University of Victoria
Department of Economics

Economics 317
Health Economics

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Midterm Examination I
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Instructions. Answer all questions. For multiple choice questions, choose the single, best answer. For short answer questions, respond concisely, using equations or a diagram if necessary. Neither calculators nor any other electronic device, including but not limited to cell phones, are needed and you may not use any such device during the exam. Each multiple choice question is worth 2 points and each short answer question is worth 10 points.

1 Multiple choice questions.

1. A new policy substantially decreases smoking rates. People who quit smoking initially have lower health care costs because they become healthier, but eventually die of diseases which are on average much more costly to treat than smoking-related diseases. What effect will the policy have on the present value of health care costs?

   (a) health care costs will rise.

   (b) health care costs will fall.

   (c) if the discount rate is sufficiently low, the policy will decrease the expected value of health care costs.

   (d) **if the discount rate is sufficiently high, the policy will decrease the expected value of health care costs.**

2. Actuarially fair insurance implies all of the following EXCEPT:

   (a) risk–averse consumers will fully insure.

   (b) loading costs in a competitive insurance market must be zero.

   (c) the expected payout from an insurance policy equals the premium.

   (d) **consumers are indifferent over how much coverage to purchase.**

3. Increases in life expectancy in Canada over the last 200 years are largely attributable to

   (a) improved medical technologies which decrease mortality from cancer and heart disease.

   (b) vaccination against communicable disease.

   (c) large increases in the proportion of GDP devoted to health care.

   (d) **improvements in standards of living such as nutrition and sanitation.**

4. Wealth and health are positively correlated in Canada. Therefore,

   (a) income redistribution programs would increase poor people's health but decrease rich people's health.

   (b) income redistribution programs would increase poor people's health but have no effect on rich people's health.

   (c) Canadian GDP would rise if new medical treatments effectively increased Canadians' health.

   (d) **a rich Canadian is expected to be in better health than a poor Canadian.**

5. The RAND Health Insurance Experiment

   (a) randomly assigned tax rates to different insurance companies.

   (b) **randomly assigned levels of health insurance coverage to people.**

   (c) randomly assigned levels of health care to people.

   (d) randomly assigned health insurance public policies to different countries.

6. The bunny rabbits on the UVic campus are found to be carriers of bubonic plague. Eradicating the bunnies has an estimated cost of $1M and is expected to reduce the probability a given student dies of the plague from 1/1,000 to zero. There are 20,000 students on campus. If the administration refuses to eradicate the bunnies due to the cost, the administration's willingness to pay to save a student statistical life is no more than

   (a) $0

   (b) $20,000

   (c) **$50,000**

   (d) $20,000,000

7. If econometric evidence shows that the marginal cost of saving a life through cancer screening is \$5M and the marginal cost of saving a life through highway maintenance is \$6M,

   (a) more lives could be saved if resources were reallocated from cancer screening to highway maintenance.

   (b) **more lives could be saved if resources were reallocated from highway maintenance to cancer screening.**

   (c) more lives could be saved if resources devoted to highway maintenance were equal to resources devoted to cancer screening.

   (d) the situation is optimal and no more lives could be saved.

8. Canada's compulsory health insurance program means that

   (a) **moral hazard is a problem.**

   (b) moral hazard is not an issue.

   (c) moral hazard occurs on the intensive but not the extensive margin.

   (d) moral hazard is canceled by adverse selection.

9. In Grossman's model, education affects health because

   (a) **educated people are assumed to be more efficient producers of health.**

   (b) health and education are both caused by rate of time preference.

   (c) healthier people choose to obtain higher levels of education.

   (d) educated people earn more money, and money is an input into the production of health.

10. As people age in Grossman's model,

    (a) their optimal health stock goes up because they are more likely to purchase health insurance.

    (b) their optimal health stock goes down and they use less medical care.

    (c) their optimal health stock goes down and they use more medical care.

