

Answer all questions in the space provided on the exam.

Total of 60 points (and worth 44.5% of final grade).

Read each question carefully, so that you answer the question.

**Multiple Choice (1 points each question)**

**CIRCLE ONE**

1. a b c d e

2. a b c d e

3. a b c d e

4. a b c d e

5. a b c d e

6. a b c d e

7. a b c d e

8. a b c d e

9. a b c d e

10. a b c d e

11. a b c d e

12. a b c d e

13. a b c d e

14. a b c d e

15. a b c d e

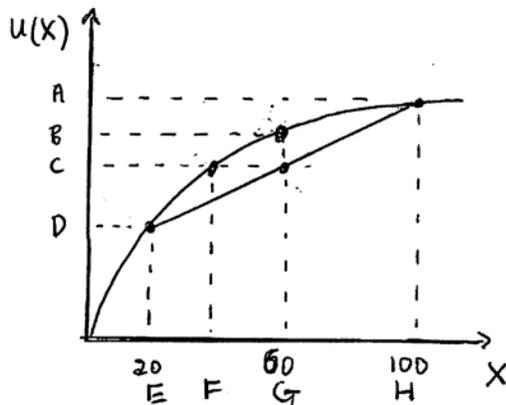
16. a b c d e

17. a b c d e

18. a b c d e

**Short Answer (6 points each question)**

1.(a) You are given the following diagram for someone facing either  $X = 20$  with probability 0.5 or  $X = 100$  with probability 0.5.



(i) The utility obtained from full insurance at the actuarially fair premium is given by which point (**circle one**): A B C D E F or G.

(ii) As drawn the individual is which one of the following (**circle one**): risk-averse, risk-neutral, risk-prefer or there is insufficient information to answer the question.

(b)(i) Suppose an insurance company sells insurance to 100 people each of whom has independent and uncertain health expenses, with common mean \$10,000 and standard deviation \$20,000. What interval will the average claim per individual insured person lie in with probability 0.95?

(ii) Consider the market for used cars and let  $X$  = value of the car.

Sellers know the value of the car they sell and their utility is  $U(X) = X$ .

Buyers only know that car value is uniformly distributed on  $(50, 150)$  and their utility is  $1.5 \times X$ .

Suppose the posted price for used cars is 90. Will consumers buy a car at this price?

**Explain your answer.**

(c)(i) The Manning et al. paper on the Rand Health Insurance experiment in Table 2 found that adjusted total expenses were \$550 under the 95% plan (which has an effective coinsurance rate of 30 percent) and were \$750 under the free plan. Calculate the arc price elasticity of health care demand.

(ii) What category of health service -- inpatient or outpatient -- was found to be most price responsive in the Rand health insurance experiment?

2. The Trump transition website <https://www.greatagain.gov/policy/healthcare.html> states:

“A Trump Administration will work with Congress to repeal the ACA and replace it with a solution that includes Health Savings Accounts (HSAs), and returns the historic role in regulating health insurance to the States.... To maximize choice and create a dynamic market for health insurance, the Administration will work with Congress to enable people to purchase insurance across state lines. The Administration also will work with both Congress and the States to re-establish high-risk pools – a proven approach to ensuring access to health insurance coverage for individuals who have significant medical expenses and who have not maintained continuous coverage.”

**(i) State one reason** for why allowing people to purchase health insurance from a different state to the state they live in may be a good idea.

**(ii) State one reason** for why allowing people to purchase health insurance from a different state to the state they live in may be a bad idea.

**(iii)** Can you see any challenges for the long-run viability of the proposed high-risk pools. **Explain your answer.**

**(iv) Explain why** health savings accounts (contributions to which are tax deductible and that roll over from year to year) coupled with a high deductible health plan could be a good idea.

**(v)** Suppose the only change made to Obamacare is to make health insurance no longer mandatory. What effect is this likely to have on insurance premiums in the health insurance exchanges? **Explain your answer.**

**(vi)** Suppose the only change made to Obamacare is to replace the current health insurance subsidies for those with low income with a tax credit of \$200 per person per year. What effect is this likely to have on insurance premiums in the health insurance exchanges? **Explain your answer.**

**3.(a)** On an appropriate diagram show **consumer choice between consumption of non-health goods and the level of health**. Now suppose the person, previously uninsured, receives a health insurance policy from the government at no cost.

**(i)** **On the same diagram**, show the effect on consumer choice between consumption of non-health goods and level of health.

