

BPS 1101 midterm 1.

- Canada is 8th in the world for life expectancy- 81.2y
 - Longer lifespan, improved quality of life
- World average 66.6y
- Stone age life expectancy- 35y
- Swaziland is last at 31.9y
- Most improvements have happened over past 150y

- In olden days
 - Disease was common and dangerous, spent most of life sick
 - Parasites and fleas very common
 - 5 types of worms
 1. Hookworm
 2. Tapeworm- can lay 1,000,000 eggs per day
 3. Tapeworm eggs
 4. Roundworm- max size 50cm, 200,000 eggs/day
 5. Pinworms- migrate out of colon and lay eggs in anus

- Causes of death have shifted from diseases to wear and tear
 - 3 main reasons for death now:
 - heart disease
 - cancer
 - stroke

- Main reasons improved health:
 - Improved sanitation
 - Toilets, no chamber pots/cesspits, separation from human waste that transmit disease from person to person
 - Close contact with dead people
 - Clean drinking water
 - Filtration systems through specialized sand, chlorine in water to eliminate pathogens
 - Guinea worm africa- tiny aquatic animals, migrate and grow in muscles of humans, secrete toxins that burn holes in skin to escape back into the water.
 - Refrigeration
 - People would have to eat spoiled food
 - No access to nutrients all year round
 - Vaccination
 - Immunization against smallpox (fully eradicated) and polio (almost completely eradicated)
 - Antibiotics
 - Penicillin decreased mortality of pregnant woman between 1930-50ish

- Drug industry:
 - \$300 billion prescription drugs
 - Over the counter drugs (OTC) \$25 billion
 - US. 49.15 drug market
 - Started in 1856

- Ancient remedies:
 - Mostly made up tricks with placebo effects
 - Many treatments actually harmful
 - Most ancient drugs from plants
- Plants:
 - Secrete toxins/poisons as protection from predators
 - Can be used as poison or drug based on dose
 - Pharmakon is greek word for drug - can mean remedy or poison
 - Does makes the poison
- Drug vs poison:
 - Normally low dose= beneficial and high= poison
 - Insulin in low doses is poisonous and beneficial in high
 - Always ask "How much?"
- Opium for pain:
 - From poppy seeds
 - Narcotic pain killer
 - sedative
 - Toxic in high doses
 - Drug in low doses
- Modern pain killers:
 - Codeine
 - Oxycodone
 - Fentanyl
 - Methadone
 - Demerol
- Cocaine as stimulant:
 - From coca leaves
 - Topical painkiller
 - Stimulant
- Modern anesthetics- cocaine
 - Reduce sensation
 - Novocaine
 - Procaine
 - Lidocaine
 - Benzocaine
- Human brains search for patterns
 - Once a story or connection was made about a remedy/cure hard to contradict
 - Mid 1990s, power lines=cancer...false
- Only experimental evidence is reliable
 - Make a measurement properly + accurately
- Problems with traditional remedies
 - Poor control over dose
 - Plants produce variable amounts of active ingredients
 - Thus raw source may change dose...line between poison and drug
- Preparation change chemical concentrations
 - Cooked carrots taste different than raw
 - Amount active ingredient changes when cooked
 - How long drug cooked may become beneficial or lethal based on time cooked
- No standardization
 - No instructions
 - Information passed verbally= Information gets changed

- Most people could not read in olden times
- False info spreads faster
- Tomatoes once thought to be poisonous
- Hippocrates and doctrine of Humours:
 - Universe made of
 - Earth, air, water, fire
 - Body made of 4:
 - Blood, phlegm, yellow bile and black bile
 - 4 humours are normally in balance
 - Too much/little of humours cause disease
 - Cure by rebalancing humours
 - Ie. fever is hot + dry, thus need cold and wet
 - blood= cold
 - phlegm=wet
 - Yellow bile=hot
 - Black bile= dry
- Bloodletting
 - Draining of blood to cure a person with “too much blood”
 - How George Washington died
 - Infection would kill person
 - Different locations of bleeding would cure different conditions
 - Bleeding with leeches
- Other: purges, fasting and special foods
- Doctrine of signatures:
 - Jakob Bohme- shoemaker and philosopher
 - 1575-1564
 - God left things to tell us how things were linked- cures and diseases
 - Ex: walnuts for brain health
 - boneset for bone cancer (plant)
 - Sharks don't get cancer thus their cartilage can cure cancer- BS sharks get cancer
 - Breath mints with chlorophyll-clorets
 - Bs- chlorophyll is a green pigment
 - Mandrake roots look like people- must cure demonic possessions?
 - Believed plant would scream when harvested
 - Dogs would pull them out to protect against screaming + preserve magic
 - Rhino horns used in Chinese medicine as an aphrodisiac
 - Horn made of the same stuff as fingernails
 - Mercury as a purgative for toxins
 - avocados , egg plants and pears good for pregnant women + womb/cervix because of shape
- Surgery:
- Amputation without anesthetic
 - Hold patients down while they screamed
 - Quickly before patient died of shock/blood loss
- Nitrous oxide

