Topic 4: Colds

- Viruses are very hard to treat with drugs
    - There are only 3 that can actually be treated with drugs
- The cold medication you take need to selectively target the specific virus you are suffering from, however this is hard because there are over 200 viruses that cause colds
- Viruses destroy tissues, our immune system is what causes our symptoms as a response to the damage being done by the virus
- There is no cure for the common cold
    - It lasts for 7 days, whether you do nothing or try and treat it
    - However you can get a little bit of relief by treating SYMPTOMs
- Most of the information we know about colds is from the Common Cold research Unit in Salisbury England
- Sneezing does not spread colds well
    - They took the mucus from people sneezed and administered to others to see if they would get sick too, however they typically did not
- Being cold does not cause colds
    - To test this they took a group indoor and one in a cold area and then infected both groups with the cold to see if one group was more susceptible to the virus than another
- Wet hair does not cause colds
- When you have a cold your nose runs and sucrets mucus that has cold viruses
    - You then touch your face and get the virus on your hands and transfer to everything you touch
    - The next person then touches the same spot and then touches their own face and then they get the virus
- Cold occurs more often in crowded environments
    - This has caused the misconceptions of the cold causing colds
    - Because school corresponds with the colder weather
- Washing hands and hand sanitizer can help
    - However if done too much it can damage your skin by completely removing the natural layer of oil on your hands
- Colds decrease with age
    - As you get older you build immunity to more and more viruses, and thus there are fewer strands that can affect you
    - Children get more than adult because they are more touchy feely (they do not have boundaries) and hence they are exposed to more viruses and are more susceptible
    - As we get older we are less “sociable”/touchy feely
- $8 billion on cold medication each year
- Cold Remedy Ingredients:
    - Pain reliever or fever reducer
        - Acetaminophen/Ibuprofen
            - Ibuprofen is becoming more popular because it does less damage to the liver

        - Menthol will produce a cooling sensation to help with a sore throat (week topical analgesic)
            - It has to touch the nerve endings to actually be effective (so putting it in the pill/cough syrup is not effective, but sucking on mint would be more effective)
        - Benzocaine
            - It is an anesthetic and will numb your throat
    - Decongestant: all vasoconstrictors
        - Menthol
            - Mucus membrane irritant
                - Has to come into contact with the mucus membranes in your nose to be effective
        - Pseudoephedrine
            - Mucus and snot is 95% water and then has mucin (a protein) that makes it thick
                - The water comes from your bloodstream
                    - The blood vessels will vasodilate in the nose area, they become more leaky and make your nose run
            - Has a similar structure to crystal meth (methamphetamine) and could be used to cook meth
                - 50% of the pseudoephedrine was being used to produce illegal drugs (you could buy the pseudoephedrine very easily and have it shipped to your house)
                - The FDA made more regulations and stopped this
                - So dealer started buying cold medication and used that to cook the meth
                - Now in the US it is a “behind the counter drug”
                    - Now it is more difficult to get medication with pseudoephedrine
                    - So they switched the active ingredient to phenylephrine
                - Still easily accessible in canada
        - Amphetamine was first used for cold medication
            - All decongestants will have a similar structure
        - An effect is a decrease in appetite, and thus it was also sold as a diet pill (has been taken off the market as a diet pill)
            - It then caused severe side effect like stroke and hallucination
                - When they stop losing weight (after the first 10 lbs typically because then our metabolism adjusts and exercise needs to be incorporated) they would increase their dose and OD on them
        - Phenylephrine (don't bother it doesn't work)
            - Metabolized too quickly to be effective
        - Oxymetazoline

    - Antihistamine
        - Side effect is drowsiness (sleeping pills will have antihistamines in them)
        - Reduce nausea
        - Chlorpheniramine (most common for colds)
        - Diphenhydramine is the most common for allergies, does the same thing though
        - Daytime cold medications do not have antihistamines, that is the only difference between the day and night time medications
    - Antitussive
        - Dry cough
            - No mucus
        - Cough syrup is no better than normal cough medication
        - Heroin was initially sold as cough medicine
        - Dextromethorphan
    - Expectorant
        - Productive cough
            - Mucus in throat causes you to cough until you clear the mucus
        - Dilutes the mucus so it is more watery and easier to cough up
        - Should also just drink lots of water
        - Guaifenesin
            - Has never actually been proven to be effective
- Multi symptom medications
    - Many cases there aren't things that are actually going to benefit you
    - Many times the ingredients will counteract each other
        - The medication that suppress cough and the ingredient that make the mucus liquidy and easier to cough
        - The stuff that makes the mucus more watery and the decongestant that makes the mucus less watery
        - An antihistamine and a stimulant (pseudoephedrine)
- Vitamin C has no effect on whether you get a cold or to cure a cold
    - Was discovered in 1960s as a cure all for everything
- Cold FX #1 cold medication in Canada
    - Fancy name for starch is the active ingredient
    - North american Ginseng
        - It is advertised as a cure all
        - Is is used to treat colds because the root looks like a person (doctrine of signatures)
- In Canada to sell a medication you need to publish a clinical trial to prove it works
    - It is really easy to manipulate a clinical trial to show what you want it to show
        - Ex: cold fx
            - Did not randomly assign the placebo and the drug group
            - Mathematically combined the data from the two different trials (not valid)
        - Gravol Multi Symptom: willow bark & ginger

                - In a lab in a controlled environment fresh ginger at 300ug/mL killed 80% of viruses it was combined with
                    - This is the best possible result you will never get results this good in an animal
                    - Only a small percentage of the active ingredients will get into the body and to the affected area
                - This means you need 1500 mg of ginger to get theses results (if every went perfectly which is impossible)
- Flu is a code word to convince us it is better than other cold medications
- Influenza is a more severe cold
- Occasional severe influenza pandemics
- 2 proteins on the flu virus:
    - The outer membrane is a piece it stole from us
    - It then produces hemagglutinin to infect other cells
    - And then neuraminidase to leave the cell that produced it
    - Big changes in theses proteins results in a big outbreak of the disease:
        - Avian Flu (2007)
            - Primarily present in chickens and ducks
            - 60% mortality rate
            - Could only get it in really close contact with chickens and ducks could not be contracted from human to human
            - Killed millions of birds to prevent spread
        - Swine Flu/H1N1 (2009)
            - Spread from person to person
            - At first they had only seen the sickest of the sickest and the data was incomplete, and people began to panic
            - Was declared a pandemic
                - Which only means someone from one country infected someone from another country
- All cold medications use the same ingredients and the same dosages:
    - Pain and fever
        - Acetaminophen 500 mg (careful not to overdose on his when mixing medications)
        - Ibuprofen 200 mg
    - Decongestant
        - Pseudoephedrine 30 mg
        - Phenylephrine 10 mg (waste of money)
    - Antihistamine
        - Chlorpheniramine 2 mg
    - Antitussive
        - Dextromethorphan 15 mg
    - Expectorant
        - Guaifenesin 200 mg
- Summary
    - You will get colds

- Nothing will cure it
- Primarily spread on surfaces
- Some medications may reduce symptoms
    - You cannot treat all symptoms
    - Choose which symptoms you want to treat
- Read the back not the front
    - Choose the right medication
- Avoid multi-symptom products
- Compare before you buy