvasive (Noninflammatory) Infectious Diarrhea

- **NO fecal WBCs or blood**
- Vomiting + **watery** diarrhea

Staphylococcus Aureus
- Short incubation (6h)
- **Heat-stable** enterotoxin
- MC source = food (dairy, mayo, meat, eggs)

Bacillus Cereus
- Short incubation (1 - 6h)
- MC source = **rice** (fried rice)

Vibrio Cholerae
- Exotoxin
- Gram (-) rod
- Source = water and food
  - **Poor sanitation**
  - Overcrowding conditions

Vibrio Parahaemolyticus & Vibrio Vulnificus
- Exotoxin
- Source = raw shellfish

Enterotoxigenic E. Coli (ETEC)
- MCC traveler's diarrhea
- Source = unsanitary water
- Incubation = 24 - 72h

Clostridium Difficile
- nosocomial/iatrogenic
- MCC = **antibiotic use** (esp. clindamycin)

Vomiting predominant sx in most cases

Staphylococcus Aureus
- Vomiting, diarrhea
- Abdominal cramps
- HA

Bacillus Cereus
- Vomiting, diarrhea
- Abdominal cramps

Vibrio Cholerae & Parahaemolyticus
- Severe grey watery diarrhea
  - **"Rice water stool"**
- May develop severe dehydration

Vibrio Vulnificus
- Bacteremia and cellulitis
- NO diarrhea

Enterotoxigenic E. Coli (ETEC)
- Abrupt diarrhea
- Abdominal cramps
- Vomiting

Clostridium Difficile
- Abdominal cramps
- Diarrhea
- **Fever**
- Tenderness
- **↑ lymphocytosis**
- Pseudomembranous colitis → may lead to bowel perf or toxic megacolon

Staphylococcus Aureus & Bacillus Cereus
- Self-limiting → **fluids**

Vibrio Cholerae & Parahaemolyticus
- **Fluid replacement**
- **Tetracyclines**, fluoroquinolones, or macrolides for comorbid or high fever pts

Enterotoxigenic E. Coli (ETEC)
- Fluids ± bismuth
- In severe → ± fluoroquinolone, Bactrim, azithromycin

Clostridium Difficile
- 1st line if mild → **metronidazole oral**
- 1st line if severe → **vancomycin**
  - Or 2nd line in mild

Invasive (Inflammatory) Infectious Diarrhea

- HIGH fever
- (+) blood and fecal leukocytes
- Not as much volume of diarrhea
- Do **NOT** give anti-motility drugs (toxicity)

<u>Campylobacter Enteritis</u>
- C. jejuni
  - MCC of bacterial enteritis
  - MCC post-infectious guillain-barre syndrome
- Incubation = 3d
- Source = food (undercooked poultry), raw milk, water, dairy

<u>Shigella</u>
- Highly virulent
- MC in US = S. Sonnei
- Incubation = 1 - 7d
- Source = fecal → oral

<u>Salmonella</u>
- Incubation = 6 - 48h
- Source = fecal → oral
  - dairy, eggs, chicken, reptiles
- High risk = sickle cell pts, immunocompromised, post-splenectomy pts
- S. typhimurium
  - Salmonella gastroenteritis
  - Incubation = 5 - 14d
- S. typhi
  - Typhoid fever
  - Incubation = 1 - 2wk

<u>Enterohemorrhagic E. Coli (EHEC)</u>
- Source = undercooked beef, unpasteurized milk/apple cider, day care centers, water
- Incubation = 4 - 9d
- Cytotoxin

<u>Yersinia Enterocolitica</u>
- Source = pork, milk, water, tofu

<u>Norovirus & Rotavirus</u>
- Source = person → person
- Norovirus → MCC gastroenteritis
- Rotavirus → MCC of diarrhea in children

<u>Campylobacter Enteritis</u>
- Fever
- HA
- Abdominal pain
- Watery then bloody diarrhea

<u>Shigella</u>
- Lower abdominal pain
- High fever
  - Febrile seizures in children
- Tenesmus
- Explosive watery diarrhea → mucoid, bloody
- Toxic megacolon in severe
- Reiter's syndrome

<u>Salmonella</u>

S. typhimurium
- Abdominal pain/cramping
- Fever
- Vomiting
- Mucus + bloody diarrhea

S. typhi
- Cephalic phase (first week)
  - HA
  - Constipation
  - Pharyngitis, **cough**
- Second week
  - Crampy abdominal pain
  - "Pea soup" diarrhea (brown/green)
  - **Intractable fever**
  - Bradycardia
  - Hepatosplenomegaly
  - **"Rose spots"** appear

<u>Enterohemorrhagic E. Coli (EHEC)</u>
- Watery diarrhea → bloody
- Crampy abdominal pain
- Vomiting
- ± fever

<u>Yersinia Enterocolitica</u>
- Fever
- Abdominal pain (appendicitis-like)

<u>Campylobacter Enteritis</u>
- Stool culture = "S, comma, or seagull shaped" gram (-)

<u>Shigella</u>
- Stool culture → gram (-)
- CBC → Leukemoid reaction (WBC > 50,000/uL)
- Sigmoidoscopy → Punctate areas of ulceration

<u>Campylobacter Enteritis</u>
- Fluids
- Severe → erythromycin

<u>Shigella</u>
- Fluids
- Severe → Bactrim

<u>Salmonella</u>
- S. typhimurium → self-limiting
- S. typhi → fluids ± fluoroquinolones

<u>Enterohemorrhagic E. Coli (EHEC)</u>
- Fluids
- Antibiotics controversial
  - Causes hemolytic uremic syndrome in children

<u>Yersinia Enterocolitica</u>
- Fluids
- Severe → fluoroquinolones, Bactrim

Protozoan Infections → refer below to "Giardiasis"

Osmotic Diarrhea vs Secretory Diarrhea

- Malabsorption of non-absorbable substances → increased solutes pull water into intestine
- **Diarrhea DECREASES w/ fasting**
- Causes
  - Rapid transit of GI contents→ medications (lactulose)
  - Bacterial overgrowth → tropheryma whippelii (whipple's dz), tropical sprue
  - Malabsorption → celiac sprue dz, pancreatic or bile insufficiency, **lactose intolerance**

- **Diarrhea does NOT decrease w/ fasting**
- Causes
  - Laxative abuse
  - Hormonal →carcinoid syndrome (serotonin), medullary cancer (calcitonin), zollinger-ellison syndrome (gastrin)

Pancreatitis

Acute Pancreatitis

- MCC **gallstones** and **alcohol abuse**
  - Other causes: scorpion bite, mumps, iatrogenic

Patho

- Acinar cell injury → pancreatic enzymes released → autodigestion of pancreas → edema, hemorrhage, fat necrosis

- **Constant, boring epigastric pain**
  - Radiates to back
  - Pain is **relieved w/ leaning forward**, sitting, or fetal position
- N/V
- Fever

PE

- ↓ bowel sounds
- Tachycardia
- ± epigastric tenderness
- Severe → dehydration, shock
- If necrotizing/hemorrhagic..
  - **Cullen's** = periumbilical ecchymosis
  - **Grey Turner** = flank ecchymosis

Abdominal CT → diagnostic test of choice

Labs

- Leukocytosis
- ↑ glucose
- ↑ bilirubin
- ↑ **Lipase** x 7 - 14d (more specific than amylase)
- ↑ **Amylase** x 3 - 5d
- ↑ **ALT** (suggestive of gallstone pancreatitis)
- ↑ Hypocalcemia
- ↓ Hematocrit if hemorrhagic

Abdominal US

- rule out gallstones, bile duct dilation, ascites, pseudocyst

AXR

- **"Sentinel loop"** = localized ileus
- Colon cutoff sign

"Rest the pancreas" → 90% recover in 3 - 7d

- NPO
- IV fluids
- Meperidine for pain
  - NOT morphine
- Antibiotics only in necrotizing (imipenem)
- ERCP only if obstructive

RANSONS CRITERIA: used to determine prognosis. APACHE score also used.

ADMISSION		WITHIN 48 HOURS	
Glucose	>200mg/dL	Calcium	<8.0 mg/dL
Age	>55 years	Hematocrit fall	>10%
LDH	>350 IU/L	**O**xygen	P_{O2} <60 mmHg
AST	>250 IU/dL	**B**UN	>5 mg/dL p IV fluids

Chronic Pancreatitis

<table>
<tr>
<td>

- MCC alcohol abuse
  - Other: idiopathic, tumors
- MCC in children cystic fibrosis

Patho

- Chronic inflammation → parenchymal destruction, fibrosis and calcification → **loss of exocrine** and sometimes endocrine fxn

</td>
<td>

TRIAD

- **Calcifications**
- **Steatorrhea**
- **Diabetes mellitus**

- Weight loss
- ± epigastric or back pain

</td>
<td>

AXR

- **Calcified pancreas**

Labs

- Amylase and lipase usually not elevated

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<td>

- **Oral pancreatic enzyme replacement**
- Alcohol abstinence
- Pain control

</td>
</tr>
<tr><td colspan="4">Inflammatory Bowel Disease</td></tr>
<tr>
<td colspan="3">

Crohn's Disease

- Idiopathic
- Affects ENTIRE GI tract ("mouth to anus")
- Transmural
- **MC = terminal ileum**

- Crampy abdominal pain (MC = RLQ)
- **Weight loss**
- Diarrhea w/ NO blood

Complications

- Fistulas
- Strictures
- Abscessed
- **Granulomas**
- Seronegative spondyloarthropathies
- Ankylosing spondylitis

- TOC for acute = Upper GI series w/ small bowel follow through
- Colonoscopy = "skips lesions" and **"cobblestone appearance"**
- Barium = "string sign"
- Labs = (+) **P-ASCA**

Ulcerative Colitis

- Idiopathic
- ONLY in the colon
  - Begins in rectum → contiguous spread proximally
  - Therefore, rectum is always involved
- Mucosa and submucosa layers only
- Smoking decreases risk

- Colicky abdominal pain (MC = LLQ)
- Tenesmus
- Urgency
- **Bloody** diarrhea (hallmark)
- May see weight loss (MC in CD)

Complications

- Primary sclerosing cholangitis
- Colon cancer
- Toxic megacolon
- Seronegative spondyloarthropathies
- Ankylosing spondylitis

- TOC for acute = flex **sigmoidoscopy**
  - Colonoscopy can cause perforation in acute
  - CI: barium enema in acute (toxic megacolon)
- Colonoscopy = uniform inflammation; **pseudopolyps**
- Barium = **"stovepipe sign"** (loss of haustral markings)
- Labs = (+) P-ANCA

</td>
<td>

Aminosalicylates → corticosteroids → immune modifying agents

<u>Aminosalicylates</u> = anti-inflammatory agents

- **Oral mesalamine: best for maintenance**
  - Esp. active in terminal small bowel and colon
- Topical Mesalamine: suppositories and enemas
  - Effective in distal colon
- Sulfasalazine: good for UC
  - Primarily for the colon
  - AE: hepatitis, pancreatitis, allergic rxns
  - Give folic acid too

<u>Corticosteroids</u>: fast-acting anti-inflammatory for **acute flares only**

- Oral or topical prednisone, methylprednisolone
- Long term use risks: osteoporosis, infxns, weight gain, edema cataracts

<u>Immune Modifying Agents</u>: steroid sparing

- 6-mercaptopurine, azathioprine, methotrexate

<u>Anti-TNF Agents</u>: inhibits proinflammatory cytokines

- Adalimumab, infliximab, certolizumab, natalizumab

</td>
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<tr><td colspan="4">Irritable Bowel Syndrome</td></tr>
</table>

- Chronic abdominal pain and altered bowel habits in the **absence of any organic cause** = functional - MC in women - MC late teens, early 20s Patho - Abnormal motility → chemical imbalance, altered gut microbiota - Visceral hypersensitivity - Psychosocial & altered CNS	- **Pain relieved with defecation** - More frequent stools at onset of pain - Passage of mucus - Bloating - Sense of incomplete evacuation - Urgency Alarming sx - GI bleeding - Anorexia - Persistent diarrhea - Onset > 45yo	<u>Rome IV Criteria</u> - **Recurrent abd pain** at least 1d/wk for the last 3m assoc. w/ 2 of the following: - **Pain is related to defecation** - Onset assoc. w/ change in stool frequency - Onset assoc. w/ change in stool form	- Lifestyle changes: smoking cessation, low fat/unprocessed food diet - Diarrhea sx: Anticholinergics (Dicyclomine), Antidiarrheal (Loperamide) - Constipation sx: bulk forming laxatives
Appendicitis			
- Obstruction of appendix **MC d/t fecalith** - MC 10 - 30yo	- Anorexia - **Periumbilical/epigastric pain→ followed by RLQ pain** - N/V - <u>+ Rovsing sign</u>: RLQ pain w/LLQ palpation - <u>+ Obturator sign</u>: RLQ pain w/internal & external hip rotation w/flexed knee - <u>+ Psoas sign</u>: RLQ pain w/right hip flexion/extension - <u>McBurney's point tenderness</u>: point ⅓ the distance from the anterior sup. Iliac spine & navel	- CT scan - Leukocytosis	- Appendectomy
GI Bleeding			
Upper GI			
- > 60yo <u>Causes</u> - **PUD** - Mallory-Weiss - Erosive esophagitis - Gastritis - Malignancy	- **Melena or hematemesis** - ± hematochezia - ± hypotension - Epigastric pain	- Endoscopy (diagnostic, prognostic, and therapeutic)	- NPO, D/C anticoagulants - Fluids - NG tube lavage - ± RBC, platelet transfusion, FFP if INR >1.5 - IV PPIs - Ocreotide - Desmopressin
Lower GI			

- Bleeding occurring below the ligament of Treitz
- 95% arise from colon
- More benign than upper GI bleeding
<u>Causes</u>
- < 50yo → infectious colitis, hemorrhoids, fissures, IBD
- > 50yo → **diverticulosis**, malignancy, ischemia, recent polypectomy
	- Black stool
	  - Maroon = right colon or small intestine
	  - Brown + red streaks = rectosigmoid or anus
	- Abdominal pain
	- Tenesmus
		- Colonoscopy (not in acute)
		- Nuclear bleeding scan or angiography
			- Same as upper GI
			- Surgery if > 10 units in 24h used

Hemorrhoids			
- Engorgement of superior hemorrhoid vein (internal) or inferior hemorrhoid veins (external) - Internal → above dentate line - External → below dentate line <u>Risk Factors</u> - Inc. venous pressure - Straining during defecation - Pregnancy - Obesity - Prolonged sitting - Cirrhosis	<u>Internal</u> - Intermittent **painless bleeding** - Blood seen on toilet paper (not mixed with stool) - ± itching, fullness, mucus discharge <u>External</u> - **Perianal pain worse w/ defecation** - ± tender palpable mass, skin tags	- Visual inspection - Digital rectal exam - Occult testing - Proctosigmoidoscopy - Colonoscopy <u>Grades</u> - I: Does not prolapse (confined to anal canal) - II: Prolapses with defecation or straining but **spontaneously reduce** - III: Prolapses with defecation or straining, requires **manual reduction** - IV: irreducible & may strangulate NOTE: There is no classification system for external hemorrhoids. They are either present or absent.	<u>Grade I - II</u> - Fluids - Fiber - Prevent straining and constipation <u>Grade II - III</u> Indications: if conservative mgmt fails debilitating pain, strangulation or stage IV 1. **Rubber band ligation (MC)** 2. Sclerotherapy 3. Infrared coagulation **Hemorrhoidectomy**: For all **stage IV** or those not responsive to the aforementioned therapies. - Closed (Ferguson) “closes” the mucosa with sutures after hemorrhoid tissue removal - Open (Milligan-Morgan) leaves mucosa “open” <u>Complications of hemorrhoidectomy</u>: **Exsanguination** (bleeding may pool proximally in lumen of colon without any signs of external bleeding) **Pelvic infection** (may be extensive and potentially fatal) **Incontinence** (injury to sphincter complex) Anal stricture
Viral Hepatitis			

Prodromal Phase
- Malaise
- Arthralgia
- Fatigue
- URI
- Anorexia, loss of appetite
- Decreased smoking
- N/V
- Abdominal pain

Icteric Phase
- **Jaundice**

Chronic Hepatitis
- > 6m duration
- **Only assoc. w/ HBV, HCV, HDV**
- May lead to end stage liver dz or cancer

Fulminant
- Encephalopathy
- Coagulopathy
- Jaundice
- Edema
- Ascites
- Asterixis
- Hyperreflexia

Labs
- ↑ **ALT** > ↑ AST
  - Both > 500 in acute
  - < 500 in chronic
- ± bilirubin

Prognosis
- Recovery within 3 - 16w
- 10% HBV → chronic
- **80% HCV → chronic**

Hepatitis A

Transmission: fecal → oral
- Water, food
- International travel
- Day care workers **(asymptomatic children → MC source for adults)**

Children → **Asymptomatic**
Adults
Prodromal Phase → same as general above
- **Spiking fever** (only one assoc w/ fever)

Icteric Phase → most don't develop this

- **Acute hepatitis**
- (+) Ig**M** HAV Ab
- (+) Ig**G** HAV Ab and (-) Ig**M** = past exposure

- Self-limiting (recovery in few weeks)
- High risk population → vaccine

Hepatitis B

Transmission: parenteral, sexual, perinatal, percutaneous
- **Chronic asymptomatic carriers can infect other**

Acute
- 70% subclinical
- 30% jaundice

Chronic
- ± hepatocellular damage on biopsy

Diagnosis	HBsAg	anti-HBs	anti-HBc	HbeAg	Anti-Hbe
WINDOW PERIOD	Negative	Negative	*IgM*	Negative	Negative
ACUTE HEPATITIS	*POSITIVE*	Negative	*IgM*	±	±

Acute → supportive

Chronic → Tx indicated if ↑ ALT, inflammation on biopsy or (+) HBeAg
- **Alpha-interferon 2b, Lamivudine, Adefovir**
- Newer: Tenofovir, Entecavir

Prevention → **Hep B vaccine @ 0, 1, 6 mo**
- Vaccine CI if allergic to baker's yeast

Hepatitis C

Transmission: **parenteral** (IV drug use, blood transfusion)
- 80% develop chronic infxn
- Fulminant rare

- HCV Ab may be (+) for 6wks
- HCV RNA more sensitive than HCV Ab

	HCV RNA	Anti-HCV
acute hepatitis	⊕	±
resolved hepatitis	Negative	±
chronic hepatitis	⊕	⊕

Chronic Management
- **Pegylated interferon alpha-2b AND ribavirin**
-
- **Screen for hepatocellular carcinoma** via serum alpha-fetoprotein & US

Hepatitis D

- **Requires Hep B virus to infect** (coinfection of B & D)
- More severe hepatitis → faster progression to cirrhosis

Hepatitis E		
Transmission: fecal → oral - Assoc. w/ waterborne outbreaks - **↑ mortality in pregnant women** (esp. 3rd trimester) → fulminant hepatitis	- IgM HEV Ab	- Self-limiting

Jaundice		
- Hyperbilirubinemia (>2.5 mg/dL) → bilirubin deposition <u>Causes</u> - Bilirubin overproduction - ↓hepatic bilirubin uptake - Hepatitis - Biliary obstruction - ↑ bilirubin w/o increased LFTs → suspect familial bilirubin disorders (Dubin- Johnson Syndrome, Gilbert Syndrome) & hemolysis	- **Yellowing of skin, nail beds, sclera**	- Not a disease but a sign of a disease

Hepatic Cancer			
Malignant tumor derived from hepatocytes frequently associated with chronic liver disease, esp. **Cirrhosis** (in USA 80 - 90% of pts) >80% all liver cancers, but <2% of ALL cancer M:F 3:1 5th or 6th decade of life Primary HCC is not as common as metastatic liver cancer - Metastatic liver cancer outnumbers Primary HCC by 20:1	**Risk Factors:** - Hep B, Hep C, Cirrhosis, Smoking, EtOH, aflatoxins (found in peanuts), liver flukes, hemochromatosis, alpha 1 antitrypsin def, anabolic steroid use, carbon tetrachlorides (found in cleaning agents) **Si/Sx** - Weight Loss, Weakness, dull pain in RUQ or epigastric, n/v, jaundice - non-tender hepatomegaly, - - splenomegaly (33%), - ascites (50%) **PE**: a bruit can commonly be heard over a HCC due to its abundant vascularity	Labs - ↑ ALP, AST, ALT, GGT, AFP and DCP - AFP Contrast CT and U/S - Visualize tumor - usually solitary but can be multifocal or diffuse - Enhances in the arterial phase with quick wash out in the late phase and portal venous phase **CT or U/S needle Bx - def dx**	**Surgical resection - ONLY CURE** - Lobectomy or segmental resection - **1 cm margin is REQUIRED** **Transplant** also possible BUT high recurrence rate due to continued presence of underlying risk factor - **Milan criteria** - to select pts for transplant. - Single tumor w/ ≤ 5cm or - ≤ tumors each w/ ≤ 3cm Newer advances in treatment include - Local chemo infusion into hepatic artery, hepatic artery embolization, and liposomal chemo **PROGNOSIS** - - Most pts die within 4 months if tumor is not resected, - After resection, 5 yr survival rate is 25 - 40%

Cholelithiasis			
- Gallstones in gallbladder (NO	- MC asymptomatic	- US test of choice	- Asymptomatic = observe

<table>
<tr>
<td>inflammation)
- 90% cholesterol
- Black stone: hemolysis
- RF: fat, female, forty, fertile</td>
<td>- Biliary colic = episodic, abrupt RUQ/epigastric pain lasting 30 min to hrs
- Nausea & precipitated by fatty foods or lrg meals</td>
<td></td>
<td>- Elective cholecystectomy (laparoscopic) if symptomatic

<u>Complication</u>
- Choledocholithiasis, acute cholangitis, acute cholecystitis</td>
</tr>
<tr><td colspan="4">Cholecystitis</td></tr>
<tr>
<td>- Gallbladder (cystic duct) obstruction by gallstone → inflammation/infection
- MC: E. coli
- Klebsiella, Enterococci</td>
<td>- RUQ/epigastric pain continuous in duration
- May be assoc. w/nausea & precipitated by fatty foods or lrg meals
- Jaundice, anorexia NOT common

PE:
- fever, (+) Murphy's sign, (+) Boas sign</td>
<td>- US initial test of choice
- HIDA scan is GS = + if nonvisualization of the gallbladder

<u>Labs</u>
- ↑ WBCs w/left shift
- ↑ Bilirubin
- ↑ Alk phosphatase & LFTs</td>
<td>- NPO, IV fluids, antibiotics (Ceftriaxone + Metronidazole) → Cholecystectomy (within 72h)
- Cholecystostomy is pt in nonoperative</td>
</tr>
<tr><td colspan="4">Cirrhosis</td></tr>
<tr>
<td rowspan="2">- Irreversible liver fibrosis w/nodular regeneration
- MCC: ETOH in US
- Chronic HCV, HBV, HDV
- Non-alcoholic fatty liver disease
- Hemochromatosis</td>
<td rowspan="2">- Fatigue, weakness, weight loss, ascites, gynecomastia, caput medusa, jaundice
- Hepatic encephalopathy
- Confusion, lethargy
- Asterixis
- Fetor hepaticus
- Esophageal varices (d/t portal HTN)
- Spontaneous bacterial peritonitis</td>
<td>- US → liver biopsy</td>
<td>- Encephalopathy
- Lactulose or Rifaximin
- Neomycin 2nd line
- Ascites → Na+ restriction
- Pruritus → Cholestyramine
- Liver transplant: definitive tx</td>
</tr>
<tr>
<td colspan="2">CIRRHOSIS STAGING CHILD-PUGH CLASSIFICATION
<table>
<tr><th>PARAMETERS</th><th>1 POINT</th><th>2 POINTS</th><th>3 POINTS</th></tr>
<tr><td>Total Bilirubin (mg/dL)</td><td><2</td><td>2-3</td><td>>3</td></tr>
<tr><td>Serum albumin (g/dL)</td><td>>3.5</td><td>2.8 – 3.5</td><td><2.8</td></tr>
<tr><td>PT INR</td><td><1.7</td><td>1.71 – 2.30</td><td>>2.30</td></tr>
</table>
</td>
</tr>
<tr><td colspan="4">Giardiasis and other parasitic infections</td></tr>
<tr><td><u>Giardia Lamblia</u></td><td><u>Giardia Lamblia</u></td><td><u>Giardia Lamblia</u></td><td><u>Giardia Lamblia</u></td></tr>
</table>

- Source = water from remote streams/wells - "Beaver's Fever" or "Backpacker's diarrhea" - Boil water for 1 min <u>Amebiasis</u> - Entamoeba histolytica - Source = fecal → oral - MC in travelers to developing nations <u>Cryptosporidium</u> - MCC of chronic diarrhea in AIDS pts - Source = fecal → oral <u>Isospora Belli</u> - MC in homosexual men, AIDs pts - Source = fecal → oral	- **Frothy, greasy, foul diarrhea** - Cramping, bloating - NO blood or pus <u>Amebiasis</u> - GI colitis - Dysentery - **Amebic liver abscess**	- trophozoites/cysts in stool <u>Amebiasis</u> - Stool ova and parasites	- Fluids - **Metronidazole** - Furazolidone in children <u>Amebiasis</u> - Fluids - Colitis: metronidazole or tinidazole → intraluminal agent (paromomycin or diloxanide furoate) - Abscess: metronidazole/tinidazole + intraluminal antiparasitic → chloroquine - May need to be drained <u>Cryptosporidium</u> → no efficacious tx <u>Isospora Belli</u> → Bactrim
Hiatal Hernia			
- Protrusion of the upper portion of the stomach into the chest cavity d/t a diaphragm tear or weakness **<u>Type 1</u> = MC**; "sliding hernia" - GE junction + stomach slide into mediastinum <u>Type 2</u> = "rolling hernia" - Fundus protrudes through diaphragm - GE junction remains in nml spot - May lead to strangulation			- Type I: similar to GERD - Type II: surgical repair of the defect to avoid complications
Gastroesophageal Reflux Disease			
- Transient relaxation of LES → gastric acid reflux → esophageal mucosal injury <u>Patho</u> - ↑ gastric acid - **Incompetent LES** - Delayed gastric emptying - Hiatal hernia	- **Heartburn (pyrosis) Hallmark*** - ↑ w/supine position - MC 30 - 60min after eating - Regurgitation - Dysphagia, **cough at night** - Non-cardiac chest pain Alarm (malignancy): - Dysphagia - Odynophagia - Weight loss - Bleeding	- **1st line: Endoscopy** - Esophageal manometry: ↓ LES pressure - **24h ambulatory pH monitoring: Gold Standard (GS)**	- 1st: lifestyle modifications - Small meals, weight loss - 2nd: OTC H2 antagonists - Upper endoscopy if alarm sx present - 3rd: **PPI for mod-severe disease** - Nissen fundoplication if refractory
Esophagitis			
- MCC: GERD	- Odynophagia, dysphagia,	- Upper endoscopy	- Tx underlying cause

<table>
<tr>
<td>- 2nd MCC: infectious

<u>Risk Factors</u>
- pregnancy, smoking, obesity, ETOH
- NSAIDs, BBs, CCBs</td>
<td>retrosternal chest pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td colspan="4">Infectious Esophagitis</td>
</tr>
<tr>
<td>- MC in immunocompromised pts
- Candida, CMV, HSV</td>
<td>- Odynophagia
- Dysphagia, retrosternal CP</td>
<td colspan="2">
<table>
<tr><th>DISEASE</th><th>ENDOSCOPIC FINDINGS</th><th>1ST LINE MANAGEMENT</th><th>2ND LINE</th></tr>
<tr><td>CANDIDA</td><td>linear yellow-white plaques*</td><td>PO Fluconazole*</td><td>Voriconazole, Caspofungin</td></tr>
<tr><td></td><td>Large superficial shallow ulcers*</td><td>Ganciclovir*</td><td>Valganciclovir, Foscarnet</td></tr>
</table>
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</tr>
<tr>
<td colspan="4">Eosinophilic Esophagitis</td>
</tr>
<tr>
<td>- Allergic, inflammatory eosinophilic infiltration
- MC in children
- MC assoc. w/ atopic dz (asthma, eczema)</td>
<td>- Dysphagia (esp. solids)
- ± reflux, difficulty feeding</td>
<td>- Endoscopy = nml ± multiple corrugated rings on esophagus ± white exudates</td>
<td>- Inhaled topical corticosteroids (NO spacer usage)</td>
</tr>
<tr>
<td colspan="4">Pill-Induced Esophagitis</td>
</tr>
<tr>
<td>- MC d/t prolonged pill contact on esophagus
- NSAIDs, bisphosphonates</td>
<td>- Odynophagia
- Dysphagia</td>
<td>- Endoscopy = small, well-demarcated ulcers of varying depths</td>
<td>- Take pills w/ 4 oz of water
- Avoid supination at least 30 - 60 min after pill ingestion</td>
</tr>
<tr>
<td colspan="4">Caustic (Corrosive) Esophagitis</td>
</tr>
<tr>
<td>- Ingestion of corrosive substance</td>
<td>- Odynophagia, dysphagia
- Dyspnea
- Hematemesis</td>
<td>- Endoscopy to determine damage and complications</td>
<td>- Supportive (pain and fluids)</td>
</tr>
</table>

ORTHOPEDICS/RHEUMATOLOGY

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Acute and Chronic Low Back Pain			
Herniated Disk			
- Lumbar disk herniation affects 2% of population - MC L4 - L5 or **L5-S1**	- **Abrupt onset of unilateral leg pain + low back pain** - Pain worsened w/ sitting, walking, standing, coughing or sneezing	- XR: evaluate vertebral alignment and disk space - MRI for progressive neurologic cases or pre-operative	- NSAIDs - Muscle relaxants - Short course oral steroids - Epidural steroid injection - Surgery for refractory pts or neuro symptoms
Degenerative Disk Disease			
- Age related	- Recurrent, episodic low back pain ± radiation to buttock/s - ± sciatica	- XR: anterior osteophytes, loss of disk height, "vacuum sign"	- NSAIDs - Weight loss - Core strengthening - Surgery (spinal fusion) if refractory
Lumbar Spinal Stenosis			
- **Narrowing ≥ 1 of spinal canal** → compression of nerve roots - > 60y	- **Back pain** w/ paresthesias in one or both extremities - Worsened w/ **extension** (walking, standing) - Relieved w/ **flexion** (sitting)	- XR: narrowed intervertebral disk, osteoporosis - MRI → diagnosis	- Physical therapy - **Corticosteroid lumbar epidural injection** - Decompression laminectomy
Spondylolysis and Spondylolisthesis			

<u>Spondylolysis</u>
- Pars interarticularis defect from failure of fusion or stress fracture (repetitive hyperextension)
- **MC form of back pain in children & adolescents**
- MC L5/S1
<u>Spondylolisthesis</u>
- Forward slipping of a vertebrae onto another
- MC 10 - 15y
	- Low back pain ± sciatica sx
	- Spondylolisthesis may have bladder or bowel dysfxn
	- ↓ ROM
		- "Stork test"
		  - Pt stand on 1 leg and extend back
		  - (+) test if it causes localized pain
		- XR: "scottie dog"
		- MRI if XR (-)
			<u>Spondylolysis</u>
			- Symptom relief
			- Restrict activity
			- Physical therapy
			- Brace
			<u>Spondylolisthesis</u>
			- Mild: treat as spondylolysis
			- Severe: surgical

Costochondritis

- Acute inflammation of the costochondral, costosternal, or sternoclavicular joints
- **Pleuritic chest pain**
  - Worse w/ **inspiration**
  - Worse w/**coughing**
  - Certain movements of upper limbs/torso
- Localized pain & tenderness on palpation (esp. 2 - 5 costochondral junctions)
- **No palpable edema**
- **Tietze Syndrome = costochondritis + <u>palpable edema</u>**
  - MC 2 - 3 costochondral junctions

Bursitis/Tendonitis

- Bursa = fluid filled sac, provides cushion b/t bones and tendons and/or muscles around joint
- Due to trauma or overuse
- Olecranon bursitis
- Trochanteric bursitis
- Patellar Tendonitis “jumper's knee”
- Pain
  - Trochanteric bursitis = lateral hip, radiate but NOT past the foot, worse w/ activity and laying on the hip
  - Jumper’s = anterior knee pain, improved w/ rest
- Swelling
- Tender to palpation
  - Trochanteric = over greater trochanter
- Do **NOT** aspirate
- XR
- MRI
- Prevention of precipitating factors
- Rest, ice, NSAIDS
- Steroid injections
- Bursectomy (rare)
- Tendon surgical repair

Rheumatoid Arthritis

- Chronic inflammatory disorder that can affect more than just your joints (skin, eyes, lungs, heart, & blood vessels)
- **Autoimmune disorder (T-cell mediated) → bone erosion & joint deformity**
- Affects smaller joints first, symptoms often spread to the wrists, knees, ankles, elbows, hips, & shoulders
- ↑risk in females, smoking
- Prodrome: fatigue, fever, weight loss
- **Tender, warm, “boggy” swollen joints**
- Joint stiffness
  - usually **worse** in the morning
  - Improves later in the day
- Radial deviation @ at the wrist
- **Ulnar deviation @ MCPs**
- **Swan neck**: DIP flexion + PIP hyperextension
- Boutonniere deformity: PIP flexion + DIP hyperextension

<u>Felty’s Syndrome</u> = RA + splenomegaly + ↓ WBC/repeated infxn
<u>Caplan Syndrome</u> = pneumoconiosis + RA

- Arthritis ≥ 3 joints, morning stiffness for ≥ 6wks

Labs:
- **(+) Rheumatoid factor** (not specific)
  - Also (+) sjorgrens
- Anti-cyclic citrullinated peptide (anti-CCP) antibodies **(most specific)**
- ↑ ESR
- ↑ C-reactive protein (CRP)

Imaging:
- XR: help track the progression of RA
  - Narrowed joint space
  - Subluxation
  - Deformities

- 1st line for <u>pain</u> = NSAIDS
  - 2nd line = Prednisone

<u>Disease-modifying antirheumatic drugs</u> → reduce disease progression
- Screen for HBV, HCV before initiating DMARDs
- 1st line: **Methotrexate (DMARDs)**
  - CI: pregnancy
  - AE: hepatotoxicity, stomatitis, bone marrow suppression, interstitial pneumonitis
- Biologic agents = -mab
  - PPD r/o TB before initiating
  - Mainly TNF inhibitors

Osteoarthritis

- **MC form of arthritis (more prevalent than RA)**
- Articular cartilage damage and degeneration
- Narrowed joint space, sclerosis, **osteophyte formation**
- MC in **weight-bearing joints**
  - Knees, hips, cervical/lumbar spine, hip
- **↑ risk w/ obesity**

- **Bouchard's nodes = PIP joints**
- **Heberden's nodes = DIP joints**
- Prominence of 1st CMC joint (squaring of the wrist)
- Evening joint stiffness
  - ↓ w/ rest
  - **Worsens throughout the day** & changes in weather
- ↓ ROM
- Absence of inflammatory signs

- XR
  - Narrowing of the space b/t the bones in the joint
  - Osteophytes

- Initial for elderly w/ risk of bleeding = acetaminophen
- NSAIDs are more effective
- Intra-articular steroid injections
- Avoid high-impact exercises

FEATURE	RHEUMATOID ARTHRITIS	OSTEOARTHRITIS
Primary joints affected	***Wrists, MCP, PIP*** *(DIP usually spared)**	***DIP***, thumb (CMC)
Heberden's nodes	Absent	Frequently present
Joint Characteristics	Soft, warm, ***BOGGY***, tender	***HARD & BONY***