- Sir Humphrey Davy
- Contained in whippets/cool whip - can get high
- Ether (Anesthesia)
 - William T.G Morton
 - 1846
 - Anesthesia
 - Renders patient unconscious
 - At time surgery was unsanitary
- Bacteria:
 - Was unknown at time
 - Less than 30% of patients survived surgery
 - Infection was very high... most pregnant women died giving birth due to infection/complication
- Joseph lister + phenol (antiseptic)
 - Carboxylic acid sprayer- vaporizer
 - Increase survival rate of patient
 - However was toxic for doctors
- Sanitary use: LISTERINE
 - Mcgill was one of the first place to use gloves + wash
 - Around 1900
 - Antiseptics in canada - 1877 Thomas Roddick
 - Listerine became household antiseptic product
 - No longer contains phenol (bc toxic)
- William Perkin- artificial dye:
 - 1856
 - Coal extracts created colour
 - Coloured clothes became cheap as coal was cheap
 - Molecular structure of dye similar to molecular structure of drugs
- Artificial drug:
 - 1897
 - Human designed substance, does not occur in nature
 - Naturally occurring substances work better in plants than animals
 - Modified structures to create drugs better suited for humans
 - Genetically engineered drugs- 1982

Rules:

- Pre 1907- no rules
 - Most drugs made up, no proof, could sell anything
- 1800's = patent medicine, people assumed was official and worked
- Most medication contained cocaine, opium, heroine... stuff to make you feel good and appear as if you were getting better
- Completely harmless meds= useless
- Radioactive water:
 - William J.A. bailey sold Radithor
 - People heard radiation cures cancer and began drinking it
 - One man drank a bit everyday, his skull became so compressed they had to remove his lower jaw + upper face
 - Next to photographic film, created images of his teeth.
- Post 1907:
 - First government regulations on meds

- Must include everything on label
- No safety regulations
- Patent medicine= fake medicine
- Sulfanilamide:
 - Antibiotic as powder
 - Was sold dissolved in water using ethylene glycol
 - Tasted sweet so kids would take it
 - In reality is antifreeze and extremely toxic
 - Started killing kids - 107 dead, 260 permanently disabled
 - No antidote
 - Company didn't technically break laws as ingredients were on label (1938)
 - Word Elixir meant methyl not ethyl... thus bottle taken off shelves

FDA:

- 1938
- Ensure the safety of drugs
- Animal testing now required (safety only)
- Clinical trials done to follow safety in humans
- Directions for proper use and safety on label
- Thalidomide:
 - Sedative for pregnant women to sleep-1957
 - Would end up eliminating limbs of the fetus while in the womb
 - Birth defects
 - 1962- teratogen
 - Caused phocomelia (seal disorder)
 - Tested in rats, however rat would reabsorb fetus
 - humans= still birth/ miscarriage/ birth defects
 - Safety testing must now be done on two species- at least one primate
 - Must Show that drug is bioavailable
 - Must use relevant doses
 - Usually use rats, dogs and monkeys

OTC drugs: (over the counter)

- \$25 billion/year (U.S.)
- No prescription
- Some are "behind the counter"
- Top meds: North America
 - Cough and cold \$8.2 billion
 - Pain reliever \$4.1 billion
 - Antacid \$2.7 billion
 - Toothpaste \$1.5 billion
 - Laxative 1.3\$ billion
- Body size contributes to dosage (how many pills) not severity of pain
- All drugs have side effects
- Important to know the incidence of side effects in order to evaluate worth (ie. death 1/5 or death 1/50,000)
- Product used depends on the type of pain