**(ii)** State, with explanation, whether or not out-of-pocket expenditure on medical goods consumption has increased **for your diagram**.

**(b)** Consider the following screening test for cancer applied to 100,000 people of whom 1,000 have cancer. Each test costs \$5, picks up 90% of cancer cases, and additionally 10% of the time falsely diagnoses cancer. Detection of cancer (rightly or wrongly) leads to a further exact diagnostic test that costs \$100. Correct early detection of cancer by the test is valued at \$10,000. Is the first test worthwhile? Explain your answer.

**(c)** Consider a policy that came into being in 1995. We have data for 1990 and 2000. The policy affected one group but not the other. We have the following table for the average of the outcome Y in various groups at various points in time.

	Affected by policy	Not affected by policy
Year = 1990	4	2
Year = 2000	10	7

Give the difference in differences estimate of the effect of the policy. **Show computations**.

**4.(a)** On appropriate diagrams show why a profit-maximizing firm holding a patent for a drug that has constant marginal costs of production and delivery will nonetheless charge different prices for the drug in different countries.

**(b)** Suppose many physicians also own MRI facilities. On an appropriate diagram show the likely impact on market price and quantity of MRI's.

**(c) (i)** On an appropriate diagram show the impact of licensure on price and quantity of medical services (assuming licensing of doctors does not change people's preferences to see doctors).  
**(ii)** On the same diagram show the welfare loss or welfare gain due to licensure.

5. Circle True or False to each of the following statements [One point each.]

- (a) **True** **False**      Obamacare has failed to prevent the fraction of the U.S. uninsured from increasing over the past two years.
- (b) **True** **False**      Payment of hospitals by diagnosis related group encourages over-servicing
- (c) **True** **False**      Negotiated payment per patient bed day is an example of capitation.
- (d) **True** **False**      The inflation-adjusted launch price of cancer drugs per life year gained is increasing in the U.S. by approximately 10 percent per year.
- (e) **True** **False**      For public health policy purposes a good measure of the value of a life saved is the present discounted value of future earnings.
- (f) **True** **False**      Life expectancy in 2015 is a forecast of average life expectancy for someone born in 2015 using 2015 death rates at each age.

6.(a) (i) and (ii) This question on public goods had an error in it so all students were given full credit.

(b) Consider vaccination against a contagious disease. If a person is vaccinated there is a direct benefit to the person (they are less likely to get the disease), as well as an indirect benefit to others (someone vaccinated is less likely to pass the disease on to others. Vaccination costs \$20. **Show on an appropriate diagram** that a competitive market will lead to too few people having vaccinations. On the same diagram **show the welfare loss to society.**

(c) Consider the paper by Cutler and McClellan “Is Technological Change in Medicine Worth It”

(i) Did the paper rely on cost-benefit analysis or on cost-effectiveness analysis?

(ii) What was the conclusion of the paper?

7. The data are for 626 people in the fifth year of the Rand Health Insurance Experiment in either the free plan or the 25% plan.

out\_infl = outpatient medical spending in 2011 dollars  
 lnout =  $\ln(\text{out\_infl} + 1)$   
 fam\_income = Family annual income in 1984 dollars  
 lnincome =  $\ln(\text{fam\_income})$   
 coins0 = 1 if have 0% coinsurance and = 0 otherwise  
 coins25 = 1 if have 25% coinsurance and = 0 otherwise

```
. sum out_infl lnout coins0 coins25 fam_inc lnincome
```

Variable	Obs	Mean	Std. Dev.	Min	Max
out_infl	626	1399.751	2397.923	0	28519.19
lnout	626	6.053099	2.167556	0	10.25837
coins0	626	.6134185	.4873558	0	1
coins25	626	.3865815	.4873558	0	1
fam_income	626	11398.97	5833.701	0	26000
lnincome	626	9.055534	1.234423	0	10.16589

```
. regress out_infl coins0, vce(robust)
```

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
out_infl					
coins0	559.5355	178.2736	3.14	0.002	209.4467 909.6243
_cons	1056.521	112.6331	9.38	0.000	835.3353 1277.707

```
. regress lnout fam_inc, vce(robust)
```

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
lnout					
fam_income	.0000396	.0000137	2.89	0.004	.0000127 .0000665
_cons	5.601474	.1988622	28.17	0.000	5.210953 5.991994

**You can answer the following in the simplest possible way. If there is not enough information provided to answer the question parts (a)-(e) then state this.**

(a) How many people in the sample were on the free care plan?

(b) Give a 95% confidence interval for mean spending in the two plans.

