Exam 2018 HMED4100 Fundamentals of Medicine

1) Cancer (10p)

A) Explain how cell division is crucial to understand cancer development. **2p** Cancer develops through mutated DNA + The kinds of mutations the typically leads to cancer are mutations that lead to increase/uncontrolled cell-division

B) Why is it important to stage cancers? **2p** Prognosis and correct treatment

C) List at least two processes that continuously takes place in the body and that prevent cancer development. **2p** Apoptosis…immune system…tumor supressor genes…

D) What is the primary tumor? **1p**

E) What cells are typically damaged by chemotherapy? **2p** cells that divide rapidly, preferably with examples

F) What is the rationale for developing anticancer medication that targets angiogenesis? **1p** No oxygen and energy for cancerous tumor growth

2) The cardiovascular system (14p)

A) What is the pulmonary circulation and systemic circulation of blood? **2p**

B) What are the coronary arteries? **1p**

C) What are the capillaries? **2p** –smallest diameter vessel + substance exchange with tissue

D) What is angina, and what is the difference between stable and unstable angina? **4p** Pain from heart muscle because of too little O2. Difference in when symptoms occur from stable /vs unstable. Unstable is more dangerous ⟶ heart attack/MI

E) What is a heart attack and what are typical symptoms of a heart attack? **2p**

F) What is a stroke? **1p**

G) What two distinct categories of stroke exist? **1p**

H) What is an aneurism and how can it be dangerous? **1p**

3) The respiratory system (11p)

A) What is the name of the anatomical structure in the lung where gas exchange takes place? **1p**

B) What is the name of the large dome-shaped muscle between the thoracic cavity and the abdomen that contracts during breathing? **1p**

D) What does tachypnoea mean? **1p**

E) What does dyspnoea mean? **1p**

G) Why does a patient with pneumonia experience difficulties breathing? **2p** Inflammation ⟶ alveoli full of pus

H) Who are the individuals (at least 3 groups of individuals) that typically acquire pneumonia? **1.5p**

I) What are typical symptoms (at least 3) of tuberculosis? **1.5 p**

J) Who are typical asthma patients, and what diseases are associated with asthma? **2p** Young, genetic disposition + environment. Associated with allergy/eczema

4) The endocrine system (15p)

A) Explain how blood sugar levels are regulated. How does it go up and how does it go down? What organs or tissues are involved? **6p** High bs: -Pancreas release insulin -glucose goes into tissue cells + glycogen stores in liver. Low bs: Pancreas release Glucagon -glycogen in liver into blood glucose

B) Explain differences between diabetes type 1 and diabetes type 2. **2p** Different populations. Insulin resistance vs insulin deficiency

C) What are symptoms of diabetes 2? **2p** . Should include thirst/frequent urination

D) What are long-term complications of having too high blood sugar? **2p** Should include something about cardiovascular complications

E) Where is adrenaline produced?**1p**

F) Why is prednisolone (a corticosteroid) a frequently used drug? **2p** Reduce body's own reaction (inflammation)

G) Why is it a problem to suddenly take prednisolone therapy? This question is taken out because there is a "stop" missing between suddenly and take!

5) Reproductive systems (10p)

A) What is Pelvic inflammatory disease, and what are serious complications to this disease? **2p** Acute-sepsis, long-term-infertility

B) What causes cervix cancer? **1p**

C) Does cancer of the ovaries have a relatively good or relatively bad prognosis as compared to for instance breast cancer? **1p**

D) What is amenorrhea? **1p**

E) What is the most frequent cancer for men? **1p** prostate ca. –in a slide from WHO used in another lecture, lung cancer comes out as the most frequent cancer for men, so this can accepted

F) Testicular torsion is an acute condition that needs urgent treatment. Why? **2p** compromised bloodsupply -infertility

G) What problems can be expected after surgery for prostate cancer? **2p** Incontinence, erectile dysfunction

6) Antibiotic resistance (10p)

Please write **maximum 1 page** about the problems of antibiotic resistance. You should address the following questions:

Why is antibiotic resistance an increasing problem?

Use and overuse. Traveling. AB used in farms.

For what kind of patient groups, and in which areas of medical intervention is antibiotic resistance especially concerning?

Patients with compromised immune system… potentially all of us. No more chemotherapy, surgery severely limited.

How can we meet the challenge of antibiotic resistance?

Use AB only when necessary, and use the right kind of AB (–narrow spectrum)
Education of health care professionals, education of population

Preventive measures to stop infections (hygiene)
Regulative measures –AB only on prescription!
Incentives for industry to develop new AB

7) Evaluating diagnostic tests (20p)

A) A pharmaceutical company manufactures a test for a contagious and lethal disease. The condition may be treated with medication, but the medication has serious side-effects (permanent paralysis of both legs). The company has launched a new version of the test, and an altered test characteristic has increased the expected number of true positives and reduced the expected number of false negatives. **10p**

What are true positives and false negatives in this context? People who are diseased –true positives with a positive test result, or with a false negative test result.

Which test characteristic has been changed, and why is this advantageous? Sensitivity –important because the disease is lethal and contagious!

Why is it important to minimize false positives in this context? Because the drug has serious side-effects

Which test characteristic is a key determinant for assessing this issue? Specificity

B) How will the prevalence of the tested condition affect how you view

a positive test result?

a negative test result?

5p If prevalence goes down, there will be an increased proportion of false positives relative to the true positives, and a positive test result will be more likely to be a false positive. Reduced prevalence will therefore reduce the confidence in a positive test result. Reduced prevalence will increase the confidence in a negative test result. Opposite for increased prevalence.

C) Explain why the cut-off value for a positive or negative test result is a trade-off between sensitivity and specificity?

5p Especially relevant for cut-off between normal and abnormal. The value distributions of the diseased and nondiseased, overlap on the measure of interest (examples blood pressure, blood glucose). Increasing sensitivity will produce more false positives –ie-specificity is decreased. Increasing specificity will produce more false negatives-ie sensitivity is reduced.

8) Prevention (10p)

A) What is the strongest scientific evidence of treatment, which ideally should be the basis for any decision of implementing a treatment or preventive measure?

3p Randomized controlled trial! Or mention hard end points, alt .meta-analyses

B) Explain the lead-time bias which is important when evaluating screening programs.

3p No change in point of death as a consequence of screening, only change is earlier diagnosis. More diseased time

C) What are unintended consequences of screening?

4p *False positives, proceeding with invase or risky tests, Over diagnosis/overtreatment/costs, psychological stress…*