- Counter indications
 - Conditions: certain conditions prevent you from using
 - Ex: pregnant/ breastfeeding
 - Drug combos/interactions
 - Antidepressants and cold meds
 -

Pain meds:

- \$4.1 billion/year (North America)
- 50 billion tablets (North America)
- 16,000 tonnes/year (500 dump trucks)

Aspirin:

- One of the world's most popular drugs
- Willow trees contain **salicylates**
 - Poison to animal, drug for humans
 - Sumerians used willow leaves for pain, 2,200 BC
 - Egyptians used willow for inflammation
 - Knowledge lost in dark ages (Europe)- church dictated all knowledge
 - Used as a treatment for fever 1763 (rector in church of england)
- **Willow bark- Salicin**
 - had bitter taste similar to **quinine**
 - Edward stone evoked doctrine of signatures
 - People near swamps get malaria, have fever, treat malaria with quinine, quinine is bitter, willow grows in swamps, willow bark will cure fever
 - Lucky coincidence
 - Willow bark dried, ground into powder and given to treat fever
 - Made tea/extract drug
 - Expensive
 - Limited supply- do not grow everywhere
 - Variable effectiveness
- **Salicin:**
 - Active ingredient in willow
 - Isolated in 1829
 - 1.5Kg only = 30g... Little salicin from a lot of bark
 - **Salicylic acid: 1838**
 - Better drug than salicin (lower dosage)
 - Occurs in meadowsweet flowers (very small amounts)
 - Expensive + hard to get
 - Analgesic: reduces pain
 - Antipyretic: reduce fever
 - Anti Inflammatory: reduces swelling
 - **Salicylic acid manufactured from coal tar + chemical rxns**
 - Easy to produce large amounts

- Coal tar was a waste product in 1800s in lamps
- Synthetic: make acid from oil.... Exact same compound
 - Differed due to source
 - Almost every plastic is made from oil
 - Dye companies specialized in coal tar- chemistry became drug companies
- Drug with problems
 - Bitter taste and stomach irritation
 - Felix Hoffmann 1868-1946
 - Father had arthritis
 - Took salicylic acid for pain
 - Suffered from stomach problems
 - Modified small part of chemical structure to improve drug- no stomach problems but no longer worked
 - 1897, modified drug again and produced the first ever artificial drug
 - Not found in nature
- Aspirin originally sold as powder - choke it down
- Tablets became more popular- Bayer
- Easy to take, convenient to consume, drug like, user friendly
- **Acetylsalicylic acid (A.S.A)**
 - Brand name: Aspirin- specific to company
 - Benefits:
 - Reduce pain, fever, inflammation, reduce heart attack risk
 - Effective for muscle pain
 - Side effects: tinnitus, stomach irritation, interferes with blood clotting
 - Not effective for visceral pain- internal organs. Ex: intestine
 - **Prostaglandins** are local hormones
 - Controls amount of certain types of hormones used in cell
 - Hormones to move info around body
 - Prostaglandins carry messages between cells
 - Unstable, are produced not stored
 - Prost. Biosynth:
 - When injured body produces prostaglandins hormones, then will feel pain
 - **Cyclogenase:** machine (active site) will carry out chemical rxns
 - Enzymes will continue coding until stop codon
 - Condons forming amino acids

- Drugs block machine action by substrate (drug) binding on machine that stops tRNA from binding (depending how drug works)
 - One molecule touches another molecule
 - Molecule will fit perfectly into binding site
 - Aspirin sticks to location instead of allowing enzyme, part of aspirin will switch to enzyme so that foreign piece will block machine
 - Prostaglandin does not form
- Aspirin preventative to heart disease- in people with heart attacks aspirin every 2 days for 5 years
- Low dose aspirin
- In regular people, no benefit and risk for other problems
- 60+ tablets= death
- tinnitus= warning of aspirin poisoning (salicylism) more than 10 tablets
 - Reversible
- Stomach irritation- excess HCl
 - Mucus will protect stomach
 - Prostaglandin helps protect stomach by decreasing acid production + increasing mucus production
 - Aspirin will cause stomach damage by increasing acid production and decreasing mucus production
 - Long term aspirin use will cause stomach damage
 - Tablets cause stomach irritation
 - On empty stomach, tablet can end up in a wrinkle in empty stomach
 - Drug will release all in one place
 - Where too much acid, not enough mucus
 - Bufferin: contains antacid (MgSO₄/gypsum)
 - Makes pills dissolve quickly
 - Plastic coating on tablets will stop them from dissolving in the stomach and only dissolve in intestine
 - Avoid irritation by drinking water to inflate stomach
- A.S.A in news:
 - Neonatzi terrorist incident in norway, blew up city hall using aspirin in homemade bomb
 - Shot kids in youth camp and blew people up with homemade grenades
 - Built chemical factory in barn
 - Aspirin as raw material into Picric acid
 - Used in WWI
- Reye syndrome and influenza
 - Young children has fever due to influenza
 - Were given aspirin

