University of Victoria
Department of Economics

Economics 318
Health Economics
Midterm Examination I

Spring 2014

Instructions. Answer all questions. Write your answers on the exam paper. No electronic devices, including but not limited to calculators and cell phones, are necessary and no such devices may be used during the exam. Remember to clearly label the axes and other objects in graphs. Good luck!

NAME: _____

STUDENT #: _____

1 Multiple choice questions (24 marks).

Instructions. Select the best answer to every question. Clearly record your answers on this page.

MULTIPLE CHOICE ANSWERS

1.	A.	B.	(C.)	D.	7.	A.	B.	(C.)	D.
2.	A.	B.	C.	(D.)	8.	A.	B.	(C.)	D.
3.	A.	(B.)	C.	D.	9.	A.	B.	(C.)	D.
4.	A.	B.	(C.)	D.	10.	A.	B.	(C.)	D.
5.	A.	B.	C.	(D.)	11.	A.	(B.)	C.	D.
6.	A.	B.	C.	(D.)	12.	A.	B.	C.	(D.)

1. In Canada, total health care spending as a fraction of GDP is roughly,
   (a) 2%.
   (b) 5%.
   (c) 10%.
   (d) 18%.

2. 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.

3. 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.

4. If an increase in the proportion of GDP spent on health care from 4% to 6% causes life expectancy to rise from 69 to 71 years, then the (arc) elasticity of life expectancy to health expenditures is:
   (a) -2/70.
   (b) 2/70.
   (c) 5/70.
   (d) 12/70.

5. Suppose the *relative income hypothesis* is true. Then an increase in income inequality, holding mean income constant, would

   (a) decrease population.

   (b) increase population health.

   (c) have no effect on population health.

   (d) any of (a), (b), or (c) could be true.

6. Taken in totality, the evidence on the health and other returns to education suggests that further educational subsidies

   (a) are not worthwhile *at the margin*, because people already demand too much education.

   (b) have the unintended consequence of reducing health through their effect on drinking and smoking.

   (c) have no effect on health.

   (d) are worthwhile because people do not seem to demand enough education.

7. A "natural experiment" is

   (a) an experiment conducted in a non-artificial setting, such as a forrest.

   (b) an obvious experiment for a scientist to conduct, as opposed to an experiment which would only occur to experts in the field.

   (c) an uncontrolled phenomena which mimics properties of controlled experiments.

   (d) a type of controlled experiment in which no ethical considerations must be confronted.

8. Which of the following is evidence that higher income causes better health?

   (a) Using a large population survey, it is found that income and health are positively correlated.

   (b) Analysts discover that patients randomized to a more effective treatment also had higher incomes.

   (c) People who win the lottery are found to be in better health than lottery players who did not win.

   (d) Statistical results demonstrate that people who place relatively large weight on future outcomes are likely to obtain more education and less likely to smoke than others.

9. The evidence suggests that the elasticity of population health to health care expenditures is

   (a) large, somewhere between 2.0 and 4.0.

   (b) moderate, around 1.0.

   (c) small but probably positive, around 0.1.

   (d) probably negative, due to iatrogenic effects.

10. In the U.S., public programs which provided sanitation to aboriginal communities were found to

    (a) have unexpectedly low impacts on population health.

    (b) produce moderate but cost-ineffective increases in population health.

    (c) produce large and cost-effective increases in population health.

    (d) have the unintended consequence of decreasing public health through offsetting behavioral responses.

11. Over the last 200 years, mortality in developed countries has decreased primarily because

    (a) deaths due to communicable diseases have fallen as a result of the development of penicillin and other treatments.

    (b) deaths due to communicable diseases have fallen primarily for reasons other than the development of medical treatments.

    (c) deaths due to cancer and heart disease have fallen, primarily because of more effective medical treatments.

    (d) deaths due to cancer and heart disease have fallen, primarily for reasons other than effective medical treatments.

12. The evidence suggests that the correlation between education and health

    (a) is almost entirely attributable to "third variables."

    (b) is very fragile, only appearing in some times and some places.

    (c) is all but entirely attributable to the effect of education on income.

    (d) is at least in part attributable to a substantial effect of education on health.

2 True / False / Uncertain questions (16 marks).

Instructions. Respond true, false, or uncertain to each assertion and write a brief justification of your answer, including a graph and/or equations if helpful. No marks will be awarded to undefended answers

1. A new policy requires all automobiles in Canada to be equipped with side airbags. Assuming the airbags increase the safety of vehicle occupants in the event of a crash, the policy will save lives.

   False. Vehicle occupants will be safer in the event of a crash, but drivers of cars with airbags may drive less safely, increasing the probability of a crash and of harm to third parties. Depending on the magnitudes of these two effects, the policy could increase or decrease mortality. (A graph showing a tradeoff between speed and safety illustrating the effect of installing airbags is useful here.)