Reactive Arthritis (Reiter's Syndrome)

- Seronegative spondyloarthropathy
- Autoimmune response to infection
  - MC **chlamydia**, gonorrhea
  - GI: salmonella, shigella, yersinia
- MC 20 - 40y, males

<u>Triad</u>

1. Arthritis (asymmetric inflammation)
   - MC in knees, ankles, feet
2. Conjunctivitis/uveitis
3. Urethritis, cervicitis

Can't see, can't pee, can't bend the knee

- Usually resolve in 12 months
- Swollen toes/fingers → sausage fingers
- Keratoderma blennorrhagicum = hyperkeratotic lesions on palms/soles

Labs:

- **(+) HLA - B27**
- ↑ WBC = 10,000 - 20,000
- ↑ ESR
- ↑ IgG

Imaging:

- X-ray: can shows signs & help rule out other arthritis

Synovial fluid:

- ↑ WBC
- Bacterial culture negative

- If triggered by bacterial infection → antibiotics
- **NSAIDS → Indomethacin**
- Injection of a corticosteroid into affected joints
- DMARDS → Sulfasalazine (Azulfidine), Methotrexate (Trexall), or Etancercept (Enbrel)

Ganglion Cysts

- MC benign tumor in the hand or wrist
- MC location = dorsal wrist

Patho

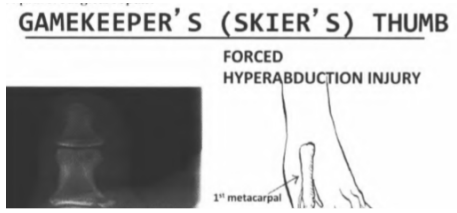
- d/t leakage of joint fluid + synovial lining through weakness in joint capsule

- MC painless
  - Become painful when nerve is compressed

PE

- Mobile mass + transilluminates

- Aspirate
- High recurrence
- Surgical resection is most effective

<table>
<tr><th colspan="4">Gout</th></tr>
<tr>
<td>- Uric acid deposition in joints
  - MC d/t underexcretion of uric acid
- Attacks precipitated by
  - Purine-rich foods
  - Diuretics
  - ACEI, ARBs
  - Xcept losartan which dec. uric
  - Pyrazinamide
  - Ethambutol
  - Aspirin
- MC in men, > 30yo
- Postmenopausal women</td>
<td>- Sudden nocturnal onset of excruciating pain and swelling in a single joint
  - MC is the metatarsophalangeal joint of the big toe = podagra
- Joint is extremely tender, the overlying skin is tense and dark red or purple
- Attacks can last for few weeks and involve multiple joints
- Untreated gout = chronic tophaceous gout whereby urate crystals deposit
- Nephrolithiasis and nephropathy</td>
<td>- ↑ serum uric acid
- ↑ ESR
- Arthrocentesis confirmatory
  - negatively birefringent needle shaped crystals with leukocytes
- XR
  - Punched-out erosions
  - “mouse/rat” bites</td>
<td>- Acute attack:
  - NSAIDS (indomethacin 50 mg tid x 1 week= first line)
  - Colchicine
  - Steroids
  - NEVER USE ASPIRIN AND PROBENECID IN ACUTE ATTACK (can increase uric acid levels)
- Prophylactic:
  - Allopurinol (xanthine oxidase inhibitor) inhibit formation of uric acid
  - Probenecid used for chronic gout (inhibit uric acid reabsorption)</td>
</tr>
<tr><th colspan="4">Sprains/Strains
Sprain = stretching/tearing of ligaments
Strain = stretching/tearing of muscle or tendon</th></tr>
<tr><th colspan="4">Gamekeeper’s (Skier’s Thumb)</th></tr>
<tr>
<td>- Sprain/tear of ulnar collateral ligament of thumb → unstable MCP joint
- “Skiers” = acute
- “Gamekeeper’s” = chronic hyperabduction injury
Patho
- Forced abduction of thumb</td>
<td>- Thumb is far away from other digits
- MCP tenderness
- Weakness
- ± fracture at base of proximal phalanx</td>
<td> 
</td>
<td>- Thumb spica
- Surgical referral in case of complete rupture</td>
</tr>
<tr><th colspan="4">Lumbosacral Sprain/Strain</th></tr>
<tr>
<td>- Acute strain/sprain of the paraspinal muscles
- Usually after twisting/lifting</td>
<td>- Back muscle spasms
- Loss of lordotic curve
- ↓ ROM
- No neurologic changes</td>
<td></td>
<td>- Bed rest < 2d
- NSAIDs
- Muscle relaxants</td>
</tr>
</table>

Ankle Sprains

- **MC anterior talofibular collateral ligament**
  - ATFL is main stabilizer during inversion
- Deltoid ligament injury seen w/ eversion injuries

- "Pop" sound
- Swelling
- Pain
- Inability to bear weight

- **RICE**
- NSAIDs
- Crutches for 2 - 3d

OTTAWA ANKLE RULES	
ANKLE FILMS	**FOOT FILMS**
Pain along the ***lateral malleolus***	***navicular*** *(midfoot)* ***pain***

Systemic Lupus Erythematosus

- Chronic systemic, multiorgan autoimmune disorder of connective tissues
- "Autoantibodies" which attacks the patient's own tissues
  - Anti-histone antibodies

Risks = genetic, environmental sun exposure, estrogen
Drug induced = **procainamide**, hydralazine, INH, quinidine, methyldopa, chlorpromazine
Population
- Young females
- Onset 20s - 40s
- ↑ African American, hispanic, native americans

Antiphospholipid AB Syndrome (APLS)
- ↑ risk of arterial & venous thrombosis
- Women @ risk of miscarriages

Triad
1. Joint pain
2. Fever
3. Malar "butterfly rash"

- Fatigue, fever, weight loss
- **Discoid lupus** = annular, erythematous patches on face, scalp that heals w/ scarring
- Systemic = can develop heart, lung inflammation, kidney, neurological problems, mouth sores
- Joint and muscle pain
- Sensitivity to light

- **Best initial test** = **(+) ANA** in 95% of patients, sensitive but not specific to Lupus
  - Most important blood screening test measures ANA
- Anti-double strand DNA (**anti-dsDNA**) found in 50-75% not highly sensitive but specific to lupus (not present in any other disease)
- **Anti-smith** (anti-Sm) also 100% specific to SLE

APLS
- (+) anticardiolipin Ab assoc. w/ false (+) VDRL/RPR
- Lupus anticoagulant
- β-2 glycoprotein I Ab

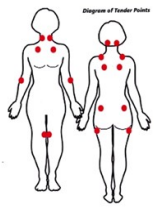
- Sun protection
- **NSAIDS or acetaminophen for pain**
- Antimalarials (hydroxychloroquine) for lesions
- Corticosteroids & immunosuppressants

Fibromyalgia

- Widespread, chronic muscular pain
  - Deep, sharp, dull, aching around muscle, tendon
- Chronic fatigue
- MC in middle aged women
- ↑ risk w/ rheumatoid arthritis, lupus, ankylosing spondylitis

- Diffuse pain (esp. morning)
- **Extreme fatigue**
- Stiffness
- Tender points
- **Sleep disturbances**
- Haziness

- Need 11/18 trigger points for > 3mo to be diagnosed
- Muscle biopsy = "moth-eaten" appearance



- Stretching exercise (swimming)
- Heat, massage
- Inject trigger points with anesthetics
- TCAs, SSRIs

Osteoporosis			

- Loss of bone mineral and matrix d/t ↑ absorption or ↓ formation of bone
- Primary: postmenopausal or senile
  - Postmenopausal risks: smoking, steroids, alcohol use, low calcium, physical inactivity
- Secondary: d/t chronic disease or meds (prolonged high dose corticosteroid use)
  - Hypogonadism, cushing's syndrome, DM, low estrogen, thyrotoxicosis
- Peak 4th decade (30s)
	- Usually asymptomatic
	- Usual first symptom = **pathologic fractures**
	  - MC vertebral, hip, colle's
	  - Postmenopausal: vertebral compression and wrist
	  - Senile: hip and pelvic
	- Spine compression: MC upper lumbar & thoracic
	- Loss of vertebral height
	- Kyphosis
	- Back pain
		<u>Labs</u>:
		- Serum Ca, phosphate, PTH & ALP usually normal
		- **DEXA scan**: best test to show extent of demineralization
		- **Osteoporosis**: bone density T-score: **< -2.5**
		- **Osteopenia**: T-score: < **-1.0 to -2.5**
		- Normal: >1
		
		<u>Screening</u>
		- If T-score = -1.0 to -1.5 → repeat 5y
		- If T-score = -1.5 to -2.0 → repeat 3-5y
		- If T score = < -2.0 → repeat 1-2y
			- 1st line: **Bisphosphonates**
			  - SE: **pill esophagitis**, jaw osteonecrosis, pathological femur fx (ex: Alendronate, Risedronate, Ibandronate)
			- Vit D
			- Selective estrogen receptor modulator (SERM): Raloxifene
			  - Used in postmenopausal
			- Estrogen in postmenopausal
			  - ↑ risk of endometrial and breast cancer
			- PTH therapy (teriparatide)

OBSTETRICS/GYNECOLOGY

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Dysmenorrhea			

<u>Primary</u>
- **Due to ↑ prostaglandins** → painful uterine muscle wall activity
- Begins 1 - 2y after menarche
<u>Secondary</u>
- **Due to pelvic pathology**
- Endometriosis MCC in younger women
- > 25y
		- **Painful menstruation**
		  - Diffuse pelvic pain right before or at onset of menses
		- ± HA, N/V
		
		PE: ± uterine tenderness
			- **1st line = NSAIDs**
			  - Best to start before onset of sx
			- Ovulation suppression (OCPs, etc)
			- Laparoscopy to rule out secondary causes if medication fails

Dysfunctional Uterine Bleeding			

- Abnormal frequency/intensity of menses d/t **non-organic causes**
<u>Chronic Anovulation</u> (90%)
- Disruption of the hypothalamus-pituitary axis
- **Unopposed estrogen** → inc. endometrial overgrowth w/ **irregular, unpredictable bleeding/shedding**
- Soon after menarche or perimenopausal women
 	
<u>Ovulatory</u> (10%)
- **Regular cyclical shedding**
- (+) ovulation w/ prolonged progesterone secretion (d/t ↓ estrogen levels) → inc. blood loss from endometrial vessel dilation & prostaglandins → menorrhagia
	- **Amenorrhea**: absence
	- **Cryptomenorrhea**: light flow
	- **Menorrhagia**: heavy bleeding @ normal intervals
	- **Metrorrhagia**: bleeding between cycles (irregular)
	- **Menometrorrhagia**: irregular, excessive bleeding between cycles
	- **Oligomenorrhea**: infrequent menstruation (> 35d cycle)
	- **Polymenorrhagia**: frequent menstruation (< 21d)
		Diagnosis of exclusion
		
		- Exclude organic causes + negative pelvic exam = DUB dx
		- Work up includes:
		  - Hormone levels
		  - Transvaginal US
		  - Endometrial biopsy if indicated
			<u>Acute Severe Bleeding</u>
			- **High-dose IV estrogen or OCP**
			  - Reduce dose as bleeding improves
			- D&C if estrogen fails
			
			<u>Anovulatory</u> (90%)
			- **1st line = OCPs**
			- Progesterone if estrogen CI
			- GnRH agonists (Leuprolide)
			
			<u>Ovulatory</u> (10%)
			- OCPs
			- Progesterone
			- GnRH agonists
			
			<u>Surgery</u>
			- If not responsive to other treatment
			- **Hysterectomy** → definitive
			- **Endometrial ablation**

Vaginitis			
Bacterial Vaginosis			
- **MCC of vaginitis** - ↓ lactobacilli acidophilus → overgrowth of normal flora - **Gardnerella vaginalis,** anaerobes <u>Complications</u> - PROM, **preterm labor** - Chorioamnionitis	- > 50% asx - Vaginal odor (worse after sex) - ± pruritus - **Thin, homogenous, watery <u>grey-white "fish rotten"</u> smelly discharge**	- pH > 5 - **Whiff test (+) w/ fishy odor** <u>Microscopy</u> - **Clue cells** on wet mount - Few WBCs	- **Metronidazole** x 7d (gel or PO) - Clindamycin (gel or PO) <u>Prevention</u> - Avoid douching - Treating partner unnecessary

Trichomoniasis			
- **Trichomonas vaginalis** - Sexually transmitted <u>Complications</u> - Perinatal complications - ↑ HIV transmission	- Vulvar pruritus - Erythema - Dysuria - Dyspareunia - **<u>Frothy, yellow green</u> discharge** worse w/ menses - **<u>Strawberry cervix</u>**	- pH > 5 - ± whiff test <u>Microscopy</u> - Mobile protozoa - WBCs	- **Metronidazole** 2g oral x 1 dose or 500 mg bid oral x 7d - Tinidazole <u>Prevention</u> - Spermicidal agents (nonoxynol) - **Must treat partner**
Yeast Infection			
- Candida albicans overgrowth - Inc. risk w/ DM, steroid, pregnancy	- Vaginal/vulvar erythema - Swelling, **burning** - Pruritus - Burning when urine touches skin - Dysuria - Dyspareunia - **<u>Thick, curd-like/cottage cheese</u> discharge**	- pH normal - Whiff test (-) <u>Microscopy</u> - Hyphae, yeast - Spores on KOH prep	- **Fluconazole** - Intravaginal antifungals - Clotrimazole, nystatin, butoconazole, miconazole <u>Prevention</u> - Keep dry, 100% cotton underwear - Avoid tight-fitting clothes, feminine deodorants and bubble baths
Cytolytic Vaginitis			

- Overgrowth of lactobacilli	- Vaginal /vulvar pruritus
	- Burning, dysuria
	- **Nonodorous white/opaque discharge**
		- pH normal
		<u>Microscopy</u>
		- Lactobacilli
		- Epithelial cells
			- D/C tampon use
			- Sodium bicarbonate
			  - Sitz bath
			  - Douche w/ $NaHCO_3$

Atrophic Vaginitis			
- Postmenopausal or allergic rxn	- Vaginal irritation - Pain w/ intercourse in postmenopausal women - Pale, vaginal epithelium w/ patches of erythema - **<u>Clear, thin</u> discharge**	- pH > 7 - Rule out cancer if bleeding is present	- Water-based moisturizing preparations - Estrogen vaginal cream

Pelvic Inflammatory Disease			

- Ascending infection of the upper reproductive tract
- **MCC =** N. gonorrhoeae **&** Chlamydia
  - Other: G. vaginalis, anaerobes. H. flu
- Inc. risk = multiple sex partners, unprotected sex, PID, nulliparous, IUD placement, 15 - 19y
	- **Pelvic/lower abdominal pain**
	- Dysuria
	- Dyspareunia
	- Vaginal discharge
	- N/V
	PE
	- Lower abdominal tenderness
	- Fever
	- **Purulent cervical discharge** ± bleeding
	- **(+) chandelier sign (cervical motion tenderness)**
		Clinical Diagnosis
		- **Abdominal, cervical motion, and adnexal tenderness** + ≥ 1 of following
		  - (+) gram stain
		  - Temperature > 38°C
		  - WBC > 10,000
		  - Pus on culdocentesis or laparoscopy
		  - Pelvic abnormality on bimanual exam or US
		  - ↑ ESR, CRP
		- Pelvic US if abscess suspected
		- Laparoscopy if uncertain or severe
			<u>Outpatient</u>
			- **Doxycycline** + **Ceftriaxone** ± Metro
			<u>Inpatient</u>
			- **IV Doxycycline + 2nd generation cephalosporin** (cefoxitin, cefotetan)
			- Or Clinda + Genta
			
			<u>Complications</u>
			- **Fitz-hugh curtis syndrome**
			  - RUQ pain d/t perihepatitis (liver capsule involvement)
			  - "Violin-string" adhesions on anterior liver surface
			- Infertility, tubo ovarian abscess, ectopic pregnancy

Breast Mass			
Abscess			
- Rare complication from mastitis	- Induration with fluctuance (pus)		- I&D - Discontinue breast feeding from affected breast
Fibrocystic Breast Disorder			
- **MC breast disorder** - Fluid-filled breast cyst d/t exaggerated response to hormones - 30 - 50y	- Multiple, **mobile**, well demarcated, often **tender** lumps - Bilateral - NO axillary involvement - NO nipple discharge - **Cysts may <u>inc. or dec. in size</u> w/ menstrual hormonal changes**	- US - FNA → straw colored fluid - NO blood	- Spontaneously resolve - FNA if symptomatic to remove fluid
Fibroadenoma			
- 2nd MC benign disorder - Late teens - early 20s - Composed of glandular & fibrous tissue	- Smooth, well-circumscribed, **nontender**, mobile, rubbery lump - Gradually grows overtime - Does **NOT** inc. or dec. in size w/ menstruation - But may enlarge in pregnancy - NO axillary involvement - NO nipple discharge		- Observation (most reabsorb) - ± excision

Breast Cancer

- Malignancy primarily of the milk ducts (ductal) or the lobules, which produce the milk
- MC non-skin malignancy in women

<u>Screening</u>
Clinical breast exam: 20 - 39yo → at least q3y; annually after 40yo
Breast Self Examination: > 20yo → monthly immediately after menstruation or on days 5 - 7 of menstrual cycle
Mammogram → best screening test
- ACS guidelines:
  - 45 - 54yo → annually
  - > 54yo → q2y
- ACOG guidelines: annually starting @ 40yo
- USPSTF guidelines:
  - 50 - 74yo → q2y
  - 40 - 72yo → if (+) risk factors q2y
  - Age of 1st degree relative diagnosed w/ breast ca - 10y = age to start screening

<u>Risk Factors</u> (75% have no risk factors)
- BRCA 1 & BRCA 2
- 1st degree relative w/ breast ca
- > 65yo
- Nulliparity, 1st full term pregnancy > 35yo
- Early onset of menarche(<12yo), late menopause
- Prolonged unopposed estrogen
- Never breastfed
- ↑ estrogen (postmenopausal HRT, OCPs, Obesity, ETOH)

<u>Staging</u>
- Stage 0 = precancerous (DCIS or LCIS)
- Stage I - III = within breast/regional lymph nodes
- Stage IV = metastatic breast cancer

Non-Invasive: Lobar Carcinoma in Situ

- Premenopausal
- Bilateral 50 - 90% of the time
- Avg. diagnosis age: mid-40s
- Precancerous, not a true cancer

Non-Invasive: Ductal Carcinoma in Situ

- More common than LCIS
- Untreated, higher potential to progress to invasive carcinoma than LCIS
- Avg. diagnosis age: mid-50s

Invasive: Infiltrative Ductal Carcinoma

- MC breast malignancy
- Assoc. w/ lymphatic METS (esp. axillary)
- Arise from the ductal epithelium and infiltrates the supporting stroma

Invasive Lobular Carcinoma

- Arises from lobular epithelium
- Infiltrates the breast stroma

- Painless, hard, fixed (non-mobile) lump
  - May be mobile early on
  - **MC upper outer quadrant**
- ± axillary lymphadenopathy
- Unilateral nipple discharge
  - ± bloody
  - Purulent or green

PE
- Skin changes
  - Asymmetric redness, discoloration, ulceration, skin retraction, changes in breast size and contour, nipple inversion, skin thickening
- **<u>Paget disease of the nipple</u>**
  - Chronic eczematous itchy, scaling rash on the nipples and areola
- **<u>Inflammatory breast cancer</u>**
  - Rare and aggressive type of cancer
  - Red, swollen, warm, itchy breast
  - Often w/ nipple retraction
  - **Peau d'orange** (d/t lymphatic obstruction) assoc. w/ poor prognosis

<u>Mammogram</u>
- Microcalcifications and spiculated masses → malignancy

<u>US</u>
- Recommended initial modality to evaluate breast masses in women <40yo

<u>Biopsy</u>
- Fine needle w/ biopsy
- Large needle core biopsy
- Open (excisional) biopsy

<u>Lumpectomy</u> → followed by radiation therapy
<u>Mastectomy</u>
- Ind: diffuse, large tumor, prior XRT to breast

Removal of regional (axillary) lymph nodes

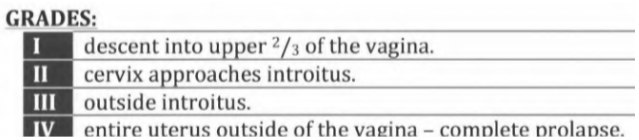
<u>Radiation</u>
- Done after lumpectomy
- May be done after mastectomy
- External beam radiation or brachytherapy (internal)

<u>Chemotherapy</u>
- Used for stage II - IV and inoperable

<u>Neoadjuvant Endocrine Therapy</u>
- Tumors can be estrogen receptor (ER) positive, progesterone receptor (PR) positive, HER2 positive
- Anti-estrogen (tamoxifen) → ER (+) tumors
- Aromatase inhibitors (letrozole, anastrozole) → postmenopausal ER (+)
- Monoclonal AB (trastuzumab) → HER2 (+) tumors

<u>Breast Cancer Prevention</u>
- SERM = **tamoxifen** or raloxifene can be used in postmenopausal women or women > 35yo with high risk
- Treat prophylactically for 5 years

<table>
<tr><th colspan="4">Cystocele</th></tr>
<tr>
<td colspan="2">
- Posterior bladder herniating into the anterior vagina
- MC after childbirth d/t weakness of pelvic support structures
  - Other: repeated heavy lifting, obesity, ↑ pelvic floor pressure



</td>
<td>
- Pelvic/vaginal fullness, heaviness “falling out” sensation
- Low back pain
- Vaginal bleeding, purulent discharge
- Urinary frequency, urgency, stress incontinence

PE
- Bulging mass
- ↑ intra-abdominal pressure
</td>
<td>
- Prophylaxis → kegel exercises, weight control
- Nonsurgical → pessaries, estrogen
- Surgical → hysterectomy, uterosacral or sacrospinous ligament fixation
</td>
</tr>
<tr><th colspan="4">Rectocele</th></tr>
<tr>
<td colspan="2">
- Distal sigmoid colon (rectum) herniating into the posterior distal vagina
- MC after childbirth d/t weakness of pelvic support structures
  - Other: repeated heavy lifting, obesity, ↑ pelvic floor pressure
</td>
<td>Refer above</td>
<td>Refer above</td>
</tr>
<tr><th colspan="4">Menopause</th></tr>
<tr>
<td>
- > 1y of amenorrhea
- Average age: 50-52yo
  - Premature menopause < 40yo onset
- Menstrual irregularity due to decreased FSH and LH

<u>Complications</u>
- Loss of estrogen protective effects → ↑ osteoporosis, ↑ cardiovascular risk, ↑ lipids
</td>
<td>
<u>Low estrogen causes:</u>
- Hot flashes
- Mood changes
- ↑ cardiovascular events
- Hyperlipidemia
- Osteoporosis
- Vaginal atrophy
- Painful intercourse

<u>PE</u>
- ↓ bone density
- thin/dry, less elastic skin
- Vaginal thin mucosa
</td>
<td>
- Most sensitive initial test = FSH assay (> 30 IU/mL)
- ↑ FSH, LH
- ↓ estrogen
  - Estrone predominant estrogen type after menopause
</td>
<td>
<u>Vasomotor insufficiency/hot flashes</u>
- Estrogen, progesterone, clonidine, SSRIs, gabapentin

<u>Vaginal Atrophy</u>
- Estrogen (transdermal, intravaginal)

<u>Osteoporosis Prevention</u>
- Calcium + vit D
- Weight bearing exercise
- Bisphosphonates
- SERM (raloxifene)

<u>Hormone Replacement Therapy</u>

Estrogen only → most effective tx
- Transdermal, vaginal over PO
- ↑ risk of endometrial ca and thromboembolism
- Preferred for pts w/o uterus

Estrogen + progesterone
- Continuous or sequential dosing
- Protective against endometrial ca
- Preferred for pts w/ uterus
- Risks: thromboembolism
</td>
</tr>
</table>

Contraception

Emergency Contraception

Levonorgestrel 0.75mg x2 or 1.5mg x1 dose
- Sooner after intercourse = more effective
- Effective only **before** implantation (does not interrupt or terminate)

- **Failure rate = 25%**
- No STI protection
- No clinical exam, testing, or follow-up necessary
- S/E = N/V, irregular bleeding

Advantages
- Beneficial if taken **within 72hr**

Disadvantages
- If no menses initiated 21d after tx → seek medical attention
- Doesn't work if already pregnant

Combined Hormonal Contraception

CI:
- Hx of DVT, PE, thrombophlebitis, thromboembolic disorder, MI, CVA, CAD, valvular dz, breast cancer
- Uncontrolled HTN, diabetes for > 20y
- Heavy tobacco use > 35y pts
- Hx of liver dz
- Pregnancy, undiagnosed vaginal bleeding

Estrogen + Progesterone
- Progesterone → **prevents ovulation** by inhibiting LH surge, thickens cervical mucosa and thins endometrium
- Estrogen → suppresses FSH and LH
- Failure rate = 9% (0.3% if used correctly)
- No STI protection
- Pros
  - Improves dysmenorrhea
  - Protection vs osteoporosis
  - Less PID and ectopic
- Cons
  - Stop smoking if > 35y
  - Gallstones
  - ↑ fluid retention
  - ↑ thromboembolism
  - Breast tenderness
  - HA, HTN
  - Caution w/ DM, biliary dz, hyperlipidemia, liver dz

Norelgestromin/ethinyl + estradiol (Ortho Evra)
- Transdermal patch
- Failure = 10%
- No STI protection
- Applied every week for 3 wks → 1wk off
  - Bleed for that 1 week
- Less effective if pt underweight

Estrogen + Progestin (Drospirenone)
- Antimineralocorticoid
- Similar to estrogen/progesterone
- No STI protection
- Pros
  - **Approved for PMDD**
  - Helps w/ bloating
- Cons
  - CI: liver, renal, adrenal dz

Etonogestrel + estradiol (NuvaRing)
- Flexible plastic vaginal ring
- Failure = 7%
- No STI protection
- **3 wks on → 1 wk off**
- Cons
  - Must be removed during intercourse and replaced within 3 hours
  - Withdrawal bleeding

Progestin - Only Contraception

- Inhibits ovulation
- Changes endometrium
- Alters ovum transport
- Thickens cervical mucus

Long-Acting
- Implanon (Etonogestrel) implant
  - Lasts 3y
- Depo Provera (medroxyprogesterone) injectable
  - Lasts 3m

- Failure rate similar to combo pills
- No STI protection

Long-Acting
- Implanon → failure = 0.05%
- Depo → failure = 5%
- Neither protect from STI

Advantages
- Safe during lactation
- No HA, nausea, HTN side effects
- ↓ovarian & endometrial cancer
- Less PID
- Can use if > 35y

Disadvantages
- Menstrual irregularities
- Slightly less effective
- ↑ risk of ectopic preg. vs combo pill
- Implanon → **osteoporosis**
- Weight gain

Intrauterine Contraception

- Levonorgestrel (mirena)
- Copper (paragard)
- CI:
  - Active infection
  - Anatomic abnormalities (sometimes fibroids)

- Mirena failure = 0.2%
- Copper failure = 0.8%
- Neither protect from STI

Advantages
- Mirena → 5 years (newer is 7y), **most effective**
- Copper → 10 years
- Good for menorrhagia and dysmenorrhea

Disadvantages
- placement/removal
- ↑ risk of PID (though newer devices do not have this risk; Mirena can actually dec. risk of PID)
- Menstrual irregularities
- If it fails → likely it is an ectopic pregnancy
- Risks: uterine perforation, expulsion

Barrier Methods

Male Condom
- Latex, polyurethane, lambskin
- Failure = 20%
- DOES protect against STIs
  - Except lambskin
- Cons → dec. intercourse sensitivity

Female Condoms
- Polyurethane w/ 2 rings
- Failure = 21%
- DOES protect against STIs
- Cons → dec. intercourse sensitivity

Diaphragm
- Holds spermicide against cervix
- Failure = 15%
- ± STI protection
- Pros
  - No systemic AE
  - Protects pelvic infxn and cervical dysplasia
- Cons
  - Remain in place 6 - 24h after sex
  - Requires pelvic exam & fitting
  - ↑ risk of TSS and cystitis

Female Cap: Silicone rubber cap covering the cervix
- Failure = 14%
- ± STI protection
- Pros
  - No fitting required
  - No additional spermicide needed b/t intercourse
- Cons → ↑ risk of TSS

Contraceptive Sponge: Polyurethane sponge w/ nonoxynol-9
- Failure
  - Nulliparous = 12%
  - Parous = 24%
- ± STI protection
- Pros → insert few hours prior
- Cons → must be left in place ≥ 6h but < 24h; ↑ risk of TSS

Other

Nonoxynol (spermicide)
- Destroys sperm
- Failure = 27%
- Pros → can be used in combo w/ other forms
- Cons → slight ↑ risk of HIV

Coitus Interruptus
- Withdrawal before ejaculation
- Failure = 20%
- No STI protection
- Con → pre-ejaculatory fluid can lead to pregnancy

Abstain from sex during fertile period

Sterilization
- Tubal ligation (permanent)
- Vasectomy

Intrauterine Pregnancy

General

GPA Classification
- Gravida = # of times pregnant
- Para = # of births (>20w) including stillbirths; multiple gestations count as 1
- Abortus = # of pregnancies lost

Uterus Changes
- Ladin's sign → uterus softening after 6w
- Hegar's sign → uterine isthmus softening after 6 - 8w
- Piskacek's sign → palpable lateral bulge or softening of uterine cornus 7 - 8w

Cervix Changes
- Goodell's sign → cervical softening after 4 - 5w
- Chadwick's sign → bluish coloration of cervix & vulva 8 - 12w

Fetal heart tones (120 - 160 bpm)
- 10 - 12w

□-hCG
- Serum → as early as 5d after conception
- Urine→ can detect 14d after conception

Pelvic US → 5 - 6wks

Fetal movement → 16 - 20wks

Fundal Height
- 12w = above pubic symphysis
- 16w = midway b/t pubis & umbilicus
- 20w = at the umbilicus
- 38w = 2-3 cm below xiphoid process

First Trimester (week 1 - 12)

Naegele's Rule (estimated date of delivery)
- First day of LMP + 7d - 3m

Maternal Blood Screening Tests
- Down syndrome
  - Free □-hCG (abnml high or low)
  - PAPP-A (low)
  - Nuchal translucency (↑thickness)
    - US 10 -13wks
- Uterine size & gestation
  - Abnml → CVS or amniocentesis ind. @ 10 - 13wks

Ultrasound
- Fetal heart tones heard @ 10 - 12wks by doppler
- Heartbeat @ 5 - 6wks by US

Chorionic villus sampling (CVS)
- ~10 - 13wks
- Ind: prior child w/ chromosomal abnormalities, maternal age >35y, previous abnml screening, abnml US, prior pregnancy losses
- Pros → early termination option if abnormalities found
- Cons → inc. risk of spontaneous abortion

Second Trimester (week 13 - 27)

Triple screening @ 15 - 20wks
1. α - fetoprotein
2. □-hCG
3. Estradiol

α-FP	β-hCG	Estradiol	Diagnosis
Low	*High*	*Low*	*Down Syndrome (Trisomy 21).**

Ultrasound → amniotic fluid lvl, fetal viability, growth for gestational age

Amniocentesis @ 15 - 18wks
- Ind: prior child w/ chromosomal abnormalities, maternal age >35y, previous abnml screening, abnml US, prior pregnancy losses

Gestational Diabetes Screening @ 24 - 28wks

Inhibin-A → high lvl may be chromosomal abnml

Third Trimester (week 28 - birth)

Antibody Titers
- Rh (-) mom + Rh (+) dad or unknown father → RhoGAM @ 28wks and within 72h after childbirth

Hemoglobin & Hematocrit @ 35wks

Biophysical profile (2 points each)
- Fetal breathing
- Fetal tones
- Amniotic fluid lvl
- NST
- Fetal movement

Non-stress testing → baseline HR 120 -160 bpm

	DEFINITION	PROGNOSIS	MANAGEMENT
REACTIVE NST	• *≥2 Accelerations in 20 minutes* • *↑Fetal heart rate* ≥15 bpm from	• *Fetal well being*	• Repeat weekly or biweekly

Contraction Stress test → fetal response to stress @ times of uterus contraction

	DEFINITION	PROGNOSIS	MANAGEMENT
NEGATIVE CST	• *No late decelerations* in the presence of 3 contractions in 10	• *Fetal well being*	• Repeat CST as needed

Cervical Cancer

- Most commonly associated with HPV serotypes 16, 18, 31, and 45-> high risk
- HPV serotypes 6 and 11 -> low risk
- HPV is associated with cervical dysplasia cancer
- HIV leads to high incidence of invasive cervical cancer-> AIDS-defining illness
- Cigarette smoking
- High number of sexual partners
- Early age at onset of sexual activity
- Immunosuppression
	- Preinvasive carcinoma (stage 0) and microinvasicve carcinoma: simple hysterectomy with cold knife cone (if patient wants to maintain fertility)
	- Early Disease (stage Ia-2 to IIa): radiation therapy or radical hysterectomy
	  - This is based on age-> young prefer sx due to maintaining ovarian function that would be diminished via radiation
	- Advanced Disease (stage IIb-IV): chemo radiation therapy
	  - External beam radiation and intracavitary radiation are used in combo with cisplatin based chemo
	- Recurrent Disease:
	  - Radiation
	
	Already treated with radiation? → Surgical treatment with pelvic exenteration if recurrence is centrally located

Spontaneous Abortion

- Termination of pregnancy < 20w
- MC during 1 - 7w
- MCC = fetal chromosomal abnormalities
  - Other: maternal infxn, uterine defects, endocrine abnormalities, malnutrition, immunologic, physical trauma, smoking, drug use

Threatened

- **MCC of 1st trimester bleeding** - Pregnancy may be viable	- **NO POC expelled** - Bloody vaginal discharge - Spotting → profuse - Uterine size nml for gestation	- Cervical OS = **closed**	- Rest @ home - Serial β-hCG to monitor - RhoGAM if necessary

Inevitable

- Not salvageable	- **NO POC expelled** - Bleeding > 7d, cramping - Uterus size nml for gestation	- Cervical OS = **progressive cervix dilation** (>3cm, effaced) - ± rupture of membranes	- **Dilation & Evacuation** (D&E) if in 2nd trimester - Suction curettage if in 1st trimester - RhoGAM if necessary

Incomplete

- Not salvageable	- **Some POC expelled, some retained** - Heavy bleeding, cramping - **Boggy uterus**	- Cervical OS = **dilated**	- **D&E** if in 2nd trimester - D&C if in 1st trimester - **Pitocin** - RhoGAM if necessary

Complete

- Not salvageable	- **ALL POC expelled** - Pain, cramps, bleeding	- Cervical OS = **closed**	- RhoGAM if necessary

Missed			
- Fetal death but retained in uterus	- **NO POC expelled**	- Cervical OS = **closed**	- **D&E** (D&C if in 1st trimester) - **Misoprostol**
Septic			
- Retained POC becomes infected → infxn of uterus and organs	- **Some POC retained** - **Cervical motion** and uterine **tenderness** - **Foul, brownish discharge** - Fevers, chills - Spotting → bleeding	- Cervical OS = **closed**	- **D&E + antibiotics**

