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BPS1101

Midterm 1

The statements in bold are featured in the sample midterm.

- Life expectancy in Canada is 81.3 years today. It started going up in the last 150 years because of the scientific method.
- In 1900, the deaths were mostly caused by disease such as pneumonia and tuberculosis. Nowadays, it's because of cancer, strokes... (the body wears out...)
- Better hygiene=less disease
 - less parasites
 - better sanitation
 - clean drinking water (thanks to chlorination)
 - refrigeration (we don't eat spoiled food anymore)
 - Vaccination (biggest innovation in medicine)
 - Antibiotics
- There used to be a lot of fraud using terms like “scientifically proven” or “patented”.
- **The FDA was created in 1907 to check labelling.**
 - later, in 1936, because of glycol ethylene poisoning in syrup intended for children (107 deaths), it began regulation.
- Thalidomide caused birth defects because it was not tested properly.
- Modern safety standards:
 - 2 test species, including 1 primates
 - Bioavailable (gets into body)
 - right dose
- Philosophy is making conclusions then finding proof afterwards. It is connected with magic and religion
- The ancient believed in 4 elements, hence Hippocrates the body was made of 4 humours:
 - blood
 - phlegm
 - yellow bile
 - black bile

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- To much of a particular humour is the case of the sickness, so doctors would rebalance them (draining blood, purging (diarrhea), vomiting)
- **Doctrine of signature is the believe that god left us clues to heal ourselves. It is at best neutral. Ex:**
 - Walnuts=brains**
 - Boneset plants (the stem seems to grow trough the leaves)=bones**
 - sharks don't get cancer= shark cartilages cures cancer but sharks DO get cancer**
 - chlorophyl in gum= bad breath (because parsley gives a good breath, so it must be chlorophyl)**
 - Mandrake roots looks like people=demonic possession they thought the root would scream, so they used dogs to prevent screaming and protect the magic**
 - Rhino horn (phallic)=aphrodisiac**
 - Mercury is a heavy liquid= good as a purgative, because it will push the toxines potent neurotoxin**
 - avocado looks like a uterus = good for pregnant women**
 - ginseng looks like a person**
 - Willow bark is bitter like quinine, so it must help with pain¹**
- 100 years ago, surgery was done with no anesthetics. Sir Humphrey Davy used Nitrous Oxide (laughing gas) as the first 150 years ago. It causes a powerful high.
- During the civil war, <30% survived surgery because of infection.
- **The first anesthetic was phenol (a poison) by Joseph Lister in 1880.** it is however dangerous to doctors.
- Lister also suggested hygiene in operation rooms
- In the US:
 - Prescription drugs market: 300 billion \$/year
 - OTC: 25 billion \$/year
 - 49% of worldwide consumption.
- genetic engineering is replacing animal tests and facilitates discovery.
- drug discovery costs usually 800 000 000\$ and 8 years/drug
- Most drugs today are synthetic
- 10% drugs survive trials
- **Brand name and generic contain the same ingredients; the only difference is the price**
 - however, generic is becoming more expensive, sometimes more than brand name.
- Drugs like Tylenol arthritis are expensive because people who buy them usually have insurance.
- Top OTC:
 1. Cough and cold
 2. Pain
 3. antacid

¹ This time, it was a lucky case by Edward Stone.

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4. toothpaste
 5. laxatives
- Pay attention to risk (side effects and their incidence), dose and indications & counter indications.
 - Aspirin is the third most popular drug, after coffee and alcohol.
 - It's chemical structure is similar to the willow family. The Sumerians and Egyptians used willow for pain relieve. It was rediscovered in 1763 by reverend Edward Stone.
 - The chemical compound, Salicin, was found in 1829 by Henry Leroux. 1.5kg of willow bark=30g of Salicin
 - **Using the Kolbe-Schmitt reaction, Rafaele Piria transformed tar, a waste product from burning coal, into salicylic acid in 1838. It is synthetic and more efficient.**
 - **Felix Hoffman transformed the acid into acetaclyic acid, which is less bitter and doesn't cause as much stomach irritation in 1897. It started as a powder, but soon became a tablet. This is Aspirin. It was trademarked by Bayer.**
 - ASA only relieves muscular pain. It intefers with cyclooxygenase, an enzyme that creates prostaglandis, the pain hormone. It also helps with fever and heart attacks, because cyclooxygenases causes blood clotting.
 - **Side effects:tinnitus (ringing in the ears, associated with overdose), stomach irritation (because prostaglandins regulates HCl in the stomach.) and Reye's syndrome (brain condition in children in the 1970, thought to have a link with aspirin, though it was never proven. Children's aspirin is still banned in Canada). It is not to be taken during pregnancy/childbirth, because it messes with the contractions.**
 - Discovery of acetaminophen (tylenol):
 - A. Cahn and P. Hepp were trying to find a vermifuge. They noticed the product they had found, antifebrin, or as they called it Antikamnia, reduced fever.
 - Carl Duisberg, a chemist at Bayer, had to dispose of 50 tons of Antikamnia. He transformed it in Phenacetin.
 - Phenacetin is metabolized by the liver, but first it is transformed into acetaminophen. They simply cut a step.
 - Contrarily to Aspirin, acetaminophen works with visceral pains, but not with inflammation/ arthritis.
 - **Acetaminophen becomes Cytochrome P450 in the body, which is dangerous for the liver.**