- Had higher than normal rate of reye syndrome
- Damages brain
- Association not direct cause
- Children's aspirin no longer available in Canada as precaution
- Do not want to experiment on children to prove if association is a cause
- Regular vs Extra strength:
 - Similar as taking more pills, depends on the size of person not pain
- Tablets vs Capsules:
 - True in science experiment, but for consumer no difference
- Name brand vs generic:
 - No difference! Same chemical substance
 - Costing more makes no difference on med
 - Same dosage
 - Equivalent bioavailability- same amount of drug enters body
 - Usually cheaper

Benefit		Side effect	
Pain	yes	Reduced blood clotting	yes
Fever	yes	Stomach irritation	yes
Inflammation	yes	Rye syndrome	maybe
Prevent heart attack	yes		

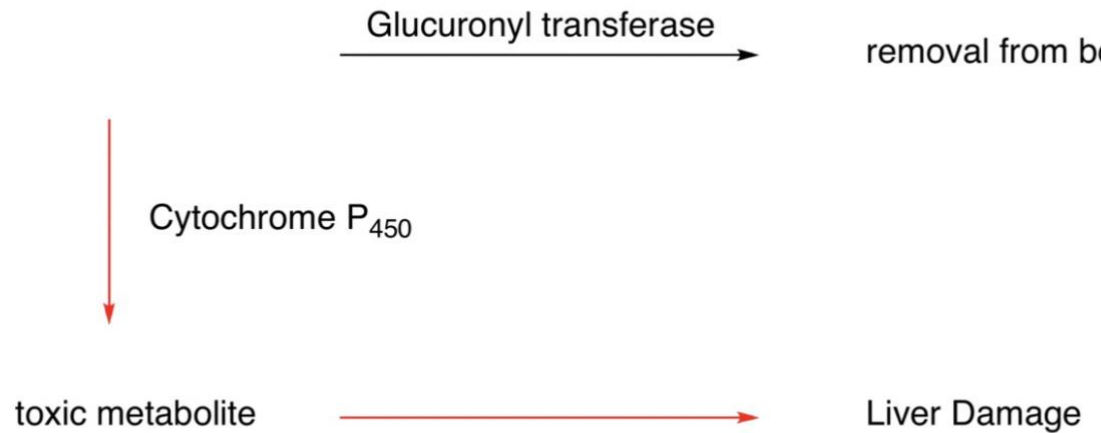
- Antikamnia: (antifebren)
 - discovered around the same time as aspirin
 - Pain fighting and fever lowering principles
 - Carl Duisburg:
 - Chemist at bayer
 - Needed to dispose of 50 tons of aminophenol (waste products from other drug companies)
 - Similar chemical properties between drugs
- Phenacetin:
 - APC tablet

- Aspirin
- Phenacetin
- Caffeine
 - Very effective for headaches
 - Works better than some medications today
 - No longer sold in Canada but still in Australia
- Both drugs converted to acetaminophen in body - 1947

- **Acetaminophen: Tylenol**
 - Raises pain threshold (body is less sensitive to pain)
 - Nothing to Do with prostaglandins
 - Good for muscle pain
 - Muscular, visceral, kidney
 - Antipyretic- lowers fever
 - Does not inhibit prostaglandin synthesis
 - Cannot do anything for swelling
 - Ibuprofen or aspirin best for muscle inflammation
 - Tylenol best for pain not swelling
 - Osteoarthritis:
 - Prescribed Tylenol will help.
 - No swelling
 - Rheumatoid arthritis:
 - Involves swelling, use ibuprofen for swelling not just pain
 - Death- more than 60 tablets
 - #1 survive drug In England
 - Acetaminophen liver toxicity:
 - Metabolizes poison
 - Liver changes toxic substance to another substance
 - Body does not know difference between drug or poison but they try to remove it since it's foreign
 - Top pathway is safe pathway