2. Suppose that, for every person, an increase in education causes an increase in health. In this society, we would find that people with more education tend to be healthier.

   False. A positive causal effect does not allow us to infer that the correlation must be positive, for example, people with more education may tend to have other characteristics which reduce health, and that may more than offset the positive effect of education on health. Optionally, an algebraic or graphical example could be used to illustrate, possibly something like: Say, at the individual level we have $H = E + 2L$, where L is a health–enhancing lifestyle choice which is also determined by education: $L = -E$. Then across people health–education outcomes are given by $H = E + 2(-E) = -E$, so we would find that people with more education tend to be less healthy.

3. Suppose that, for every person, an increase in income causes an increase in health. It follows that costless income redistribution from relatively high to relatively low income people would increase average health.

   False. Even assuming that the only determinant of health is income, the conclusion only follows if there are diminishing returns. If we write $h = f(y)$ where h is health and y income, we need the function $f(y)$ to be concave. A graph could be used to illustrate, or a counterexample could be given, e.g., if the function is linear, like $h = y$, then costless income redistribution has no effect on average health.

4. Give, and briefly explain, two reasons why there may be a causal effect of education on health.

   (Note this is inadvertently not true/false, do not penalize answers which nonetheless assert true or false). Any two of the reasons we discussed in class: (1) Education increases income which in turn increases health, (2) education leads to safer jobs, (3) education allows more efficient health production, (4) education increases intelligence which in turn increases health, and (5) education decreases time discounting, (6) education changes social networks, (7) education changes preferences over health and other goals.

3 Long answer question (14 marks).

Instructions. Answer the question clearly and concisely. Write your answers on this paper in the space provided. Undefended answers are worth no marks.

1. Answer the following questions in the framework of Grossman's model of the demand for health.

   (a) In this model people care about health and about bread. Briefly explain what we mean by "bread" in this context.

   (b) Use a diagram to illustrate the tradeoff people make between health and bread, making the same assumptions we made in lectures. Show the consumer's feasible allocations of bread and health, the consumer's optimal choice assuming the person chooses to consume some bread and some health (label that choice point **A**), and display the indifference curve passing through point **A**.

   (c) Suppose the person's wage increases, such that they may obtain more health for any given level of bread consumption (or vice versa). On your diagram, show the new feasible set and the consumer's new optimal allocation, labeling that point **B**.

   (d) Does an increase in wage necessarily increase the person's health, assuming the consumer is rational?

   (e) Now consider the "pure investment" variant of Grossman's model. Sketch the diagram we used to illustrate choices in this model, showing the person's optimal choice of health stock at age t given a market interest rate of r and rate of health depreciation δ_t. Label the person's optimal choice of health stock, H_t^*.

   (f) Illustrate the effect on health of aging to age $(t+1)$, under the assumptions we made in class. Label the new optimal stock H_{t+1}^*.

   (g) Suppose the MEI schedule is highly inelastic. In this case, does health care consumption rise or fall as the consumer ages? Briefly explain.

ANSWER: (also use following page as needed.)

ANSWER TO LONG ANSWER QUESTION 1 CONTINUED:

(a) "Bread" means all goals in life other than health, or "home production," or any equivalent phrasing.

(b) A diagram in bread–health space with a standard-shaped production possibilities frontier. An interior point on the PPF should be marked A, and a standard–shaped indifference curve should pass through A tangent to the PPF. The axes and all other objects should be correctly labeled.

(c) The PPF should be shown shifting out. A point on the new curve should be labeled B. It is fine if an indifference curve is shown passing through B tangent to the new PPF, but the question does not insist that this curve is displayed.

(d) No. The answer should merely show any bundle on the new PPF which has higher lower health than the initial point A. If indifference curves are shown, they must have the correct shape and must not be depicted crossing.

(e) Diagram from class notes showing H_t on the x–axis and rate of return (or "\$") on the y-axis. A horizontal line should be depicted and labeled "$r + \delta_t$" or "marginal cost" or equivalent, and a downward sloping curve should be displayed labeled "MEI" or "marginal benefit" or equivalent. The value of H_t at the point of intersection should be labeled "H_t^*".

(f) The marginal cost curve should be depicted moving up, the value of H_t below the new intersection should be labeled "H_{t+1}^*".

(g) If the MEI schedule is very inelastic (steep), the magnitude of the aging–induced decline in health is very small, implying the agent must be offsetting the effects of aging by increasing investment in health by, in part, using more health care. A diagram can optionally be used to illustrate the effect of the elasticity of the MEI schedule on the magnitude of the decline in health.

EXTRA SPACE. *Use as needed to answer short answer questions, or as scratch space, or to sketch amusing cartoons.*

END.