Hence, it should not be taken for hangover pains.

-Some drugs nowadays contain added acetaminophen and ibuprofen. The label should be read while taking multiple drugs because an

Benefits and side effects

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

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- overdose is possible.
- - Ibuprofen (Advil & Motrin) and Naproxen (Aleve) is usually more effective than aspirin, and works the same way. It lasts longer than acetaminophen.
 - Cyclooxygenase can come in two ways: COX-1 and COX-2. When you mess with COX-1, it can create ulcers. Arthritis treatments can mess with both kinds, and may cause death my ulcer.
 - VIOXX was a “miracle drug” in 1999 that only targeted arthritis yet only inhibit COX-2. Yet, it caused 28 000 heart attacks/year (which was hidden from the FDA and public) and caused a scandal in 2004. The FDA is in favour of it, but the company has taken it off the shelves because of >10000 lawsuits.
 - 90% of people suffer from occasional headaches.
 - People once believed they were caused by demons. They would but their heads in ovens, put a hot rod in the ear and practice trepanation. Today, scams include magnetic bracelets.
 - The brain feels no pain; it comes from pressure on the tissues in the skull.
 - There are 12 types of headaches and 60 subtypes, in two classes: muscular and vascular.
 - Muscular: the pain comes from the tense muscles in the head caused by stress. Take some pain drugs (ASA, acetaminophen, ibuprofen, naproxen,...)
 - Vascular: toxic or migraine
 - A toxic headache is when the body is intoxicated a proceeds to vasodilation; the veins dilates, which puts pression on the head. Ex: acetaldehyde (Alcohol), histamine (fermented food), tyramine (aged cheese), phenylethylamine (chocolate), nitrites²(hot dogs), MSG³ (in Asian food), caffeine⁴. Treatment: pain killers and caffeine (see footnote 3).

² Nitroglycerin, for example, dilates the veins.

³ This syndrome, named Kwok syndrome, was later debunked as being false ands the product of the doctrine of signatures (I have a headache, I just ate Chinese food, hence this is what caused the pain. In reality, there's MSG in pretty much every prepared food.

⁴ Caffeine makes your veins contract. When you consume a lot, your body automatically falls in vasodilation. So, when you don't consume caffeine for a while, you get a headache.

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- Migraines affect 18% of women and 6% of men. It's overused. The pain comes from vasodilation following a vasoconstriction, caused by a trigger, like a strong smell or menstruations. There are four phases:
 - A. Prodrome (mood swings a few days before the pain. Experienced by 30-40%)
 - B. Aura (1-2 hours before the pain, 20-30% of sufferers experience vertigo, hallucinations and scotomas⁵)
 - C. Pain (Affects half of the head. Lasts 1-72 hours)
 - D. Postdrome (similar to a hangover, the sufferer will experience fatigue, depression and/or euphoria)
- The reason for a migraine is that the neuro-transmitter serotonin drops during the aura phase. You cannot use serotonin as a drug because it does not target the specific part of the head.
- Treatments for migraines:
 - Pain killers
 - **Prescription drugs like the triptan class, who activate the nerve signals usually carried by serotonin. They have no nasty side effects, but you must take them before the pain phase.**
 - Ergot
 - A fungus that grows on rye, ergot poisoning causes St Anthony's fire (gangrene), hallucinations and spasms. It was associated with witchery in the middle ages. The active compound ergotamine can however help with your migraine⁶. It was discovered by Arthur Stroll in 1918. LSD is a derivative of ergotamine discovered by accident in 1943 by Albert Hoffman, who was trying to eliminate ergotamine's nasty side effects. It doesn't help with migraines, but it doesn't cause St Anthony's fire and spasms. It however produces powerful hallucinations.
- Cold is 25X more common than all other infections in Canada, with 5-15% of the population affected every year.

