Topic 8: Tobacco

- Tobacco is the most dangerous substance in the world
- Top 3 causes of death, all three the biggest contributor is tobacco
- Discovered by christopher columbus in 1492
    - Natives really discovered it
    - He brought it back to europe
- Was used to revive drowning victims
- Wasn't done at home or out in public it was done in smoking clubs
    - Was smoked out of a pipe
    - It was a long pipe because there was a lot of acid in the smoke, the long pipe then allowed to smoke to cool so that the acid would leave the smoke
- Cigarettes used to be very expensive because they had to be rolled by hand
    - Thus making it an unpopular activity
- In the late 1800 a machine was invented to roll the cigarettes
    - Thus making then available to everyone in large quantities
- Flue Curing
    - Reduces manufacturing costs
        - Before the leaves would be dried out before sold
    - Used a stove to dry it out much faster
        - This reduces a lot of the acid produced by burning the leaf
        - Making it less irritating
- Cigarettes became dangerous
    - Machine manufacturing reduced cost
        - Could afford to smoke a lot
    - Flue curing reduced irritants in smoke
        - Smoke brought deep into lungs
    - Cigarettes now addictive
    - These two factors increase exposure to toxic substances
    - Risk = toxicity X exposure
- Average smoker smokes 10,000 cigarettes a year
- Cigarette consumption:
    - Late 1800's
        - 80 cigarettes per year
        - Did not inhale
    - Today
        - 10,000 cigarettes per year
        - Inhale deeply
        - Hold smoke in lungs
- Nicotine is the addictive substance
    - 2 mg of nicotine per cigarette required to addict a smoker
    - Acts on the acetylcholine receptors
    - Replaces acetylcholine
        - Can send/block the signals
    - Agonist in low doses
        - A stimulant

- Nicotine stimulates dopamine
    - The reward center
    - Important for learning
    - All addictive drugs affect dopamine
- Lethal dose of nicotine is 60 mg
    - Common form of poisoning in kids, they will eat the cigaret and die of nicotine poisoning
    - Also used to kill large animals
- Toxic Substances in Tobacco Smoke
    - Carbon Monoxide (CO)
        - Reduces oxygen capacity of blood
            - It sticks tightly to the hemoglobin
        - More people die from heart attack than lung cancer
            - Nicotine stimulates the heart muscle
        - Also causes strokes
    - Polonium
    - Combustion by-products
        - Strong carcinogens:
            - Benzopyrenes (PAHs)
            - Nitrosamines
            - Aldehydes
            - Epoxides
            - Aza-arenes
            - Trace Metals
                - React Chemically with DNA
                    - Damage and Mutations
                - Electrophiles
- Alton Ochsner linked cancer to smoking in 1919
- Only 400 cases of lung cancer in North America in 1919
    - Due to chimney sweeps
- 190,000 cases in North America in 2004
    - Due to smokers
- Tobacco Advertising:
    - Tobacco advertising emphasized glamour
    - Tobacco companies paid stars to smoke
    - Cigarettes were provided free to soldiers
    - Started targeting women in 1950s
        - Started smoking to stay slim
            - Common myth, when you quit smoking you gain weight because you replace the dopamine with food
    - Smoking created wrinkles
        - Damages collagen
    - Started targeting children
        - Rare for people to start smoking at 18
        - Usually start at 13

- They want you to be a lifetime buyer
- Second Hand Smoke
  - Same effects as first hand smoking
    - Lung cancer
    - Heart attack
  - Dose makes the poison
- Cigarettes are highly engineered drug delivery device
  - Reconstituted Tobacco
    - Paper made from tobacco
    - Cut into small strips
    - Can use the whole tobacco plant
      - Cheaper
    - Can blend tobacco
      - Cut costs by mixing small amounts of high quality tobacco with cheap tobacco
    - Easy to introduce additives
      - Flavor, burn rate, etc
    - Control nicotine content
      - Using ammonium
  - Paper is specially designed
    - Chemical additives to control burning
      - Even burn rate
      - TiO_2 keeps paper lit
    - Burn rings regulate combustion
      - Tin areas burn quickly when smoker draws
      - Thick areas burn slowly between puffs
  - Filter is decorative
- Light cigarettes are no safer
  - People draw more deeply on them
  - Causing them to smoke more of them
  - Cover the holes with fingers or lips
- Nicotine substitutes to stop smoking
  - No smoke so no dangers
  - Risk is dramatically reduces
    - Heart attack
    - No cancer
- E-Cigarettes
  - Stimulate behaviour of smoking without the harmful smoke effects
  - Sold as a way to stop smoking
    - Could lead to becoming a smoker
      - Tries vaping and becomes a life long vapour/smoker
  - eFluid is a flavoured vapor source
    - Solvent (added to produce texture, heavy vapour in mouth and throat)
      - Propylene glycol

        - In stomach they are safe but we don't know the effects on the lungs
    - Glycerol (glycerin
        - In stomach they are safe but we don't know the effects on the lungs
    - Polyethylene glycol (PEG)
- Nicotine (0mg to 20mg)
    - Heart attack risk
- Flavour
    - Artificial food flavour
- Safer than cigarettes, but not 100% safe