

UNIVERSITY OF VICTORIA
DEPARTMENT OF ECONOMICSECONOMICS 318
HEALTH ECONOMICS
FINAL EXAMINATION

Spring 2014

Instructions. Answer all questions in both sections. No electronic devices, including but not limited to calculators and cell phones, are necessary and no such devices may be used during the exam. Please write on only one side of each page of your examination book. Good luck!

MULTIPLE CHOICE ANSWERS

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| 13. | <input checked="" type="radio"/> A. | B. | C. | D. | 28. | A. | B. | C. | <input checked="" type="radio"/> D. |
| 14. | A. | <input checked="" type="radio"/> B. | C. | D. | 29. | <input checked="" type="radio"/> A. | B. | C. | D. |
| 15. | <input checked="" type="radio"/> A. | B. | C. | D. | 30. | A. | <input checked="" type="radio"/> B. | C. | D. |

1 MULTIPLE CHOICE QUESTIONS (30 MARKS).

Instructions. Answer all questions. Clearly record your answers on the preceding page.

1. Roughly what percentage of health care expenditures in Canada are publicly funded?
 - (a) 40%.
 - (b) 70%.
 - (c) 85%.
 - (d) 95%.

2. According to estimates we discussed in class, providing accurate information about the health risks of smoking would
 - (a) decrease smoking rates by about 7%.
 - (b) increase smoking rates by about 7%.
 - (c) have no effect on smoking rates.
 - (d) decrease smoking rates very slightly, about 1%.

3. The U.S. health care system is best characterized as
 - (a) mixed public and private provision of care and insurance.
 - (b) mostly market provision of insurance but mostly socialized care.
 - (c) mostly market provision of care but mostly socialized insurance.
 - (d) socialized provision of care and insurance.

4. The Canadian health care system is best characterized as
 - (a) mixed public and private provision of care and insurance.
 - (b) mostly market provision of insurance but mostly socialized care.
 - (c) mostly market provision of care but mostly socialized insurance.
 - (d) socialized provision of care and insurance.

5. In the model of physician behavior we discussed in class, a physician who increases her level of inducement in response to an increase in her fee would respond to a lump-sum increase in her income by
 - (a) increasing inducement.
 - (b) decreasing inducement.
 - (c) not changing her level of inducement.
 - (d) there is not enough information to determine the effect on inducement.

6. An increase in education in Grossman's model leads to greater health because more education
 - (a) causes people to place more value on future outcomes.
 - (b) leads to higher wages.
 - (c) makes people more efficient in producing health.
 - (d) induces people to pursue healthier lifestyles.
7. Econometric evidence suggests that the price elasticity of demand for cigarettes is roughly
 - (a) 0.
 - (b) 0.5.
 - (c) -0.5.
 - (d) -1.5.
8. A public health intervention has immediate costs of \$10M. The intervention yields immediate benefits of \$5M, and another \$6M of benefits in one year. The intervention is worthwhile if the annual interest rate used to discount future costs and benefits is:
 - (a) greater than 20%.
 - (b) less than 20%.
 - (c) greater than 25%.
 - (d) less than 25%.
9. Which of the following is a correct criticism of the standard gamble approach to eliciting QALYs?
 - (a) The standard gamble suffers from the problem that it confounds risk preferences with valuation of health states.
 - (b) The standard gamble cannot be used when discounting future outcomes is part of the analysis.
 - (c) The standard gamble cannot be used to compare health outcomes across different illnesses.
 - (d) The standard gamble can only be used to elicit preferences over mortality, not morbidity.
10. Which of the following is NOT evidence that education causes health?
 - (a) people subject to more stringent compulsory schooling laws are all else equal also healthier.
 - (b) American men who went to college to avoid the Vietnam War draft were less likely to become smokers.
 - (c) people who faced lower college tuition were all else equal also healthier.
 - (d) people who go to college are on average healthier than people who do not.