⁵ Sight disturbances, like flashes of light.

⁶ Once more, the dose makes the poison.

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- There are >200 viruses that cause flu⁷, about half are rhinoviruses. Hence it will never be curable.
- **Influenza is the deadliest virus, but only if you are very young or very old. It is 15% of colds, but there are no different syndrome from other viruses.**
 - **kids get more viruses because they are very physically social (they touch each other) and the elderly have a weaker immune system. The incidence of colds decreases with age.**
- Cold medication only help with the syndromes; they do not cure it.
- The cold virus destroys tissues, but most syndromes come from the immune system fighting back.
- Colds are more common in crowds. They spread by touching secretions.
- Ginseng (Cold fX) and vitamin C do not help with colds
- Sinus cold is bullshit!
- Never give cold drugs to children <6 years (overdose is easy)
- **Cold drugs usually**
- **contain:**
 - **pain relievers (mostly acetaminophen and ibuprofen). Menthol helps weakly with a sore throat; however, syrups are useless, because the exposure takes a while. Drops, like Halls, are better.**
 - **decongestants (amphetamines⁸, pseudo-ephedrine⁹, phenylephrine¹⁰, oxymetazoline¹¹)**

⁷ They are classified by their exterior envelope.

⁸ The first decongestants found, they cause euphoria and appetite loss. They are banned in OTC drugs. They were used in diet pills, but caused many heart attacks because they induce vasoconstriction. Methamphetamines are used recreationally for their hallucinatory effects today.

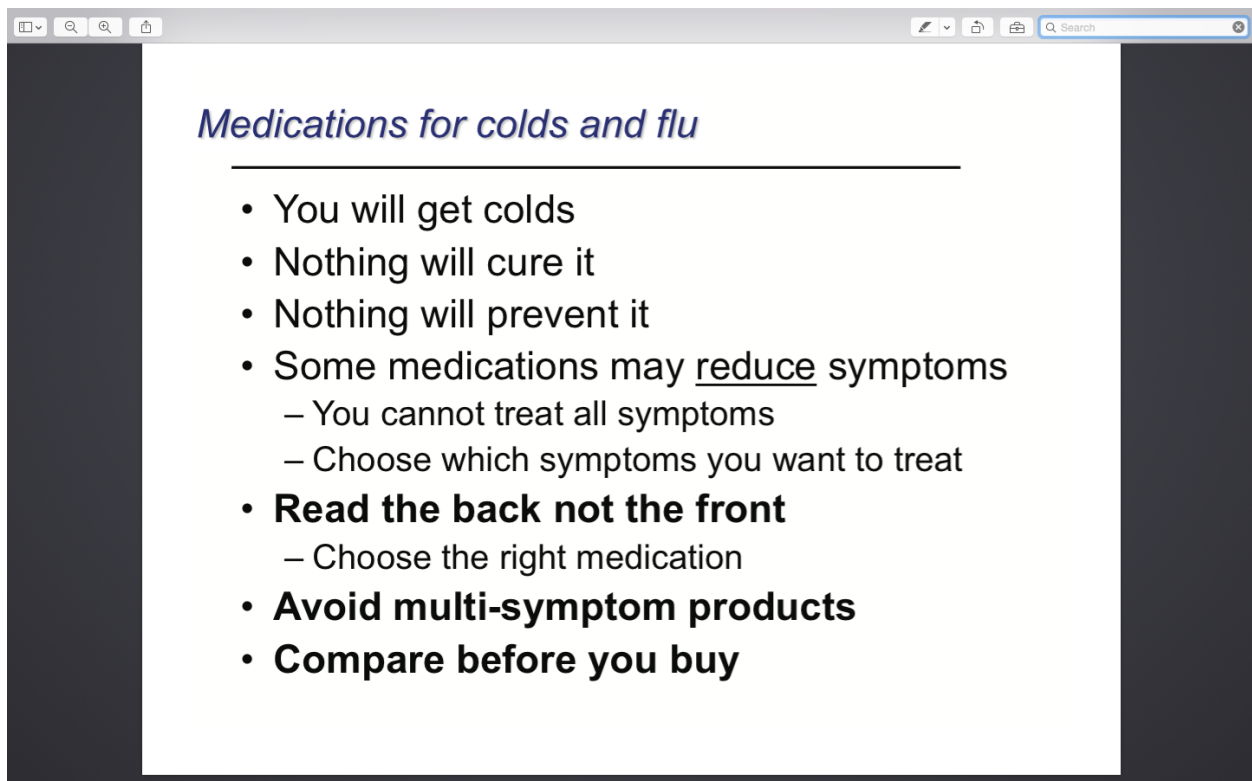
⁹ Very similar to meth, it was a prime ingredient in its manufacture in the 1980. Smerfing was the act of buying a lot of pills to extract it. It is illegal in the US but legal without prescription in Canada (however, you must ask your pharmacien and present ID to acquire some)