ENT/OPHTHALMOLOGY

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Pharyngitis/Tonsillitis			
- **MCC overall = viral** (adenovirus, rhinovirus, enterovirus, epstein-barr, influenza A/B, herpes zoster)	- Sore throat - Pain w/ swallowing or talking		- Fluids, warm saline gargles - Topical anesthetics - Lozenges, NSAIDs
Streptococcal Pharyngitis			
- **Group A Beta Hemolytic Streptococcus (**streptococcus pyogenes**)** - Course of illness = 3 - 5d <u>Complications</u> - **Rheumatic fever** - **Glomerulonephritis** - Peritonsillar abscess	- Sore throat **Centor Criteria*** (each sx is 1 point; +1 < 15yo; -1 > 44yo) - Fever (>38/100.4) - Pharyngotonsillar exudate - Tender anterior cervical lymphadenopathy - Absence of cough *More effective in ruling out strep cause than diagnosing it is strep	<u>Throat Culture</u> → definitive diagnosis - Sent for anyone 5 - 15y old - If centor score 2 - 3 points <u>Rapid antigen detection test</u> - Specific but not sensitive - Useful if positive - If negative → send for culture esp. In 5 - 15yo	- Treatment is to prevent complications - **1st line = Penicillin G or Penicillin VK** - Amoxicillin, Augmentin - Macrolides if PCN allergy
Acute Sinusitis			
- 1 - 4wks - MC maxillary → ethmoid → frontal → sphenoid - S. pneumo, H. flu, GABHS, M. catarrhalis - Often occurs w/ rhinitis or follows viral URI	- **Sinus pressure worse w/ bending & leaning forward** - Maxillary → cheek pain/pressure - Frontal → CN VI palsy - Ethmoid → tenderness in high lateral wall of nose - Sphenoid → mid head pressure - HA, fever - Malaise - Purulent sputum, congestion - Nasal discharge PE → sinus tenderness and opacification w/ transillumination	- Sx present > 1w - **CT → test of choice** - XR: water's view	<u>Symptomatic therapy</u> (Ind: sx <7d) - Decongestants - Antihistamines - Mucolytics - Intranasal steroids - Analgesics - Nasal lavage <u>Antibiotics</u> (Ind: sx >10-14d, swelling, febrile) - **DOC = Amoxicillin** (x 10 - 14d) - 2nd line = doxycycline, Bactrim - Recent abx use/refractory → fluoroquinolones or amox/clavulanic acid
Chronic Sinusitis			
- ≥ 12 consecutive wks - MC fungal = Aspergillus - 2nd = mucormycosis - MC bacterial = S. aureus - Pseudomonas, anaerobes - Other: Wegener's <u>Mucormycosis</u>: caused by Mucor, Rhizopus, Absidia, Cunninghamella → may enter the CNS - Seen in immunocompromised pts		- Same as acute - **Mucormycosis → black eschar on palate/face**	- **1st line = IV Amphotericin** - Posaconazole - ± surgical debridement

<table>
<tr><th colspan="4">Aphthous Ulcers</th></tr>
<tr>
<td>- Idiopathic
- Aka canker sore, ulcerative stomatitis
- May be assoc. w/ herpesvirus 6
- MC on buccal or labial mucosa</td>
<td>- Heals within a few weeks
- Small round/oval painful ulcers (yellow, white, or grey)
- Erythematous halos
- Nonkeratinized mucosa</td>
<td></td>
<td>- Topical analgesics
- Topical/oral steroids
  - Triamcinolone in orabase, Fluocinonide
- Cimetidine w/ recurrent ulcers</td>
</tr>
<tr><th colspan="4">Blepharitis</th></tr>
<tr>
<td>- Inflammation of both eyelids
- Anterior → involves skin and base of eyelashes; less common
  - Infectious (Staph)
  - Seborrheic
- Posterior → meibomian gland dysfxn
  - Assoc. Rosacea and allergic dermatitis</td>
<td>- Eye irritation/itching
- Eyelid
  - Burning, erythema
  - Crusting, scaling
  - Red rim of eyelid
- Eyelash flaking
- ± entropion, ectropion</td>
<td colspan="2"><u>Anterior</u>
- Eyelid hygiene
  - Warm compress
  - Eyelid scrubbing/washing w/ baby shampoo
  - ± azithromycin solution or ointment
<u>Posterior</u>
- Eyelid hygiene
- Regular massage/expression of meibomian gland
- ± systemic tetracycline or azithro in severe or refractory</td>
</tr>
<tr><th colspan="4">Conjunctivitis</th></tr>
<tr><th colspan="4">Viral</th></tr>
<tr>
<td>- MC adenovirus.
- Swimming pool MC source
- MC in children</td>
<td>- Preauricular lymphadenopathy
- Copious watery discharge
- Mucoid discharge
- Bilateral</td>
<td>- Punctate staining on slit lamp</td>
<td>- Supportive → cool compresses, artificial tears
- Antihistamines for itching/redness
  - Olopatadine</td>
</tr>
<tr><th colspan="4">Allergic</th></tr>
<tr>
<td colspan="2">- Red eyes
- Cobblestone mucosa
- Itching, tearing, watery, viscous discharge
- Bilateral
- Chemosis</td>
<td colspan="2">- Topical antihistamines
  - Olopatadine
  - Pheniramine / Naphazoline
- Topical NSAID: Ketorolac
- Topical corticosteroids</td>
</tr>
<tr><th colspan="4">Bacterial</th></tr>
<tr>
<td>- MC S. aureus, S. pneumo, HiB</td>
<td>- Purulent discharge
- Lid crusting
- No visual changes
- Absence of ciliary infection</td>
<td>- Fluorescein staining needed to detect abrasions or keratitis</td>
<td><u>Topical antibiotics</u>
- Erythromycin
- Fluoroquinolones
- If contact lens, cover Pseudomonas
  - Fluoroquinolone
  - Aminoglycoside
- If Chlamydia/Gonorrhea, admit for IV and topical abx
  - Gonorrhea = ceftriaxone
  - Chlamydia = azithromycin</td>
</tr>
</table>

Ophthalmia Neonatorum (Neonatal)			
- Day 1: silver nitrate - Day 2-5: Gonococcal - Day 5-7: Chlamydia - Day 7-11: HSV	Complications: - Corneal ulceration - Opacificacion - Blindness	Prophylaxis given immediately after birth: - Erythromycin ointment - Topical tetracycline - Silver nitrate - Povidone-iodine	
Dacryocystitis			
- Infection of the lacrimal sac - **MC S. Aureus**	- Tearing - Tenderness - Edema - Redness to medial canthal (nasal side) of lower lid - +/- purulent	<u>Acute:</u> - Antibiotics → Dacryocystorhinostomy - Clindamycin. - Vanco + Ceftriaxone <u>Chronic:</u> Dacryocystorhinostomy	
Hordeolum (Stye)			

- MCC S. aureus
 	
<u>External:</u> infection of eyelash follicle or external sebaceous glands near lid margin
 	
<u>Internal:</u> inflammation/infection of Meibomian gland
	- Focal abscess: painful, warm, swollen red lump on eyelid	- Warm compresses; most drain spontaneously
		- Can add topical antibiotic ointment
		  - Erythromycin
		  - Bacitracin
		- I & D if no spontaneous drainage after 48hrs	

Labyrinthitis			

- Vestibular neuritis + hearing loss/tinnitus (from cochlear involvement)	<u>Vestibular sx:</u>
	- Peripheral vertigo (continuous)
	- Dizziness
	- N/V
	- Gait disturbances
	- Nystagmus is horizontal & rotary (away from affected side)
	
	<u>Cochlear sx:</u> hearing loss
			- Corticosteroids 1st line
			- If symptomatic:
			  - Antihistamines (Meclizine)
			  - Benzodiazepines

Tinnitus			
- Not a disease but a sx of one - Can be caused by age related hearing loss, exposure to loud noise, ear wax blockage , ear bone changes, Meniere's disease, medication induced (Antibiotics, ASA)	- Ringing, buzzing, roaring, clicking, hissing noise - Damage to inner ear hair cells - If sound coincides w/ pulse → think vascular problem, glomus tumor, AV malformation	- Presence of a pulsatile tinnitus → of vascular etiology - MRI angiography - Asymmetric or unilateral → MRI of the internal auditory canals is needed to check for possible acoustic tumor. - "Clicking" tinnitus may be due to palatal myoclonus	- Tx underlying cause

Laryngitis		

MCC infectious or trauma
- **MC viral infection**
  - Adenovirus, rhinovirus, influenza, RSW< parainfluenza
- Bacterial: M. catarrhali and M. pneumo
	- **Hoarseness = hallmark**
	- Aphonia
	- Pharyngitis
	- Rhinitis
	- Cough
		- Supportive:
		  - Vocal rest
		  - Warm saline gargles
		  - Anesthetics
		  - Lozenges

Otitis Externa		
- **Swimmer's ear** - excess H20 or local trauma - MCC Pseudomonas	- 1-2 days of ear pain - Pruritus in ear canal - **Auricular discharge** - Pressure/fullness - **Pain on traction of ear canal/tragus**	- Drying agents: Isopropyl alcohol & acetic acid - Cipro/dexamethasone - Ofloxacin safe if TM perforated - Neomycin/ Polytrim-B/ hydrocortisone otic (NOT if TM perforated) - Amphotericin B if fungal
Malignant Otitis Externa		
- Osteomyelitis at skull base 2ry to Pseudomonas - MC seen in DM & immunocompromised		- IV antipseudomonal Abx: Ceftazidime or Piperacillin + Fluoroquinolones or Aminoglycoside
Otitis Media		
Acute		

- Infection of middle ear, temporal bone, mastoid air cells
- MC preceded by viral URI
- AOM:
  - **MC S. pneumo**
  - H.influ, M. catarrhalis, S. pyogenes
  - RF: Eustachian tube dysfunction, young age
	- AOM: rapid onset +signs/sx of inflammation
	- OM c effusion: asyx/no inflammation
	- Fever
	- Otalgia
	- Ear tugging in infants
	- If TM perforated → rapid relief of pain + otorrhea
	  - Usually heals in 1 - 2 days
	- Bulging, erythematous TM w/ effusion
	- Loss of landmarks
	- Decreased TM mobility
		- AOM w/ perforation: decreased tympanic membrane mobility on pneumatic otoscopy	- Amoxicillin 1st line
			  - Cefixime in children
			- 2nd line: Augmentin
			- PCN allergic: Erythromycin-Sulfisoxazole
			- Severe/recurrent: Myringotomy
			- OM w/ effusion = observation

Chronic		
- **MC Pseudomonas & S. aureus** - Complication of acute OM, trauma, or d/t cholesteatoma	- Perforated TM + persistent or recurrent purulent otorrhea - May have conductive hearing loss	- Topical antibiotics = 1st line: - Ofloxacin or Cipro. - Avoid water/moisture/topical aminoglycosides in ear whenever TM ruptured - Surgical: TM repair	

Tympanic Membrane Perforation			

- MC d/t penetrating or noise trauma
- MC @ pars tensa
	- Ear pain
	- Hearing loss
	- ∓ Bloody otorrhea
	- ∓ Tinnitus and vertigo
		- Otoscopic Exam: TM perforated
		- CHL
		  - Weber = lateralization to affected ear
		  - RInne: BC > AC
			- Most heal spontaneously
			- Avoid water/moisture/topical aminoglycosides in ear
			- ∓ Surgical repair

Ectropion			
- Eyelid & lashes turned OUTWARD - d/t relaxation of orbicularis oculis muscle - MC in elderly	- Irritation - Ocular dryness, tearing - Sagging of eyelid - ↑ sensitivity		- Surgical correction - Lubricating eye drops
Entropion			
- Eyelid & lashes turned INWARDS - MC in elderly	- Eyelashes can cause corneal abrasion/ulcerations - Erythema - Tearing - ↑ sensitivity		- Surgical correction - Lubricating eye drops
Corneal Abrasion			
	- Foreign body sensation - Tearing - Red & painful eye	- Fluorescein staining → "ice rink"/linear abrasions - Pain relieved w/instillation of ophthalmic analgesic drops - VA	- Check visual acuity first - Patching not indicated for small abrasions - Patch if lrg >5mm but don't patch longer than 24hrs - Don't patch in contact lens wearers/ Pseudomonas. - Fluoroquinolone eye drops (Cipro) - Topical abx drops → Erythromycin, polymyxin/trimethoprim - Rust ring: remove rust ring at 24hrs usually rotating burr
Corneal Ulcer			

- Aka keratitis
- MCC bacterial
  - Contact lens wearers → pseudomonas
  - Fungal
  - Exposure keratitive (Bell palsy)
	- Pain, photophobia
	- Reduced vision
	- Tearing
	- Conjunctival erythema
	- Ciliary injection (limbic flush)
	- Purulent or watery discharge
		- Corneal ulceration on slit lamp exam
		
		<u>Bacterial Keratitis:</u> hazy cornea, ulcer, stromal abscess, w or w/o hypopyon
		
		<u>HSV Keratitis:</u> dendritic lesions* (branching seen of fluorescein staining)
			<u>Bacterial keratitis:</u>
			- Fluoroquinolone drop: Moxifloxacin
			- DO NOT PATCH EYE
			
			<u>HSV keratitis:</u>
			- Topical antivirals: trifluridine, vidarabine, acyclovir ointment
			- PO acyclovir

<table>
<tr><th colspan="4">Acute Narrow Angle- Closure Glaucoma</th></tr>
<tr>
<td>- Increased IOP → optic nerve damage → decreased visual acuity → Ophtho emergency
- Decreased drainage of aqueous humor
- Precipitating factors:
  - Mydriasis from dim lights
  - Sympathomimetics
  - Anticholinergics</td>
<td>- Severe, sudden onset of unilateral ocular pain
- N/V
- HA
- Vision changes
  - Halos around lights
  - Peripheral vision loss (tunnel)
- Conjunctival erythema, steamy cornea
- Mid-dilated, fixed, non reactive pupil
- Eye feels hard to palpation
- Unilateral peripheral vision loss</td>
<td>- IOP by tonometry (> 21 mmHg)
- Fundoscopy: cupping of optic nerve</td>
<td>- 1st: Acetazolamide → decreases IOP by decreasing aqueous humor production
- 2nd: Topical BB (Timolol) → reduces IOP w/o affecting visual acuity
- Miotics/cholinergics (Pilocarpine, Carbachol)
  - Reverse angle closure
- Alpha 2-agonist (apraclonidine)
- Peripheral iridotomy is definitive tx
- Avoid anticholinergics, sympathomimetics</td>
</tr>
<tr><th colspan="4">Chronic (Open Angle) Glaucoma</th></tr>
<tr>
<td>- Risk Factors::
  - AA
  - > 40 y/o
  - Fhx
  - DM
- 2 MCC of blindness in the world</td>
<td>- Gradual bilateral painless peripheral vision loss (tunnel vision) → central loss
- Cupping of optic discs (increased cup to disc ratio)</td>
<td colspan="2">- 1st: prostaglandin analogs
  - Latanoprost
- Timolol
- Brimonidine
- Laser therapy (trabeculoplasty) if tx failed
- Surgical (Trabeculectomy) last line tx</td>
</tr>
<tr><th colspan="4">Hyphema</th></tr>
<tr>
<td>- Can happen during trauma or globe rupture, shaken baby syndrome</td>
<td colspan="2">- Blood in anterior chamber
- Pain, no vision changes
- No discharge, no pupil changes</td>
<td>- Place at 45 degrees (keeps RBCs from staining the cornea</td>
</tr>
<tr><th colspan="4">Macular Degeneration</th></tr>
<tr>
<td><u>Risk Factors:</u>
- > 50 y/o
- Caucasians
- Females
- Smokers

- MCC of permanent legal blindness & visual loss in the elderly (>75)
- Macula = responsible for central vision & detail & color vision</td>
<td>1. <u>Dry (atrophic):</u> gradual blurring of central vision.
  - Drusen spots (yellow/white scattered, diffuse)

2. <u>Wet (neovascular or exudative):</u> new abnormal vessels grow under central retina, which leak & bleed → retinal scarring.
  - More rare but progresses faster

Sx of both:
- Bilateral blurred or loss of CENTRAL vision (including detailed & color).
- Scotomas, metamorphopsia</td>
<td>- Fluorescein angiography</td>
<td><u>Dry:</u>
- Amsler grid at home to monitor stability.
- Zinc, Vit A,C,E to slow progression

<u>Wet:</u>
- Intravitreal anti-angiogenesis (Bevacizumab) - reduces neovascularization
- 2nd line: Laser photocoagulation
- Optical tomography to monitor tx response</td>
</tr>
</table>

Papilledema			
- Optic nerve (disc) swelling d/t to increased intracranial pressure <u>Etiology</u>: - MCC idiopathic intracranial HTN (pseudotumor cerebri - Lesion, tumor - Increased CSF production - Cerebral edema, severe HTN	- HA - N/V - Vision is usually preserved - **Bilateral**	- Funduscopy: swollen optic disc w/blurred margins - MRI/CT head to rule out mass effect → LP (increased CSF pressure)	- Diuretics (Acetazolamide) - Tx underlying cause
Pterygium			
- Associated w/increased UV exposure in sunny climates	- Elevated fleshy, triangular shaped "growing" fibrovascular mass - MC inner corner/nasal side of eye - Can cross pupil & cause visual changes		- Observation - Excised if causes visual changes
Retinal Detachment			
<u>3 types:</u> 1. Type I: - Rhegmatogenous MC type: retinal tear → retinal inner sensory layer detaches from choroid plexus. - MC RF myopia & cataracts 2. Type II: - Adhesions separate the retina from its base (Proliferative DM retinopathy, sickle cell, trauma) 3. Type III: - Exudative: fluid accumulates beneath the retina → detachment (HTN, CRVO, papilledema)	- Photopsia (flashing lights) → floaters → progressive unilateral vision loss: shadow "curtain coming down" in periphery initially → loss of central visual field - No pain/redness	- Funduscopy: - See retinal tear - + Shafer's sign: clumping of brown colored pigment cells in the ant. Vitreous humor resembling tobacco dust	- Ophtho emergency: keep pt. supine - Don't use miotic drops - Laser, cryotherapy, ocular surgery
Central Retinal Artery Occlusion (CRAO)			
- Retinal artery thrombus or embolus - MC 50 - 80 y/o w/atherosclerotic disease - Ophtho emergency	- Acute, sudden monocular vision loss, often preceded by amaurosis fugax	- Funduscopy: - Pale retina /**cherry red macula** - Box car appearance of retinal vessels	- Decrease IOP: Acetazolamide - Revascularization: place supine + orbital massage to dislodge clot
Central Retinal Vein Occlusion (CRVO)			
- Retinal vein thrombus → fluid backup in retina - RF: HTN, DM, glaucoma, hypercoagulable states	- Acute, sudden monocular vision loss	- Funduscopy: - Extensive retinal hemorrhages (blood & thunder appearance	- No known effective tx - May resolve spontaneously or progress to permanent vision loss

<table>
<tr><th colspan="4">Diabetic Retinopathy</th></tr>
<tr>
<td>- MCC of new, permanent vision loss/blindness in 25-74y
- MC due to maculopathy
- Retinal blood vessel damage → retinal ischemia, edema</td>
<td colspan="2">1. <u>Nonproliferative:</u>
- Microaneurysms
- Cotton wool spots
- Hard exudates
- Blot & dot hemorrhages
2. <u>Proliferative:</u>
- Neovascularization; new abnormal blood vessel growth
- Vitreous hemorrhage

3. <u>Maculopathy</u>:
- Macular edema or exudates
- Blurred vision
- Central vision loss</td>
<td><u>Nonproliferative:</u>
- Panlaser tx
- Strict glucose control

<u>Proliferative:</u>
- VEGF inhibitors (Bevacizumab)
- Laser photocoagulation tx

<u>Maculopathy:</u> laser</td>
</tr>
<tr><th colspan="4">Hypertensive Retinopathy</th></tr>
<tr>
<td>- Damage to retinal blood vessels from longstanding HTN</td>
<td colspan="2"><u>Four Grades:</u>
I: Arterial narrowing: copper wiring is moderate, silver wiring is severe
II: AV nicking
III: flame shaped hemorrhages, cotton wool spots
IV: Papilledema (Malignant HTN)</td>
<td>- BP control</td>
</tr>
<tr><th colspan="4">Cholesteatoma</th></tr>
<tr>
<td>- Abnormal keratinized collection of desquamated squamous epithelium → mastoid bony erosion
- MC due to chronic ET dysfunction: chronic negative pressure inverts part of the TM → granulation tissue that erodes the ossicles over time → conductive hearing loss</td>
<td>- Painless otorrhea (brown/yellow discharge w/strong odor)
- Peripheral vertigo
- Conductive hearing loss</td>
<td>- Otoscopy: granulation tissue (cellular debris)
- Weber: lateralization to affected ear
- Rinne: BC > AC</td>
<td>- Surgical excision of debris/cholesteatoma & reconstruction of ossicles</td>
</tr>
<tr><th colspan="4">Ménière disease</th></tr>
<tr>
<td>- Idiopathic distention of the endolymphatic compartment of the inner ear by excess fluid → increased pressure w/in inner ear → hearing & balance disorders</td>
<td>- Episodic peripheral vertigo lasting 1-8hs
- Horizontal nystagmus
- Tinnitus
- Ear fullness & hearing loss
- N/V</td>
<td>- Transtympanic electrocochleography most accurate test during active episode
- Audiometry: loss of low tones</td>
<td>- If symptomatic:
- Antiemetics: Meclizine, benzos
- Decompression if refractory to meds or severe
- Preventative
- Diuretics
- Avoid salt, caffeine, chocolate, ETOH</td>
</tr>
</table>

Allergic Rhinitis			
- MC type of rhinitis - IgE-mediated mast cell histamine release	- Clear rhinorrhea - Associated w/nasal polyps & tends to be worse in the morning - Pale/violaceous, boggy turbinates, nasal polyps w/cobblestone mucosa of the conjunctiva		- Avoid trigger - Intranasal corticosteroids 1st line - Oral antihistamines - Decongestants don't use more than 3 - 5 days bc rebound congestion - Mast cell stabilizers
Epistaxis			

- Anterior MC site of bleeding
  - Kiesselbach's plexus MC site of bleeding @ anterior
  - RF: nasal trauma (nose picking).
- Posterior:
  - RF: HTN & atherosclerosis MC
  - Palatine artery MC site → bleeding both nares & posterior pharynx
		- Direct pressure 1st line therapy
		- Topical decongestants/vasoconstrictors (Phenylephrine, Oxymetazoline, Cocaine
		- Cauterization: Silver nitrate if above fails
		- Nasal packing
		- Septal hematoma associated w/loss of cartilage if hematoma is not removed	

Nasal Polyps			

- MCC is allergic rhinitis
- Samter's triad:
  - Asthma
  - Nasal polyps
  - ASA/NSAID allergy
	- Most are incidental findings but if lrg can cause obstruction or anosmia (decreased smell)	- Signs of allergic rhinitis: pale/violaceous, boggy turbinates
		- Masses seen on inspection
			- Intranasal corticosteroids tx of choice
			- Surgical removal if medical therapy failed

Peritonsillar Abscess			
- Tonsillitis → cellulitis → abscess formation - MC S. pyogenes (GABHS), S. aureus, polymicrobial	- Dysphagia, pharyngitis, muffled "hot potato voice" - Difficulty handling oral secretions, trismus - Uvula deviation to contralateral side	- CT scan 1st line	- Antibiotics + aspiration or I&D - Ampicillin/Sulbactam; clindamycin - Tonsillectomy indications: recurrent strep infections, recurrent peritonsillar infections, chronic tonsillitis
Parotitis			
- Inflammation of one or both parotid glands → swelling of parotid gland - Infectious MCC S. aureus - Autoimmune MCC: Sjogrens - Can be caused from Sialodenitis			- Increase salivary flow: sialogogues ex. Lemon drops - IV nafcillin if severe
Sialadenitis			
- Bacterial infection of parotid or submandibular salivary glands - MC S. aureus	- Acute pain, swelling & erythema near gland especially w/meals - Tenderness at duct opening +/- pus - Local pain, dysphagia, trismus - Fever/chills if severe	- CT scan	<u>Sialogogues:</u> tart hard candies or lemon drops used to increase salivary flow **Antibiotics:** Anti Staphylococcus (Dicloxacillin or Nafcillin) + Metronidazole or clinda if severe

NEUROLOGY

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Dizziness			
- Sensation of lightheadedness, spinning, or impending syncope - Third most common complaint in PC	- Loss of proprioception and vestibular function	- History & PE - Ortostatics - Observation of gait - Check for nystagmus - Cardiac exam - Neurologic exam	
Vertigo			
- False sense of motion 2 types: 1. Peripheral Vertigo 2. Central Vertigo			
CENTRAL VERTIGO	- Problem @ brainstem or cerebellar <u>Causes</u>: 1. Cerebellopontine tumors 2. Migraine HA 3. Cerebral Vascular Dz 4. Multiple Sclerosis 5. Vestibular Neuroma - **VERTICAL** nystagmus - Non Fatigable - Gait problems - Gradual onset - Positive CNS symptoms		<u>Antihistamines</u> = 1st line - Meclizine - Cyclizine - Dimenhydrinate - Diphenhydramine <u>Dopamine Blockers</u>: - Metoclopramide - Prochlorperazine (IV or IM) - IV promethazine <u>Anticholinergics</u>: - Scopolamine → good for motion sickness and recurrent vertigo <u>Benzodiazepines</u>: - Lorazepam - Diazepam - Used in refractory patients
PERIPHERAL VERTIGO	- Problem @ labyrinth or vestibular nerve <u>Causes:</u> 1. Benign Positional Vertigo (MC) → episodic vertigo, NO hearing loss 2. Meniere's → episodic vertigo AND hearing loss 3. Vestibular Neuritis → continuous vertigo, NO hearing loss 4. Labyrinthitis → continuous vertigo AND hearing loss 5. Cholesteatoma - **HORIZONTAL** nystagmus - Fatigable - Sudden onset tinnitus, hearing loss		

<table>
<tr><th colspan="4">Benign Paroxysmal Positional Vertigo</th></tr>
<tr><td>- d/t displaced otoliths
- MCC of vertigo</td><td>- Sudden, episodic, peripheral vertigo provoked with changes of head positioning
- 10 - 60 secs</td><td>- + Dix-Hallpike Test → pt supine w/ head 30 lower than body. Quickly turn head to 90 → delayed fatigable horizontal nystagmus</td><td>- Epley maneuver = canalith repositioning
- Meds usually not needed
- Antihistamines
- Anticholinergics
- Benzodiazepines</td></tr>
<tr><th colspan="4">Syncope</th></tr>
<tr><td>- Can occur with any ↓ in cerebral perfusion.
- Incidence ↑ with age.

Types:
1. Vasovagal syncope (MC)
2. Orthostatic
3. Neurogenic
4. Cardiogenic</td><td>- Transient loss of consciousness & postural tone for few seconds to few min
- Preceded by nausea, faintness, blurred vision, diaphoresis, vertigo, paresthesias, or pallor.
- No postevent confusion.</td><td>Examine for orthostatic changes</td><td>Treat underlying cause
- Tilt table test
- Valsalva maneuver
- Orthostatic BP changes
- EKG</td></tr>
<tr><td>VASODEPRESSOR</td><td colspan="3">- Caused by excessive vagal tone or impaired reflex control of the peripheral circulation
- “Common faint” most common – often initiated by stressful situations</td></tr>
<tr><td>ORTHOSTATIC</td><td colspan="3">- Caused by impaired vasoconstrictive response to assuming upright posture, leading
- Occurs in advanced age, DM, blood loss or hypovolemia, vasodilator, diuretic or adrenergic-blocker therapy</td></tr>
<tr><td>CARDIOGENIC</td><td colspan="3">- Worse prognosis
- Caused by rhythm disturbances (sick sinus syndrome, AV block, tachyarrhythmias) or mechanical causes (aortic or pulmonary stenosis, hypertrophic obstructive cardiomyopathy, pulmonary HTN, atrial myxoma)
- Episodes are often exertional</td></tr>
<tr><th colspan="4">Seizure Disorders</th></tr>
<tr><td colspan="4">Partial (Focal) Seizure

Coming from one area of the brain w/ or w/o spread to other areas</td></tr>
<tr><td>SIMPLE PARTIAL</td><td>- Consciousness fully maintained
- Unsynchronized tonic to clonic movements with or without aura
- Focal sensory, autonomic, motor symptoms
- Followed by transient neurologic deficit → Todd’s paralysis
- Last up to 24 hrs</td><td><u>EEG:</u> focal discharge at the onset of the seizures
- Spike, sharp waves</td><td>- Carbamazepine
- Phenytoin</td></tr>
</table>

COMPLEX PARTIAL (TEMPORAL LOBE)	- **Consciousness impaired**
	- Starts focally
	- Aura (secs-min) → impaired consciousness
	- Automatism:
	  - **Lip smacking**
	  - Manual picking
	  - Patting coordinated motor movement
	- UNRESPONSIVENESS for a period of time – MC AFTER seizure
	  - Fatigue, confusion, difficulty speaking & comprehending can last several minutes of contralateral limb or body
		<u>EEG</u>: interictal spikes with slow waves in the temporal area
		- Temporal lobe spikes + slow waves
			- Carbamazepine
			- Phenytoin

Generalized Seizures Involves BOTH hemispheres of the brain simultaneously			

ABSENCE (PETIT MAL)
 	
- MC in childhood
  - Usually ceases by 20 y/o
	- Brief lapse of consciousness
	- Pt unaware of attacks
	- Brief staring episodes
	- Eyelid twitching
	- NO post-ictal phase
	- Can be:
	  - Clonic = jerking
	  - Tonic = stiffness
	  - Atonic = loss of postural
		<u>EEG</u>: bilateral symmetric 3Hz spike and wave action	- **Ethosuximide = 1st line**
			- Valproic acid = 2nd line
			- Lamotrigine

TONIC-CLONIC (GRAND MAL)	<u>Tonic Phase</u>: LOC → rigidity, sudden arrest of respiration → clonic phase <u>Clonic Phase</u>: repetitive, rhythmic jerking → postictal phase <u>Postictal Phase</u>: flaccid coma/sleep - Incontinence - Tongue biting	<u>EEG</u>: generalized high amplitude rapid spiking - May be nml in bwtn seizures	- **Valproic acid** - Phenytoin - Carbamazepine - Lamotrigine
MYOCLONUS	- Sudden, brief, sporadic involuntary twitching - NO LOC		- Valproic Acid - Clonazepam - If febrile → phenobarbital
ATONIC	- **“DROP ATTACKS”** - Sudden loss of postural tone		
STATUS EPILEPTICUS	Repeated, generalized seizures without recovery for > 30 min		Lorazepam OR Diazepam → Phenytoin → Phenobarbital

<table>
<tr><th colspan="4">Transient Ischemic Attack</th></tr>
<tr>
<td>- TRANSIENT, focal neuro deficit without acute infarction
- Clinical deficit resolves completely in 24 hrs.
- MCC = embolus

Embolization is an important etiology; some sources:
- Cardiac: a. fib, rheumatic heart dz,mitral valve dz, infective endocarditis, atrial myxoma, MI, atrial septal defects
- Cerebrovascular
- Hypotension
- Polycythemia
- Sickle cell
- Hyperviscosity</td>
<td><u>ICA/MCA/ACA</u>: cerebral hemisphere dysfunction
- Sudden HA
- Speech changes
- Confusion

<u>Internal Carotid Artery</u>:
- Amaurosis fugax – transient monocular blindness
- Weakness of CONTRALATERAL hand

<u>PCA</u>: somatosensory deficits

<u>Vertebrobasilar</u>:
- Brainstem, cerebellar symptoms:
- Gait
- Proprioception
- Dizziness, Vertigo</td>
<td>- Head CT = initial test of choice
- Need to r/u ICH
- Carotid Doppler
- CTA, MRA
- Glucose level
- Echo
- EKG
- $ABCD^2$ → assess CVA risk
- Age
- BP
- Clinical Features
- Duration of symptoms
- DM</td>
<td>- Carotid endarterectomy if ICA or common carotid stenosis > 70%
- ASA
- Dipyridamole or Clopidogrel
- THROMBOLYTICS CONTRAINDICATED
- Avoid lowering BP unless > 200/120</td>
</tr>
<tr><th colspan="4">Cerebral Vascular Accident</th></tr>
<tr>
<td>- Hx of athersosclerotic heart dz, HTN, diabetes, a. fib
- Deficits >24 hrs.