11. Adverse selection in health insurance markets
- (a) refers to the tendency of low risk people to opt out of insurance, increasing the price of insurance.
 - (b) refers to firms refusing to insure people with pre-existing conditions, leading to social problems.
 - (c) refers to efforts by consumers to select the lowest priced insurance on the market, leading to pervasive disequilibrium.
 - (d) refers to the tendency of insured people to take fewer preventive actions, increasing everyone's costs.
12. Fishermen and miners have similar education and other characteristics, and fishing and mining are considered comparable jobs except that fishing is riskier. Fishermen face a risk of on-the-job death of $4/10,000$ per year, whereas $2/10,000$ miners per year are killed in workplace accidents. Fishermen earn \$51,000 per year and miners earn \$49,000 per year. We infer that the value of a statistical life for this population is
- (a) \$8,000,000.
 - (b) \$10,000,000.
 - (c) \$12,000,000.
 - (d) \$20,000,000.
13. In Grossman's model, the aging process is represented by
- (a) eventually increasing rates of depreciation of health stock.
 - (b) decreases in the efficiency of health investment.
 - (c) MEI schedules which are monotonically decreasing in age.
 - (d) decreases in "effective education" levels as memory fades.
14. The external costs of cigarette smoking are
- (a) attributable largely to health care costs.
 - (b) attributable largely to factors other than health care costs.
 - (c) attributable largely to the harm smokers do to their own health.
 - (d) irrelevant because cigarettes are a rationally addictive good.
15. Canada spends less per capita on health care than the U.S. primarily because
- (a) prices and wages in the health sector are lower in Canada.
 - (b) care in the U.S. must cover a profit margin, whereas care in Canada does not.
 - (c) Canadians use less health care because the Canadian system efficiently rations scarce care.
 - (d) the Canadian single-payer system has lower administrative costs.

16. The rational addiction model predicts that an increase in the price of heroin
- (a) will have no effect on quantity of heroin demanded.
 - (b) may affect quantity demanded by reducing number of users, but will have no effect on existing users' demand.
 - (c) will decrease quantity demanded, and the effect will increase in magnitude over time.
 - (d) will decrease quantity demanded, and the effect will decrease in magnitude over time.
17. Fred is an expected utility maximizer with utility function $U(W) = W$. Fred has initial wealth $W = 100$ and faces a 10% probability of needing a surgical procedure which costs \$60. What is the maximum Fred is willing to pay for full insurance against the cost of the surgery?
- (a) \$0.
 - (b) \$6.
 - (c) \$7.
 - (d) \$9.
18. The RAND Health Insurance Experiment
- (a) randomly assigned tax rates to different insurance companies.
 - (b) randomly assigned levels of health care to people.
 - (c) randomly assigned people to different managed care providers, such as HMOs.
 - (d) randomly assigned levels of health insurance coverage to people.
19. Which of the following is NOT a valid criticism of the rational addiction model?
- (a) The model assumes people know all future prices, but future prices are actually uncertain.
 - (b) The model assumes people fully understand they will become addicted, but people may not know whether or not they are prone to addiction.
 - (c) There is only addictive good in the model, but in reality multiple addictive behaviors may interact.
 - (d) The model predicts that addicts will regret their past decisions, but not all addicts display regret.
20. Akerlof's "model for lemons" model demonstrates that
- (a) adverse selection can lead to Pareto inefficient allocations.
 - (b) moral hazard can lead to Pareto inefficient allocations.
 - (c) externalities can lead to Pareto inefficient allocations.
 - (d) public goods can lead to Pareto inefficient allocations.

21. Life expectancy in Canada is much higher in 2011 than it was in 1800 primarily because of
- (a) improvements in medical technology.
 - (b) massive increases in labour and capital devoted to health care (such as physicians and hospitals).
 - (c) improvements in living standards such as housing, nutrition, and sanitation.
 - (d) reductions in smoking and other unhealthy behaviors that allow people to now commonly live into their 80s and 90s.
22. Statistical evidence shows that
- (a) tax rates have no effect on smoking patterns.
 - (b) tax rates reduce smoking but demand is moderately inelastic.
 - (c) tax rates reduce smoking and demand is highly elastic.
 - (d) any of the above could be true; it is very difficult to estimate demand for cigarettes.
23. In Canada, the value of life typically used in program evaluations is roughly
- (a) \$2,000,000.
 - (b) \$7,500,000.
 - (c) \$15,000,000.
 - (d) infinite.
24. Patients on a new treatment live one year in full health, then they face a 50% probability of dying. If they do not die, they live one more year in health state $q = 5/8$ and then die with certainty. Future outcomes are discounted at an annual rate of 25%. Present expected value QALYs of patients on this treatment are
- (a) 1.05.
 - (b) 1.25.
 - (c) 1.50.
 - (d) 1.75.
25. The B.C. government currently spends \$500M per year on traffic safety policies and also \$100M per year on ambulance services. It is estimated that saving one additional life through traffic safety policies would cost \$4M, and saving one additional life through ambulance services would cost \$6M. Assuming the only effects of these policies is on lives saved, the government should
- (a) not change the current allocation of funding.
 - (b) divert funding from traffic safety to ambulance services.
 - (c) divert funding from ambulance services to traffic safety.
 - (d) decrease spending on both traffic safety and ambulance services.