¹⁰ Cannot be used to make meth

¹¹ Only used in sprays, because it's dangerous in the stomach

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- **Antihistamines (side effects: no runny nose/eyes, reduced nausea and drowsiness¹²)**
- A dry cough doesn't involve mucus, a productive cough does.
- For a dry cough, use an antitussive (cough suppressant). The best is morphine, but nowadays we use dextromethorphan, which has a similar structure.
- In a productive cough, you have mucus in your throat. Drugs make that mucus watery. You need to take expectorants with water. Gaifenesin, the most popular, has never been proven to work.
- **Multi-symptom medication are bullshit; the decongestants and expectorants cancel each other.**
 - **In this optic, nighttime cold meds are as bad; pseudo-ephedrine is a stimulant that will cancel the drowsiness of the antihistamines.**



The image shows a screenshot of a presentation slide. The slide has a white background with a dark blue header and footer. The title 'Medications for colds and flu' is written in a blue, italicized font. Below the title is a horizontal line. The main content is a bulleted list of points. The first point is 'You will get colds'. The second is 'Nothing will cure it'. The third is 'Nothing will prevent it'. The fourth is 'Some medications may reduce symptoms', with a sub-bullet '– You cannot treat all symptoms' and another sub-bullet '– Choose which symptoms you want to treat'. The fifth point is 'Read the back not the front' with a sub-bullet '– Choose the right medication'. The sixth point is 'Avoid multi-symptom products'. The seventh point is 'Compare before you buy'.

- Cancer is uncontrolled growth¹³ of the cells, called a tumour.

¹² The non-drowsy kinds are used in allergy treatments.

¹³ AKA hyper-proliferation lesion.

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- A tumour can be benign (not dangerous¹⁴) or malign (potentially lethal).
- You die from cancer because the body literally uses all its resources on the tumour; it's a self made parasite in a kind.
- Normal cells must touch each other¹⁵ to survive. They divide on command. Cancer cells are mobile (metastasis)
- **Cancer cells are immortal. Used in research, HeLa cells were taken from Henrietta Lacks, a woman who died from uterine cancer in the 1950. Her cells are still alive and dividing.**
 - **Cancer cells are immortal because, each time a normal cell divides, it loss a part of its DNA. Cancer cells do not go through this process.**¹⁶
- Cancer usually takes 20 years to develop (8-10 mutations in the same cell). Hence over 75% of cases occur after the age of 55. (cancer in children is very rare)
- Cancer is responsible for 22.9% of deaths in the US
- Modern cancer treatments are unpleasant, and can be the cause of death. It's one of the only disease where the survival rate hasn't dropped in 50%¹⁷.
- Men are much more likely to have cancer, because they have bad lifestyle habits (smoking, food, etc.)
- They will never be a cure, because each cancer is unique.
- Cell division is regulated in two ways in the body:
 - stimulation (acceleration)
 - repression (brake)
- In cancer, stimulation is always active but repression doesn't work
 - protein p53 controls repression, but is in a vulnerable spot in the cell.

¹⁴ Though it is not dangerous, it must be treated, else it will become malign.

¹⁵ of the same kind

¹⁶ They can divide about 50 times before their deaths.

¹⁷ the 10% increase is mostly due to earlier diagnosis.

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- Apoptosis is programmed cell death.
 - each day, you have a mutation, but most of the time, the cell commits suicide.