1. Ischemic Stroke
2. Hemorrhagic Stroke</td>
<td colspan="2"><u>Etiology:</u>
- Large artery thrombosis
- Small artery thrombosis (lacunar)
- Embolic (cardiogenic or artery-to- artery)
- Vascular dissection
- Systemic HTN
- Bleeding</td>
<td><u>Risk factors:</u>
- Age
- Family hx
- Diabetes
- HTN
- Smoking
- Hypercholesterolemia
- A. fib</td>
</tr>
<tr><th colspan="4">Ischemic Stroke</th></tr>
<tr>
<td colspan="4">- MC type
<u>Etiology</u>:
1. Thromotic (MC)
2. Emboli
3. Cerebrovascular occlusion</td>
</tr>
<tr>
<td>LACUNAR INFARCT</td>
<td>- Hx of HTN
- Small vessel disease
- Pure motor (MC)
- Ataxic hemiparesis and clumsiness
- Legs > arms
- Dysarthria (clumsy hand syndrome)
- Pure sensory loss
- Numbness
- Paresthesias</td>
<td>- CT scan: small punches out hypodense areas
- Central lesions and in non cortical areas (basal ganglia)</td>
<td>- ASA
- Control risk factors: HTN and DM
- Good prognosis</td>
</tr>
</table>

<table>
<tr><td colspan="2">Anterior Circulation</td><td rowspan="10">Noncontrast CT
- r/u hemorrhage</td><td rowspan="10">- Thrombolytics w/in 3 hrs of onsets
- rTPA (alteplase) if NO evidence of hemorrhage
- CI:
- BP > 185/110
- Recent bleed or trauma
- Bleeding
- Antiplatelet therapy:
- ASA
- Given after 3 hr and if thrombolytics arent given OR 24 hr after thrombolytics
- Clopidogrel
- Anticoagulation
- Lower BP if:
- > 185/110 AND thrombolytics given
- > 220/120 and NO thrombolytics given
- MAP > 130

<u>Complications:</u>
- Pneumonia – d/t aspiration & hypoventilation
- Hypovolemia – d/t lack of fluids often b/c of dysphagia
- Hyponatremia – inappropriate ADH, diuretics, poor intake
- Seizures – excitable partially injured cerebral tissue
- Depression – organic mental changes, discouragement
- Shoulder dislocation – lack of proper care of paralyzed limbs
- Peripheral nerve injury – improper positioning of paretic limbs
- Decubitus ulcer – immobility
- UTI – indwelling catheter, bladder distention
- Bleeding, brain or systemic – excessive anticoagulation
- CHF – fluid overload
- Hypotension – excessive use of antihypertensives</td></tr>
<tr><td>MIDDLE CEREBRAL ARTERY

- MC type</td><td>- Contralateral sensory/motor loss/hemiparesis:
- Face, arm > leg/foot
- CONTRALATERAL hemianopsia → gaze TOWARDS side of lesion

<u>Dominant (usually L-side)</u>:
- Aphasia
- Broca = expressive
- Wernicke = sensory
- Math comprehension
- Agraphia
<u>Nondominant (usually R-side)</u>
- Spatial deficits
- Dysarthria
- L-side neglect
- Apraxia</td></tr>
<tr><td>ANTERIOR CEREBRAL ARTERY</td><td>- Contralateral sensory/motor loss/hemiparesis:
- Leg/Foot > UE
- Abnormal gait
- Face SPARED
- Impaired judgement
- Confusion
- Personality changes, flat affect
- Urinary incontinence
- Upper motor neuron weakness
- Gaze TOWARDS side of lesion</td></tr>
<tr><td colspan="2">Posterior Circulation</td></tr>
<tr><td>POSTERIOR CEREBRAL ARTERY</td><td>- Visual hallucinations
- CONTRALATERAL hemianopsia
- Coma, drop attacks</td></tr>
<tr><td>BASILAR ARTERY</td><td>- Cerebellar dysfunction
- CN palsy
- Decrease vision
- Decrease bilateral sensory</td></tr>
<tr><td>VERTEBRAL ARTERY</td><td>- Vertigo
- Nystagmus
- N/V
- Diplopia
- IPSILATERAL ataxia</td></tr>
</table>

Hemorrhagic Stroke			

SPONTANEOUS ICH
 	
- Usually d/t HTN especially @ basal ganglia
- Intraparenchyma
	- LOC
	- N/V
	Hemiplegia
	- Hemiparalysis
		- Noncontrast CT
		- DO NOT perform ICP if ICH suspected
			- If ↑ICP →
			  - Head elevation
			  - IV mannitol
			  - Hyperventilation
			- Gradual BP reduction
			- Hematoma evacuation if mass effect

SUBARACHNOID HEMORRHAGE (SAH)
 	
- MCC = Berry aneurysm or AVM
- Arterial bleed btw arachnoid and pia
	- Sudden, worst HA of my life!!
	Brief LOV
	- N/V
	- Meningeal irritation
	  - Nuchal rigidity
	- Seizures
	- NO focal neurological deficits
		CT scan
		- (-) CT AND high suspicion → LP:
		  - Xanthochromia (RBC's)
		  - ↑ CSF P
		
		4 vessel angiography
			- Anti Anxiety meds
			- Stool softeners
			- Lower BP ONLY if:
			  - > 220/120
			  - MAP > 130
			  - Nicardipine, Nimodipine, Labetalol
			- Surgical coiling or clipping

"BERRY" ANEURYSM	- MC @ Circle of Willis - Asymptomatic until SAH	- Angiography = gold stand	- Aneurysm clipping of coiling
Alzheimer's Disease			
- MC type of dementia - d/t amyloid deposition (senile plaques), neurofibrillary tangles	- Short term memory loss = initial symptom → long term memory loss) - Disorientation - Behavioral changes - Personality changes	- CT scan: cerebral cortex atrophy	<u>Acetyl-cholinesterase Inhibitors</u>: - Donepezil - Tacrine - Rivastigmine - Galantamine <u>NMDA Antagonist</u>: Memantine
Parkinson's Disease			

- Idiopathic dopamine depletion
- MC: 45 - 65 y/o
- Lewy bodies, loss of pigment cells in the substantia nigra
	- Resting tremor = pill rolling
	  - Often first sign
	  - Worse @ rest
	  - Better w/ voluntary activity, international movement
	- Bradykinesia
	- Cogwheel rigidity
	- Face involvement = fixed facial expression
	- Postural instability
		- Levodopa/carbidopa = most effective txt
		- Dopamine agonists:
		  - Bromocriptine
		  - Pramipexole
		  - Ropinirole
		  - Young pts to delay the use of levodopa
		- Anticholinergics:
		  - Trihexyphenidyl
		  - Benzotropine
		  - Help w/ tremor BUT NOT bradykinesia
		- Amantadine - early on mild symptoms
		- MAO-B Inhibitors:
		  - Selegiline
		  - Rasagiline
		- COMT Inhibitors:
		  - Entacapone, Tolcapone	

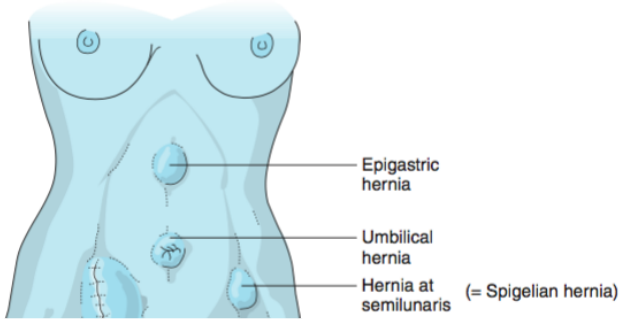
<table>
<tr><th colspan="4">Essential Familial Tremor (Benign)</th></tr>
<tr>
<td>- Autosomal dominant
- MC: 60s but may occur at any age</td>
<td colspan="2">- Intentional tremor → postural, bilateral action tremor
  - Can occur in hands, forearms, head, neck, or voice
  - Occurs at rest, worse w/action
  - Worse w/caffeine, better w/alcohol</td>
<td>Txt usually not needed
- Propranolol: if severe or situational
- Primidone = if no relief w/ propranolol
- Alprazolam (3rd line)</td>
</tr>
<tr><th colspan="4">Dementia</th></tr>
<tr>
<td>1. Alzheimer’s Disease
2. Vascular (stroke/ischemia)
3. Lewy Body Dementia
4. Normal Pressure Hydrocephalus
5. Creutzfeldt-Jakob</td>
<td colspan="2">Progressive, chronic intellectual deterioration of selective functions:
- Memory loss
- Loss of impulse control
- Motor and cognitive fxns

- Language dysfunction
- Disorientation
- Inappropriate social interaction</td>
<td>Tx underlying cause</td>
</tr>
<tr><th colspan="4">Delirium</th></tr>
<tr>
<td>1. CNS dz
2. Systemic dz
3. Fever
4. Endocrine dysfunction
5. Drugs
6. EtOH w/d
7. Acute hepatic failure</td>
<td>- Acute, abrupt, TRANSIENT confused state
- Deficit in short term memory</td>
<td>- Psych interview
- Cognitive eval
- Face hand test
- PE
- Neuro eval
- Labs
- Thyroid
- EEG
- CT/MRI
- Blood, urine, CSR cultures
- LP
- Toxicology</td>
<td>Tx underlying cause

Full recovery w/in 1 wk in most cases</td>
</tr>
<tr><th colspan="4">Cluster HA</th></tr>
<tr>
<td>- MC young and middle aged MALES</td>
<td colspan="2">- Severe UNILATERAL periorbital/temporal pain
  - Sharp
  - < 2 hrs
  - Spontaneous remission
- Triggers: night, EtOH, stress
- Ipsilateral Horner’s Syndrome:
  - Ptosis
  - Miosis
  - Anhydrosis
- Lacrimation
- Nasal congestion
- Conjunctivitis</td>
<td>- 1st line = 100% O2
- SQ sumatriptan
- Ergotamines

<u>Prophylaxis</u>:
- Verapamil = 1st line
- Corticosteroids
- Lithium
- Valproic acid</td>
</tr>
</table>

<table>
<tr><th colspan="3">Migraine HA</th></tr>
<tr>
<td>
- MC in W
- d/t vasodilation
- Duration = 4 - 72 hrs
</td>
<td>
- W/o aura (MC) OR w/ aura (rarer; classic)
- Lateralized, pulsatile, throbbing HA
- N/V
- Photophobia
- Phonophobia
- Worsens w/ physical activity, stress, OCP's/menstruation
- Auras
  - Visual changes (MC)
    - Light flashes
  - Aphasia
  - Weakness
  - Numbness
  - <60 min → HA onset
</td>
<td>
<u>Symptomatic (Abortive)</u>:
- Triptans or ergotamines
- Dopamine blockers
  - Metoclopramide
  - Promethazine
  - Prochlorperazine
- IVF
- If mild symptoms → NSAIDs, APAP = 1st line
<u>Prophylactic:</u>
- Beta Blockers
- CCB
- TCA's
- Anticonvulsants: Valproate, Topiramate
- NSAIDs
</td>
</tr>
<tr><th colspan="3">Tension HA</th></tr>
<tr>
<td>
- MC overall HA
- d/t mental stress
</td>
<td>
- BILATERAL, tight, band like, wise like, constant daily HA
- Worsened w/ stress fatigue, noise or glare
- NO N/V or focal neurologic symptoms
</td>
<td>
- 1st line = NSAIDs, ASA, APAP
- Antimigraine meds
- TCA's (amitriptyline) in:
  - Severe
  - Recurrent
  - Prophylaxis
</td>
</tr>
</table>

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Hernias			
Inguinal Hernia			
- Protrusion of the contents of the abdominal cavity through the inguinal canal **1. Indirect Inguinal** → protrudes @ internal inguinal ring - MC type of hernia - MC in young children & young adults - Origin of sac LATERAL to inferior epigastric artery - MCC = congenital = persistent patent process vaginalis - Can descend into scrotum **2. Direct Inguinal** - Protrudes MEDIAL to the inferior epigastric vessels within Hesselbach's triangle ("RIP") - Rectus Abdominis (medial) - Inferior epigastric vessels (lateral) - Poupart's ligament (inferior) - Does NOT reach scrotum	Asymptomatic: - Swelling at hernia site - Scrotal swelling w/ indirect Incarcerated: - - Unable to return the hernia contents back into the abdominal cavity - Painful, enlargement of an IRREDUCIBLE hernia - N/V if bowel obstruction present Strangulated: - Ischemic - Incarcerated WITH systemic toxicity - Irreducible hernia w/ compromised blood supply - Severe painful bowel movement	- Surgical repair - If strangulated → surgical EMERGENCY  	
Femoral Hernia			
- Protrusion of contents through femoral canal below the inguinal ligament - Upper thigh MEDIAL to femoral vein - MC in W		- Often become incarcerated or strangulated so surgical repair	
Umbilical Hernia			
- Through the umbilical fibromuscular ring - Congenital → failure of umbilical ring closure - In adults d/t loosening of the tissue around the ring		- Observation → usually resolved by 2 y/o - Persistent and > 5 y/o → sx repair - Want to avoid incarceration or strangulation	
Incisional (Ventral) Hernia			
- Herniation through weakness in abdominal wall - Breakdown of fascial closure from prior surgery - MC w/ vertical incisions and in obese pts		- Often asymptomatic - May become larger on standing or with ↑ intra-abdominal pressure	

Obturator Hernia

- RARE
- Through the pelvic floor in which addominal/pelvic contents protrude through obturator foramen
  - Through large obturator canal
- MC in W
  - Especially multiparous or W with significant weight loss

- Can present as bowel obstruction

Epigastric Hernia

- Through defects in the aponeurosis of the rectus sheath
- Midline between the umbilicus and the xiphoid process
- MC in middle age
  - May also occur in young adults

Cystitis

- Infection along the urinary tract involving the bladder and distal structures

<u>Risk Factors:</u>
- Women:
  - Sexual intercourse "honeymoon cystitis"
  - Pregnancy
  - Postmenopausal
- Males: RARE → need further w/u
  - > 50 y/o: BPH, prostate CA
- Kids/neonates
  - Vesicourethral reflux
  - Newborn w/ fever of unknown origin
  - DM
  - Catheter

<u>Etiology:</u>
- MC = E.coli
- Staph saprophyticus in sexually active W
- Enterococci w. Indwelling catheter
- Other: proteus, enterobacter, klebsiella, pseudomonas

- Dysuria (burning)
- Frequency
- Urgency
- Hematuria
- Suprapubic discomfort

<u>UA:</u>
- Pyuria > 5 WBC
- + leukocyte esterase
- + nitrites
- Hematuria
- Cloudy urine
- Bacteriuria
- ↑ pH

<u>Dipstick:</u>
- + leukocyte esterase
- + nitrites
- Hematuria
- WBC but NO WBC cast

<u>Urine Culture:</u> DEFINITIVE DIAGNOSIS
- Indications:
  - Complicated UTI
  - Infants/kids
  - Elderly
  - Males
  - Urologic abnormalities
  - Refractory to txt
  - Catheterized pt
- W > 100,000
- M > 100 - 10,000 + symptoms = acute urethral syndrome

- Increase fluid intake
- Void after intercourse
- Phenazopyridine (pyridium) = bladder analgesic
  - Not used for > 48 hr
  - Turns urine orange

<u>Uncomplicated</u>:
- Nitrofurantoin 100 mg bid 5 - 7 days
- Fluoroquinolones (Ex: ciprofloxacin 250 mg bid X 3 days)
- Trimethoprim-sulfamethoxazole (bid for 3 days

<u>Complicated:</u> underlying condition w/ risk of therapeutic failure: symptoms > 7 days, pregnancy, DM, immunosuppression, catheter, elderly, males
- Fluoroquinolone PO or IV 7 - 10 days
- Aminoglycosides 7 - 10 days

<u>Pregnant</u>:
- Amoxicillin X 7 - 10 days
- Amox/clavulanate
- Cephalexin
- Cefpodoxime
- Nitrofurantoin
- Fosfomycin

<table>
<tr><th colspan="4">Pyelonephritis</th></tr>
<tr>
<td>

- Infection along the urinary tract affecting the kidneys and other structures

<u>Risk Factors:</u>
- Women:
  - Sexual intercourse “honeymoon cystitis”
  - Pregnancy
  - Postmenopausal
- Males: RARE → need further w/u
  - > 50 y/o: BPH, prostate CA
- Kids/neonates
  - Vesicourethral reflux
  - Newborn w/ fever of unknown origin
  - DM
  - Catheter

<u>Etiology:</u>
- MC = E.coli
- Staph saprophyticus in sexually active W
- Enterococci w. Indwelling catheter
- Other: proteus, enterobacter, klebsiella, pseudomonas

</td>
<td>

- Fever
- Tachycardia
- back/flank pain
- + CVA tenderness
- N/V
- Plus one or more of the symptoms of cystitis

</td>
<td>

UA:
- Pyuria > 5 WBC
- + leukocyte esterase
- + nitrites
- Hematuria
- Cloudy urine
- Bacteriuria
- ↑ pH
- **WBC CAST**

Dipstick:
- + leukocyte esterase
- + nitrites
- Hematuria
- WBC CAST

Urine Culture: DEFINITIVE DIAGNOSIS
- Indications:
  - Complicated UTI
  - Infants/kids
  - Elderly
  - Males
  - Urologic abnormalities
  - Refractory to txt
  - Catheterized pt
- W > 100,000
- M > 100 - 10,000 + symptoms = acute urethral syndrome

</td>
<td>

- Fluoroquinolone PO or IV
- Aminoglycoside
- X 14 days
  - 7 days may be used in healthy, young W

</td>
</tr>
<tr><th colspan="4">Glomerulonephritis (AGN)</th></tr>
<tr>
<td>

- Immunologic inflammation of the glomeruli → protein and RBC leakage into urine

<u>Etiologies:</u>
1. IgA nephropathy (Berger’s Disease)
2. Post Infectious
3. Membranoproliferative/mesangiocapillary
4. Rapidly Progressive Glomerulonephritis (RPGN)
   a. Goodpasture's Disease
   b. Vasculitis

</td>
<td>

Hallmark:
- HTN
- Hematuria (RBC cast) = cola-colored/dark urine
- Dependent edema (proteinuria)
  - Peripheral
  - Periorbital (kids)
- Azotemia

- Fever
- Abdominal pain, flank pain
- Acute kidney injury = oliguria (↓urine output)

</td>
<td>

<u>UA:</u>
- Hematuria (RBC cast)
- Dysmorphic RBC
- Proteinuria (usually < 3)
- High specific gravity > 1.020 osm
- ∓ WBC

- ↑ BUN
- ↑ Cr

Gold Standard = renal biopsy
- Not needed is post-strep suspected

</td>
<td>

Usually self limited w/ good prognosis EXCEPT in cases of RPGN

Edema, hypervolemia, HTN:
- Loop diuretics (edema)
- Beta-blockers (HTN)
- CCB (HTN)

</td>
</tr>
</table>

<table>
<tr><th colspan="4">IgA nephropathy (Berger's Disease)</th></tr>
<tr><td colspan="2">- MCC of AGN
- Young M after URI or GI infection
- d/t IgA complexes</td><td>+ IgA mesangial deposits on immunostaining</td><td>ACE inhibitors AND corticosteroids</td></tr>
<tr><th colspan="4">Post Infectious</th></tr>
<tr><td>- MC after GABHS
- 10 - 14 days after skin or pharyngeal infection</td><td>CLASSIC: 2 - 14 y/o M w/ facial edema 3 wks after strep infection w/ scanty, cola-colored dark urine
- Hematuria
- Oliguria</td><td>- ↑ antistreptolysin (ASO) titers
- Low serum complement (C3)
- Biopsy:
- Hypercellularity
- ↑ monocyte/lymphocytes
- Immune humps of IgG, IgM, C3</td><td>- Supportive management
- ABX may be given
- Lupus nephritis:
- Steroids or cyclophosphamide</td></tr>
<tr><th colspan="4">Membranoproliferative/Mesangiocapillary</th></tr>
<tr><td>- Due to:
- SLE
- Viral hepatitis (HCV, HBV)
- Hypocomplementemia
- Cryoglobulinemia</td><td colspan="3">- Usually present with a mixed nephritic-nephrotic picture</td></tr>
<tr><th colspan="4">Rapidly Progressive Glomerulonephritis (RPGN)</th></tr>
<tr><td colspan="2">- Associated w/ poor prognosis → rapid progression to end stage renal dx w/in weeks/months

Any cause of AGN can present with RPGN EXCEPT for the following 2 that ONLY present with RPGN:
1. Goodpasture's Disease
2. Vasculitis</td><td>- Biopsy: crescent formation d/t fibrin and plasma' protein deposition collapsing the crescent shape of Bowman's capsule</td><td>Corticosteroids AND cyclophosphamide</td></tr>
<tr><td>GOODPASTURE'S DISEASE

- Ab VS type 4 collagen of the glomerular basement membrane in kidney and lung alveoli</td><td>- Kidney failure
- Hemoptysis
- Occurs w/ URI</td><td>- + anti-GBM Ab
- Dx: Linear IgG deposits</td><td>High dose corticosteroids AND cyclophosphamide AND plasmapheresis</td></tr>
<tr><td>VASCULITIS

- Characterized by lack of immune deposits</td><td colspan="3">+ ANCA deposits
- Microscopic Polyangiitis = vasculitis of small renal vessels
- + P-ANCA
- Granulomatosis w/ Polyangiitis (Wegener's) = necrotizing vasculitis
- + C-ANCA</td></tr>
</table>

<table>
<tr><th colspan="4">Nephrolithiasis</th></tr>
<tr>
<td>Risk Factors:
- Decreased fluid intake (MC)
- Males
- Meds (loop diuretic, antacids, chemo drugs)
- Gout
- Hypercalcemia
- Polycystic kidney dz
- UTIs

Four Types:
1. Calcium oxalate (MC) and phosphate
2. Uric Acid
3. Struvite stones (Mg ammonium phosphate)
- May form staghorn calculi d/t urea-splitting organisms (proteus, klebsiella, pseudomonas, serratia, enterobacter)
4. Cystine: genetic disorder</td>
<td>- Sudden, CONSTANT, upper/lateral back/flank pain
- Radiates to groin/anteriorly
- N/V
- + CVA tenderness
- Hematuria
- Frequency
- Urgency

Proximal ureter:
- + CVAT
- Flank pain

Midureter:
- Mid-abdominal

Distal Ureter:
- Groin pain</td>
<td>- Electrolytes, creatinine, Calcium, phosphate, uric acid

UA:
- Microscopic or gross hematuria
- Nitrites (if infectious) → get culture
- pH 5.5 - 6.8 = calcium (oxalate and phosphate)
- pH < 5 (acidic) = uric acid, cystine
- pH > 7.2 (alkaline) = struvite stones

Non Contrast CT: abdomen/pelvis
- MC initial diagnostic

Renal US: used if CT contraindicated

KUB: only calcium and struvite stones visible

Intravenous pyelography: GOLD STANDARD
- Determines extent of obstruction and severity</td>
<td>- Increase fluid intake
- Decrease protein intake

STONE DIAMETER < 5 mm:
- Spontaneous passage
- IVF
- Analgesics
- Anti Mimetics
- Tamsulosin → facilitates passage
- At ureterovesical junction and ureteropelvic junction = passage difficult
- Strain urine to collect stone

STONE DIAMETER > 7 mm:
- Spontaneous passage difficult
- Alkalinize urine to pH > 6.5 = dissolves uric acid stones
1. Extracorporeal shock wave lithotripsy = breaks up larger stones
2. Ureteroscopy ∓stent = immediate relief to an obstructed or at risk kidney
3. Percutaneous nephrolithotomy = most invasive
- > 10 mm
- Struvite stones
- If other modalities fail</td>
</tr>
<tr><th colspan="4">Benign Prostatic Hypertrophy</th></tr>
<tr>
<td>Enlargement of the prostate gland → bladder outlet obstruction

- Older men 60-65</td>
<td>- Frequency
- Urgency
- Nocturia
- Hesitancy
- Weak/intermittent stream force
- Incomplete emptying (intermittent voiding)

MNEMONIC: HI FUN
Hesitancy
Intermittence, Incontinence
Frequency, Fullness
Urgency
Nocturia</td>
<td>- Digital Rectal Exam: uniformly, enlarged, firm, rubbery prostate
- ↑ PSA
- Urine cytology: if ↑ risk of bladder CA
- Hx of tobacco use, irritative bladder sx or hematuria</td>
<td>Avoid antihistamines and anticholinergics

Observation: mild symptoms
5 - alpha reductase inhibitors:
- Finasteride, Dutasteride
- Do NOT provide immediate relief BUT positive effect on clinical course
Alpha 1 blockers:
- Tamsulosin most uroselective
- Alfuzosin, Doxazosin, Terazosin
- Rapid relief BUT no effect on clinical course
Surgical:
- Transurethral resection of prostate (TURP)
- Laser prostatectomy
- Open prostatectomy = last resort</td>
</tr>
</table>

Prostatitis			
Ascending infection → prostate gland inflammation <u>ACUTE</u>: **> 35 y/o:** - E.Coli (MC) - Pseudomonas, klebsiella, proteus, serratia, enterobacter **< 35: y/o** - Chlamydia and gonorrhea (MC) - E.coli, treponema, gardnerella **Children** = viral (mumps MC) <u>CHRONIC:</u> - E.coli MC - Enterococci, trichomonas, HIV, inflammatory - Structural or functional abnormality - Recurrent UTI's - Progression of acute to chronic	- Fever, chills (acute) - Malaise - Arthralgias - Frequency - Urgency - Dysuria - Hesitancy - Poor/interrupted stream - Straining to void - Incomplete emptying - Low back/abdominal pain - Perineal pain (acute) - Recurrent UTI's/intermittent dysfunction (chronic)	<u>ACUTE:</u> exquisitely tender, normal or hot, boggy prostate <u>CHRONIC:</u> usually NONtender, boggy prostate <u>UA and Urine Culture:</u> - (+) in acute - Prostatic massage CI! - Often (-) in chronic - Prostatic massage often done to increase bacterial yield <u>Transrectal US:</u> helpful for suspected abscess or calculi	<u>ACUTE:</u> > 35 y/o: - Fluoroquinolones or trimethoprim-sulfamethoxazole X 4-6wks - Hospitalized: IV fluoroquinolones ∓ - Aminoglycoside OR - Ampicillin ∓ gentamicin < 35 y/o: - Txt for gonorrhea and chlamydia: Ceftriaxone AND doxycycline (or Azithromycin) <u>CHRONIC:</u> - Fluoroquinolones or trimethoprim-sulfamethoxazole X 6-12wks - If refractory → TURP
Epididymitis			
- Secondary to retrograde infection or reflux of urine <u>ACUTE:</u> **< 35 y/o:** - Chlamydia MC - Gonorrhea, ureaplasma, E. coli, treponema, trichomonas, gardnerella **Children** = viral (mumps MC) **> 35 y/o: and children** - Enteric organisms MC: E.coli, klebsiella, pseudomonas, proteus <u>CHRONIC:</u> > 6wks d/t inadequate txt of acute cases, chronic dz, M.tuberculosis	- Gradual onset of scrotal pain, erythema and swelling - MC unilateral - Groin, abdominal pain - Fever, chills - Dysuria - Frequency - Urgency - Epididymal tenderness and induration - Testicles usually in nml (vertical) position	- + prehn's sign = relief of pain w/ elevation of affected scrotum - + (nml) cremasteric reflex = elevation of testicle after stroking inner <u>Scrotal US:</u> - Enlarged epididymis - Increased testicular blood flow - ∓ reactive hydroceles <u>UA:</u> - Pyuria (↑ WBC)/bacteriuria - + WBC and NO visible organism on smear = chlamydia, gonorrhea <u>CBC:</u> - Leukocytosis - STD testing - RPR HIV	- Symptomatic txt: - Bed rest - Scrotal elevation - Cool compresses - Analgesics (NSAIDS) <u>ACUTE:</u> - Gonorrhea and chlamydia (< 35): Doxycycline 100 mg BID X 10d PLUS Ceftriaxone (250 mg IM x 1) - Azithromycin = alt to doxy - Enteric organism - > 35: fluoroquinolones (Ofloxacin, Levofloxacin) - Children: cephalexin or amoxicillin <u>CHRONIC:</u> - 4 - 6 wk trial of abx

Orchitis			

- Infection of the testes MC d/t viral infection
  - mumps (MC), coxsackie, rubella, echovirus, parvovirus
- Mumps parotitis precedes orchitis by 3 - 10 days
	- Painful, swollen testicle
	- If d/t mumps: parotitis, fever, and malaise
	-
	-
		- Radiologic studies usually not needed for mumps orchitis
		- ∓ reactive hydroceles
		- Nml cremasteric reflex
			- Supportive txt:
			  - Bed rest
			  - Scrotal elevation
			  - Cool compresses
			  - Analgesics (NSAIDS)

Gonorrhea			

- Gram (-) diplococci
- MCC of urethritis M < 30 y/o
- Incubation period = 2 - 8 days
	<u>Urethritis and Cervicitis:</u> anal, vaginal, penile or pharyngeal discharge
	  - PID
	  - Epididymitis
	  - Prostatitis
	
	<u>Dissemination</u>: arthritis-dermatitis syndrome
	  - Tendon pain
	  - Arthralgias
	  - Rash (maculopapular, petechial)
	  - Septic arthritis (MC @ knee)
		<u>Culture:</u> gram (-) diplococci in polymorphonuclear leukocytes
		  - Nucleic acid amplification (PCR test most specific/sensitive)
			Ceftriaxone (250mg IM) PLUS Doxycycline (100mg BID x 10d) OR Azithromycin (1GM PO)
			
			- Cotreatment for chlamydia
			- Cefixime = alternative for ceftriaxone

Chlamydia			

- MC overall bacterial cause of STD's in the US	- Can be asymptomatic
	<u>Urethritis:</u>
	  - Purulent or **<u>mucopurulent</u>** d/c
	  - Pruritus
	  - Dysuria
	  - Dyspareunia
	  - Hematuria
	
	<u>Pelvic Inflammatory Disease:</u>
	  - Abd pain
	  - Cervical motion tenderness
	
	<u>Reactive Arthritis (Reiter's Syndrome):</u> "can't see, can't pee, can't climb a tree"
	  - Urethritis
	  - Uveitis
	  - Arthritis
	  - +HLA-B27
	
	<u>Lymphogranuloma Venereum:</u>
	  - PAINLESS genital/rectal lesion w/ softening, suppuration and lymphadenopathy
		- Nucleic acid amplification
		  - Vaginal swab or first-catch urine prefe
		- Genetic probe
		- Culture
		- Antigen detection
			Azithromycin (1GM X 1 dose) or Doxycycline (100mg BID X 10 days) AND Ceftriaxone (250mg IM X 1 dose)
			
			- Retest in 3 wks
			- Cotxt for gonorrhea
			- Avoid sexual intercourse X7 days after txt

Urethritis			
COMPLICATIONS: <u>Men</u>: - Epididymitis - Prostatitis - Infertility - Reactive arthritis (urethritis, conjunctivitis, arthritis) - Septic arthritis <u>Women</u>: - PID - Infertility - Ectopic pregnancy - Premature delivery - Septic arthritis <u>Children/Infants:</u> - Neonatal PNA - Neonatal conjunctivitis (ophthalmia neonatorum) - Day 2 - 5 = gonococcal - Prophylaxis = erythromycin ophthalmic ointment - Day 5 - 7 = chlamydia	1. Gonococcal Urethritis - Abrupt onset ptoms (3 - 4 days) - Opaque, yellow, white or clear thick d/c - Pruritus - 20% asymptomatic 2. Non-Gonococcal Urethritis - Chlamydia MCC - Other causes: ureaplasma, urealyticum, trichomonas - 5 - 8 days onset of symptoms - Purulent or mucopurulent d/c - Pruritus - Hematuria - Pain w/ intercourse - 40% asymptomatic	- Nucleic acid amplification = most sensitive AND specific for gonorrhea and chlamydia	Txt of both gonorrhea and chlamydia recommended <u>Gonococcal:</u> Ceftriaxone 250mg IM X 1 dose - Azithromycin 2g is allergic to cephalosporin - Cefixime <u>Nongonococcal:</u> Azithromycin 1gm PO X 1 dose OR doxycycline 100mg BID x 10 days - If recurrent → 1 time dose of metronidazole + erythromycin x 7d
Balanitis			
- Inflammation of the glans penis MC d/t fungal organisms - MC in uncircumcised M and diabetic	- Burning, irritation, and redness of the head of the penis. - Dysuria - White, cheesy d/c → fungal - Tender, erythematous, & swollen glans, prepuce & urethral opening - Papules, pustules, or ulcerations may be seen	- Hx and exam - Culture - STD testing	- If fungal → topical antifungals - If recurrent → consider treating the sexual partner to prevent reinfection. - Recommend hygiene measures - Keep the area clean and dry - Avoid unnecessary foreskin manipulation - If DM → aggressive glycemic control - Antibacterials against skin or STI organisms.

<table>
<tr><th colspan="4">Testicular Cancer</th></tr>
<tr><td>- MC solid tumor in M 15 - 40 y/o

<u>Risk Factors:</u>
- Cryptorchidism (MC R - sided)
- MC in caucasians. Klinefelter's syndrome</td><td colspan="2">- PAINLESS testicular nodule, solid mass or enlargement
- Dull pain
- Testicular heaviness
- Any hematoma or hydrocele d/t scrotal trauma → suspect testicular CA
- + hydrocele present in 10%
- Gynecomastia <10%
  - MC w/ Leydig or Sertoli tumors
- Signs of METS = RARE:
  - Hemoptysis (pulm)
  - Supraclavicular lymph node neck mass
  - Abd mass (retroperitoneal)</td><td>- Good prognosis = very curable</td></tr>
<tr><td colspan="4">Germinal Cell Tumors (97%) (usually malignant)</td></tr>
<tr><td>SEMINOMA (SGCT)

- MC in 30 - 40 y/o</td><td>- Simple
  - Lack tumor markers = normal serum AFP & B-hCG)
- Sensitive to radiation
- Slower Growing
- Stepwise Spread

- May spread to bone</td><td>- Scrotal US: hypoechoic mass
- Nml AFP
- Nml B-hCG</td><td>Low grade: orchiectomy → radiation

High grade: debulking chemo → orchiectomy AND radiation</td></tr>
<tr><td>NONSEMINOMATOUS (NSGCT)

- Embryonal cell carcinoma
- Teratoma
- Yolk sac (MC < 10 y/o)
- Choriocarcinoma (worse prognosis)
- Mixed tumors → txt'ed like nonseminomas</td><td>- Radioresistance</td><td>- Scrotal US: cystic, inhomogeneous mass
- ↑ AFP
  - Not usually elevated in choriocarcinoma
- ↑ b-hCG (especially choriocarcinoma)</td><td>Low grade (Stage 1) = limited to testes
  - Orchiectomy with retroperitoneal lymph node dissection</td></tr>
<tr><td colspan="4">Nongerminal Cell Tumors (3%)</td></tr>
<tr><td colspan="4">- Spread hematogenously
- Pulmonary symptoms

1. Leydig Cell Tumors:
- May be benign
- Secrete hormones (androgens and estrogen)→ precocious puberty, gynecomastia, loss of libido
2. Sertoli Cell Tumors:
- Often benign
- Secrete hormones (androgens and estrogens)
3. Gonadoblastoma
4. Testicular Lymphoma</td></tr>
</table>

DERMATOLOGY

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Dermatitis (Eczema, Seborrhea) - "The itch that rashes" - Superficial inflammatory response of epidermis - Overactive response to the body's immune system to an irritant + loss of barrier fxn to skin integrity - Redness, itching, small papules, weeping, oozing, crusting, scaling plaques, lichenification			
ATOPIC DERMATITIS - Elevated IgE production - Appears in childhood	- **Flexor** surfaces in adults - Extensors & face in infants - Erythematous, ill defined blisters, papules, plaques - Atopic triad 1. Eczema 2. Allergic rhinitis 3. Asthma	Chronic - Emollient ointment + ceramide moisturizers (petroleum jelly + Eucern) Acute: - Topical corticosteroids - Hydrocortisone - Fluticasone - Betamethasone - Antihistamines - Wet dressings → Burrow's solution - Topical immunomodulators → calcineurin - Replace steroids, less SE	
CONTACT DERMATITIS - Contact with allergen - Type 4 hypersensitivity rxn	- Erythematous scaly patches/ plaques - Eczematous (irritant) - +/- vesicles, bullae - Vesicular (allergic) - MC - +/- vesicles - Diaper rash	- Patch testing → read after 48 hrs	- Avoid allergens - Topical corticosteroids - Oral antihistamines - Poisin ivy = Tecnu, calamine lotion, oatmeal baths
ASTEATOTIC DERMATITIS	- Very dry skin, scaling, cracking		- Emollients, topical steroids, antihistamines
ECZEMA HERPETICUM	- Fever & clusters of itchy blisters or umbilicated vesicles - **Punched out erosions** - Sites of skin damage → kids with eczema - Disseminated viral infection (HSV)		- Oral antivirals - Emergency in kids
SEBORRHEIC DERMATITIS - Infants & elderly (M>F) - Asc w/ systemic dz (HIV, Parkinson)	- Whitish, yellow greasy scale on red patches or plaques - **Nasolabial folds, eyebrows, ears, scalp**		- Topical azoles - **Shampoo** - Zinc pyrithione - Selenium sulfide
LICHEN SIMPLEX CHRONICUS - Skin thickening in pts w/ eczema 2ry to repetitive rubbing/scratching - "itch-scratch"	- Hyperpigmented scaly plaques - Accentuated skin markings - **horizontal & vertical white lines (direction of scratching**)		- Avoid scratching and itching - High potency topical steroids

PERIORAL DERMATITIS
- MC young women
	- Hx of topical corticosteroid use
	- Papulopustules on erythematous base
	- +/- scalin
	- **Spares vermillion border**
	- No pruritus
			- Topical
			  - **Metronidazole**
			  - **Erythromycin**
			- Oral → tetracyclines
			  - Avoid topical corticosteroids