- Bottom path way (happens in certain situations) very dangerous

Acetaminophen liver toxicity



- Never take for hangover- alcohol stimulates liver function- take aspirin
- In lots of prescriptions (otc cold meds)
- OD is easy
- No rye syndrome
- Small bottles to stop kids from OD as cherry flavour is good
- Regular strength=325mg. Extra=500mg
- Tylenol arthritis=650mg
- Tylenol migraine= 500mg acetaminophen, caffeine 65mg
 - Helpful for certain types headaches
 - Can wash normal pills down w caffeine
- Tylenol and cyanide:
 - Emptied plastic capsules and faked with cyanide, then put back in bottle...killed 6 people....J & J recalled
 - Replaced with caplets, harder to counterfeit
 - Safety seal added to all OTC meds

Benefit		Side effect	
Pain	yes	Reduced blood clotting	no
Fever	yes	Stomach irritation	no
Inflammation	no	Rye syndrome	no
Prevent heart attack	no	Liver toxicity	yes

- Stomach irritation
 - ASA- strong irritation (chronic)
 - Acetaminophen- weak irritation? No science behind
- price: extra strength is cheaper
 - Tylenol with caffeine- migraine is more expensive
 - Muscle body and arthritis are identical, one more expensive
 - Children's has less drug in it.. small bottles +higher price
 - Costco has best deal for generic drugs

Ibuprofen: Advil + motrin

- Developed 1961
- Originally prescription only
- OTC apprised 1984
- Similar to ASA
- Blocks enzyme cyclooxygenase, different way, same active site

Benefit		Side effect	
Pain	yes	Reduced blood clotting	yes
Fever	yes	Stomach irritation	yes
Inflammation	yes	Rye syndrome	no
Prevent heart attack	no	Liver toxicity	no

- read back of box not front
- Normal Advil is better than migraine (more expensive)
- Regular strength is identical but more expensive
- Children's Motrin ¼ drug for safety

Naproxen: Aleve

- Very good for inflammation
- Relatively expensive

Effect	A.S.A.	Acetaminophen	Ibuprofen	Naproxen
Pain	yes	yes	yes	yes
Fever	yes	yes	yes	yes
Inflammation	yes	no	yes	yes
Prevent heart attack	yes	no	no	no
Reduced blood clotting	yes	no	yes	yes
Stomach irritation	yes	no	yes	yes
Rye syndrome	maybe	no	no	no
Liver toxicity	no	yes	no	no

Effects COX-1 inhibition:

- Stomach
 - HCl production increases
 - Mucus production decreases
- Platelets:
 - Clotting is inhibited
- Long term COX-1 inhibition
 - Ulcers in stomach can bleed severely
- Harmful effects

Effects COX-2 inhibition:

- does not cause ulcers

Current arthritis treatments:

- inhibit both COX-1 and COX-2
- COX-2 beneficial
 - Reduce pain
 - Reduce inflammation- blocks version 2 of enzyme
- COX-1 is harmful: when blocks very in 1 of enzyme
 - Stomach irritation
 - Blood clotting inhibited
 - Bleeding ulcers in chronic users
- Selective COX-2 inhibitor for arthritis
 - Montreal doctor discovered VIOXX, did not block COX 1
 - VIOXX clinical trials:
 - Approximately 60 studies were done
 - More than 5000 patients
 - No serious side effects
 - No difference in cardiovascular disease vs placebo
 - Drug approved in 1999- sales averaged \$2.5 billion/year
 - Became more about advertising than drug
 - Increased risk of heart attack... tried to cover up
 - Estimated 88,000-139,000 heart attacks 199-2004
 - Benefit outweigh risk as - can hurt those risk of heart attacks but beneficial to arthritis- Merck did not introduce drug tho... risk outweigh benefit

Headaches:

- cephalalgia- 90% of pop
 - Cluster headache
- Once thought headaches were caused by demons
 - Exercism to lose headache
- MAGNETIC HEADBANDS
- Surgical procedures
- Trepanation as a cure for headache
- Speciality tools for trepanation- burr holes
- Modern practice trepanation:
 - Cult leader thinks drilling holes in head will fix headache... flaw in human head design
- 12 types of headaches
 - 60 subtypes
 - 2 classes- **muscular, vascular**
 - Muscular: muscle band around skull
 - Muscles contract+squish tissue
 - Stress
 - A.S.A, acetaminophen, ibuprofen, Naproxen

