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USMLE STEP 2

美国医生执照考试（二）

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预防医学及公共卫生

Preventive Medicine and Public Health

9th edition

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Preventive Medicine and Public Health

PreTest® Self-Assessment and Review

Ninth Edition

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Preventive Medicine and Public Health

PreTest® Self-Assessment and Review

NOTICE

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required. The authors and the publisher of this work have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication. However, in view of the possibility of human error or changes in medical sciences, neither the authors nor the publisher nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they disclaim all responsibility for any errors or omissions or for the results obtained from use of the information contained in this work. Readers are encouraged to confirm the information contained herein with other sources. For example and in particular, readers are advised to check the product information sheet included in the package of each drug they plan to administer to be certain that the information contained in this work is accurate and that changes have not been made in the recommended dose or in the contraindications for administration. This recommendation is of particular importance in connection with new or infrequently used drugs.

前　言

“美国医生执照考试(United States Medical Licensing Examination,USMLE)”是一种获取美国行医执照的考试，由“美国国家联邦医学会(Federation of State Medical Board,FSMB)”和“美国国家医学考试委员会(National Board of Medical Examiners,NBME)”联合发起，由美国“外国医学生教育委员会(Educational Commission for Foreign Medical Graduates,ECFMG)”组成的联合会及“美国国家联邦医学会”和“美国国家医学考试委员会”共同组织管理。国际上，其他一些国家的医学组织也承认此项考试。目前，这项考试已在我国的北京、上海和广州开展。有志参加此项考试的中国医学生和医生可与这项考试在北京设立的机构 Prometric 取得联系，以获取更多的信息。联系地址和方式如下：100086 北京市海淀区泛亚大厦 1201 室(Room 1201,PANA Tower,Zhichun Road,Haidian District,Beijing 100086,China)，网址：http://www.prometric.com，E-mail：webmaster@sylvan.com.cn。

美国医生执照考试共分三部分，即美国医生执照考试(一)(PreTest USMLE Step 1)、美国医生执照考试(二)(PreTest USMLE 2)、美国医生执照考试(三)(PreTest USMLE 3)。第一部分考试以基础医学为主，如解剖、生理、病理、药理、生化，等等。第二部分考试以临床医学为主，如内科、外科、妇产科、儿科、物理诊断、神经病、精神病，等等。第三部分试题只为美国国内医学生使用。国际上，只使用第一和第二部分考试。

为满足中国医学生和医生的需求，人民卫生出版社将陆续引进了“美国医生执照考试”的第一和第二部分系列考试丛书英文版最新版本。这套系列考试丛书不仅为有志于参加美国医生执照考试的中国医学生和医生提供帮助，更为广大的医学生和医务工作者比较中美医学教育和自己掌握的知识提供了参考。同时，该书也是学习专业英语的好教材。

PREFACE

Many changes have been made in this book from the last edition. I hope it will be helpful in providing a good review of public health and preventive medicine. I also hope you will appreciate how applicable this field is in everyday clinical practice (even biostatistics principles!) and what an important impact prevention can have on the health of a population. Many thanks to the medical students, Lucy Chie, Megan Schwarzman, and Natalie Holt, for their thoughtful comments.

This book is dedicated to my husband, Alain Campbell, M.D., M.S., and my daughter, Myriam. Very special thanks for supporting me throughout this project.

SYLVIE RATELLE, M.D., M.P.H.

INTRODUCTION

Preventive Medicine and Public Health: PreTest® Self-Assessment and Review, Ninth Edition, has been designed to provide medical students and physicians with a comprehensive and convenient instrument for self-assessment and review within the field of epidemiology and public health. The 500 questions provided have been designed to parallel the format of the questions contained in Step 2 of the United States Medical Licensing Examination (USMLE).

Each question in the book is accompanied by an answer, a paragraph explanation, and a specific page reference to either a current journal article, a textbook, or both. A bibliography that lists all the sources used in the book follows the last chapter.

Perhaps the most effective way to use this book is to allow yourself one minute to answer each question in a given chapter; as you proceed, indicate your answer beside each question. By following this suggestion, you will be approximating the time limits imposed by licensing examinations.