26. Cost-effectiveness analysis differs from cost-benefit analysis in that
- (a) no attempt is made to monetize benefits.
 - (b) geometric discounting is not imposed.
 - (c) costs and benefits in the distant future are not ignored.
 - (d) contingent valuation can be used as a method of measuring outcomes.
27. The average person who has diabetes earns \$40,000 per year, the average person who does not have diabetes earns \$50,000 per year. There are one million diabetics in Canada. Therefore, a new treatment which instantly and costlessly cures diabetes would
- (a) have no effect on GDP.
 - (b) increase GDP by somewhere between \$0 and \$10 billion dollars.
 - (c) increase GDP by \$10 billion.
 - (d) we do not have enough information to calculate the effect of the treatment on GDP.
28. When we discussed Grossman's model, "bread" was shorthand for
- (a) money.
 - (b) leisure time.
 - (c) all foodstuffs.
 - (d) a composite good produced using time and market goods.
29. "Obamacare" in the U.S. requires all people to purchase at least minimal health insurance. One theoretical rationale for this policy is a reduction in problems caused by
- (a) adverse selection in insurance purchases.
 - (b) moral hazard in insurance markets.
 - (c) profiteering by HMOs and other providers.
 - (d) pecuniary externalities
30. In the context of health and income, "the concavity effect" refers to
- (a) the necessity of strictly concave utility functions for a health equilibrium to exist.
 - (b) a mechanical effect of income dispersion on health operating solely through the effect of personal income on health.
 - (c) an "action at a distance" effect of relative income on health.
 - (d) a nonlinear causal effect of health on income.

2 SHORT ANSWER QUESTION (20 MARKS).

Instructions. Answer all questions clearly and concisely. Undefined answers are worth no marks. Remember to clearly label the axes and other objects in graphs. Remember to please only write on one side of the page.

1. Consider a competitive market for health care. First suppose there is no health insurance available. Suppose demand for health care is given by

$$Q^D = 24 - 4P^D, \quad (1)$$

where Q^D is quantity demanded and P^D is the price paid by consumers. Supply is given by

$$Q^S = 2P^S. \quad (2)$$

where Q^S is quantity supplied and P^S is the price received by firms.

- (a) Show the supply and demand schedules on a diagram.
- (b) Find the equilibrium price and quantity mathematically.
- (c) Now suppose the government introduces an insurance program which pays 50% of all health care expenditures. Placing market price on the y-axis, display supply and demand schedules under this insurance plan on a new diagram (*Hint: if you cannot do this mathematically, try finding two points on the new (linear) demand schedule*).
- (d) Find the new equilibrium price and quantity.
- (e) Indicate the deadweight loss caused by the insurance program on your diagram.
- (f) Now relax the assumption that the market is competitive. Present and very briefly discuss TWO reasons why the government insurance program may *increase* social welfare.

ANSWER. (*Also use following page as needed.*)

(Answer to short answer question continued.)

2. Consider the canonical Becker and Murphy (1988) “rational addiction” model we discussed in class.
- (a) Define “addiction” as the term is used in this framework.
 - (b) Suppose people view \$1 with certainty in one year as equivalent to b dollars today, $0 \leq b \leq 1$, where b varies across people. Would you expect people with high values of b to be more or less likely to acquire harmful addictions than people with low values of b ? Explain.
 - (c) Display a graph with stock of addiction, S , on the x-axis and consumption, c , on the y-axis. Assume the stock of addiction follows the law of motion we discussed in class. Display the set of points such that consumption is just sufficient to maintain S at its current level. Label this set “SS,” for steady state.
 - (d) Display optimal consumption as a function of S , $c(S)$, for an addict. Assume that $c(0) > 0$. Label this function “ $c(S)$.” Indicate the unique positive-consumption steady-state equilibrium level of S , labeling it S^* .
 - (e) Use your graph to illustrate the immediate and the long-run effects of an increase in the price of the addictive good, assuming the price increase is not sufficient to cause the addict to quit.
 - (f) On a new graph, illustrate the immediate and long-run effects of an increase in the price of the addictive good, assuming the price increase is large enough to cause the addict to quit.
 - (g) What effect does an anticipated increase in the *future* price of the addictive good have a rational addict’s current consumption? Briefly explain.

ANSWER. (*Also use following pages as needed.*)

(Answer to short answer question continued.)

SCRATCH SPACE. Use for calculations or as extra space for written answers.

END.