

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)** On an appropriate diagram show the benefit of health insurance to a risk-averse consumer.

**(b)** Consider moving from no health insurance to complete health insurance. On an appropriate diagram show

**(i)** The effect on total medical expenditures.

**(ii)** The welfare loss due to moral hazard.

**(c)** A firm has 10,000 employees, each of whom have probability 0.2 of incurring annual health expenses of \$2,000 and probability 0.8 of incurring annual health expenses of \$12,000. Give the range of values that the average loss for the 10,000 employees falls in with 95% probability.

2. U.S. Congressman Paul Ryan in 2011 provided in some detail a proposed HEALTH PLAN, an alternative to Obamacare that was ultimately implemented. The following is a summary:

The plan ensures universal access to affordable health insurance by restructuring the tax code, allowing all Americans to secure affordable health plans that best suit their needs, and shifting the ownership of health coverage away from the government and employers to individuals. It

- Provides a refundable tax credit – \$2,300 for individuals and \$5,700 for families – to purchase coverage in any State, and keep it with them if they move or change jobs.
- Provides transparency in health care price and quality data, making this critical information readily available before someone needs health services.
- Creates state-based health care exchanges, so individuals and families have a one-stop marketplace to purchase affordable health insurance without being discriminated against based on pre-existing conditions.
- Equips states with tools like auto-enrollment programs and high-risk pools, so affordable health coverage can be accessed by all.
- Addresses health care's growing strain on small businesses, by allowing them to pool together nationally to offer coverage to their employees.
- Encourages the adoption of health information technology and assists states in establishing solutions to medical malpractice litigation.

(i) Does the proposed transparency in health care price and quality data seem like a good idea, compared to current health care arrangements? Provide a brief explanation.

(ii) What is the advantage of state-based health care exchanges? Provide a brief explanation.

(iii) Does the proposed “affordable” health insurance seem to be actually affordable? Provide a brief explanation.

(iv) Is the proposed tax credit likely to increase the budget deficit? Provide a brief explanation.

(v) Provide one fundamental way that the Ryan plan differs from the implemented Obamacare.

(vi) Provide a second, different, fundamental way that the Ryan plan differs from implemented Obamacare.

3.(a) Suppose that a person with terminal cancer has the following options:

- Passive treatment: spend \$40,000, live five more years with each year worth 0.5 of a year in perfect health.
- Aggressive treatment: spend \$100,000, live ten more years with each year worth 0.6 of a year in perfect health.

Is it cost effective to go beyond passive treatment and consider aggressive treatment? For simplicity ignore any time discounting. Explain your answer.

(b) On an appropriate diagram show the impact on an individual's health and consumption of nonmedical goods of an increase in income. For your diagram state the effect on individual well-being and level of health.

(c) Present the equations for the Grossman model, with description of each variable. (One point off each missing / incorrect equation).

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

- (a) **True** **False** The main uses of health funds in the U.S. are in order: hospital, pharmaceutical and physician.
- (b) **True** **False** Recent government studies place the value of a human life as in excess of \$5 million.
- (c) **True** **False** The coinsurance rate in an Obamacare bronze plan is 60%.
- (d) **True** **False** A patent is issued upon successful completion of a stage III drug trial.
- (e) **True** **False** Health care spending as a fraction of GDP is higher in the U.S. than in western European countries despite the fact that the U.S. if anything has a smaller number of per capita doctor visits and days in hospital.
- (f) **True** **False** Life expectancy in 2015 is a forecast of average life expectancy for someone born in 2015 allowing for forecast future increases in longevity.

- 5.(a)** On an appropriate diagram show the profile of income over time from age 22 for
- (i)** a college graduate who gets no further training and immediately works fulltime.
  - (ii)** a college graduate who immediately enters medical school and eventually works fulltime as a general practitioner.

**(b)** On an appropriate diagram illustrate the pricing and output decision of a pharmaceutical company that is the sole seller of a pharmaceutical drug.

**(c)(i)** Explain what a prospective payment system is.

**(ii)** Explain what capitation is.

**6.(a)** Consider funding of NIH research. If  $Q$  research studies are funded, then a typical household places value  $\$(1 - 0.001Q)$  on the  $Q$ -th study. There are 100 million households in the country. If each study costs \$2 million, what is the optimal amount of money the NIH should spend on supporting research studies?

**Draw an appropriate diagram and compute the answer.**

**(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 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)(i)** What did we learn from the paper Cutler, D.M and M. McClellan (2001), "Is Technological Change in Medicine Worth It?", *Health Affairs*?

**(ii)** Briefly contrast public provision of health care in the United States with that in the major western European countries

## 7. Consider the assignment 5 data example

Key variables: lyg = Life-years gained  
 price = Drug price at launch per treatment-episode 2012 \$1000's  
 plyg = Price per life-year gained 2012 \$1000's  
 time = Approval date since 1995 in years"  
 year = Approval date (year)  
 orphan = 1 if orphan drug status (for drugs used to treat rare conditions)  
 lncomp = number of drugs previously approved for the tumor site

You are given the following information

```
. regress price lyg, vce(robust)
```

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
price						
lyg	157.3749	8.64967	18.19	0.000	140.0476	174.7023
_cons	-6.436241	4.642034	-1.39	0.171	-15.73535	2.86287

```
. regress lnprice lnlyg, vce(robust)
```

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
lnprice						
lnlyg	.9910206	.1644554	6.03	0.000	.6615768	1.320464
_cons	4.601793	.194676	23.64	0.000	4.21181	4.991776

```
. regress lnplyg year, vce(robust)
```