- Vascular: blood circulation
 - Cluster headaches effect older men
 - No effective treatment
 - 3 types:
 - Toxic- caused by poison (toxins, food)
 - Migraine
 - Cluster
- Pain caused by vasodilation: increased blood flow to skull, blood vessels get bigger + start to push on tissue (squishing + causing pain)
- Most common toxic= hangover
- Disulfiram (Antabuse)- treat alcoholics
 - Blocks second enzyme so instant hangover, cause to throw up and have horrible headaches
- Aging adds to pain
 - Older alcohol absorbs substances from food so taste better + darker= worse headaches
 - Darker colour= worse hangover (cognac= worst, vodka=least)
- Alcohol activates CYP450= acetaminophen toxic
 - Don't take tylenol for hangover
- Some red wines=histamines (allergies too)
 - Fermented foods: sauerkraut
 - Aged cheese= tyramine
 - chocolate=headaches phenylethylamine
 - Hot dogs (processed meats) =nitrites (converted to gas, signaling molecule causing tissue around skull to expand)
- Nitroglycerin= vasodilator
 - Heart meds, dilates blood vessels... causes headaches
 - Found in dynamite
- MSG: Monosodium glutamate
 - Made from seaweed
 - Enhances food flavour
 - Kwok syndrome= chinese restaurant food= headache...false
 - In almost all food.. Big scale food added to ensure flavor quality
 - Disguised- hydrolyzed vegetable protein
 - Normal human metabolite...5% of [protein, produced constantly in body (glutamic acid (amino acid))
- Caffeine:
 - Rebound vasodilation
 - Causes vasoconstriction
 - Body compensates for heavy caffeine by trying to initiate vasodilation
 - Reducing caffeine= vasodilation.... withdrawal= open blood vessels more= headache bc flow around head
- Brain freeze:
 - Cold food against pallet, blood vessels in the head dilate to thermoregulate warm up
- Toxic headache treatment: A.S.A, Ibuprofen, Naproxen... not tylenol for hangover (liver damage)
 - Caffeine may help reduce pain
- Migraines:
 - 18% women

- 6% men
- Phase 1: Vasoconstriction (narrow blood vessels)
- Phase 2: vasodilation (wide vessels)
- Initiated by triggers
 - Tension, lack of sleep, menstruation, food,relaxation, too much sleep, pregnancy, drugs,strong smells
- Progression:
 - Prodrome phase
 - Aura
 - Pain
 - Postdrome
 - Prodrome- warning (mood swings) can occur 1-2 days prior (30-40% of sufferers)
 - Aura phase 20-30%,
 - Scotomas- visual disturbances/ flashes of light
 - Hallucinations
 - Auditory hallucinations
 - Vertigo
 - Reduced sensation
 - Hypersensitivity
 - Olfactory hallucinations- smell
 - Pain involves half of head
 - 1-72h
 - Nausea
 - GI disturbances
 - Movement makes it worse
 - Sensitivity to light, smell and sound
 - postdrome= hungover feeling
 - Exhaustion
 - Poor concentration
 - depression/ euphoria
- Treatment: A.S.A, acetaminophen, Ibuprofen, Naproxen, prescription pain meds
 - Triptans can abort a migraine- specialized drug , stop migraine if caught early (aura phase)
- Rye bread:
 - Ergot fungus grows on rye
 - St anthony's fire- vasoconstriction- blood supply loss= gangrene... amputation
 - Was used to induce labour (involuntary muscle contractions)
 - Powerful hallucinogen
 - Ergot poisoning seen as demonic possession
 - Normal law suspended for witches- sink in lake... survive/float= witch= burn/die, sink/drown= not witch (pure but dead)
 - Salem 1692- rained a lot that year= poisoning= demonic possession... a lot people killed
 - Extracts for migraine 1862
 - Dangerous due to poor control of dosage... variable amounts
 - Isolated ergotamine 1918- arthur stoll
 - Cafergot available
 - ergotamine= not user friendly/drug like... not used much