    (d) **their optimal health stock goes down; whether they use more or less medical care depends on the elasticity of the MEI schedule.**

11. In Grossman's model, an increase in the interest rate

    (a) increases desired health.

    (b) **decreases desired health.**

    (c) has no effect on desired health.

    (d) has no effect on desired health but changes the optimal allocation of money and time spent producing health.

12. Jerry gets $u(w) = w^2$ units of utility from wealth w. Jerry has \$10 and is considering buying a lottery ticket which costs \$5. With probability 0.9 the ticket pays nothing and with probability 0.1 the ticket pays \$50.

    (a) **Jerry will buy the ticket.**

    (b) Jerry will not buy the ticket.

    (c) Jerry is indifferent: he gets equal utility from buying or not buying.

    (d) There is not enough information to determine if Jerry will buy the ticket.

13. Canada spends less per capita on health care than the United States, and Canadians live longer on average than Americans. From these facts we can infer that

    (a) the Canadian health care system produces more health per dollar at the margin than the American system.

    (b) the Canadian health care system more effectively targets high–risk individuals than the American system.

    (c) the Canadian health care system is allocatively efficient but the American system is inefficient.

    (d) **nothing about the relative effectiveness of the two health care systems.**

14. "Social capital" refers to

    (a) factors of production owned by the government.

    (b) **networks of friends, family and other social contacts.**

    (c) capital that impacts the elasticity of the MEI schedule.

    (d) capital that generates substantial positive external effects.

15. A heart transplant is successful with probability 2/3, otherwise the patient dies. If the transplant is successful the patient lives for two more years. If the discount rate is 25%, what is the expected present value of life years for heart transplant patients? (*Note: discount the second but not first year.*)

    (a) 1/6 years.

(b) 1.0 years.

(c) 1.1 years.

(d) **1.2 years.**

2 Short-answer questions.

Instructions. Answer each question clearly and concisely. No question requires more than a sentence or two and possibly an equation or a single graph. Ensure graphs are clearly labeled.

1. You are uncertain whether Economics 317 will be an easy course or a hard course. You think it is equally likely that the course is easy or hard, and you think that if the course is easy, you will get a final grade of G=81%, and if the course is hard you will get a final grade of G=49. Your utility function for grades is $U(G) = \sqrt{G}$.

   (a) What is your expected grade?

   (b) What is your expected utility?

   (c) If you have the opportunity to receive a grade of G=63 with certainty, should you take it?

   Answer:

   (a) Expected grade:

$$\begin{aligned} E(G) &= 0.5(49) + 0.5(81) \\ &= 24.5 + 40.5 \\ &= 65. \end{aligned}$$

   (b) Expected utility:

$$\begin{aligned} EU &= 0.5\sqrt{49} + 0.5\sqrt{81} \\ &= 8. \end{aligned}$$

   (c) The certainty equivalent of taking the exam, G_{CE}, satisfies $U(G_{CE}) = EU$, or $\sqrt{G_{CE}} = 8$, so G_{CE}=64. Therefore taking the exam is preferred to taking a 63 with certainty.

2. Supply of dental services is given by the function

$$Q^S = P$$

where P is the price of dental services, and demand is given by

$$Q^D = 100 - P.$$

Assume that markets are competitive and that there are no externalities or other distortions.

(a) Show these relationships on a graph and calculate the equilibrium price and quantity.

(b) Suppose an insurance plan covers 100% of consumer's dental expenditures. Draw the demand curve which results from this insurance plan and indicate the new equilibrium price and quantity.

(c) In this model, is social welfare higher or lower under the insurance scheme? Very briefly explain.

Answer.

(a), (b) as graph below. For (c) they should say that social welfare falls under the insurance scheme because all units consumed beyond the quantity in part (a) constitute deadweight loss. For full marks they should display this loss on the as the shaded triangle in the graph or very clearly explain why the loss occurs.