(c) Give a 95% confidence interval for the difference in mean spending for people in either of the two plans.

(d) By what percentage does mean spending in the two plans change when family income increases by \$1,000? Note: Be careful with units of measurement here.

(e) What Stata command would yield a direct estimate of the income elasticity of spending? You need to give both the command and the names of any variables.

(f) What is estimated by the Stata command `regress out_infl if coins0 == 0` ?

**Multiple Choice (1 points each)      Note: You should spend 30% of time on these!**

1. The three major uses of health funds in the U.S., ordered from largest to smallest, are
  - a. physicians, hospitals, pharmaceuticals
  - b. hospitals, pharmaceuticals, physicians
  - c. pharmaceuticals, hospitals, physicians
  - d. none of the above.
  
2. Suppose the price elasticity of demand for health care is zero. Then
  - a. the welfare loss due to moral hazard is high
  - b. the welfare loss due to moral hazard is low to moderate
  - c. there is no welfare loss due to moral hazard
  - d. any of the above are possible.
  
3. John obtains a major medical and hospital policy that covers all costs, aside from a \$1,000 annual deductible and a 20% coinsurance rate. If John actually incurs annual health charges of \$4,000, by how much will his health insurance company reimburse him?
  - a. less than \$1,000
  - b. between \$1,000 and \$1,999
  - c. between \$2,000 and \$2,999
  - d. more than \$3,000.
  
4. Studies revealed that
  - a. HMO's on balance provide a lower quality of care than traditional FFS insurance
  - b. HMO's on balance provide similar quality of care to traditional FFS insurance
  - c. HMO's on balance provide a higher quality of care than traditional FFS insurance
  
5. A risk-averse person's expected health expenses equals the actuarially fair premium for the policy. Then
  - a. they will definitely buy the insurance policy
  - b. they will definitely not buy the insurance policy
  - c. they are indifferent between buying and not buying the policy
  - d. it's unclear given the information - they may either buy or not buy the policy.
  
6. The article by Neuhauser and Lewicki, "What Do We Gain from the Sixth Stool Guaiac?" presented in the coursepack and discussed in class found that
  - a. that it is best to have less than six Guaiac tests
  - b. it is better to have no Guaiac test than to have six tests
  - c. neither a. nor b.
  - d. both a. and b.

7. The California website for “Obamacare” health insurance is called
- California Cares
  - Covered California
  - Insured California
  - none of the above
8. Suppose treatment A costs \$20,000 and leads to one more year of life while treatment B costs \$50,000 and leads to two more years of life. The incremental cost-effectiveness ratio of treatment A compared to treatment B is
- \$20,000
  - \$30,000
  - \$40,000
  - \$50,000
9. Doctor’s pay in the U.S. is high due to
- high return on training
  - high training costs
  - neither a. nor b.
  - both a. and b.
10. The main reason for the dramatic increase in the real cost of a hospital patient bed day over the past fifty years is
- increased price of medical equipment
  - increased quantity of medical equipment
  - increased wages and salaries
  - increased use of labor
11. The economic rationale for patent protection for prescription drugs is
- internalization of a positive externality
  - privatization of a public good to make it excludable
  - redistribution of income to wealthy corporations
  - creation of a monopoly that will maximize consumer surplus
12. The economic rationale for Medicare is
- avoid failure of the market for health insurance for elderly
  - avoid negative externalities from disease transmission
  - avoid private monopoly in the market for health insurance for elderly

**13.** Medicare sets reimbursement rates for providers of

- a. physician services
- b. pharmaceutical drugs
- c. neither a. nor b.
- d. both a. and b.

**14.** Medicaid

- a. is insurance for the poor
- b. is jointly funded by state government and federal government
- c. neither a. nor b.
- d. both a. and b.

**15.** The marked increase in average life expectancy in the world really began

- a. 10,000 years ago
- b. 2,000 years ago
- c. 1,500 years ago
- d. 200 years ago.

**16.** Very large variation from region to region in the U.S. of the use of C-sections (rather than vaginal delivery) for child birth is viewed as a sign of

- a. overuse of medical technology
- b. underuse of medical technology
- c. neither of the above.

**17.** Cross-country comparisons reveal that

- a. health care is an inferior good
- b. health care is a normal good
- c. health care is a superior good
- d. none of the above.

**18.** Compared to other highly developed countries the U.S. has

- a. low life expectancy
- b. low infant mortality
- c. neither a. nor b.
- d. both a. and b.