Nummular Eczema			
- If 2ry to Staph aureus infection → microbial eczema - Chronic condition - Worse in winter	- Severe pruritus - Discoid, **coin shaped** red edematous, vesicular crusty patches - **Well defined** → unlike atopic dermatitis - A couple in a few places (pityriasis rosea is all over) → MC in dorsum of hands, feet, and **extensors**		- Soaking and greasing → occlusive ointments - Super potent topical steroids - Topical calcineurin inhibitors
Dyshidrosis Dermatitis			
- People < 40 yo - Stress - Hot, humid weather	- Pruritus - Small vesicles in clusters **(TAPIOCA appearance)** - Late: papules, fissures - Soles, palms & fingers (esp lateral digits)	- Culture to r/o secondary infection - KOH to r/o dermatophytosis	- Wet dressings with Burrow's solution - **Topical steroids ointments** - Cold compresses, tar soaks
Lichen Simplex Chronicus			
- Long term manifestation of atopic dermatitis due to repetitive scratching and rubbing	- Lichenification - Well-circumscribed plaques, highly pruritic - Itch/scratch lesions - Solid, firm, thick plaques with little to no scaling - Nuchal area, scalp, ankles, exterior forearms	- KOH to r/o fungal infection - Biopsy shows hyperplasia and hyperkeratosis	- Stop itch/scratch cycle - Occlusive dressing w or w/o topical steroids or tar - Antihistamines
Lichen Planus			
- Acute or chronic inflammatory dermatitis in adults - F>M - Graft vs host dz - Malignant lymphoma - Drug reactions	Flat-topped, violaceous papules with white lines on surface (**WICKHAM'S STRIAE**) - Flexor aspect of wrists, lumbar, eyelids - Can be mucosal - Koebner's phenomenon **6Ps**: 1. Pruritic 2. Planar 3. Purple 4. Polygonal papules 5. Plaques	- Biopsy and immunofluorescence - **Screen for hepatitis C → High incidence w/ hep C**	- **Topical steroids** with occlusive dressings - First line - Intralesional steroids or tretinoin for severe - Cyclosporine mouthwash for oral lesions

<table>
<tr><th colspan="4">Drug Eruption</th></tr>
<tr>
<td>- Allergic rxn to med
- d/t immune system response to modified proteins in the drug
- IgE binds to mast cells → release of histamine</td>
<td>- Appear w/in 2 ks of initial dose
- Papulosquamous dz
- Minor skin rashes & hives (urticaria)
- Symmetric erythematous macular (morbilliform), blanching eruption → exfoliative dermatitis
- Erythroderma: red → violaceous demarcated path
- Pruritus
- DRESS SYNDROME: Drug Rash/reaction with Eosinophilia and Systemic Symptoms
- Photosensitivity → Linear, pruritic vesicles in sun-exposed areas
  - Carbamazepine
  - Amiodarone
  - Doxycycline
  - Furosemide
  - Phenothiazines
  - Sulfonamides</td>
<td>- History & PE</td>
<td>- Withdrawal offending drug
- Systemic steroids
- Antihistamines
- Cooling baths</td>
</tr>
<tr><th colspan="4">Pityriasis Rosea</th></tr>
<tr>
<td>- Viral (HHV7)
- Teens
- Young adults</td>
<td colspan="2">- Annular erythematous patches w/ collarette of scale → oval shaped
- Herald patch → prior to eruption a pink patch over the back
  - Christmas tree pattern
- Trunk, neck, proximal extremities ---- Face spared</td>
<td>- None needed → resolves in 6-12 wk
- Lotions, antipruritics for itching
- Prednisone, topical corticosteroids in more severe cases</td>
</tr>
<tr><th colspan="4">Psoriasis
- Psoriasis vulgaris most common
- Guttate psoriasis after strep pharyngitis</th></tr>
<tr>
<td>- Genetic predisposition
- Disordered immune system → T cells become overstimulated
- 25% have psoriatic arthritis
  - MC asymmetric oligoarthritis of DIP joints
- Comorbidities: DM, overweight, hyperlipidemia</td>
<td><u>Classic</u>
  - Erythematous
  - Well demarcated patches/plaques
  - Silvery scale
<u>Inverse</u>: Shiny, red
<u>Location:</u> extensor surfaces, scalp, sacrum, palms and soles
Nails:
  - Oil spots
  - Salmon patches
  - +/- onycholysis
Auspitz sign: punctate bleeding spots
Koebner phenomenon: injured/trauma
Munro microabscesses: intraepithelial abscesses</td>
<td>- History and appearance</td>
<td>- Mild-Mod: Topical corticosteroids
  - +/-Topical vitamin D
- Mod-Severe: Phototherapy (UVB, PUVA)
  - Methotrexate</td>
</tr>
</table>

Erythema Multiforme			

- Two types:
  - Minor (less severe)
  - Major (more severe)
- **Acute hypersensitivity rxn II and III**
- Etiology: idiopathic, viral, bacterial, fungal, HSV MC
- Drug reactions: acute hypersensitivity
  - Sulfa drugs
  - Beta-lactams
  - Phenytoin
- Note: SJS is thought to be a severe form of EM, TEN is thought to be severe form of SJS
	Based on severity and extent of mucous membrane involvement
	
	Minor:
	- Iris, **target lesion (in different stages)**
	- Symmetric
	- Acral distribution w/ palms and soles
	- Oral blistering
	- 1 mucosal site only
	- Resolves in 2 weeks
	Major
	- More severe
	- Mouth, lips, & bulbar conjunctiva
	- Oral bullae break easily → 2ry erosions infected → pain/bloody crusty lips
		Skin biopsy	- Treat underlying cause
			- Withdrawal from offending drugs
			- Systemic corticosteroids has most effect

Steven Johnson Syndrome			

- **< 10% bSA inolvement**
- Hx of drug, HSV, mycoplasma infection
- Increased incidence in HIV
- HIstopatho:
  - Epidermal necrosis
  - Necrotic keratinocytes
  - +/- bulla
  - Scant inflammation
- Meds causing SJS:
  - Abx
  - NSAIDs
  - Seizure meds
  - Diuretics
	- Erythematous purpuric macules & papules may progress to bullae, erosions, ulcerations
	- Dorsal hands, palms, soles, 2 or more mucosal sites up to entire body
	- Fever, respiratory syndromes, pain
		- Elevated ESR & CBC	- Discontinue drug
			- Supportive care in burn unit
			- IVIG
			- Steroids controversial

Toxic Epidermal Necrolysis			

- Potentially deadly → risk of sepsis
- **> 30% BSA erosions**
- Histopatho
  - Subepidermal bulla
  - Necrosis of entire epidermis
  - Mild lymphocyte inflammation
- 1-3 wks after **new drug**
	- Erythematous dusky patches → large bullae → large areas of erosions: skin sloughs (peels)
	- Entire body, at least 2 mucosal sites
	- Pain
	- Burning
	- Dysphagia
	- Fever, malaise
		- **Nikosky +** → press down on skin w/ your finger and it will peel off	- Discontinue drug
			- Supportive care in burn unit
			- IVIG
			- Steroids - controversial
			
			SCORTEN - prognostic scoring system

Bullous Pemphigoid			
- Subepidermal blister - Males > females - Peak age > 65 yo	- Large , tense bullae - Have urticarial phase - Intertriginous & flexor surfaces/groin, axillae & flexural areas/extremities - 20% oral involvement	- Punch biopsy	- Topical → if no oral lesions - PO corticosteroids → oral lesions - Immunosuppressives - Methotrexate
Acne Vulgaris			

- MC adolescents
- Exacerbated by: drugs, cosmetics, sun, occlusion
- Patho:
  - Increase sebum production: Increase androgens
  - Clogged sebaceous glands
  - Propionibacterium acne overgrowth
  - Inflammatory response
	- Erythematous papules, nodules, pustules
	- Location: face and upper trunk
	- Scarring marks occur if untreated
	
	<u>Comedones</u>: small, noninflammatory bumps from clogged pores
	  - Open (blackheads) : incomplete blockage
	  - Closed (whiteheads): complete blockage
	<u>Inflammatory</u>: papules/pustules surrounded by inflammation
	<u>Nodular or cystic</u> → scars
		- Clinical
		- <u>Mild</u>: comedones (+/- small amounts of papules &/or pustules
		- <u>Moderate</u>: comedones, larger amount of papules
		- <u>Severe</u>: nodular (>5mm) or cystic
			Mild
			- Topical retinoids → Retin-A; Adapalene
			- Benzoyl peroxide
			- Topical abx → Clinda
			- OCP
			Moderate
			- Mild tx + oral abx
			  - Doxy or Minocyclin
			- Spironolactone (anti-androgen)
			Severe
			- Isotretinoin → attacks all 4 pathophys mechanisms
			  - Highly teratogenic

Rosacea			

- MC in females
- Chronic course/exacerbation by factors
  - Light, spicy food, alcohol, hot beverages, steroids
- Histology
  - Telangiectasia edema
  - Perifollicular & perivascular inflammation
  - Sebaceous hyperplasia +/- granulomas
- Confused w/ SLE
	- Erythematous macules/papules & pustules
	- Location: face on cheeks
	- Ocular involvement is possible → blepharitis, recurrent chalazion
	- Rhinophyma → Hypertrophy of nose seen in men
	- No blackheads/comedones
	Types
	- Erythematotelangiectatic
	- Papulopustular glandular granulomatous
		- Clinical	- **Sunscreens**
			- **Topical metronidazole**
			- Azelaic acid
			- Sodium sulfacetamide topical/oral abx BPO
			- Tacrolimus

Actinic Keratosis			
- Precursor to SCC - MC in older adults → that go to the beach and don't put sunscreen - MC on top of head	- Scaly / sandpaper feeling - Pre-skin CA - Histology: Pink and blue pattern	- Punch or shave biopsy	- Liquid nitrogen / cryosurgery - 5 FU

Seborrheic Keratosis			
- MC Benign skin tumor - Older people	- Beige to brown or black - Velvety, warty surface - Appears stuck on - **"Greasy stuck on appearance"**		- **No treatment needed** - Liquid nitrogen - Electrodessication - 5 FU
Lice			

- Pediculus humanus
  - Head louse = capitus
  - Body louse = corporis
- Louse: < 4mm, flat, wingless, w/ 3 legs
	- Nits (white eggs) attached to shaft of hair
	- Feces (rush-colored flecks) seen on skin
	- Itching esp. At night
	- Posterior cervical adenopathy
	- Caution: 2ndary infections d/t excoriations
			- Topical → repeat after 1 wk, txt family too)
			  - Permethrin
			  - Malathion → Not for kids
			- Oral → repeat in 10 days
			  - Ivermectin
			- Nit removal

Scabies			
- Cause: sarcoptes scabiei - Very contagious - Spread via skin 2 skin, clothes, bed	- Hands, genitalia, axillary areas - Pruritic burrows, vesicles, nodules with excoriations and crusting - 2nd infections group A strep	- Scraping to look for mites, eggs, or feces	- 1% lindane (not for kids) - 5% permethrin - Leave on overnight and then repeat in 7 days - Wash all linens
Spider Bites			
- Most common in brown recluse	- Pain 3 hrs after bite, systemic 4-6 hrs - Acute necrotic injury to skin for 10-15 days <u>Black widow:</u> neurologic overstimulation <u>Brown recluse:</u> infarct of skin, rapid coagulation of vessels, sinking macule, pale gray, eroded in center, halo		- Local care - Analgesics <u>Black widow:</u> diazepam and calcium gluconate <u>Brown recluse</u>: wound cleansing, analgesia
Basal Cell Carcinoma			
- **Most common skin cancer** - Does NOT metastasize	- Pearly, translucent, smooth papule with rolled edges and surface telangiectasia - Central depression, umbilicated - Keeps cutting himself when he shaves	- Clinical and biopsy - Classification based on location	- Goal: Eliminate Tumor! - Electrosurgery → electrodesiccation & curettage - Office excision - Moh's surgery - Radiation

Kaposi Sarcoma			

- Malignancy of endothelial cells that lines small blood vessels
- Opportunistic cancer→ Immunosuppressed pt
- Linked to Herpes virus 8
- Located on: trunk neck, head, **tip of nose**
	- One or more macules, papules, or violet skin lesions that enlarge and darken
	- Enlarge to form raised plaques or tumors
	- Irregular in shape
	- Size: 0.8 - 1.5 in
	- Painless early on
	- Invasion of internal organs
	- Variable progression
		- Visual identification of lesion
		- Biopsy of at least one lesion
			- Localized → HAART
			- Systemic or extensive:
			  - Liquid nitrogen
			  - Vinblastine
			  - Chemo
			  - Radiation
			  - Alpha interferon injection

Melanoma			
- Melanoma tends to spread to the **LUNGS--#1 met** - **Melanoma is most common met to small bowel**	- Black, brown, pink, flesh colored macule, papule, nodule, plaque >6mm - Asymmetric - Irregular surface - Variation in color - SUPERFICIAL SPREADING most common: Doesn't have stuck on appearance - Lentigo Maligna - Acral Lentiginous: palms and soles, nail beds - Nodular	- Biopsy- **full-thickness excision bx** with **1-3 mm margins**. (full-thick incisional or punch bx for palm, face, subungual,etc) - Lymph node exam - Pathology: **Breslow thickness**, ulceration, **Clark level**, margin status (deep and peripheral), satellite lesion - **Sentinal lymph node bx**—inject dye, look at closest node and see if it is cancerous - Complete skin exam	- **III (+ node): wide excision + full LN dissection** – And watch vs clinical trial vs interferon - **IV**: resect if possible, **consider clinical trial**/ interferon or supportive care - Do CXR, LDH, CBC every 3-12 mo for stage IB to IV
Alopecia			
- Unknown cause - Seen in thyroiditis, pernicious anemia, SLE, Addison's dz	- Tiny hairs found - Loss can be patchy, involve only scalp, or entire body		- Systemic steroids - Relapse common
Paronychia			
- Inflammation of the nail fold Acute infection: d/t trauma and manipulation Chronic infection: → d/t contact irritant exposure	- Erythema, swelling, throbbing pain - Acute → pus accumulates behind cuticle or in lateral nail folds - Chronic → Many fingers involved. Nail plate distorted but uninfected		- Acute → antistaphylococcal abx - Chronic → miconazole, fluconazole When treating upper and lower extremities, give abx AND antifungal to be safe.
Condyloma acuminatum			
- Genital warts - Spread via direct genital to genital contact Location: Anogenital, oral mucosa, skin	- Soft, skin colored, fleshy warts - Single or group /cauliflower - External genital warts (vulva or penile) --. Rarely spread to cancer	- Biopsy with immunofluorescence	- Only treated, not cured - Cryosurgery - Tricholoacetic acid or topical podophylin - Imiquimod (aldara)

<table>
<tr><th colspan="4">Onychomycosis</th></tr>
<tr>
<td>- Infection of nail with fungi or yeast
- Trauma predisposes to infection</td>
<td>- Thickened, discolored nail and debris on nail bed</td>
<td>- KOH
- Confirm by fungal culture</td>
<td>- Systemic antifungal agents are more effective than topicals
- Topical antifungals
  - Lamisil
  - Sporanox
  - Fluconazole</td>
</tr>
<tr><td colspan="4">
<table>
<tr><th>Type</th><th>Presentation</th></tr>
<tr><td>Distal subungual</td><td>Distal plate is yellow or white; nail rises and separates from the underlying bed</td></tr>
<tr><td>White superficial</td><td>Nail is soft and dry; Nail plate is not thick and remains adherent to the bed</td></tr>
<tr><td>Proximal subungal</td><td>Surface of the nail plate remains intact; hyperkeratotic debris → nail separation</td></tr>
<tr><td>Candida</td><td>Nail plate is thick and turns yellow to brown</td></tr>
</table>
</td></tr>
<tr><th colspan="4">Exanthems</th></tr>
<tr>
<td>- Exanthem = Exanthema = Breaking out
- MC in kids
- Causes
  - Toxin or drugs
  - Microorganism
  Autoimmune</td>
<td>- Widespread rash
- Generalized macular and/or papular eruption
- Assc. with systemic infection
- Not itchy</td>
<td></td>
<td>- Treat symptoms</td>
</tr>
<tr><th colspan="4">Molluscum contagiosum</th></tr>
<tr>
<td>- Poxvirus
- Immunocompromised</td>
<td>- Discrete, flesh-colored, waxy, dome shaped, umbilicated papules
- 3-6 mm in size, in groups</td>
<td>- Biopsy for immunocompromised to r/o fungal infection</td>
<td>- NONE
- Can do local destruction of individual lesions
- Tretinoin</td>
</tr>
<tr><th colspan="4">Cellulitis</th></tr>
<tr>
<td></td>
<td>- Swollen, red, hot, tender area
- Lymphadenopathy, fever, chills, malaise</td>
<td></td>
<td>- DICLOXACILLIN
- Cephalosporin
- Erythromycin
- Mark margins
- Surgical intervention</td>
</tr>
</table>

Verrucae

- Caused by HPV
- MC in kids
- Transmission
  - Skin 2 Skin
  - Autoinoculation
  - Neonatal (first 28 days)
- Incubation = sever weeks
	- Solitary or multiple hyperkeratotic verrucous or filiform papules
	- Flat warts = tan, brown, pink topped
	  - Resembles nevis
	  - More evident lumination
	- Exophytic warts (outside to inside)
	- Exception: plantar = endophytic (in to out)
	  - Painful
	  - Resemble a plantar corn/callus
		- Based on clinical findings	- No txt can prevent recurrence or remission
			- Liquid nitrogen or keratolytic agents
			- Podophyllum resin (podophylin) → anogenital warts
			- Blunt dissection → plantar warts
			- CO2 laser therapy → recurrent warts
			- Bleomycin diluted to 1u/ml → plantar and common warts
			  - Can cause Raynauds if used for digital warts

Disease	HPV Type
Common Warts	2, 7
Plantar Warts	1, 2, 4
Flat Warts	3, 10
Anogenital Warts	**6, 11**, 42, 43, 44, 55
Genital Cancers	**16, 18,** 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 73, 82

Disease	HPV Type
Epidermodysplasia verruciforms	> 15 types
Focal epithelial hyperplasia (oral	13, 32
Oral papillomas	6, 7, 11, 16, 32
High BP	8

Erysipelas

- Strep infection	- Abrupt onset - Rapid progression - Painful macular rash with well-defined margins - Usually confined to face - Fiery red - Desquamates in 5-10 days	

Acanthosis nigricans

- Hereditary or acquired
- Associated with
  - Obesity
  - Endocrine disorders
  - DM
  - Meds like estrogen
- Paraneoplastic syndromes
	- Skin darkens and appears dirty
	- Hyperpigmentation w/ thick and velvety w accentuated skin lines → flexor surfaces
		- CLinical findings
		- Labs to r/o DM and carcinoma
			- None
			- Treat underlying disorder

Impetigo			

- Staph aureus vs GAS (Strep pyog)
- Self-limiting, common, contagious, superficial
- Predisposing conditions: warm, moist climates & poor hygiene
	- **Thick, crusted honey yellow lesions**
	- Papules → vesicles and pustules that break easily
	- Bullous Form
	  - Start clear
	  - Become cloudy
	  - Collapse to thin, flat, honey lesion
	- NonBullous Form
	  - vesicle/pustule rupture → red, moist base
	  - Honey crust present
		- Clinical findings	Localized → Bactroban 2% ointment (Mupirocin x 2wks)
			Severe = oral AB
			  - Dicloxacillin
			  - Cephalexin
			  - Azithromycin
			  - Clarithromycin
			GAS → PCN
			S. aureus → Keflex, Clinda, Augmentin
			MRSA → Doxy, Cipro, Bactrim
			If treatment doesn't improve, always treat as bacterial and fungal infection

Hidradenitis suppurativa			
- Disease of apocrine gland areas (axilla, anogenital, scalp) - Females btw puberty and menopause - Obesity - Acne - Genetic	- Tender, inflammatory nodules or abscesses - Open comedones drain purulent material	- Culture for secondary bacterial infection	- Intralesional triamcinolone - I and D of abscesses - Excision of sinus tracts - Oral abx - Prednisone
Lipomas/epithelial			
- Benign neoplasm of mature fat cells - Subcutaneous tumors of adipose tissue	- Located on trunk, neck and proximal limbs - Single or multiple in different sizes - Soft, rounded or lobulated freely movable against overlying skin - Non-painful, rubbery		- No rx indicated - Cosmetic defect → surgery
Inclusion cysts			
- Dermal nodule d/t implantation of epidermis w/in the dermis - Accumulation of keratin w/in the cyst	- Freely movable subQ mass - Enclosed in a stratified squamous epithelium w/ well formed granular layer - May look infected if ruptures		- Excision if needed
Melasma			
- Pregnancy - OCP - Young females	- Hyperpigmented macular areas evolve rapidly over weeks - Color uniform	- Wood's lamp	- 3% hydroquinone w/ 0.025% tretinoin gel - Sunblock

Pilonidal disease			
- Infection of subQ tissue at top of intergluteal fold	- May be asymptomatic - Can become infected and a sinus tract can develop - Acute subQ abscess develops, spreads along the tract and may discharge contents through sinus in the skin		Abscess → I & D Recurrent → excise sinus & tract Cephalexin, Dicloxacillin, Clindamycin
Pressure Ulcers			
- Localized injury to the skin and/or underlying tissue over a bony prominence, as a result of pressure, or pressure in combination with shear	<u>Stage I:</u> Intact skin with non-blanchable redness usually over a bony prominence. - Area may be painful, firm/soft, warm/cool. <u>Stage II</u>: Partial thickness loss of dermis presenting as shallow open ulcer with a red- pink wound bed, without slough. - May also present as intact or open/ruptured serum- filled blister. <u>Stage III:</u> Full thickness tissue loss. - Subcutaneous fat may be visible. - Bone, tendon, or muscle are not exposed. - Slough may be present but does not obscure depth of wound. - May include undermining and tunneling. <u>Stage IV:</u> Full thickness tissue loss with bone, tendon, or muscle exposed. - Slough or eschar present on some parts. - Often include undermining and tunneling. - Can extend into the bone, muscle or tendon. - High risk for osteomyelitis.		- Remove all pressure from that area. - Keep area dry and clean, perform proper wound care. - Pack wound as needed. - Surgery if severe.
Urticaria			
- Food or drug allergies - Heat or cold - Stress - Infection	- Hives - Wheals - Pruritic - Can sting or burn	- Allergy skin testing, or aspirin, or exercise challenge.	- Eliminate causes - Diphenhydramine - Steroids - Epipen
Vitiligo			
- Thyroid dz - Pernicious anemia - DM - Addison's dz	- Macules of HYPOpigmentation focally, segmentally or generalized		- Sunscreen

Folliculitis			
Follicular inflammation +/- rupture Types - Pityrosporum folliculitis - Eosinophilic folliculitis - Hot tub folliculitis → be careful in hotels - Pseudofolliculitis → dark skinned men on shaved or plucked areas	- Erythematous follicular papules and pustules - +/- collarette of scale - Location → areas w/ terminal hairs (head, neck, butt) - Prain - Pruritus	Bacterial culture	- Topical and oral abx - BPO (benzoyl peroxide)
Tinea Infections			
Infectionsd - TInea capitis → ringworm scalp & kerion - Tinea barbae → tinea sycosis, barber's' itch - Tinea faciei → of the face - Tinea corporis → tinea circinata, "ringworm" - Tinea cruris → jock itch, crotch itch, groin - Tinea unguium → onychomycosis - Tinea magnum → of the head - Tinea pedis → of the foot, athletes foot		Major fungi that cause only stratum corneum, hair and nail infections	

TINEA CAPITIS	- Ringworm scalp & kerion
	- Broken hair shafts seen as black dots
	- Kerion
	  - Indurated boggy inflammatory plaque studded w/ pustules
	  - Can present in any location, MC scalp
			- Griseofulvin

TINEA CORPORIS
 	
- MCC trichophyton runburn
- Spread P2P or infected animal
- Types:
  - Moccasin
  - Interdigital
  - Vesicular/bullous tinea
	- Pedis ringworm
	- Erythematous, annular patches w/ distinct border
	- Scaling
	- Central clearing
	- Location = plantar surfaces rarely dorsal and toe webs
	- Pruritus
	- +/- onychomycosis
		- KOH -->visualize hyphae
		- Fungal culture
		- Histopathology → hyphae w/in horny layer
			- Topical imidazole
			- chronic/resistant: oral griseofulvin, itraconazole, terbinafine, ketoconazole
			- Kerion → oral fluconazole or griseofulvin
			- AVOID STEROIDS

Tinea versicolor			
- Caused by **Malassezia furfur**	- **Hypo or hyperpigmented** macules that do not tan - Upper trunk	- **KOH (spaghetti and meatballs**) - Wood's lamp: yellow-green fluorescence	- Daily application of **selenium sulfide** shampoo from neck to waist, leave on for 15 min - Ketoconazole - Imidazole creams

ENDOCRINOLOGY

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Diabetes Mellitus			

TYPE 1
 	
- Pancreatic beta cell destruction → no longer produce insulin
- MC in children/young adults
  - Usually < 30 y/o
- **Type 1A autoimmune**
- Type 1B non-autoimmune
 	
TYPE 2
 	
- Insulin resistance AND relative impairment of insulin secretion
- Etiology: Genetic factors and environmental factors → weight gain and decreased physical activity
- MC > 40 y/o
 	
Risk Factors:
- Hx of impaired glucose tolerance
- Family hx
- Hispanic
- African american
- HTN
- Hyperlipidemia
- Delivery of baby > 9 lbs
 	
GESTATIONAL
 	
- During pregnancy
	- Polyuria
	- Polydipsia
	- Polyphagia
	- Weight loss
	- Diabetic ketoacidosis
	- HHS
	
	Complications:
	1. Neuropathy
	2. Retinopathy
	3. Nephropathy
	4. Macrovascular
	5. Hypoglycemia
		Fasting Plasma Glucose:
		- ≥126
		- Fasting at least 8 hrs on 2 occasions
		- **GOLD STANDARD**
		
		2 Hour Glucose Tolerance Test (GTT):
		- ≥ 200
		- 3 hr GTT **gold standard in gestational DM**
		
		Hemoglobin A1C:
		- ≥ 6.5%
		
		Random Plasma:
		- ≥ 200
		
		Screening:
		- ADA: > 45 y/o every 3 years OR any adult with BMI ≥ 25 AND 1 additional risk factor
		- USPSTF: any 40 - 70 y/o that is overweight or obese every 3 years
			- Diet, exercise and lifestyle changes
			  - Should be tried first in DM II → oral antihyperglycemic agents
			- Insulin therapy in DM I and gestational
			
			Glucose Control Goal:
			- HgB < 7.0 %
			- Check q3 months if NOT controlled; twice a year if controlled
			- Preprandial glucose = 80 - 130
			- Postprandial glucose < 180
			
			Lipid Control:
			- LDL < 100
			- HDL ≥ 40
			- TG < 150
			
			ANTI-HYPERGLYCEMIC AGENTS
			Biguanides: ↓ hepatic glucose production
			- **Metformin**
			- 1st line PO in DM II
			Sulfonylureas: stimulates pancreatic insulin release from beta cells
			- 1st gen: Tolbutamide, Chlorpropamide
			- 2nd gen: **Glipizide, Glyburide, Glimepiride**
			Meglitinides: pancreatic beta cell insulin release
			- Repaglinide, Nateglinide
			Alpha-glucosidase Inhibitors: delays intestinal glucose absorption
			Thiazolidinediones: ↑insulin sensitivity @ peripheral receptor side
			- Pioglitazone, Rosiglitazone
			Glucagon-Like Peptide 1 Agonists: mimics incretion
			- Exenatide, liraglutide
			DPP-4 Inhibitor: ↑ GLP-1
			- Sitagliptin, linagliptin
			SGLT-2 Inhibitor: ↑ urinary glucose excretion
			- Canagliflozin, Dapagliflozin

Insulin Therapy

Type on Insulin		Onset	Peak	Duration	Insulin Coverage
Rapid Acting (Lispro, Aspart)		5 - 15 min	1 hr	3 - 4 hr	Given at the same time of meal
Short Acting (Regular)		30 min - 1 hr	2 - 3 hr	4 - 6 hr	30 - 60 minutes prior to meal
Intermediate (NPH, Lente)		2 -4 hr	4 - 12 hr	16 - 20 hr	Covers insulin for about half day
Long Acting	Detemir	6 - 8 hr	12 - 16 hr	20 - 30 hr	Covers for 1 full day
	Glargine	4	No peak	24 - 36 hr	Should NOT be mixed with other types of insulin

Dawn Phenomenon: normal glucose until rise in serum glucose levels btw 2 am - 8 am
- Management = NPH @ bedtime

Somogyi Effect: nocturnal hypoglycemia → rebound hyperglycemia
- Management = prevent hypoglycemia = decrease nighttime NPH dose

Insulin Waning: progressive rise in glucose from bed to norming
- Management: move insulin dose to bedtime OR increase evening dose

Complications of DM

NEUROPATHY	- Stocking glove pattern - Pain - ↓ DTR		- Gabapentin - TCA's - Foot care
RETINOPATHY	- Painless deterioration of small retinal vessels - May cause permanent vision loss	Fundoscopy, angiography: 1. Nonproliferative: - Hard exudates, blood - Cotton wool spots 2. Proliferative: neovascularization 3. Maculopathy: - Macular edema - Blurred vision - Central vision loss	- DM control - Laser photocoagulation txt - Bevacizumab - Vitrectomy
NEPHROPATHY	- Kidney deterioration → **microalbuminuria** - DM is the MCC of end stage renal dz	- Albuminuria - Anemia, Acidosis - Kidney Bx: Kimmelstiel-Wilson	- Dm control - ACEi - Low NA diet
MACROVASCULAR	- Atherosclerosis → CAD, Peripheral vascular dz, Stroke		
HYPOGLYCEMIA	- d/t too much insulin use - Sweating, tremors, palpitations, HA, confusion, slurred speech	- Random blood sugar = 50 - 60 - Brain dysfunction begins @ 50	Mild < 60: 10 - 15 g fast acting carb, fruit juice, hard candies Severe/unconscious < 40: IV bolus D50 OR Glucagon SQ

<table>
<tr><th colspan="4">Adrenal Insufficiency (Addison's Disease)</th></tr>
<tr>
<td>
- Insufficient production of cortisol, aldosterone and sex hormones d/t adrenal gland destruction
- MCC in industrialized countries → Autoimmune
  - Causes = adrenal atrophy
- MCC worldwide → infections (TB, HIV, fungal, CMV)
  - Causes = adrenal calcification
- Other causes
  - Trauma (thrombosis, hemorrhage)
  - Metastatic dz
  - Meds: ketoconazole, rifampin, phenytoin, barbiturates
</td>
<td>
- Hyperpigmentation
- Orthostatic hypotension
- Hyponatremia
- Hyperkalemia
- Metabolic acidosis (non-anion gap)
- Hypoglycemia
- Loss of libido
- Amenorrhea
- weakness/muscle ache
- Myalgias
- Fatigue
- HA
- Weight loss
</td>
<td>
- Obtain baseline 8am ACTH, cortisol, and renin levels
<u>Cosyntropin Stimulation Test</u>
- Screening test
- High dose dexamethasone
- Blood/urine cortisol measured → IM injection of ACTH → blood/urine cortisol measured @ 30m, 60m
- Normal = rise in blood/urine cortisol
- Insufficiency = little or no inc. in cortisol (<20ug/dL)

<u>CRH Stimulation Test</u>
- Differentiates b/t causes of insufficiency
- Addison → ↑ACTH lvl but low cortisol
- Secondary → low ACTH AND low cortisol
- Tertiary → delayed, prolonged or exaggerated ACTH response
</td>
<td>
HRT → Glucocorticoids + mineralocorticoids
- Glucocorticoid = hydrocortisone
  - Other: prednisone, dexamethasone, DHEA
- Mineralocorticoid = fludrocortisone
</td>
</tr>
<tr><th colspan="4">Cushing Disease</th></tr>
<tr>
<td>
Cushing Syndrome = signs/symptoms related to <u>cortisol excess</u>
Cushing Disease = syndrome caused specifically by pituitary ↑ACTH secretion

<u>Exogenous</u>
- Iatrogenic → MCC overall; long-term high dose corticosteroid therapy
<u>Endogenous</u>
- Benign pituitary adenoma or hyperplasia (70% of cases)
- Ectopic ACTH: Small cell lung cancer, medullary thyroid cancer
- Adrenal tumor that secretes cortisol
</td>
<td>
- Central obesity
- "Moon facies"
- Buffalo hump
- Supraclavicular fat pads
- Wasting of extremities
- Proximal muscle weakness
- Skin atrophy (bruising, striae)
- ↑ infections
- Hypertension
- Weight gain
- Hypokalemia
- Acanthosis nigricans
- Depression, mania
- Hirsutism, oily skin
- ↑ libido
</td>
<td>
<u>Low-Dose Dexamethasone Suppression Test</u>
- Inject dexamethasone
- Normal = cortical suppression
- Syndrome = no suppression (cortisol >5)
<u>24h Urinary Free Cortisol Levels</u>
- Most reliable index of cortisol secretion
- ↑ urinary cortisol = syndrome
<u>Salivary Cortisol Levels</u>
- ↑ cortisol
- Usually done @ night

Tests to differentiate cause:
<u>High-dose Dexamethasone Suppression Test</u>
- Cushing's disease = suppression
- Adrenal/Ectopic ACTH-producing tumor = no suppression
<u>ACTH Levels</u>
- ↓ ACTH = adrenal tumors
- Nml/↑ ACTH = cushing's disease
</td>
<td>
- Transsphenoidal surgery
- Radiation if unresectable tumor
- Ketoconazole or metyrapone for inoperable pts
- Gradual steroid taper if iatrogenic cause
</td>
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</table>

Hyperthyroidism			
<u>Etiology:</u> - Grave's disease - Toxic multinodular goiter - TSH secreting pituitary adenoma - Excess intake of T3 and T4 - Iatrogenic thyrotoxicosis	- **Heat intolerance** - Weight loss - Skin warm, moist, soft, fine hair - Goiter - **Hyperactivity**: anxiety, fine tremors, nervousness - Diarrhea - Hyperdefecation - **Tachycardia** - **Palpitations** - **High output heart failure** - Gynecomastia - Scanty periods - Hyperglycemia	- ↓ TSH with ↑ free T4 - ↑ LFTs and Ca - ↓ Lipids	- PTU (ADR aplasia cutis) - **Methimazole** - Reactive iodine - Surgery - Propranolol/atenolol - Untreated thyrotoxicosis can progress to a thyroid storm that can be fatal!
Grave's Disease			

- Autoimmune
- **MCC of hyperthyroidism**
- Circulating TSH receptor Ab → ↑TSH synthesis, release, and thyroid gland growth
  - Worse w/ stress
	- Diffuse, enlarged thyroid
	- **Thyroid bruits**
	- **Ophthalmopathy**
	  - **Lid lag**
	  - **Exophthalmos/proptosis**
	- **Pretibial myxedema:** non pitting, edematous, pink to brown plaques on shin
		- (+) Thyroid stimulating Immunoglobulin (Ab)
		- ↑ FT4
		- ↑ FT3
		- ↓ TSH
		- RAIU: ↑ diffuse uptake
			- **Radioactive iodine = MC therapy**
			  - Need hormone replacement
			- Methimazole or PTU
			- BB (propranolol) → symptomatic relief of tremors, anxiety, tachycardia, etc.
			- Thyroidectomy
			  - If no response to meds
			  - If RAI CI

Toxic Multinodular Goiter (TMG)			