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
lnplyg						
year	.0976528	.0255998	3.81	0.000	.0463702	.1489353
_cons	-191.3058	51.43277	-3.72	0.000	-294.3381	-88.27363

```
regress lnplyg year lncomp, vce(robust)
```

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
lnplyg						
year	.0979692	.0225911	4.34	0.000	.0526957	.1432427
lncomp	-.6397598	.174104	-3.67	0.001	-.988672	-.2908475
_cons	-190.5277	45.26768	-4.21	0.000	-281.2462	-99.80924

**For each of the following if there is not enough information to answer the question then state this.**

- What is the elasticity of drug price at launch with respect to life years gained? **Explain.**
- What is the annual percentage change increase in drug price at launch? **Explain.**
- Is there a statistically significant relationship between drug price at launch and drug effectiveness at significance level 0.05? **Explain.**
- What economics lesson do we learn from the last set of regression output? **Explain.**
- What **regression command** would allow us to obtain the sample average of drug price at launch?
- What **regression command** would allow us to do a difference-in-means comparison of drug price at launch for orphan drugs to non-orphan drugs?

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

1. Health expenditures as a percentage of GDP in the U.S. are
  - a. more than 15%
  - b. between 10% and 15%
  - c. between 5% and 10%
  - d. less than 5%
  
2. According to the Rand Study the price elasticity of demand for health care is
  - a. less than -1.0
  - b. between -0.5 and -1.0
  - c. between 0 and -0.5
  - d. essentially 0
  
3. A limitation of the Rand study is that
  - a. all health insurance policies had the same coinsurance rate
  - b. health insurance was selected by the individual rather than randomly assigned
  - c. both a. and b.
  - d. neither a. nor b.
  
4. A risk-averse consumer needs to choose between:
  - 1: Insurance costs \$110. It pays out \$0 with probability 0.5 and \$200 with probability 0.5.
  - 2: Insurance costs \$110. It pays out \$50 with probability 0.5 and \$150 with probability 0.5.
  - a. insurance choice 1 is preferred
  - b. insurance choice 2 is preferred
  - c. there is not enough information to answer this question.
  
5. A lesson from Akerlof's market for lemons is that market failure can occur
  - a. when there is uncertainty and information is symmetric
  - b. when there is uncertainty and information is asymmetric
  - c. when there is certainty and information is symmetric
  - d. none of the above.
  
6. Health insurance provider types in order of increasing management are
  - a. FFS, PPO, HMO
  - b. PPO, FFS, HMO
  - c. FFS, HMO, PPO
  - d. PPO, HMO, FFS



7. Economist's studies have found that movement from FFS to managed care led to
- measurably lower costs
  - measurably lower quality of care
  - neither a. nor b.
  - both a. and b.
8. According to a Kaiser Health News column, picked up by Paul Krugman in his New York Times column of March 11 2011, at AcademyHealth's yearly policy conference a participant stated that there was no reason the government should pay for "so-called comparative effectiveness research." The explanation for this viewpoint is
- it is very expensive to do comparative effectiveness research and would cost more than the benefit
  - comparative effectiveness research should be done privately because the benefits are private
  - ignorance.
9. The study by Neuhauser and Lewicki (1975), "What Do We Gain from the Sixth Stool Guaiac?" discussed in class and presented in the coursepack
- the first Guaiac test is cost-effective but the sixth test is not cost-effective
  - the first Guaiac test is not cost-effective
  - it would be better to do no Guaiac tests than to do all six tests.
10. Hospitals in the U.S.
- are mostly for profit
  - are mostly not-for-profit but act similarly to for-profit hospitals
  - are mostly not-for-profit and act quite differently from for-profit hospitals
11. A pharmaceutical drug that passes phase III drug trials and is approved by the FDA
- is safe and effective
  - is better than alternative drugs available at the time of approval
  - both a. and b.
  - neither a. nor b.
12. Adverse selection in insurance means:
- the choice by consumers of an insurance plan that is insufficient to meet their needs
  - the choice by insurance plans not to cover medical conditions that exist at the time a person begins coverage with the insurance plan
  - the systematic choice of a particular insurance plan by persons with higher than average risks
  - the choice by insurance plans to require certain persons to have their premiums determined on an individual basis.
  - all of the above.

- 13.** The National Center for Health Statistics collects and freely disseminates health-related data. Government funding of the Center is an example of government intervention to
- provide a good with a positive externality
  - provide employment to a political interest group (statisticians)
  - provide a good that would otherwise be provided by a monopoly
  - provide a public good
- 14.** Medicare parts A and B cover
- hospital, physicians, pharmaceutical drugs, nursing homes
  - hospital, physicians, pharmaceutical drugs
  - hospital, physicians
  - hospital
- 15.** The biggest challenge for U.S. federal government health care funding in the future is
- paying for Medicare
  - paying for Medicaid
  - subsidizing health insurance purchased through the Obamacare health insurance exchanges.
- 16.** New medical technologies are felt to have
- improved health outcomes
  - decreased health care costs
  - Neither a. nor b.
  - Both a. and b.
- 17.** The major gains in life expectancy due to increased health spending per capita occur
- at relatively high levels of spending
  - at moderate levels of spending
  - at relatively low levels of spending
  - uniformly across these levels of spending
- 18.** In less developed countries most health expenses are paid
- through government health insurance
  - through private health insurance
  - out of pocket
  - through government clinics