- Lsd: albert hoffman by accident
 - Accidentally poisoned himself by licking finger in lab
 - So high couldnt walk, someone brought him home on handles of bicycle
 - Used by CIA at mcgill 1950...hallucinations from part ergotamine (operates on serotonin)
- Migraine starts with serotonin
 - Levels decrease ... replaced= decreased migraines?
 - Amount drop during aura
 - Nerve signals= cascading chemical signal reaction
 - synapse= space between receptors... drug must be n synapse not cell
 - Messages carried by neurotransmitters
 - sumatriptan= selectively targets migraines
 - Other triptan options

Colds:

- most common infection
- most= rhinovirus 30-50%
- No such thing as sinus cold
- Virus destroys tissues- immune system makes symptoms
- No cure for the common cold
 - Many remedies do nothing, no meds to prevent
- Being cold does not cause colds
 - Wet hair does not cause colds
- Direct exposure to the virus will not always cause colds
- Cold virus in nasal secretions
 - Spread easily
 - Confirmed by mythbusters
- Transferred by touch
- More common in crowds
- School season=cold season
- Washing hands reduces colds
- Hand sanitizer reduces colds
- Incidence of cold goes down w age- higher when have young kids (more social, touch eachother more)
- age= acquired immunity
 - More exposure to virus
 - Large amount of antibodies
 - Memory cells
- \$4.1 billion/y on cold meds
- Read back not front of box
- Cold remedy ingredients:
 - Pain reliever/fever reducer
 - Decongestant
 - Antihistamine (allergy)=drowsy
 - Antitussive- prevent/ relieve cough
 - Expectorant- expel mucus
- Acetaminophen: pain relief and fever
 - Ibuprofen becoming replacement (safer for liver)

- Menthol (mint) good for sore throats- topical analgesic (pain reliever)
- Cepacol- topical anesthetic (induce temporary loss of sensation)
- Decongestants: vasoconstrictors
 - dry a runny nose
 - Pseudoephedrine- works
 - Phenylephrine- doesn't work
 - Snot = water w little mucin
 - Blood vessels become smaller as takes water to manufacture mucus...
- Amphetamine: meth...
 - For colds
 - Sudafed- pseudoephedrine hydrochloride
 - Can make meth... banned from buying high amounts (bTC, prescription in USA)
 - Drug dealers could buy direct
 - Smerfing- buy every box + ask junkies to
 - Available OTC bundled with a pain reliever= can't make meth
 - Sudafed PE= phenylephrine
 - Sinutab benylin (contain stabilizers)
- Nasal sprays: decongestants
 - Narrow blood vessels in nose= decreased inflammation= increased air flow for mucus to drain
- Antihistamines for sneezing, runny nose, watery eyes
 - Reduce nausea
 - Side effect= drowsiness
 - Chlorpheniramine- most common antihistamine for colds
 - Diphenhydramine= most common for allergies
 - Dayquil= no antihistamines (stay awake)

- Cough: dry vs productive
 - Cough syrup vs pill= no difference
 - Could buy heroin as cough medicine'
 - Dextromethorphan- antitussive (prevent/relieve cough)
 - Suppresses cough reflex
 - Dry cough
 - Expectorant= productive cough (thins + loosens mucus)
 - Could also just drink a lot of water/fluids to thin mucus
 - Guaifenesin- never clinically proven to work
- Multisymptom:
 - Can have chemicals that negatively interact = not work
 - DM + E.... (DM= cough suppressant, E= expectorant... will not work)
 - D + E (D= decongestant)
 - Nighttime meds should not have decongestants bc amphetamine= steroid/hyper
 - No cold meds for kids under 6 bc interactions
- Vitamin C doesn't prevent colds
- Cold FX= doctorate of signatures... ginseng root looks like person
 - Ginseng doesn't work
 - Fake clinical trials/ fudged numbers
- Willow bark gravol= not enough to work (same for ginger)

- Cold and flu:
 - Influenza= seasonal colds
 - 5-15% pop.
 - New virus each year\very young/old at risk
 - Occasional severe pandemic (H1N1, corona)
 - Outer envelope: hemagglutinin (viral entry into cell)
 - Neuraminidase (viral exit from cell)
 - Flu virus classified based on envelope proteins
 - Ex: H1N1= Hemagglutinin (H), Human flu (H1), Neuraminidase (N), Human flu (N1)
 - Hemagglutinin- 16 types
 - Neuraminidase- 9 types
- Name brand/ generic use same ingredients
 - generic= cheaper

End of Midterm 1