- Autonomous functioning nodules
- MC in elderly
	- Diffuse, enlarged thyroid
	- **No skin/eye changes**
	- Palpable nodule
	- **Compressive symptoms:**
	  - Dyspnea
	  - Dysphagia, hoarseness
	  - Stridor
		- ↑ FT4
		- ↑ FT3
		- ↓ TSH
		- RAIU: patchy areas of both increase and decrease uptake
			- **Radioactive iodine = MC therapy**
			- Subtotal thyroidectomy if compressive symptoms present
			- Methimazole or PTU
			  - PTU preferred in pregnancy
			- BB for symptomatic relief

Toxic Adenoma			

- One autonomous functioning nodule	- Diffuse, enlarged thyroid
	- **No skin/eye changes**
	- Palpable nodule
	- **Compressive symptoms:**
	  - Dyspnea
	  - Dysphagia, hoarseness
	  - Stridor
		- ↑ FT4
		- ↑ FT3
		- ↓ TSH
		- RAIU: ↑ Local uptake (hot nodule)
			- **Radioactive iodine = MC therapy**
			- Subtotal thyroidectomy if compressive symptoms present
			- Methimazole or PTU
			  - PTU preferred in pregnancy
			- BB for symptomatic relief

TSH secreting Pituitary Adenoma			
- Autonomous TSH secretion by pituitary adenoma	- Diffuse enlarged thyroid - **Bitemporal hemianopsia** - Mental disturbances	- ↑ FT4 - ↑ FT3 - **↑ TSH** - RAIU: DIFFUSE uptake - Pituitary MRI: adenoma	- Transsphenoidal surgery → removal of adenoma
Hypothyroidism			
<u>Etiologies:</u> - Iodine deficiency (dietary) - Hashimoto's thyroiditis - Postpartum thyroiditis - Pituitary Hypothyroidism - Hypothalamic Hypothyroidism - Cretinism - Riedel's Thyroiditis	- **Cold intolerance** - Weight gain - Dry, thick, rough skin - Loss of outer ⅓ of eyebrow - Goiter - Non Pitting edema - **Hypoactivity**: fatigue, memory loss, depression, ↓ DTRs - Constipation - **Bradycardia** - **↓ CO** - **Menorrhagia** - Hypoglycemia	- ↑ TSH - ↑ LD - ↑ TG - ↑ LFTs - ↑ CK	- LEVOTHYROXINE - 1.6 mcg/kg - ½ life is 3 weeks—wait 6 weeks to recheck TFTs
Hashimoto's Thyroiditis (Chronic Lymphocytic)			
- MCC of hypothyroidism - MC in women - Autoimmune	- Painless, enlarged thyroid - May present in euthyroid state	- **(+) thyroid Ab present** - TFT's (HYPO) - RAIU: ↓ radioactive iodine uptake	- Levothyroxine
Silent (Lymphocytic) Thyroiditis			
- Autoimmune	- painless , enlarged thyroid - Thyrotoxicosis → hypothyroid - Depends on when they present	- **(+) thyroid Ab present** - TFT's - can be HYPER or HYPO depending on when they present - RAIU: ↓ radioactive iodine uptake	- Return to euthyroid state w/in 12 - 18 months w/o txt - ASA - No anti-thyroid meds
Postpartum Thyroiditis			
- Autoimmune	- Painless, enlarged thyroid - Thyrotoxicosis → hypothyroid - Depends on when they present	- **(+) thyroid Ab present** - TFT's - can be HYPER or HYPO depending on when they present - RAIU: ↓ radioactive iodine uptake	- Return to euthyroid state w/in 12 - 18 months w/o txt - ASA, NAIDS - No anti-thyroid meds

De Quervain's Thyroiditis (Granulomatous)			
- **MC post viral** or viral inflammatory rxn - Associated w/ HLA-B35	- PAINFUL, tender neck/thyroid - Clinical hyperthyroidism - Thyrotoxicosis → hypothyroid - Depends on when they present	- **↑ ESR = HALLMARK** - NO thyroid Ab - TFT's - usually HYPER but depends on when they presen - RAIU: ↓ radioactive iodine uptake	- Return to euthyroid state w/in 12 - 18 months w/o txt - ASA - for pain and inflammation - No anti-thyroid meds
Medication-Induced			
- Amiodarone - Lithium - Alpha interferon	- Painless, enlarged thyroid - Thyrotoxicosis → hypothyroid - Depends on when they present		- Often returns to euthyroid state when meds stopped - Corticosteroids
Acute Thyroiditis			
- **MCC S. aureus**	- PAINFUL, fluctuant, thyroid - Fever	- ↑ WBC count w/ left shift - **EUTHYROID**	- Antibiotics - Abscess present → I&D
Riedel's' Thyroiditis			
- Fibrous thyroid	- Fibrous, hard, "woody" nodule	- May develop hypothyroidism	- Surgery
Cretinism			
- Congenital hypothyroidism d/t maternal hypothyroidism or infant hypopituitarism	- Macroglossia - Hoarse cry - Coarse facial feature - Umbilical hernia - Weight gain - Mental development abnormalities		- Thyroid hormone replacement = levothyroxine

PSYCHIATRY/BEHAVIORAL MEDICINE

<table>
<tr><th>General and Scientific Concepts</th><th>History/PE and Clinical Manifestations</th><th>Diagnostic Studies and Intervention</th><th>Treatment and Maintenance</th></tr>
<tr><td colspan="4">Major Depressive Disorder (MDD)</td></tr>
<tr><td><u>Risk Factors:</u>
- Family hx
- F > M (2:1)
- 20 - 40 y/o

<u>Four Subtypes:</u>
1. Seasonal affective disorder/seasonal pattern
2. Atypical depression
3. Melancholia
4. Catatonic depression

- 15% commit suicide
- White M > 45 y/o and concurrent substance abuse</td><td>Depressed mood OR anhedonia OR loss of interest in activities with ≥ 5 associated symptoms almost every day for <u>at least</u> 2 wks:
- Fatigue almost all day
- Insomnia or hypersomnia
- Feelings of guilt or worthlessness
- Recurring thoughts of death/suicide
- Psychomotor agitation
- Significant weight change (gain/loss)
- Decreased/increased appetite
- Decreased concentration/indecisiveness
- Somatic:
- Constipation
- HA
- Skin changes
- Chest or abdominal pain
- Cough, dyspnea
- Si/sx’s cause distress/impairment in social, occupational or other impt areas of fxning
- NO mania or hypomania</td><td>- Patient health questionnaire (PHQ-2) → initial screening
- If + → PHQ-9 form</td><td><u>Psychotherapy:</u>
- Initial therapy in mild - mod
- Cognitive behavioral therapy:
- exposure/response prevention
- Psychoeducation
- Support groups
- Beneficial when combined w/ medical therapy

<u>Medications:</u>
- SSRI’s = first line in mild - mod
- SNRI’s
- Bupropion & Mirtazapine = 2nd line
- TCA’s and MAOi’s = 3rd line
- Continued for a MIN of 3 - 6 wks

<u>Electroconvulsive Therapy (ECT):</u>
- If fail to medical therapy, positive previous response to ECT or rapid response for severe symptoms
- Safe in pregnant & elderly</td></tr>
<tr><td>SEASONAL AFFECTIVE DISORDER/SEASONAL PATTERN</td><td colspan="2">- Presence of depressive symptoms at the SAME TIME each year
- “Winter blues”</td><td>- SSRI’s
- Light therapy
- Bupropion</td></tr>
<tr><td>ATYPICAL DEPRESSION</td><td colspan="2">- Many of the typical symptoms of MDD BUT experience mood reactivity → improved mood to positive events
- Significant weight gain/appetite increased
- Hypersomnia
- heavy/leaden feelings in arms or legs
- Oversensitivity to interpersonal rejection</td><td>- MAOi’s</td></tr>
<tr><td>MELANCHOLIA</td><td colspan="3">- Anhedonia
- Lack of mood reactivity
- Depression
- Severe weight loss/loss of appetite
- Excessive guilt
- Psychomotor agitation or retardation
- Sleep disturbance (increased REM and reduced sleep) → early morning awakening or mood that is worse @ morning</td></tr>
<tr><td>CATATONIC DEPRESSION</td><td colspan="3">- Motor immobility
- Stupor and extreme withdrawal</td></tr>
</table>

<table>
<tr><th colspan="3">Anxiety Disorder</th></tr>
<tr>
<td>GENERALIZED ANXIETY DISORDER

Excessive anxiety or worry a majority of days ≥ 6 month period about VARIOUS ASPECTS of life

MC in F
Onset of symptoms = early 20s</td>
<td>≥ 3 of the following:
- Fatigue
- Restlessness
- Difficulty concentrating
- Muscle tension
- Sleep disturbance
- Irritability
- Shakiness
- HA</td>
<td>- Antidepressants:
  - SSRI’s (Paroxetine, Escitalopram)
  - SNRI’s (venlafaxine)
- Buspirone (Buspar) → may take several weeks before clinical improvement
  - Does NOT cause sedation
- Benzodiazepines = short term use ONLY
- Beta blockers
- TCA’s
- Psychotherapy = cognitive behavioral therapy</td>
</tr>
<tr>
<td>SOCIAL ANXIETY DISORDER

Persistent (> 6 months), intense fear of social or performance situations in which the person is exposed to scrutiny of others for fear or embarrassment</td>
<td>Social situations provoke anxiety → <u>expected</u> panic attacks</td>
<td>- Antidepressants:
  - SSRI’s (Paroxetine, Fluoxetine, Escitalopram)
  - SNRI’s (Venlafaxine)
- Beta-blockers: for performance anxiety
  - Propranolol, atenolol
- Benzodiazepines: if txt needed unfrequently
- Psychotherapy:
  - Cognitive behavior therapy
  - Insight-oriented therapy</td>
</tr>
<tr><th colspan="3">Panic Attack</th></tr>
<tr>
<td colspan="2">Episode of intense fear or discomfort
- Sudden onset
- Peak w/in 10 min
- Last < 60 min

≥ 4 of the following symptoms:
- Dizziness
- Trembling
- Choking feeling
- Paresthesias
- Sweating
- SOB
- Chest pain/discomfort
- Chills or hot flashes
- Fear of losing control
- Fear of dying
- Palpitations, increased HR
- Nausea or abdominal distress
- Depersonalization (being detached from oneself) or derealization (feeling of unreality)</td>
<td><u>Acute Attack:</u>
- Benzodiazepines
  - Alprazolam
  - Clonazepam
  - Watch for dependence/abuse</td>
</tr>
<tr><th colspan="3">Panic Disorder</th></tr>
</table>

- MC in F - Before 30 y/o	Recurrent, unexpected panic attacks (≥2 attk) - Sudden onset - Peak w/in 10 min - Last < 60 min At least 1 of the following must occur for at least 1 month: - Panic attack followed by concern about future attacks - Worry about implication of the attack - Significant change in behavior related to the attacks At least 4 of the 13 panic symptoms ∓agoraphobia → anxiety about being in places/situations from which escape may be difficult	<u>Long Term Management:</u> - SSRI's = 1st line - Paroxetine - Sertraline - Fluoxetine - SNRI's may also be used - Cognitive Behavioral Therapy (CBT) - Psychotherapy may be initial in mild cases <u>Acute Attack:</u> - Benzodiazepines - Alprazolam - Clonazepam - Watch for dependence/abuse
Specific Phobia		
- Persistent (> 6 months), intense fear/anxiety of a specific situation (heights, flying, etc) or object (pigeon, snakes, blood) or place (hospital) - Fear OUT OF PROPORTION to any real danger - Phobic object or situation is actively avoided or endured w/ intense fear or anxiety - Everyday activities impaired by distress or avoidance		- Exposure/desensitization therapy = 1st line - Short term benzodiazepines - Beta-blockers
Post Traumatic Stress Disorder		
MC in young adults - Trauma: - Males - combat and urban violence - Women - rape or assault - Also common in adult survivors of sexual abuse	Exposure to actual or threatened death, serious injury or sexual violence via: - Direct experience of the traumatic event - Witnessing the event in person - Learning the event happened to someone close - Experiencing extreme or repeated exposure to aversive details of the traumatic event > 1 of the following intrusion symptoms: - Re-experiencing - > 1 month as repetitive recollections and dissociative reactions → physiologic distress - Avoidance of stimuli - Negative alterations in cognition and mood - Horror guilt, anger, or shame - Disinterest in activities - Arousal and reactivity - Angry outburst - Irritable behavior	- Antidepressants - SSRI's = 1st line - Paroxetine - Sertraline - Fluoxetine - TCA's (Imipramine) - MAOi - Trazodone → for insomnia - Cognitive behavioral therapy - Psychotherapy = individual or group counseling
Insomnia Disorder		

Acute insomnia: < 3 months
- Generally associated with stress or changes in sleep schedule
- Usually resolves spontaneously.
 	
Chronic insomnia: ≥3 months to years
- Associated with reduced quality of life and ↑ risk of psychiatric illnes
	Interfere with duration and/or quality of sleep despite adequate opportunity for sleep.
	Symptoms may include:
	- Difficulty initiating sleep
	- Frequent nocturnal awakenings
	- Early morning awakenings
	- Waking up feeling fatigued and unrefreshed
	- Difficulty initiating/maintaining sleep or early-morning awakening with inability to return to sleep
	
	- At least 3 days a week for at least 3 months
	- Causes clinically significant distress or impairment in functioning
	- Occurs despite adequate opportunity to sleep
	- Does not occur exclusively during the course of another sleep-wake disorder
			- Sleep hygiene measures
			- Cognitive-behavioral therapy
			
			Pharmacotherapy:
			- Benzodiazepines: reduce sleep latency and nocturnal awakening.
			- Non-benzodiazepines:
			  - Zolpidem
			  - Eszopiclone
			  - Zaleplon
			  - Short term txt
			- Antidepressants:
			  - Trazodone - most prescribed sedating antidepressant for patients with chronic insomnia
			  - Amitriptyline

Anorexia Nervosa			

Refusal to maintain a minimally normal body weight
 	
Morbid fear of fatness or gaining weight even though they are UNDERWEIGHT
	Behaviors targeted at maintaining a low weight:
	- Restrictive type
	  - Reduced calorie intake
	  - Fasting
	  - Excessive exercise
	  - Diet pills
	  - Dieting
	- Purging type
	  - Self-induced vomiting
	  - Diuretic, enema, laxative
		- BMI ≤ 17.5 kg/m2
		- Body weight < 85% of ideal weight
		
		Physical exam:
		- Emaciation
		- Hypotension
		- Bradycardia
		- Arrhythmias
		- Skin/hair changes
		- Dry skin
		- Salivary gland hypertrophy
		- Amenorrhea
		- Osteoporosis
		
		Labs:
		- Leukocytosis
		- Leukopenia
		- Anemia
		- Hypokalemia
		- ↑ BUN d/t dehydration
		- Hypothyroidism
			- Medical stabilization
			  - < 75% ideal BW or pts w/ complications → hospitalize
			  - Electrolyte abnormalities → cardiac abnormalities
			- Psychotherapy
			  - CBT
			  - Supervised meals
			  - Weight monitoring
			- Pharmacotherapy: if depressed:
			  - SSRI's
			  - Atypical antipsychotics

Bulimia Nervosa			

<table>
<tr>
<td>

- NORMAL WEIGHT OR OVERWEIGHT
- MC in F
- Late teens

</td>
<td>

<u>Binge Eating:</u>

- Recurrent episodes of eating within a 2hr period w/ lack of control
- At least weekly for 3 months
- Triggered by stress/mood changes

<u>Compensatory Behavior:</u>

1. Purging type
   - Self induced vomiting
   - Diuretic, laxative, enema
2. Non-purging type
   - Reduced calorie intake, fasting
   - Excessive exercise
   - Diet pills, dieting

</td>
<td>

- Teeth pitting or enamel erosion
- Russell's sign = calluses on dorsum of hand
- Parotid gland hypertrophy
- Metabolic alkalosis

<u>Labs:</u>

- Hypokalemia
- Hypomagnesemia

</td>
<td>

- Psychotherapy: CBT
- Pharmacotherapy:
  - Fluoxetine = reduced binge-purge cycle

</td>
</tr>
<tr><td colspan="4">Bipolar Disorders</td></tr>
<tr><td colspan="4">Bipolar I Disorder</td></tr>
<tr>
<td>

- 1st degree relative family hx = strong RF
- Avg onset = 20 - 30 y/o
- Earlier onset = greater risk of psychotic features and poorer prognosis

</td>
<td colspan="2">

≥ 1 MANIC or MIXED episode that cycles with occasional depressive episode

- MDD typical but NOT required

<u>MANIA</u>: abnml & persistent elevated, expansive or irritable mood at least 1 wk with marked impairment of social/occupation function ≥ 3 of the following:

- **Mood**: euphoria, irritabile, labile, dysphoric
- **Thinking**: racing, flight of ideas, disorganized, easily distracted
- **Behavior**: physical hyperactivity, pressured speech, decreased need for sleep, increased impulsivity, disinhibition

"DIG FAST"

- Distractibility
- Irritable mood/insomnia
- Grandiosity
- Flight of ideas
- Agitation/increase in goal-directed activity
- Speedy thoughts/speech
- Thoughtlessness: seek pleasure without regard to consequences

</td>
<td>

<u>Mood Stabilizers:</u>

- Lithium = 1st line
- Valproic acid
- Carbamazepine
- 2nd gen antipsychotics (Olanzapine)
- Haloperidol (1st gen antipsy) OR Benzos → added if psychosis or agitation develops
- ECT
- MAOI's, SSRi's, TCA's

<u>Therapy</u>: cognitive, behavioral, interpersonal, sleep hygiene

</td>
</tr>
<tr><td colspan="4">Bipolar II Disorder</td></tr>
<tr>
<td colspan="2">

≥ 1 HYPOMANIC episode AND ≥ 1 major depressive episode

<u>HYPOMANIA:</u>

- Period of elevated, expansive, or irritability ood at least 4 days
- Does NOT cause marked impairment
- No psychotic features
- Does not include racing thoughts or excessive psychomotor agitation

</td>
<td colspan="2">

- Usually does not require hospitalization
- Antipsychotics, mood stabilizers, benzos

<u>Acute Mania:</u> Mood stabilizers: lithium, valproate, 2nd gen antipsychotics
<u>Depression:</u> lithium, valproate, carbamazepine, 2nd gen antipsychotics
<u>Mixed:</u> atypical antipsychotics, valproate

</td>
</tr>
<tr><td colspan="4">Substance Use Disorders</td></tr>
</table>

TOBACCO	- Major cause of pulmonary, cardiac, and cancer deaths	- Nicotine tapering therapy: gum, nasal sprays, transdermal patches, inhaler, lozenges - Bupropion - Varenicline	
OPIOID: **Heroin** **Oxycodone** **Morphine** **Meperidine** **Codeins**	**Behavioral/Mood Effects**	**Psychological Effects**	**Treatment**

	- **Euphoria**
	- **Sedation**
	- Impaired social functioning
	- Impaired memory
	- Slow or slurred speech
		- **Pupillary constriction**
		- **Respiratory depression**
		- **Bradycardia**
		- **Hypotension**
		- Coma
		- N/V
		- Hypothermia
		- Chronic:
		  - Pruiruts
		  - Constipation
			- Naloxone (Narcan)
			  - MC used in pts w/ resp depression
			- Long term management:
			  - Methadone maintenance program
			  - Suboxone: Buprenorphine + Naloxone

ETHANOL **BENZODIAZEPINES**	**Behavioral/Mood Effects**	**Psychological Effects**	**Treatment**

	- Disinhibition
	- Depression:
	  - Slurred speech
	  - Impaired judgement
	  - Somnolence
	  - Ataxia
	- Labile Mood:
	  - Erratic behavior
	  - Aggression
		- Prolonged reaction time
		- Muscular incoordination
		- Facial flushing
		
		<u>Chronic:</u>
		- **Wernicke's encephalopathy:** thiamine (B1) deficiency
		  - Ataxia
		  - Confusion
		  - Oculomotor palsy
		- **Korsakoff Syndrome:**
		  - Amnesia - retrograde and antegrade
		- Hepatomegaly
		- Palmar erythema
		- Cirrhosis
		- Dupuytrens contractures
		- Gynecomastica
		- Testicular atrophy
		- Increased MCV
			- Flumazenil
			- Benzodiazepine

PCP	- Impulsiveness - Homicidality - Psychosis - Delirium - Seizures - **Nystagmus**		
STIMULANTS **COCAINE**	**Behavioral/Mood Effects**	**Psychological Effects**	**Treatment**

<table>
<tr><td>AMPHETAMINES</td><td><u>Initial:</u>
- Elevated/euphoric mood
- Restlessness
- Pressured speech

<u>Psychosis:</u> mild → anxiety
- Paranois
- Aggression
- Agitation
- Hallucination</td><td>- Compulsive and stereotyped behavior
- Rhadomyolysis

<u>Neurologic:</u>
- ↑ motor activity
- HA
- Tremor
- Flushing
- Hyperthermia
- Cold sweats
- N/V
- Seizures
<u>Sympathetic stimulation:</u>
- Swearting
- Tachycardia
- Hypertension
- Pupillary dilation
- Peripheral vasoconstriction
- MI</td><td>- Cocaine:
- Benzodiazepines
- Neuroleptics
- BP reduction</td></tr>
<tr><td rowspan="2">NICOTINE</td><td colspan="2">Behavioral/Mood Effects</td><td>Psychological Effects</td></tr>
<tr><td colspan="2">- N/V/D
- Abdominal pain
- HA</td><td>- Tremor
- Tachycardia
- Salivation</td></tr>
<tr><td rowspan="2">CANNABIS</td><td colspan="2">Behavioral/Mood Effects</td><td>Psychological Effects</td></tr>
<tr><td colspan="2">- Euphoria
- Giddiness
- Psychosis</td><td>- Dry mouth (cotton-mouth)
- Conjunctival erythema
- Tachycardia
- Hypotension</td></tr>
<tr><td>LSD</td><td colspan="3">- Visual hallucinations and synesthesias (seeing sound as color)
- Delusions
- Pupillary dilation</td></tr>
<tr><td colspan="4">Spouse of Partner Neglect/Violence</td></tr>
</table>

Guidelines for domestic violence surveillance: **"RADAR"**

- Remember to ask about partner violence.
- Ask directly about violence.
- Document information in the patient's chart.
- Assess the patient's safety.
- Refer the patient to outside resources (eg, legal services, support groups, shelters).

- Domestic violence should by no means be considered a "private matter," → physicians must screen for it in 1° care visits.
- Should let victims know that the abuse is not their fault; that they do not merit such treatment; and that the violence they are confronting is unacceptable.
- Pregnancy is a known period of heightened risk for domestic violence.
- With every new intimate relationship; all females > 14 years of age; with each pregnancy should be screened
- Some questions to ask on the topic of abuse, suggested by the Family Violence Prevention Fund:
  - Do you feel controlled or isolated by your partner?
  - Do you ever feel afraid of your partner?
- Elder Abuse: physicians are mandatory reporters of elder abuse and neglect.

Physical Abuse	**Emotional Abuse**	**Family Abuse**	**School Abuse**
- Fatigue - Insomnia or hypersomnia - Runny nose - Shortness of breath - Injected eyes - Pinpoint pupils	- Personality change - Sudden mood changes - Irritability - Irresponsible behavior - Low self-esteem - Poor judgment - Depression - Withdrawal - General lack of interest	- Breaking rules or withdrawing from the family - High family conflict - Lack of bonding.	- Truancy, academic failure - Lack of commitment to school and education - Early persistent behavioral problems
		Social/Behavioral Abuse - Peer group involvement with drugs and alcohol - Problems with the law.	

Suicide		

Previous attempt of threat = strongest single predictor factor
- 3rd leading cause of mortality among adolescents
"SAD PERSONS"
- Sex—male
- Age > 60 y/o
- Depression
- Previous attempt
- Ethanol/drug abuse
- Rational thinking loss
- Suicide in family
- Organized plan/access
- No support
- Sickness
	- Sex: F attempt more than M BUT M complete more than F
	- Age
	  - Elderly white men have highest suicide rate
	- Race: whites > blacks
	- Psychiatric disorder
	  - Underlying condition: depression, bipolar, substance abuse, schizophrenia, anxiety
	- Substance abuse
	- Marital status: alone > never married> widowed > separated/divorced > married w/o kids > married w/ kids
	- Others:
	  - + family hx
	  - Hx of impulsivity
	  - Chronic illness
		- Medical therapy aimed at treating medical complications of the suicide attempt.
		- Physical protection needed to avoid harm to self if a plan is in place.
		- Provide emergency psychological consultation for any teenager who is severely depressed, psychotic, or acutely suicidal.
		- Safety contracts are not effective in preventing suicide.

HEMATOLOGY

General and Scientific Concepts	**History/PE and Clinical Manifestations**	**Diagnostic Studies and Intervention**	**Treatment and Maintenance**

<table>
<tr><th colspan="4">Anemia</th></tr>
<tr><td colspan="2">Medical condition → RBC count or Hgb less than normal
Cause: decrease in production of RBC/Hb or increase in bleeding/destruction of RBC.
Diagnose: CBC - Women: Hb < 12g/100ml
Men: Hb < 13.5g/100ml
Hct < 41%</td><td colspan="2">Signs and Symptoms:
- Fatigue
- Palpitations
- Tachycardia
- Hair loss
- Dyspnea on exertion/SOB
- Skin & mucosal changes, smooth tongue, brittle nails, spooning of nails (koilonychia) & cheilosis
- Pica - craving for specific foods, ice chips</td></tr>
<tr><th colspan="4">MACROCYTIC ANEMIA (MCV > 100)</th></tr>
<tr><th colspan="4">B12 (Cobalamin) Deficiency</th></tr>
<tr><td>- Megaloblastic Anemia
- <u>Pernicious Anemia</u>

<u>B12 Function</u>
- Cofactor for methionine synthetase in the conversion of homocysteine to methionine for DNA synthesis
- B12 deficiency → abnml DNA synthesis
- Cofactor as adenosyl-cobalamin for the conversion of methylmalonyl-CoA to succinyl-CoA

<u>Causes of Deficiency</u>
- Vegans who avoid dairy products, meat, and fish
- <u>Decreased production or neutralization of intrinsic factor</u>
- <u>Pernicious anemia → d/t gastric bypass</u>
- H. pylori
- Malabsorption: alcoholism
- Pancreatic Insufficiency
- Decreased ileal absorption
- Surgical resection
- Crohns
- Celiac sprue
- Tropical sprue</td><td>- Moderate to severe anemia of slow onset
- Glossitis
- Anorexia
- Diarrhea
- Neurological symptoms
- Paresthesias (numbness/tingling) nerves affected first
- Balance and proprioception
- Gait disturbance
- Cerebral function impairment
- Dementia
- Mildly icteric
- Decreased vibration and position sense or memory disturbances</td><td>- Low Serum B12 < 170

Best confirmed via <u>elevated</u> level of serum
- Methylmalonic acid (MMA) > 1000
- Homocysteine > 15

<u>Peripheral blood smear</u>
- Macroovalocyte
- Hypersegmented neutrophils
- Decreased reticulocyte count
- Decreased WBC’s
- Decreased platelets in severe cases

Bone marrow morphology: erythroid hyperplasia

Assess for pernicious anemia as a cause with anti parietal cell AB and anti-intrinsic factor AB</td><td>B12 REPLACEMENT
- Parenteral therapy
- Intramuscular therapy
- Subcutaneous therapy
- <u>Injections</u> 100 mcg daily for 1 wk
- Weekly for the first month
- Monthly for life
- Watch for signs of hypokalemia w/ txt
- If mild can use PO B12

- Methylcobalamin 1mg/day
- Folic acid replacement 1mg/day for first 3 months</td></tr>
<tr><td>PERNICIOUS ANEMIA</td><td>- One of the Vit B12 deficiency
- d/t inability to absorb vit B12 needed for your body to make</td><td>- Anti Parietal cell AB
- Anti-intrinsic factor Ab
- Bone marrow examination if dx</td><td>Untreated = severe complications

- <u>Vit B12 shots or pills</u></td></tr>
</table>

<table>
<tr><td></td><td>enough healthy RBC
- <u>Lack of intrinsic factor in the gastric mucosa</u> which helps the body absorbed Vit B12 in the intestine
- MCC = loss of stomach cells (parietal cells) that make intrinsic factor
- Achlorhydria
- Atrophic gastritis</td><td>unclear
- CBC
- Reticulocyte count
- <u>+ Schilling test</u> → determines if body is producing intrinsic factor
- LDH level
- MMA level
- Vit B12 level</td><td></td></tr>
<tr><td colspan="4">Folate (Vitamin B9) Deficiency</td></tr>
<tr><td>- Megaloblastic Anemia
- Folate absorption occurs @ jejunum
- Required for DNA synthesis
Causes:
- Diet - not enough leafy green veggies, beans citrus fruits or whole grains
- Alcohol consumption
- GI problems - intestine malabsorption, celiac dz, CA
- Pregnancy - baby absorbs lots of folic acid from mom
- Hereditary</td><td>- Fatigue, lack of energy
- SOB, Pale skin
- HA
- Racing heart (tachycardia)
- Weight loss
- Tinnitus (ringing in ears)
- Decreased sense of taste
- Diarrhea
- Muscle weakness
- Depression
- Gloss

Similar to B12 BUT NOT NEUROLOGICAL ABNORMALITIES</td><td>- Serum homocysteine is increased
- NML MMA
- Blood smear: macro ovalocytes and hypersegmented neutrophils
- LOW SERUM FOLIC ACID LEVEL < 150 = DIAGNOSTIC
- Nml serum vit B12</td><td>Healthy diet
- Nuts
- Leafy green vegetables
- Breads, cereals
- Fruit
<u>Daily</u> folic acid supplement: 1mg PO daily
- Lifelong usually
- 1 - 5 mg daily
- Prophylactically given during pregnancy
- Refer to GI, hem, nutritionist
- Treat underlying condition
Complication in pregnancy = neural tube defects</td></tr>
<tr><td colspan="4">MICROCYTIC ANEMIAS (MCV < 80)
Small, hypochromic RBC in a peripheral blood smear</td></tr>
<tr><td colspan="4">Iron Deficiency Anemia</td></tr>
<tr><td>- MC type of microcytic anemia
<u>Etiology:</u>
1. MCC bleeding (GI tract/menstruation)
2. Malabsorption in GI</td><td>- Pagophagia (ice craving)
- Pica
- Angular cheilitis
- Koilonychia (nail spooning)</td><td>NO target cells, anisocytosis or poikilocytosis
<u>Peripheral blood smear:</u>
- Macrocytes
- Microcytic hypochromic cells</td><td><u>FERROUS SULFATE ORAL</u> 325mg 1-3x daily on empty stomach for 2 months
- Then continue 3-6 mo after Hct returns to normal
- IV iron infusion if refractory to oral

Vitamin C to absorb iron
- Hct & reticulocyte count to measure response</td></tr>
<tr><td colspan="3"><table>
<tr><th></th><th>Fe Serum</th><th>Ferritin</th><th>TIBC</th><th>Transferrin</th><th>TSAT</th></tr>
<tr><td>Iron Deficiency Anemia</td><td>LOW</td><td>LOW</td><td>HIGH</td><td>HIGH</td><td>LOW</td></tr>
<tr><td>Anemia of Chronic Disease</td><td>LOW</td><td>HIGH</td><td>NML OR LOW</td><td>LOW</td><td>LOW</td></tr>
</table></td></tr>
<tr><td colspan="4">Lead Poisoning</td></tr>
</table>

- **MC in young kids** - Lead inhaled or orally consumed - **Leads to cell death, shortens RBC lifespan and inhibits synthesis of Heme** - Poisoning occurs at levels of 80 - 120 mcg/dl and is toxic - Hypochromic	- May be asymptomatic - **Abdominal pain** - **Constipation** - **Anemia** - Peripheral neuropathy - Kidney dz - **Neurological:** confusion, seizures, coma at high levels, ataxia	- **History** - **<u>Basophilic Stippling</u> on peripheral blood smear** - **Microcytic, hypochromic** - Bone Marrow: ringed sideroblast - **Whole blood levels (BLL) > 10 ug/dl** - ↑ serum lead - **↑ serum Fe** - ↓ TIBC - ∓ ↑ ferreting <u>Free Erythrocyte protoporphyrin (FEP)</u> - NOT DIAGNOSTIC - FEP and Fe elevated - **CHRONIC** - FEP normal and Fe High - **ACUTE** <u>XR</u>: lead lines - @ metaphyseal plates - @ gums in adults	Removal of source of lead **<u>Chelation therapy</u>** - Dimercaprol DOC - Succimer - BLL>100 → CaNa2EDTA + Dimercaprol DOC - CI peanut allergy
Class V: - BLL > 70 - Medical Emergency **Class IV:** - BLL 45 - 69 - Must remove the source of lead **Class II:** - BLL 20-44 - NO CHELATION		**Class II:** - BLL = 15 - 9 - Repeat BLL and lead prevention education - Elevated > 3 months then treat as class I **Class I:** - BLL = 10 - 14 - Lead prevention education - Periodic screening in young children	
Alpha Thalassemia			
- MC In SE asians - Decreased alpha globin chain production. 4 TOTAL GENES 1. Silent Carrier State (1/4 abdnml alleles) - Clinically nml. Usually asymptomatic 2. Alpha Thalassemia Minor (Trait) (2/4 abnml alleles) - Mild microcytic anemia 3. Alpha Thalassemia Intermedia (Hemoglobin H disease) (3/4 abnml alleles) - Similar to beta-thalassemia major - Chronic anemia, pallor - Hepatosplenomegaly - Frontal and maxillary bony overgrowth, pathologic fx's 4. Hydrops Fetalis (4/4 abnml alleles) - Associated w/ stillbirth or death shortly after birth - HgB Barts: gamma tetramers		<u>CBC:</u> Hypochromic, microcytic anemia - Nml or ↑ serum Fe - Nml or ↑ RBC count - <u>Peripheral Smear</u>: - **Target cells** - Teardrop cells - Basophilic stippling - **Heinz bodies** in Alpha Thalassemia Intermedia (**Hemoglobin H dz**) <u>HgB electrophoresis</u>: nml HgB	<u>Mild Thalassemia (alpha- trait)</u>: no txt needed <u>Moderate Disease:</u> - Folate if reticulocyte count is high - Avoid iron supplementation - Avoid oxidative stress (sulfa drugs) <u>Severe Disease:</u> 1. Blood Transfusions weekly - Give folate supplementation - Vit C 2. Iron Chelating Agents: Deferoxamine IV, Deferasirox PO 3. Splenectomy 4. Bone marrow transplant = definitive txt
Beta Thalassemia			

- MC in Mediterranean (Greek, Italian) 1. Beta-Thalassemia trait (minor) (1/2 abnml alleles) - Asymptomatic usually - Mild to mod anemia 2. Beta-Thalassemia major (Cooley's anemia) (2/2 abnml alleles) - Asymptomatic @ birth → symptomatic @ 6 months when HgbF declines - **Frontal bossing** - Maxillary overgrowth - **Hepatosplenomegaly** - **Severe hemolytic anemia:** jaundice, dyspnea, pallor - Osteopenia → pathologic fx - Fe overload - Pigmented gallstones 3. Beta-Thalassemia Intermedia (mild homozygous form) - Anemia - Hepatosplenomegaly - Bondy dz	<u>CBC:</u> hypochromic, microcytic anemia - Nml or ↑ serum Fe - Nml or ↑ RBC count - Peripheral smear: - **Target cells** - Teardrop cells - Basophilic stippling - Nucleated RBC's <u>Hemoglobin Electrophoresis:</u> 1. MINOR: - ↑ Hgb F - ↑ Hgb A2 - ↓ Hgb A 2. MAJOR (Cooley's Anemia): - ↑ Hgb F - ↑ Hgb A2 - Little to NO Hgb A <u>XR:</u> bossing with **hair on end appearance**	<u>Beta-Thalassemia Trait (minor):</u> - Genetic counseling Beta-Thalassemia Major/Severe Anemia: - Blood transfusions - Vit C - Folate supplements - Iron Chelating agents: Deferoxamine IV, Deferasirox PO - If refractory → splenectomy - Bone marrow transplant = definitive txt	
Zinc Deficiency			
- Inadequate dietary ZInc or malabsorption - Increased loss of increased body system utilization	- Acne, eczema, seborrheic dermatitis - Xerosis, alopecia - GI: diarrhea, loss of appetite - Oral ulcers, stomatitis, angular cheilitis - Night blindness - Pneumonia	- Blood plasma - Urine test - Hair analysis	- Diet - Eat red meat, poultry, seeds, nuts, wheat germ, wild rice, oysters - Zinc multivitamins
Sideroblastic Anemia			
Group of blood disorders w/ impaired ability of the bone marrow to produce normal RBC - Fe inside RBC is inadequately used to make HgB despite nml amounts of Fe <u>Etiology</u>: hereditary (congenital), acquired, and idiopathic <u>Acquired causes:</u> - **Myelodysplastic syndrome** - **SF3B1** - **Hypothermia** - Nutritional deficiency - Lead poisoning - Zinc deficiency - **Drugs - antiTB, abx, progesterone, chealators, busulfan**	- SOB - Heart palpitations - HA - Irritability - Chest pain <u>Physical Exam:</u> - Pale skin/ lemon-yellow tinge (could be brownish due to bleeding) - Splenomegaly/Hepatomegaly - Rare: acute leukemia develops	Labs - CBC - Peripheral smear - Iron studies - Bone marrow aspiration - **Abnormal nucleated erythroblast** - **Ring sideroblasts** = atypical - Iron loaded mitochondria - **Perinuclear ring of blue granules**	- Differs depending on the underlying cause - Vit B6 (pyridoxine) - If not effective, then blood transfusion <u>Acquired:</u> - Avoidance or **removal of toxin** or drug
NORMOCYTIC ANEMIA (MCV = 80 - 100)			

Anemia of Chronic Disease

- **Anemia of inflammation**
- **Seen in elderly w/ inflammatory chronic dz:**
  - Osteomyelitis
  - RA
  - Lupus
  - Cancer
  - Connective tissue disorders
  - Chronic infections
- Suspect in pt w/ chronic illness
- Poor dietary intake of iron or folic acid is common in chronically ill pts
- Pts on hemodialysis - lose Fe and folic acid

- **-** Nml or ↑ ferritin
- ↓ TIBC
- ↓ serum Fe
- Mild, normochromic, normocytic
  - Early anemia of chronic dz → microcytic, hypochromic

Bone marrow bx w/ iron stains:
- Absent iron staining = iron deficiency anemia
- Iron Localized in marrow macrophages = anemia of inflammation/anemia of chronic dz

- Treat underlying condition

If severe (HgB < 10) and interfering w/ quality of life:
- RBC transfusion or parenteral recombinant EPO
  - **EPOETIN ALFA**
  - **DARBEPOETIN**
  - **Dose individualized to maintain HgB of 10-12**
  - **AE: risk of venous thromboembolism and arterial thrombotic events**

Glucose-6-Phosphate Dehydrogenase Deficiency (G6PD)

- X-linked recessive
- MC in african american M
- G6PD = protective RBC enzyme against oxidative stress

Oxidative Stress:
- **Infections (MCC)**
- Fava beans
- Medications: sulfa drugs, antimalarials

Oxidative stress oxidizes Hgb into methemoglobin → RBC membrane damage and denatured Hgb

- Most asymptomatic until times of oxidative stress
- **Episodic hemolytic anemia**
  - Back/abdominal pain
  - Jaundice
  - Splenomegaly
- Neonatal jaundice
- Severe cases → acute renal failure

Peripheral Smear: normocytic, hemolytic anemia during crisis
- Schistocytes
- ∓ heinz bodies
- Smear nml during nonacute cases

Labs:
- ↑ reticulocyte cnt
- ↑ indirect hyperbilirubinemia
- ↓ haptoglobin

G6PD enzyme assay: fluorescent spot test

- Usually self limited
- Avoid offending drug and good
- Hydration
- Severe anemia:
  - Iron supplementation
  - Folate supplementation
  - ∓ blood transfusions

Hemolytic Anemia

- RBC are destroyed and removed from bloodstream before their normal lifespan is over
- MCC: Blood transfusion of incorrect blood type

- Paleness of skin
- Fatigue
- Fever
- Confusion, lightheaded or dizzy
- Weakness
- Dark urine - d/t blood
- Icteric or jaundice
- Heart murmur
- Tachycardia
- Hepatomegaly/ Splenomegaly

- CBC
- Bilirubin
- Low Hemoglobin
- LFT
- Reticulocyte count
- Urine test
- Bone marrow bx
- LOW WBC
- LOW PLT

- Blood transfusion
- IVIG
- Corticosteroids
- Surgery → splenectomy if that's where RBC are being destroyed
- If mild → may have spontaneous resolution

Prevention
- Give mother Rh at 28 wks if Rh (-)

Hereditary Spherocytosis (HS)

- Autosomal Dominant intrinsic hemolytic anemia
- MC in N Europeans
	- Hemolysis
	  - Anemia
	  - Jaundice
	  - Splenomegaly
	  - Pigmented black gallstones (calcium bilirubinate)
		<u>Blood Smear</u>:
		- HYPERchromic microcytosis
		- 80% spherocytes = round RBC's lacking central pallor
		- ↑ RDW
		
		+ Osmotic Fragility test
		- Coomb''s
			- Folic acid
			- Severe case → splenectomy

Sickle Cell Disease			

DISEASE = autosomal recessive genetic disorder of HgbSS
TRAIT = heterozygous HgbS
- Usually asymptomatic
 	
- Group of inherited RBC disorders
- **SIckle cell anemia is MC type of SCD**
- Dz - both Hgb S genes are inherited
- <u>Abnormal, sickled RBC</u> blocking blood flow in a blood vessel
- NOT like normal hgb
  - Stiff rod w/in RBC
  - Crescent shape
  - Block blood flow
  - **Cells last 10-20 days (instead of 120)**
 	
RBC sticking → microthrombosis
Hemolytic anemia
	- Early signs begin @ 6 months:
	  - **Dactylitis**
	  - Delayed growth and development
	- Infections:
	  - **Osteomyelitis**
	  - Functional asplenia
	  - **Aplastic crisis** → associated with parvo B19
	- Hemolytic anemia:
	  - Jaundice
	  - Pigmented gallstones
	- Microthrombosis (infarcts)
	  - "H" shaped vertebrae
	  - Splenic sequestration crisis → splenomegaly
	  - **Painful occlusive crisis**
	  - Triggered by cold weather
	  - Abrupt pain
	  - Renal dysfxn
	  - Hepatic dysfxn
	  - **Priapism**
		<u>CBC w/ peripheral smear:</u>
		- ↑ reticulocytes
		- Target cells
		- Sickled erythrocytes
		- ∓ howell jolly bodies
		
		<u>Hemoglobin Electrophoresis</u>:
		DISEASE:
		- HgbS
		- No HgbA
		- ↑ HgbF
		
		TRAIT:
		- HgbS
		- ↓ HgbA
			- Pain control:
			  - IVF + O2
			  - Narcotics
			  - Avoid Meperidine
			- Hydroxyurea
			- Folic acid
			- Immunize children for S. pneumo and HiB and N. meningococcus
			- Severe sickle cell crisis → RBC transfusion
			- Stem Cell Transplant = only curative management

Paroxysmal Nocturnal Hemoglobinuria			
- Stem cell mutations - Complement mediated RBC destruction AND thrombosis	- Hemolytic anemia - Dark cola-colored urine during night OR early AM - Venous Thrombosis of lg vessels - Pancytopenia	- Best screening = flow cytometry - Osmotic fragility test - (-) Coombs - ↑ RDW	- Eculizumab - Prednisone - Marrow transplant
Autoimmune Hemolytic Anemia (AIHA)			

<table>
<tr>
<td>

- Ab VS own RBC surface → RBC destruction by macrophages, spleen & complement
- MCC = Idiopathic

<u>WARM AGGLUTININS:</u>

- IgG Ab causes splenic macrophage RBC destruction via phagocytosis
- At core body temp = 98.6 F
- Etiology:
  - Autoimmune (SLE MC)
  - Malignancy (CLL)

<u>COLD AGGLUTININS:</u>

- IgM Ab VS RBC → intravascular complement-mediated RBC lysis
- At colder temperatures (< 39F)
- Etiology:
  - Infection (Mycoplasma, EBV)
  - Malignancy
- Anemia
- Acrocyanosis
- Fatigue, weakness
- Dyspnea
- Hemoglobinuria

</td>
<td>

- (+) Direct Coombs Test
- Cold agglutinin study
- Peripheral Smear: microspherocytes, polychromasia, RBC agglutination

</td>
<td>

<u>WARM AGGLUTININS:</u>

- 1st line = corticosteroids
- Splenectomy or Rituximab
- Immunosuppressants. IVIG

<u>COLD AGGLUTININS:</u>

- Avoid cold exposure
- Rituximab
- Refractory → plasmapheresis

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<tr>
<td colspan="4">Aplastic Anemia</td>
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Rare disease: bone marrow & hematopoietic stem cells are damaged

- Causes **<u>Pancytopenia</u> → deficiency of all three blood cells**
  - **Anemia → RBC**
  - **Leukopenia → WBC**
  - **Thrombocytopenia → platelets**
- Can be fatal when severe.

<u>Causes:</u>

- Radiation/chemo tx
- Exposure to toxic chemicals
  - Pesticides
  - Insecticides
- Drug use: RA drugs, Abx
- Autoimmune disorders
- Viral infection
  - Hepatitis
  - EBV
  - Cytomegalovirus
  - Parvo B19
  - HIV
- Pregnancy
- Unknown → idiopathic aplastic anemia

</td>
<td>

- Fatigue
- SOB w/ exertion
- Rapid/irregular HR
- Pale skin
- Frequent/prolonged infections
- Unexplained/easy bruising
- Nosebleeds
- Bleeding gums
- Prolonged bleeding
- Skin rash
- Dizziness
- HA

</td>
<td>

- Blood work - CBC
  - **<u>Low: RBC, WBC, platelets</u>**
  - **<u>Low reticulocyte count</u>**
- Bone marrow bx: to **confirm dx**
  - Fewer blood cells than normal

Blood and bone marrow studies:

- **Hypoplastic bone marrow** → has fatty replacement and ma have increased nonhematopoietic elements such as **MAST CELLS**

- **LOW RBCs, WBCs, PLATELETS**
- **LOW RETICULOCYTE COUNT**
- MCV USUALLY NORMAL BUT CAN HAVE MACROCYTOSIS

</td>
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- RBC - transfusions raise RBC counts → helps relieve anemia and fatigue
- Platelets

Stem cell transplant - to rebuild bone marrow

- **Tx of choice for people who are younger and have a matching donor**
- **70-90% pt with bone marrow transplant from sibling survive**
  - Lower rates for pts with unrelated donor

Immunosuppressants - for people who cant undergo bone marrow transplant or for those d/t autoimmune disorder

- Cyclosporine and antithymocyte globulin

Corticosteroids - methylprednisolone

Bone marrow stimulants - colony-stimulating factors

- Sargramostim, Filgrastim, Pegfilgrastim
- Epoetin alfa

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</tr>
<tr>
<td colspan="4">Leukemia</td>
</tr>
</table>

- High levels of **abnormal white cells that overwhelm and overtake the bone marrow**
- Invade and take over other organs
- May affect RBC, WBC, and platelets
- Blood stem cells (immature cells) → become mature blood cells over time
- Blood stem cell may become:
  - Myeloid stem cell
  - Lymphoid stem cell
	Myeloid Stem Cell: becomes one of three types of mature blood cells:
	- RBC: that carry O2
	- Platelets
	- WBC
	Lymphoid Stem Cell: become a lymphoblast then one of the 3 lymphocytes:
	- B lymphocytes: make Ab
	- T lymphocytes: help B make Ab
	- NK cells: attack cancer cells and viruses

Acute Lymphocytic Leukemia (ALL)

- **MC in KIDS (3-7 y/o)**
- **Bone marrow makes too many immature lymphocytes**
- Cells do not work like normal lymphocytes and are not able to fight infection → leukemia cells
- Affects **lymphoblasts**
- Risk Factors:
  - Down syndrome
  - Radiation
- MC site for METS:
  - CNS
  - Testes
 	
"ALL kids have a BLAST"
	- **Type B symptoms:**
	  - **Fevers**
	  - Chills
	  - Drenching
	  - Night Sweats
	  - Weight loss
	  - Easy bleeding and bruising
	- **Petechiae**, purpura
	- **Bone pain**
	- HA
	- Stiff neck
	- Visual changes
	- Vomiting
	- Pallor
	- Hepatosplenomegaly
	- Lymphadenopathy
		Labs:
		- Leukocytosis
		- Anemia
		- Thrombocytopenia
		
		Imaging: CXR r/o mediastinal mass
		
		Hallmark of Diagnosis
		- **Pancytopenia**
		- **Circulating blasts > 20%**
		
		Bone Marrow: hypercellular w/ > 20% BLASTA
			- Oral Chemo (Hydroxyurea)
			  - HIGHLY responsive to COMBO chemo
			  - (+) Philadelphia Chromosome → Imatinib
			- Relapse → stem cell transplant
			- CNS dz → intrathecal methotrexate
			
			Prognosis
			- Excellent outcome
			- <39 YO = 60-80% cure rate following chemo and stem cell transplant

Chronic Lymphocytic Leukemia (CLL)

- **MC type of leukemia in adults**
- Bone marrow makes too many lymphocytes
- B cell clonal malignant
 	
"CHRONIC old people commonly SMUDGE it up"
	- Usually asymptomatic
	- PAINFUL lymphadenopathy
	- Hepatosplenomegaly
	- **Fatigue**
	- Dyspnea on exertion
	- Infections
	  -
		Peripheral smear: incompetent, well differentiated, lymphocytes with scattered **SMUDGE CELLS**
		
		Labs
		- Elevated WBC
		- B cell Lymphocytosis > 20,000
		- PANCYTOPENIA
		  - Thrombocytopenia
		  - Anemia
		
		Flow Cytometry or immunophenotyping to determine type of lymphocyte and look for CLL cells in bone marrow or other fluids
		- CD5, CD19, CD20, CD23 (+) B cells
			- Symptomatic or progressive → chemotherapy
			  - Fludarabine ∓ Rituximab, Chlorambucil
			- Stem cell transplant = curative

Acute Myelogenous Leukemia (AML)

- MC ACUTE form of leukemia in adults (MC > 50 y/o)	- **Splenomegaly** - **Gingival hyperplasia** - Bone pain - HA - Confusion - TIA - CVA - Resp distress - Dyspnea	- Pancytopenia: anemia, thrombocytopenia, neutropenia - **WBC > 100,000** <u>Bone Marrow:</u> - **AUER RODS** - > 20% blasts	- Combination chemotherapy - Cytarabine + anthracycline - Bone marrow transplant after remission <u>Complication:</u> Tumor Lysis Syndrome - 48 - 72 hr after induction of txt - Hyperuricemia - ↑ K - ↑ phosphate - ↓ Ca - Acute renal failure - Txt: allopurinol, IVF
Chronic Myelogenous Leukemia (CML)			

- > 50 y/o	- Asymptomatic until develop blastic crisis = acute leukemia
	  - Splenomegaly
		<u>Cytogenetics or FISH:</u> **PHILADELPHIA CHROMOSOME**
		"Philadelphia CreaM Cheese"
		
		- Extremely elevated WBC
		- ↑ LDH
		- ↓ LAP
		
		Chronic = < 5% blasts
		Accelerated = > 5% - 30% blasts
		Acute = > 30% blasts
			- Chemotherapy
			  - Hydroxyurea
			  - Imatinib if + philadelphia chromosome
			  - Dadtinib
			  - Ponatinib
			- Severe or failed chemo → stem cell transplant

Thrombocytopenia			
Thrombotic Thrombocytopenic Purpura (TTP)			

<u>Etiology</u>:
1. Primary TTP → idiopathic (autoimmune)
2. Secondary TTP:
- Malignancy
- Marrow transplantation
- SLE
- Estrogen
- Pregnancy
- HIV
	<u>Pentad:</u>
	1. Hemolytic anemia
	  - Anemia, jaundice
	  - Schistocytes on peripheral smear
	2. Thrombocytopenia
	  - Petechiae, bruising, purpura, mucocutaneous bleeding
	3. Kidney failure
	4. Fever
	5. Neurologic symptoms
	  - HA, CVA, AMS
		- Systemic low platelets
		
		- Peripheral smear = Schistocytes (**Helmet cells**)
		- Elevated LDH, bilirubin, reticulocyte
		- **Nml fibrinogen**
		- **Nml INR**
		- **Nml PT/PTT**
			- **1st choice = Plasmapheresis**
			- **Immunosuppression = corticosteroids**

Hemolytic Uremic Syndrome (HUS)			

- MC in kids; rare in adults - **MCC: gram (-) sepsis - E.coli**, Shigella, or Salmonella - Platelet activation by exotoxins - RBC's are destroyed and block the kidney filtering system - Condition characterized by destruction of red blood cells, low platelet count, and kidney failure. <u>2 types:</u> - Typical HUS - d/t E.coli - Atypical HUS	<u>Triad:</u> 1. Hemolytic anemia - Anemia, jaundice - Schistocytes on peripheral smear 2. Thrombocytopenia - Bruising, purpura, bleeding 3. Kidney failure - Uremia - MC in HUS > TTP	- Peripheral smear = Schistocytes (**Helmet cells**) - Elevated LDH, bilirubin, reticulocyte - **Nml fibrinogen** - **Nml INR** - **Nml PT/PTT** - ↑ BUN and creatinine	- In children tends to be self-limiting - IVF - Plasmapheresis (∓ FFP) if severe or neuro complications
Disseminated Intravascular Coagulation (DIC)			
- Proteins in the blood involved in blood clotting become overactive → PLTs chewed up - Blood clots form in small blood vessels throughout body <u>Etiology</u>: - Infection: gram(-) MC - Malignancy - Obstretric - Massive tissue injury	- **Widespread hemorrhage** - Bleeding from mucous membrane - Digital ischemia - **Gangrene jury** - Renal, hepatic, and respiratory dysfxn	- **<u>SEVERE Thrombocytopenia</u>** - ↑ PTT, PT, INR - ↑ **plasma d-dimer** - **↓fibrinogen** (factor I) - Peripheral Smear: fragmented RBC'S (schistocytes)	- Txt underlying cause - If bleeding → **FFP** or **cryoprecipitate** to replace fibrinogen - **Heparin** → in severe thrombosis **FFP:** contains ALL coagulations factors **CRYOPRECIPITATE**: contains factor 8, vWF, 13
Idiopathic (Autoimmune) Thrombocytopenic Purpura (ITP)			
- Immune antibodies attack & destroy platelets → low levels of platelets → easy bruising & bleeding - Primary ITP: idiopathic - Secondary ITP: immune-mediated; associated with underlying dz <u>ACUTE ITP</u>: MC kids s/p viral infection <u>CHRONIC ITP</u>: MC adults - MC F < 40 y/o - M > 70 y/o	- **Purpura** - Easy or excessive bruising - **Petechiae** - Superficial bleeding into to skin → pinpoint red spots - Mucocutaneous bleeding - NO splenomegaly	- **Hallmark is <u>isolated thrombocytopenia</u>** - Normal coag tests - Peripheral smear: megakaryocytes or large sized platelets	CHILDREN: - Observation - Hasn't resolved in 6 months → IVIG ADULTS: - Corticosteroids - IVIG - Refractory → splenectomy
Clotting Disorders			

<table>
<tr><th colspan="4">Factor V Leiden Mutation</th></tr>
<tr><td colspan="2">- MC inherited cause of hypercoagulability
- Factor V mutation → ↑DVT's, PE's especially in young patients
- Not associated with increased incidence of MI and CVA</td><td>(+) activated protein C resistance assay → confirm w/ DNA testing

Normal PT/PTT</td><td><u>High Risk</u>: indefinite anticoagulation
- Thromboprophylaxis during pregnancy
-
<u>Moderate Risk</u> = 1 thrombotic even with a prothrombotic stimulus OR asymptomatic
- Prophylaxis during high-risk procedure</td></tr>
<tr><th colspan="4">Protein C Deficiency</th></tr>
<tr><td>- Autosomal dominant
- Protein C = Vit K dependent anticoagulant
- May have family hx</td><td>- Recurrent DVT's or pulmonary embolisms</td><td colspan="2">Heparin PO for life
- Complication = warfarin-induce skin necrosis</td></tr>
<tr><th colspan="4">Antithrombin III Deficiency</th></tr>
<tr><td>1. Inherited: autosomal dominant
2. Acquired: liver dz, nephrotic syndrome, DIC, chemo

- Results in venous thrombus</td><td>- Recurrent DVT's or pulmonary embolisms</td><td colspan="2">- Asymptomatic → anticoagulation before surgical procedures
- Hx of thrombotic event → high dose IV heparin → PO anticoagulation</td></tr>
<tr><th colspan="4">Lymphomas</th></tr>
<tr><th colspan="4">Hodgkin Lymphoma</th></tr>
<tr><td>- Bimodal: peaks @ 20 y/o then again @ > 50 y/o
- MC in M
- Associated with EBV virus

<u>Types</u>:
1. Nodular - Sclerosing (MC in F)
2. Mixed Cellularity
3. Lymphocyte rish
4. Lymphocyte depleted</td><td>- PAINLESS lymphadenopathy
- Upper body lymph nodes
- Firm, freely mobile
- Hepatosplenomegaly
- B symptoms = advanced disease
- Cyclical fever
- Night sweats
- Weight loss</td><td><u>Excisional Biopsy</u>: REED-STERNBERG CELL
- Owl eye appearance

- PET/CT for staging
- Mediastinal lymphadenopathy</td><td>- Highly curable

<u>Local Dz (Stage I, II, IIIA)</u>: radiation

<u>Stage IIIB, IV</u>: combination chemo ("ABVD")
- Adriamycin
- Bleomycin
- Vinblastine
- Dacarbazine</td></tr>
<tr><th colspan="4">Non-Hodgkin Lymphoma</th></tr>
</table>

- MC > 50 y/o
 	
<u>Risk Factors</u>:
- Increasing age
- Immunosuppression
- Connective tissue dz
- Family hx
- Hx of radiation therapy
 	
<u>Types</u>:
1. Diffuse B cell - **MC aggressive fast growing type**
2. T cell
3. Follicular
4. Burkitt's Lymphoma
	- PAINLESS lymphadenopathy
	  - Peripheral lymph nodes MC
	  - Extranodal sites common: GI, skin, CNS
	- Mediastinal masses
	- Systemic B symptoms rarer in NHL
	
	<u>BURKITT'S LYMPHOMA:</u>
	- Abdominal pain
	- Jaw involvement
	- "Starry" sky appearance on histology
		- PET/CT for staging	<u>FOLLICULAR:</u>
			- Rituximab
			
			<u>DIFFUSE B CELL</u>:
			- Curable w/ chemo
			- R-CHOP
			  - Rituximab
			  - Cyclophosphamide
			  - Hydroxydaunorubicin
			  - Oncovin/Vincristine
			  - Prednisone

Polycythemia Vera (Primary Erythrocytosis)			
- Overproduction of ALL 3 myeloid stem cell lines - Peaks 50 - 60 y/o - MC in M - d/t JAK 2 mutation	- HA - Dizziness - Tinnitus - Blurred vision - **Pruritus - especially after hot bath** - Fatigue - Epistaxis - Splenomegaly - Flushed fashed = facial plethora	<u>Major Criteria:</u> - ↑ RBC mass - ↑ hematocrit - ↑ Hgb - Bone marrow Biopsy: hypercellularity - **JAK2 mutation** <u>Minor Criteria</u>: - ↓ erythropoietin	- **Phlebotomy** = txt of choice - Lose dose ASA - Hydroxyurea - Allopurinol if hyperuricemia - Ruxolitinib

INFECTIOUS DISEASE

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Mononucleosis			

- MC young adults (15 - 25 y/o)
- Transmitted via saliva
- Epstein Barr virus - HHV4
- Incubation several weeks
	- Fever
	- Sore throat - exudative
	- POSTERIOR cervical lymphadenopathy
	- Malaise
	- Myalgias
	- Splenomegaly
	- Hepatomegaly
	- Petechial rash if given ampicillin
		- Heterophile (Monospot) Ab Test = positive within 4 weeks
		- Rapid viral capsid antigen test
		- Peripheral Smear:
		  - > 50% lymphocytes
		  - > 10% atypical lymphocytes
			- Supportive txt
			  - Rest
			  - Analgesics
			  - Antipyretics
			- If airway obstruction d/t lymphadenopathy
			- Avoid trauma/contact sports at least 1 month to prevent splenic rupture

Lyme Disease			

- Borrelia burgdorferi → gram (-0 spirochete
- Transmitted by Ixodes spp deer tick
	<u>Stage 1:</u> EARLY LOCALIZED
	- Flu-like symptoms
	- Erythema migrans
	  - Expanding, warm, annular, erythematous rash with central clearing (bullseye)
	
	<u>Stage 2:</u> EARLY DISSEMINATED
	- Disseminated disease with secondary skin lesions
	- Arthritis
	- HA
	- Meningitis
	- Weakness
	- AV block
	- Pericarditis
	- Multiple skin lesions
	
	<u>Stage 3:</u> LATE DISEASE
	- Occurs months to years after initial infection
	- Monoarticular or oligoarticular arthritis
	- Persistent synovitis
	- Persistent neuro symptoms
	- Intermittent paresthesias
	- Acrodermatitis chronicum atrophicans
		- Serology for antibodies
		- Confirmatory Western blot
		- Serologic testing often negative during the time that erythema migrans is present
			<u>Early Disease:</u>
			- Doxycycline bid X 10 - 21 days
			  - If CI can use azithromycin or erythromycin
			- Amoxicillin
			  - Children < 8 y/o
			  - Pregnant
			
			<u>Late/severe disease</u>:
			- IV ceftriaxone if 2nd/3rd degree heart block, syncope, dyspnea, chest pain, CNS disease
			
			<u>Prophylaxis:</u>
			- Doxycycline 200 mg x 1 dose
			  - Within 72 hr of tick removal if tick present for > 36 hrs

Human Immunodeficiency Virus

- Retrovirus = changes viral RNA into DNA via reverse transcriptase
- HIV-1 (MC) and HIV-2
- Transmission
  - Sexual intercourse
  - IV drug use
  - Mother to child

Acute Seroconversion:
- Flu-like illness
  - Fever
  - Malaise
  - Generalized rash
- Generalized lymphadenopathy

AIDS:
- CD 4 count < 200
- Recurrent severe and potentially life threatening opportunistic infections
- HIV wasting syndrome
  - Chronic diarrhea
  - Weight loss
- Neuro changes
  - Encephalopathy
  - Dementia

- ELISA = screening test
  - Reactive w/in 3 - 6 months of infection
- Rapid Testing - blood or saliva
- Western Blot = CONFIRMATORY
- HIV RNA viral load
  - Can be (+) in window period
  - Monitor infectivity

Post Exposure Prophylaxis: w/in 72 hrs of incident

HAART Regimen:
NNRTI + 2 NRTI
OR
PI + 2 NRTI
OR
INSTI OR 2 NRTI

Opportunistic Infections

CD 4 count	Disease	1st line Agent	2nd line Agent
700 - 1500	Normal		
> 500	Lymphadenopathy		
500 - 200	Tuberculosis	ING if latent TB	Rifampin
	Kaposi sarcoma, Thrush, lymphoma, Zoster		
≤ 200	Pneumocystis (PCP)	Trimethoprim/sulfamethoxazole	Dapsone, Atovaquone, Pentamidine
≤ 150	Histoplasmosis	Itraconazole	Amphotericin B
≤ 100	Toxoplasmosis	TMP/SMX	Dapsone + Pyrimethamine + Folinic Acid
	Cryptococcus	Fluconazole	Amphotericin B
≤ 50	MAC	Azithromycin or clarithromycin	Rifabutin
	CMV retinitis	valganciclovir	Ganciclovir + Foscarnet

Influenza

- Acute respiratory illness d/t influenza A or B virus
  - A = more severe, extensive outbreaks
- Orthomyxovirus family
- Spread via airborne respiratory secretions
- MC fall/winter
- Incubation 18-72 hrs

- Abrupt onset
- HA
- Fever
- Chills
- Malaise
- URI symptoms
- Pharyngitis
- PNA

- Clinical dz
- **Rapid influenza test** (nasal swab)
- Viral culture

- Supportive care
  - Rest
  - Salicylates
  - APAP

<u>Antivirals</u>: best if initiated w/ in 48 hrs of symptoms

- Influenza A AND B - Neuraminidase Inhibitors
  - **Oseltamivir (Tamiflu)**
  - Zanamivir
  - Ribavirin
- Influenza A - not commonly use
  - Amantadine
  - Rimatidine

Prevention

- Vaccine given annually (Oct/Nov)

Influenza Trivalent Vaccine	Intranasal

- CI: eggs, gelatin or thimerosal allergies
- CAUTION if severely ill
- ≥ 65 y/o
- Residents of nursing homes/long term care facilities
- Underlying chronic medical conditions:
  - Asthma, COPD, Sickle cell, Heart Dz, DM
- Healthcare workers
- Immunocompromised
- Contracts of patients infected w/ influenza
- Pregnant women
	- Live attenuated
	- Not routinely used
	- Healthy patients 2 - 49 y/o
	- CI:
	  - > 50
	  - Pregnant
	  - Immunocompromised
	  - DM
	  - Chronic lung or heart dz
	  - Egg allergy
	  - Hx of Guillain Barre

Salmonellosis

- Greater in summer months
- Incubation period = 6 - 48 hrs
- MC source:
  - Poultry products (dairy, meats, eggs)
  - Exotic pets (reptiles)
  - feco-oral
- High risk groups:
  - Immunocompromised
  - Sickle cell disease
  - Post splenectomy pts
  - AIDS
  - Children
  - Elderly

<u>Gastroenteritis</u>:

- S.typhimurium
- IP = 5 - 14 days
- Abd pain
- Fever
- Vomiting
- **MUCUS AND BLOODY DIARRHEA**

<u>Typhoid Fever:</u>

- S. typhi
- IP > 1 - 2 wks
- Cephalic phase: HA, constipation, pharyngitis, cough → crampy abd pain, diarrhea (**PEA SOUP STOOLS)**
- Intractable fever
- Blanching “rose” spots in 2nd week

- Stool culture

- Gastroenteritis usually self-limited
- IVF
- Severe:
  - **Fluoroquinolones**
  - Ceftriaxone
  - TMP-SMX

Shigellosis

- Etiology
  - Shigella sonnei (MC)
  - Flexneri
  - Dysenteriae
- Bacillary dysentery → infectious colitis, mainly rectosigmoid colon
- Fecal oral transmission (daycare) → raw vegetables or cold salads

- Lower abdominal pain
- High fever
- Tenesmus
- **EXPLOSIVE WATERY DIARRHEA → MUCOID, BLOODY**
- Neuro findings especially in young children
  - Febrile seizures

- Stool culture
  - Feval WBC/RBC
- CBC: Leukemoid reaction (WBC > 50,000)
- Sigmoidoscopy: punctate areas of ulceration

- Fluids
- Severe:
  - TMP-SMX = 1st line
  - Fluoroquinolones

Meningitis

- Fever/ chills
- Meningeal symptoms:
  - HA
  - Nuchal rigidity
  - Photosensitivity
  - N/V
  - AMS
  - Seizures

- (+) Kernig's sign → inability to straighten knee w/ hip flexion
- (+) Brudzinski's sign → neck flexion produces knee/hip flexion
- Head CT r/o mass
  - Before LP
- Lumbar Puncture = definitive dx
  - Start empiric txt BEFORE LP results

	Bacterial	Viral	Fungal & TB
Opening P (5 - 20)	↑	Nml or slightly ↑	Normal or slightly
Protein (18 - 58)	↑↑ > 200	Nml or slightly ↑	↑
Glucose (50 - 80)	↓↓↓	Normal	↓
WBC Count (0 - 5)	↑ 100-100,00 > 80% PMN's	↑ 10 - 300 Lymphocytes	↑ 10 - 200 Lymphocytes

Age	Pathogens	Empiric Management
< 1 month	- **GBS (S. agalactiae) MC** - L. monocytogenes - E. coli - S. pneumoniae	Ampicillin + Cefotaxime OR Aminoglycoside
1 months - 18 y/o	- **N. meningitidis (MC)** → petechial rash - **S. pneumo** - H. Influenzae	Ceftriaxone + Vancomycin Cefotaxime can be used instead of ceftriaxone
18 - 50 y/o	- **S. pneumo (MC)** - **N. meningitidis** - H. Influenzae - Listeria monocytogenes - Gram (-) rods	
> 50 y/o	- **S. pneumo** - **Listeria monocytogenes** - Gram (-) rods	Ampicillin + Ceftriaxone OR Cefotaxime ∓ Vancomycin

Post-exposure Prophylaxis = Ciprofloxacin 500 mg PO X 1 dose

Viral (Aseptic) Meningitis			

<u>Etiology:</u>
- Enterovirus MC
  - Echovirus, coxsackie
- Arbovirus
- Mumps
- HSV 1, HSV 2
	- HA
	- Fever
	- Mild confusion
	- Meningeal symptoms
	  - Nuchal rigidity
	  - Photophobia
	  - Phonophobia
	  - Lethargy
	- Normal cerebellar function
	  - Not associated with seizures or focal neurological deficits
		- (+) kernig's signs
		- (+) brudnizki sign
		- CSF analysis
		  - Lymphocytosis
		  - **Normal glucose**
		  - Mildly increased P
		- CT scan
		- MRI
		- Serologies, viral culture
			- Supportive case
			  - Antipyretics
			  - IVF
			  - Anti Mimetics
			- Self- limiting (7-10 days)

URGENT CARE

General and Scientific Concepts	History/PE and Clinical Manifestations	Diagnostic Studies and Intervention	Treatment and Maintenance
Respiratory Failure/Arrest			

- Idiopathic respiratory failure associated with severe injury or illness causing epithelial cell damage.	- Severe hypoxia	- CXR: bilateral infiltrates that become confluent + Air bronchograms.
		- pO2/FIO2 ratio
		  - <300 = ARDS
		  - <100 = Severe ARDS.
		- Pulmonary wedge pressure: Normal.
			- Low tidal volume mechanical ventilation is best supportive care.
			  - Use 6mL/kg of tidal volume.
			- Steroid use is not beneficial in this case.
			- Use Positive end-expiratory pressure (PEEP) to decrease FIO2 levels, levels > 50% are toxic to lungs.

Deteriorating Mental Status/Unconscious Patient			

- Various etiologies may cause changes in mental status	**Clouding of consciousness:** very mild form of AMS
	- Inattentive
	- Reduced wakefulness
	
	Confusional state: more profound deficit that includes:
	- Disorientation
	- Bewilderment
	- Difficulty following commands
	
	Lethargy: severe drowsiness in which the patient can be aroused by moderate stimuli then drift back to sleep.
	
	Obtundation:
	- Severe drowsiness with a lessened interest to environment
	- Slower responses to stimuli
	- Sleeping more than normal with drowsiness in between sleep states.
	
	Stupor: only vigorous and repeated stimuli will arouse the individual, and when left undisturbed, the patient will immediately lapse back to the unresponsive state.
	
	Coma: state of unarousable unresponsiveness.
		- Asses ABCDE's.
		- Assess GCS score.
			- If unclear etiology is Naloxone + dextrose.
			  - Can also give thiamine.
			  - If they do not work, intubate immediately to protect airway.
			- Find etiology, MC metabolic or toxic disturbances.
			- GCS<8 = intubate.

Allergic Reaction/Anaphylaxis			

IgE mediated severe systemic hypersensitivity reaction with histamine release: vasodilation leading to increased capillary permeability	Hx: - Bites/ stings - Food or druG allergy - Recent IV contrast S/S: within 60 min of exposure - Pruritus - Hives - Angioedema S/S lead to: - Respiratory distress - Stridor - Lump throat - Hoarseness: life threatening laryngeal edema	- DX is clinically based	1st line: epinephrine - 0.3 mg IM of 1:1000 repeat q 5-10 min PRN Cardiovascular collapse: epinephrine 1mg IV (1:10,000) Airway management: antihistamines: diphenhydramine 25-50 mg IV blocks H1 Ranitidine IV blocks H2 IV fluids: observe pt for 4-6 hours 20% of pt have biphasic phenomenon return of symptoms 3-4 hours after initial rxn
Acute Abdomen			
Appendicitis			

- Obstruction of appendix **MC d/t fecalith** - MC 10 - 30yo	- Anorexia - **Periumbilical/epigastric pain→ followed by RLQ pain** - N/V - <u>+ Rovsing sign</u>: RLQ pain w/LLQ palpation - <u>+ Obturator sign</u>: RLQ pain w/internal & external hip rotation w/flexed knee - <u>+ Psoas sign</u>: RLQ pain w/right hip flexion/extension - <u>McBurney's point tenderness</u>: point ⅓ the distance from the anterior sup. Iliac spine & navel	- CT scan - Leukocytosis	- Appendectomy
Ischemic Bowel			
- Caused by a ↓ in intestinal blood flow, usually arising from occlusion, vasospasm, or hypoperfusion of the mesenteric vasculature. <u>Risk Factors</u>: - Advanced age - Atherosclerosis - Low cardiac output states - Cardiac arrhythmias - Recent MI - Severe cardiac valvular disease - Intra-abdominal malignancy	- Periumbilical pain - Nausea, vomiting, anorexia, and diarrhea progressing to obstipation. - Mild abdominal distention or occult blood in the stool. - Peritoneal signs - Feculent odor to the breath	- Duplex sonography - Angiography = GOLD STANDARD	- Correction of metabolic acidosis - Broad-spectrum antibiotics - Placement of an NG tube for gastric decompression. - Anticoagulants - Intra-arterial vasodilators or thrombolytic agents, angioplasty, stent placement, embolectomy, or exploratory laparotomy with resection of necrotic bowel may be necessary.
Ruptured Aortic Aneurysm (AAA)			
	- Sudden onset of abdominal, back, or flank pain - Hypotension - Tachycardia - Temporary loss of consciousness - Abdominal bruit - Pulsatile abdominal mass	- Abdominal CT or MRI	- Hemodynamic support - Blood transfusions - Immediate consultation for surgical repair.
Burns			

FIRST DEGREE - Minor epithelial damage of epidermis - MC causes are flash burns & sunburn - Superficial	- Redness, tenderness & pain are present - No blistering	**RULE OF NINE:** <u>Adults BSA</u> - 9% head & neck - 9% each upper extremitY - 18% anterior portion of trunk - 18% posterior portion of trunk - 18% each lower extremity - 1% to perineum & genitalia <u>Children BSA</u> - 18% head & neck - 9% each upper extremity - 18% anterior portion of trunk - 18% posterior portion of trunk - 13% each lower extremity - 1% to perineum & genitalia	<u>Pre-hospital care:</u> Evaluate for signs of inhalation injury – includes dyspnea, burns on mouth & nose, singed nasal hairs, sooty sputum, & cough treat w/ humidified oxygen, non-rebreathing mask at 10-12 L/min <u>Minor Burns:</u> - Cool with room temperature water - Do not apply ice - Wash with soap and water - Debride ruptured blisters or necrotic skin. (Do not rupture intact blisters) - Pain management: NSAIDS or acetaminophen. - Non superficial blisters need silver sulfadiazine or bacitracin to prevent infection. <u>Hospital care:</u> - Fluid resuscitation: 4ml/kg X %BSA = fluid given in 24 hours. Half is given in 8 hours and following half is given in 16 hours. - **Parkland formula:** - Uses lactated ringers - Total volume given is 4ml/kg/% body surface area burned in first 24h (1/2 is given in first 8h, rest given over next 16h)% body area burned includes only 2nd/3rd degree bu <u>Pain management</u> - Requirement for pain meds is inversely related to depth of burn injury - Full thickness are painless - Morphine is medication of choice <u>Third Degree:</u> Skin grafting needed unless burn is small (<1 cm in diameter) <u>Fourth Degree:</u> Requires debridement & reconstruction of tissues
SECOND DEGREE - Superficial partial-thickness burn Involves epidermis & superficial dermis layers Deep partial-thickness burn - Involves epidermis & extends into the lower dermis layer	- Superficial partial-thickness burn - Skin appears pink, moist & soft & thin-walled blisters are present, very tender - Deep partial-thickness burn - Skin appears red & blanched white w/ thick-walled blisters		
THIRD DEGREE - Full-thickness burn that destroys epidermis & dermis	- Caused by immersion scalds, flame burns, chemical & high-voltage electrical injuries - Skin is white or leathery w/ underlying clotted vessels & is numb		
FOURTH DEGREE	- Full-thickness destruction of skin, subcutaneous tissue, fascia, muscle, bone & other structures - Due to prolonged exposure to causes of 3rd degree burns		
Third Trimester Bleeding			

PLACENTA PREVIA Abnormal placenta placement on or close to the cervical os Partial: covering cervix ahead of fetal presenting part Complete: total coverage of cervical os Marginal: w/in 2-3 cm of cervical os Risk Factors: - Multiparity - Increasing age - Smoking	- 3rd trimester bleeding - PAINLESS BRIGHT RED bleeding - b/t 20-30 W - Resolves 1-2 hrs - **NO abdominal pain** - Uterine soft, **NON TENDER**	- Fetal HR: normal - Dx: pelvic US	- Hospitalization Stabilize fetus: - Tocolytics: **Magnesium sulfate** (inhibits uterine contractions) - Amniocentesis: to fetal lung maturity - Steroids given between 24-34 wks to increase lung maturity
ABRUPTIO PLACENTAE - Premature separation of placenta from uterine wall after 20 weeks gestation Risk Factors: - MC: maternal HTN - Smoking - ETOH - Cocaine - Folate deficiency - High parity - Increased age - Trauma - Chorioamnionitis	- I: mild, slight bleeding - II: moderate/ partial - III: complete - **Bloody vaginal discharge** - 3rd trimester bleeding - Continuous, DARK RED - ABDOMINAL PAIN - Painful uterine contractions - Rigid uterus - +/- back pain and shock symptoms	- **Fetal HR:** bradycardia (fetal distress b/c interferes with fetal oxygenation) - Dx: US - Do NOT perform pelvic exam	- Hospitalization - Immediate delivery: C-section Complications = DIC
Bites/Stings			
BLACK WIDOW	- Red hourglass marking - Webs close to ground in sheltered places - Immediate sharp pain to painless - Look for small red fang marks - Initial swelling generalized abdominal, back & leg pain 15 min.to 2 h after bite - Dizziness, HA - Sweating - N/V – gradually or several days,possible residual sx for weeks to month		- Antivenin - Calcium gluconate (muscle relaxant) - Analgesics
BROWN RECLUSE	- Small, “violin” marking on back, lives in dark, undisturbed areas		- Ice, elevation

	- Complications:
	  - Hemolytic anemia
	  - DIC
	  - Renal failure
	  - Death
	- Bite: minor stinging or burning, most bites are mild w/ minimal swelling/redness
	- Fatty areas show more rxn & may become necrotic w/in 4 h
	- Blue-gray, cyanotic pustule or vesicle/bulla
	- Severe pain w/in 4 h – tissue damage can be severe a take months to heal w/ scarring
			- Avoid strenuous activity
			- Abx
			- ASA

RABIES	- Rhabdovirus – bullet-shaped - Transmitted by infected saliva - Hx of animal bites – bats, bears, skunks, foxes & raccoons, dogs & cats in developing countries - Paresthesias, hydrophobia, rage - Convulsion, paralysis, thick saliva, muscle spasms		- Supportive, wash & clean the wound - Observe the animal - Post-exposure immunization – rabies immune globulin (RIG): full dose around wound, do not give if previously immunized - Vaccine: dose on days 0, 3, 7 & 14 & 28, if previously immunized then on days 0 & 3
DOG, CAT, HUMAN BITE	- Human bites are more damaging than the others. - Human bites: transmit Eikenella Corrodens - Dog & Cat bites: transmit pasteurella multocida -		- Management of dog, cat, and human bite is the same. - Amoxicicillin/clavulanate + Tetanus vaccination if booster >5 yrs since last inj.

SNAKE BITE	- MC injury from snake bite is a local wound. Proteases and lipases damage local tissue.
	- Usually bite is not deep enough to enter blood stream.
	- Death from a snake bite occurs due to:
	  - Hemolytic toxin → causing hemolysis and DIC
	  - Neurotoxin → causing respiratory paralysis, ptosis, dysphagia, and diplopia
			- Apply pressure
			- Immobilize patient to decrease venom movement
			- Administer antivenom.

Orbital Cellulitis			
- Infection of the orbit - **Secondary to sinus infections** (ethmoid 90%) - S. aureus, S. pneumo, GABHS, H. influ - Caused by dental/facial infections or bacteremia - **MC: 7-12 yo** - MC complication → periosteal abscess and orbital abscess.	- Decreased vision - Pain with ocular movement - Proptosis - Eyelid erythema - Edema	- High resolution **CT scan**	<u>IV ABX</u> - Vancomycin - Clindamycin - Cefotaxime - Ampicillin/sulbactam - If no response w/in 48 hrs → repeat CT → look for abscess
FB Aspiration			

- Accidental inhalation of foreign material into airway or esophagus
 	
<u>Epidemiology:</u>
- Highest incidence in children <3 d/t limited mastication skills & commonly place objects in mouth in active exploration
- Aspiration in older children – improperly chewed food, habitually chewed objects (pen tops, erasers, small toy parts)
 	
Site where foreign bodies lodge: trachea, **major bronchus most common location**, smaller airways, esophagus (common in younger children, causes tracheal compression, stridor or cough)
	- Varies according to location, size & shape of object
	- Auscultation reveals, unilateral decreased breath sounds or wheezing.
	- **Occluded upper airway** – sudden & severe respiratory distress
	- **Peripheral airway** – chronic cough
	- **Supraglottic region or larynx** – dyspnea, stridor, retractions, croupy cough, drooling
	- **Small airway** – asymmetric breath sounds, wheezing cough
	- **Trachea** – dyspnea, stridor/wheezing, retractions, cough
	- **Bronchus** – asymmetric chest movement, unilateral wheezing, cough
		- Normal CXR in 80%
		  - Inspiratory/expiratory films may be helpful in cases of partial obstruction
		  - R & L decubitus films – may show partial airway obstruction
		- CT scan
		- Abdominal series XR
		- Do NOT do MRI
		
		<u>Coughing or choking episode followed by wheezing, think airway foreign body**</u>**
			- Removal of foreign body → manual, rigid of flexible bronchoscopy, thoracotomy
			  - Endoscopy for retraction if early in tract, otherwise surgical laparotomy for removal if obstruction present.
			- If no obstruction, patient will eventually defecate it.
			- Abx (when evidence of secondary infxn)

Cardiac Failure			
Abnormal cardiac function renders the heart unable to pump blood at a rate to meet the requirements of the metabolizing tissue <u>Etiologies:</u> - Valvular heart disease - Ischemic heart disease - Arrhythmias - HTN - Cardiomyopathy **R side failure** – think systemic **L side failure** – think pulmonary	Dyspnea, orthopnea, PND, fatigue, edema, exercise intolerance <u>Physical exam:</u> - JVD >8 cm - Rales - Tachycardia - Displaced PMI - S3 (LV dysfunction) - Edema, ascites <u>NY Heart Association:</u> - I – pts w/ no limitations of activities; suffer no sx from ordinary activities - II – pts w/ slight, mild limitations of activity; comfortable w/ rest or mild exertion - III – pts w/ marked limitations of activity; comfortable only at rest - IV – pts confined to bed or chair; any physical activity brings on discomfort & sx at rest	<u>EKG:</u> LVH, check for MI <u>Labs:</u> - BNP: elevated - Cardiac enzymes - CBC, electrolytes, renal function <u>CXR:</u> cardiomegaly + pulmonary vasculature, pleural effusions, Kerley B lines <u>ECHO:</u> - Systolic/diastolic dysfunction - Decreased EF - LV/RV hypertrophy - Regional wall motion	Low sodium diet **Diuretics** – enhance sodium/water excretion - Loop diuretics – diuretics of choice - Thiazide diuretics – mild HF **ACEI** – use early. Reduce hypertrophy, **ARB** – no cough like ACEI **Beta-blocker** – reduce vasoconstriction (preload/afterload) & sodium retention **Hydralazine** – vasodilator **Avoid corticosteroids, NSAIDs, CCBs**
Cardiac Arrest			

- Always assess if patient is truly unresponsive: ABC's.
- If unresponsive active EMS.
- Begin chest compressions in a 30:2 compression/breath ratio.
	- Pulselessness due to:
	  - Asystole
	  - Vfib
	  - Vtach
	  - PEA
		<u>Asystole:</u> 1st line epinephrine or vasopressin.
		
		<u>Vfib:</u>
		- 1st line unsynchronized cardioversion (AKA defibrillation) and continue CPR, defib again
		- If uneffective give epinephrine or vasopressin and defib again, then can give amiodarone and defib again.
		
		<u>Vtach:</u> Pulseless Vtach 1st line: defib, CPR, epinephrine, defib, amiodarone.
		<u>Hemodynamically stable Vtach:</u> amiodarone, then lidocaine, then procainamide. If fails, cardiovert.
		<u>Hemodynamically unstable Vtach:</u> cardiovert several times, give amiodarone, then lidocaine, or procainamide.
		
		<u>PEA:</u>
		- Normal EKG but no pulse.
		- Tx underlying cause: MC cardiac tamponade, tension pneumothorax, pulmonary embolism, hypo/hyperkalemia.	

Fractures/Dislocations			
Clavicle Fracture			
- MC at middle third of clavicle. 2nd - MC is distal third of clavicle.	- Pain at level of clavicle. - May carry a weight to show displacement of clavicle on weight bearing.	- AP XR	- Sling - If complete displacement = surgery. - Distal fx = surgery.
Upper Extremity			
SHOULDER FRACTURE **Clavicle:** Very common in pediatrics D/t FOOSH (fall on outstretched hand) injury	**Exam:** holds ipsilateral arm close to trunk	- XR - Check neurovascular status	- Figure 8 - Cradle sling
SHOULDER DISLOCATION <u>Anterior:</u> **MC**; fall on abducted/externally rotated arm or forceful throwing motion <u>Posterior</u>**:** direct blow to anterior shoulder when arm is in adduction & internal rotation; s/p seizure	- Squared-off appearance of shoulder - Acromion is more prominent - **Exam:** check for possible axillary nerve injury (numbness in middle of deltoid muscle) <u>Anterior:</u> arm held externally rotated & internal rotation painful <u>Posterior:</u> arm held internal rotation & external rotation painful	- XR pre- & post-reduction	- Reduction – straight traction or Stimson's method - Immobilize - Follow up 2-3 weeks & begin PT - Surgery (recurrent dislocations) <u>Anterior</u>: reduce & immobilize in adduction and internal rotation position. <u>Posterior</u>: If simple dislocation with <25% humeral head affected and dx w/i 6wks of injury can do closed reduction under general anesthesia → unsuccessful = open reduction.
SUPRACONDYLAR FRACTURE	- Child unable to move elbow after	- XR: AP and lateral of distal humerus	- Immobilize arm + pain control

- Supracondylar region is distal posterior aspect of humerus.	FOOSH. - Median nerve and brachial artery are at risk for injury. <u>Type 1:</u> Non-displaced fx with effusion (anterior sail sign or posterior fat pad sign on xray) <u>Type 2</u>: Displaced fx w/ intact posterior periosteum <u>Type 3</u>: Displaced fx w/ disrupted anterior and posterior periosteum	+ forearm	- Type 1 fx → long arm splint - Type 2 & 3 fx → surgery - MC complication"Gun stock" deformity - Most serious complication→ Volkmann contracture – ischemia leading to claw like deformity of hand.
MEDIAL EPICONDYLAR FRACTURE - MC from avulsion injury	- Pain over medial aspect of elbow.	- Long arm splint with forearm in flexion. - Non-displaced fx → non-operative tx. - Displacement >1cm, open, or nerve compromise → surgery.	
LATERAL EPICONDYLAR FRACTURE	- MC from avulsion injury - Immobilize arm with ROM exercise 1 wk post injury.		
ELBOW DISLOCATION - MC is posterior elbow dislocation <u>Simple dislocation</u> → dislocation w/o fx. <u>Complex fx</u> → dislocation w fracture.	<u>Posterior dislocation</u> → fall on extended abducted arm. - Pt will present with arm in flexion. - Evaluate neurovascular function before and after reduction.	- Pre and post reduction XR	- Reduce elbow ASAP. - Splint in 90 degrees flexion.
NURSEMAID'S ELBOW - Radial head subluxation in < 5 y/o.	- Arm in pronation - Guards arm.	- Clinical diagnosis	- Reduction supination/flexion or hyperpronation. - Will cause immediate relief and allow patient to use arm in 5 min.
PROXIMAL HUMERUS FRACTURE - MC elderly d/t FOOSH	Neer classification: - One part = no fragment displaced - Two part = one fragment displaced - Three part = two fragments displaced and humeral head in contact with glenoid - Four part = three or more displaced fragments and dislocation of articular surface from glenoid.	- XR	- One part fx → closed reduction. - Casting is unnecessary and pendulum exercises started w/I 2 wks of injury. - 2,3,4-part fx → require surgery.
MIDSHAFT HUMERUS FRACTURE - d/t direct blow	- May cause wrist drop	- XR → axillary or scapular Y-view.	<u>Open fx</u> = surgery. <u>Closed fx</u> = immobilize with sugar tong splint. - Functional splint after swelling improved. - Recovery 8-12 weeks.

Forearm/wrist/hand			
BOXER'S FRACTURE	- Fracture at distal end of 5th metacarpal - Result from direct blow of closed fist against another object - Increased angulation (>25-30%) may result in malunion (malunion leads to permanent hyperextension deformity) - Swelling over fracture site & depression of knuckle - Loss of the knuckle prominence noted.		- If >30 degrees angulation → manual reduction with ulnar gutter splint. - Surgery if neurovascular compromise exists or if any degree of rotation, or open fx.
RADIAL FRACTURE	- D/t FOOSH w/ elbow extended - Tenderness over radial head or pain w/ passive rotation or flexion of forearm	- Positive fat pad: anterior or posterior	- Sling support - Surgery
COLLES FRACTURE	- Most common injury of the wrist - Fracture of the distal radius - D/t FOOSH w/wrist in extension - Transverse fracture of the distal radial metaphysis w/ dorsal displacement of the distal fragment - Typically also an injury to the ulnar styloid or ulnar collateral ligament - Check for fractures of the elbow - "Dinner fork" deformity of the wrist	- Fracture through radial metaphysis	- Reduction & immobilization w/ short arm cast (6 weeks)
SMITH FRACTURE	- Fracture of distal radius w/ volar displacement of distal fragments - D/t FOOSH or direct blow to back of wrist - Reverse Colles' fracture		- Casting in supination - May require open reduction w/ internal fixation
HUTCHINSON FRACTURE	- Radial styloid fracture: Chauffeur's fracture - D/t FOOSH or high-energy impact injury - Can occur w/ radiocarpal dislocations	- Difficulty to see on lateral view, need AP - Look for associated scaphoid fracture	- Thumb spica or double sugar-tong splint - Internal fixation
MONTEGGIA FRACTURE	- Ulna fracture usually in the proximal 1/3 & radial head dislocation - D/t forced pronation of the forearm or direct blow over the posterior aspect of the ulna	- XR: ulna fracture w/ dislocation of the radial head, in the direction of angulation of the ulnar fracture	- Closed treatment or open reduction w/ internal fixation
GALEAZZI FRACTURE	- Radial fracture usually located at - The junction of the middle & distal thirds, & dislocation of the distal radioulnar joint - D/t direct blow on dorsolateral wrist or from a fall		- Surgery
ULNAR SHAFT FRACTURE	- Nightstick fx : D/t direct blow to ulna - Point tenderness	- XR	- Long arm cast or posterior splint

GAMEKEEPER'S THUMB	- D/t forced radial abduction at the MCP, w/ injury to ulnar collateral ligament of the thumb - Affects pincer function - Pain over MCP of the thumb	- Tear diagnosed by measuring angle of joint opening w/ abduction stress: >20% means complete tear	- Thumb spica (partial disruption) - Surgery (complete disruption)

SCAPHOID FRACTURE	- MC carpal bone fracture; seen in young adults
	- Think of a pt w/ a "sprained wrist w/ persistent pain & swelling
	- D/t FOOSH injury
	- Point tenderness on anatomical snuffbox
	- Pain w/ hand grip
	- Limited ROM of wrist & thumb
		- XR: may need to repeat in 2 weeks to detect
		  - Thumb spica splint until XR obtained.
		  - Can show a false negative in first 1- 3 wks → keep splint for 1 week then re-image.
		  - If fx still unclear, do MRI (GOLD STANDARD).
			- Stable, non-displaced fx → short arm cast x 3 months.
			- All others surgery.
			- Non-union fx are due to poor blood supply to scaphoid, therefore, do serial xrays to ensure union.
			  - Fx at risk for avascular necrosis.

SALTER HARRIS FRACTURE	- Type 1: Straight through epiphysis (normal xrays) - Type 2: Above, through metaphysis and physis. MC type. - Type 3: Low/beLow, through physis and epiphysis. - Type 4: Through, metaphysis, physis, and epiphysis - Type 5: ERasure/cRush of growth plate/physis.		
Lower Extremity			
HIP DISLOCATION D/t high impact trauma: knee is struck w/ hip & knee flexed, femoral head displaced from acetabulum	<u>Posterior</u> (90%) - Limb short - Adducted & internally rotated <u>Anterior:</u> - Flexion - Abduction, & external rotation	- XR - CT	- Prompt reduction, watch for sciatic nerve injury w/ posterior & avascular necrosis

HIP FRACTURE Common in elderly w/ osteoporosis MC = femoral neck fracture - Has worse prognosis. <u>Types:</u> 1. Intracapsular: femoral head & neck:may damage blood supply 2. Extracapsular: inter or subtrochanteric	- Pain in hip that radiates to groin & inner thigh - Leg is short & held in external rotation	- Initial = hip XR: PA, lateral, frog leg view - MRI = GOLD STANDARD	Immobilization <u>Surgical:</u> - Intracapsular: prosthetic replacement - Intertrochanteric: open reduction & internal fixation - Watch for avascular necrosis - Mortality high d/t DVT & PE
KNEE FRACTURE - Includes fx of patella, femoral condyles, tibial eminence, tibial tuberosity & tibial plateau	<u>Patella:</u> d/t direct blow <u>Femoral condyle</u>: d/t axial loading w/ valgus/varus stress <u>Tibial eminence:</u> d/t direct blow to proximal tibia w/ knee flex or hyperextension w/ varus/valgus stress <u>Tibial tubercle:</u> d/t jumping activities, more common in males & adolescents <u>Tibial plateau:</u> d/t axial loading w/ varus or valgus forces	AP, lateral & oblique XR views CT/MRI Ottawa rules for obtaining knee radiographs: - Age 55 years or older - Tenderness at head of fibula - Isolated tenderness of patella - Inability to flex knee to 90 degrees - Inability to bear wt. (4 steps) immediately after injury & in ED Arthrocentesis if effusion present	<u>Patellar:</u> - Knee immobilizer, crutches & restriction to partial wt. bearing - 6 weeks of immobilization <u>Femoral condyle</u> Surgery for open, displaced or neovascular injury <u>Tibial spine:</u> Nondisplaced: immobilize Surgery for unstable cases <u>Tibial tubercle:</u> Nondisplaced: immobilize Open reduction & internal fixation if displaced <u>Tibial plateau:</u> - Nonweightbearing - Open reduction & internal fixation for displaced fx - Goal is to stabilize, align, mobilize, & reduce pain of knee joint to minimize risk of posttraumatic OA
KNEE DISLOCATION - May be seen w/ high or low velocity injuries - High incidence of popliteal artery injury - Tibiofemoral joint dislocations are an orthopedic emergency & may be limb- threatening - May dislocations have associated fx	- Tenderness & joint effusion w/ tibiofemoral joint dislocation - Gross deformity <u>Anterior:</u> caused by severe knee hyperextension <u>Posterior</u>: occurs w/ anterior-to- posterior force to the proximal tibia such as high-energy fall on a flexed knee <u>Medial, lateral or rotatory:</u> d/t varus/valgus or rotatory components of applied force	- XR - ABI (ankle-brachial index) - Duplex U/S for vascular injury assessment	- Many (50%) spontaneously reduce - Reduction – sedation & longitudinal traction relocates majority - Posterolateral dislocations often require operative reduction

ANKLE FRACTURE - MC → malleolar fx's.	Inversion: stretches lateral ankle and compresses medial ankle. Eversion: stretches medial ankle and compresses lateral ankle. - Stretched structures fracture first, followed by compressed fractures.	- AP & lateral x-rays. - Mortise view XR to visualize syndesmosis and talus bone.	- Stable fractures managed nonoperatively. - ORIF indicated if patient having neurovascular compromise and/or open fracture. - Stable fx → isolated, nondisplaced and no damage to ligaments → short leg splint with ankle at 90 degrees. Posterior malleolar fracture involve multiple structures and is considered unstable injury. Lateral and medial malleolar fractures = bimalleolar fx's Lateral, medial, and posterior malleolar fractures = trimalleolar fx surgery needed.
Sprains/Strains			
ANKLE SPRAIN	- 85% involve collateral ligaments - MC: anterior talofibular (main stabilizer during inversion)	- "pop": swelling, pain, inability to bear weight - Grade I and II: incomplete tears - Grade III: complete tears	- RICE - NSAIDs - Increase ROM and conditioning - Crutches for 1st 2-3 days
BACK PAIN/STRAIN Most common cause of lower back pain is prolapsed disk or low back strain (mechanical)	- Pain in low back w/ radiation down leg; suggests nerve root irritation - Area of point tenderness suggests MSK cause - Sciatic pain in buttocks, posterior thigh, & posterolateral aspect of the leg around lateral malleolus	- XR not required when exam normal - MRI/CT scan - EMG - Myelogram - Diagnosis of exclusion	- Short-term bed rest (2d) - NSAIDs - Ice vs. heat - Fitness program

Myocardial Infarction

- 50% of pts have identifiable factor – very heavy exercise, severe mental stress
- Often preceded by periods of unstable angina
- Most deaths occur w/in 1h of onset d/t v. fib
- ST elevation & Q waves are the 2 most characteristic features of AMI seen in only 50% of pts at presentation
- If EKG normal <10% chance of MI

ST elevation:
- Injury pattern
- Occurs w/ transmural ischemia
- DDX: pericarditis, aneurysm, LVH,
- Early repolarization

ST depression:
- Occurs w/ subendocardial ischemia
- More often seen in NQMI
- DDX: hypertrophy, conduction/electrolyte abnormality, drug effects

STEMI vs. NSTEMI:

STEMI
- Occlusive thrombus
- Complete & prolonged occlusion of an epicardial coronary blood vessel
- Causes full thickness(transmural) damage of heart muscle
- Defined based on ECG criteria

NSTEMI
- Non-occlusive thrombus
- Results from severe coronary artery narrowing, transient occlusion or microembolization of thrombus &/or atheromatous material
- Elevation of cardiac biomarkers w/o ST elevation
- Causes partial thickness damage of heart muscle

Pain: Usually severe & intolerable; retrosternal (may radiate to arm, neck & jaw)
- Prolonged: 20 min. to hours
- Quality: crushing, constricting, compressing, oppressing

Caused by
- ischemia, not infarction
- Other sx: N/V in 50% (usually inferior MI), weakness, dizziness, palpitations, cold sweat, sense of impending doom -
- May have elevated BP, tachycardia & **presence of S4**

Labs: leukocytosis (12-15K), lipid profile, serum cardiac markers

Creatinine kinase:
- Exceeds normal range w/in 3-6 h, normalizes in 2-4 d, & peaks at 24h
- Check serially every 8-24 h
- May elevate 10-20x normal limit in AMI
- **Isoenzymes:** MM (skeletal muscle), BB (brain, kidney), MB (myocardium, small intestine, tongue, diaphragm, uterus, prostate)
- Ratio of CPK-MB to total CPK >4% is diagnostic

Troponin:
- Troponin (I or T) has nearly absolute myocardial tissue dz, polymyositis, dermatomyositis)
- May elevate >20x normal range
- Begins to rise 2-4 h post-AMI, peaks at 10-24 h & may persist for 5-12 d
- Aids in picking up AMI in pts who present late

Myoglobin:
- Non-specific
- Detectable in 1-2 h after AMI & lasts <1 d
- Found in skeletal & cardiac muscle

Treatment is similar in STEMI vs. NSTEMI except as mentioned below:
- Antiplatelets: ASA, thienopyridine, GP IIb/IIIa antagonists

- Clopidrogel – rapid onset of action
  Anticoagulants: heparin, LMWH
- BB, ACEi (start in all pts w/ AMI), nitrates, statins, O2

Mnemonic:
M – Morphine for pain control
O – Oxygen to avoid hypoxia
N – Nitrates to reduce preload & afterload
A – ASA given to all pts unless contraindicate
Heparin
BB – CI in 2nd or 3rd degree heart block

- Primary percutaneous coronary intervention (PCI) & percutaneous transluminal coronary angioplasty:
- **STEMI:** preferred choice of reperfusion therapy, but should be achieved within 120 min. of dx or PCI is not available
- **NSTEMI**: early coronary angiography & revascularization is the tx of choice for medium to high risk pts w/ NSTEMI

Fibrinolytics:
- STEMI - tx needed w/in 12 hrs. (SEs: bleeding & intracerebral hemorrhage)
- NSTEMI – fibrinolytics not useful & may be harmful in NSTEMI

<table>
<tr><th colspan="4">Hypertensive Crisis</th></tr>
<tr><td>HYPERTENSIVE URGENCY</td><td>- BP >180/120
- No organ damage.
- ASYMPTOMATIC</td><td colspan="2">- Lower BP gradually over 2 days with 2 BP lowering medications.
- Do NOT give sublingual nifedipine as can drop BP too fast and cause MI or CVA.</td></tr>
<tr><td>HYPERTENSIVE EMERGENCY</td><td>- BP >180/120
- Organ damage

<u>Malignant Hypertension:</u>
- Papilledema
- Exudate
- Retinal hemorrhage
- Acute kidney injury - hematuria/proteinuria
- Focal neurological findings

<u>Hypertensive encephalopathy:</u>
- Cerebral edema
- HA
- N/V
- Confusion
- Seizure
- Coma.</td><td>- MRI to r/o stroke</td><td>- Decrease diastolic pressure to 100 in 6 hours.
- Once stabilized, oral therapy to lower diastolic to <90 over next couple of months.</td></tr>
<tr><th colspan="4">Pneumothorax</th></tr>
<tr><td>- Air in pleural space
- Increasingly positive pleural pressure= causes collapse of lung
<u>Types:</u>
1. Spontaneous: due to bleb rupture (thin walled air containing space)
A. <u>Primary:</u>
- No underlying lung dz
- Tall, thin men 20-40 yo
- Smokers
- Family hx
B. <u>Secondary:</u>
- Underlying lung dz
- W/o trauma
- COPD, asthma
2. Traumatic
- Iatrogenic
- During CPR, thoracentesis, PEEP, subclavian line placement
3. Tension: + air pressure pushes lungs, trachea, great vessels & heart to C/L side
- <u>MC:</u> trauma, mechanical ventilation, resuscitative efforts</td><td>- Chest pain: pleuritic, unilateral, non exertional, sudden onset
- Dyspnea
- Hyperresonance to percussion
- Decreased fremitus/ breath sounds on affected side
- Tension pneumothorax
- Increased JVP
- Pulsus paradoxus
- Hypotension</td><td>CXR
- Decreased peripheral lung markings
- +/- companion lines: visceral pleural line running parallel with ribs</td><td>Management
- Observation in primary spontaneous if small
- Chest tube placement (thoracostomy): if large/ severe symptoms
- Needle aspiration
- If tension pneumothorax followed by chest tube placement
- Needle in 2nd ICS @ midclavicular line of affected side</td></tr>
</table>

Pulmonary Embolism			

D/t thrombi in the venous circulation or right side of heart
 	
80 - 90% originate in deep veins of lower extremities
 	
<u>Risk factors:</u>
- **Hypercoagulable states:** malignancy, thrombophilia
- Pregnancy/BCP
- **Surgical procedures:** Orthopedic sx
- A. fib
- Major trauma
	- Pleuritic chest pain (74%)
	- Dyspnea (85%)
	- Cough (53%)
	- Hemoptysis (30%)
		- ABG: hypoxemia, hypocapnia, wide A- a gradient
		- EKG: sinus tachycardia (S1Q3T3) d/t right heart strain (cor pulmonale)
		  - S wave in lead I
		  - Q wave in lead II
		  - Inverted T waves in III
		- CXR: normal
		<u>Hampton hump</u> (wedge-shaped infiltrate = pulmonary infarction)
		<u>D-dimer</u> (normal result = no PE in low- risk pts)
		<u>Ultrasound LE</u>
		<u>V/Q scan:</u> Uses radioactive material to compare ventilation & perfusion
		<u>Scoring system:</u>
		- Normal <1% PE rate
		- Low prob. 14% PE rate
		- Intermediate 30% PE rate
		- High prob. 87% PE rate
		<u>Angiography</u> = gold standard – very invasive & not easily available
		<u>Spiral CT:</u>
		- 95% sensitive for large PE
		- 75% sensitive for subsegmental PE
		<u>Wells Probability System:</u>
		- DVT S/S 3 points
		- PE as or more likely 3 points
		- HR >100 1.5 points
		- Immobilization/surgery 1.5 points
		- Previous DVT/PE 1.5 points
		- Hemoptysis 1 point
		- Malignancy 1 point
			<u>If hemodynamically stable:</u>
			- IV or LMW heparin & oral anticoagulation (warfarin) 5-7 days
			- Oral anticoagulation (warfarin)for at least 6 mos.
			- If anticoagulation contraindicated inferior vena cava filter
			
			<u>If hemodynamically unstable:</u>
			- Thrombolytic therapy
			- If anticoagulation contraindicated pulmonary embolectomy & interrupt inferior vena cava

Ingesting Harmful Substances (Poisonings)