When you practice your examination-taking skills with this PreTest®, one way to maximize your score is to go through, answer all the questions you find easy, and skip over the more difficult ones initially. We do recommend, however, that once you come back to the more difficult questions, you spend as much time as you need. You will then be more likely to retain the information. *Do note:* When it comes to your examination for the board, you will do better to answer each question as you come to it and not skip around. Do not spend too much time on any one problem. Make a guess, circle the question, and come back to it. Otherwise, you can waste time looking for the questions you skipped or—the ultimate tragedy—you may discover time is running out.

When you have finished answering the questions in a chapter, you should then spend as much time as you need verifying your answers and carefully reading the explanations. Although you should pay special attention to the explanations for the questions you answered incorrectly, you should read every explanation. The author of this book has designed the explanations to reinforce and supplement the information tested by the questions. If, after reading the explanations for a given chapter, you feel you need still more information about the material covered, you may wish to consult the references indicated.

CONTENTS

BIOSTATISTICS AND METHODS OF EPIDEMIOLOGY

Questions

DIRECTIONS: Each item below contains a question or incomplete statement followed by suggested responses. Select the **one best** response to each question.

1. Assuming that mammography has a sensitivity of 90% and a specificity of 98% and that consecutive tests are independent, what is the probability that a woman with breast cancer will have a negative yearly screening mammogram for two consecutive years?

a. 1/10
b. 2/10
c. 4/10
d. 1/100
e. 4/100

2. The association between low birth weight and maternal smoking during pregnancy can be studied by obtaining smoking histories from women at the time of the first prenatal visit and then subsequently assessing and assigning birth weight at delivery according to smoking histories. What type of study is this?

a. Clinical trial
b. Cross-sectional
c. Prospective cohort
d. Case-control
e. Retrospective cohort

3. An investigator wishes to perform a randomized clinical trial to evaluate a new beta blocker as a treatment for hypertension. To be eligible for the study, subjects must have a resting diastolic blood pressure of at least 90 mm Hg. One hundred patients seen at the screening clinic with this level of hypertension are recruited for the study and make appointments with the study nurse. When the nurse obtains their blood pressure two weeks later, only 65 of them have diastolic blood pressures of 90 mm Hg or more. The most likely explanation for this is

a. Spontaneous resolution
b. Regression toward the mean
c. Baseline drift
d. Measurement error
e. Hawthorne effect

4. Which of the following measures is used frequently as a denominator to calculate the incidence rate of a disease?

a. Number of cases observed
b. Number of new cases observed
c. Number of asymptomatic cases
d. Person-years of observation
e. Persons lost to follow-up

5. Among women aged 18 to 34 in a community, weight is normally distributed with a mean of 52 kg and a standard deviation of 7.5 kg. What percentage of women will have a weight over 59.5 kg?

a. 2%
b. 5%
c. 10%
d. 16%
e. 32%

6. In nine families surveyed, the numbers of children per family were 4, 6, 2, 2, 4, 3, 2, 1, and 7. The mean, median, and mode numbers of children per family are, respectively,

a. 3.4, 2, 3
b. 3, 3.4, 2
c. 3, 3, 2
d. 2, 3.5, 3
e. 3.4, 3, 2

7. A study is undertaken to determine whether drinking more than eight cups of coffee a day is associated with hypertension. The blood pressure readings were taken of persons who drink more than eight cups and persons who drink no coffee. The results are as follows:

	Hypertension	Normal Blood Pressure	Total
>8 cups	6	4	10
No coffee	2	7	9
	8	11	19

Which of the following is the most appropriate test to analyze the data?

a. Chi-square test
b. McNemar's test
c. Fisher's exact test
d. Student *t* test
e. Analysis of variance

Items 8–10

The results of a study of the incidence of pulmonary tuberculosis in a village in India are given in the following table. All persons in the village are examined during two surveys made two years apart, and the number of new cases was used to determine the incidence rate.

Category of Household at First Survey	Number of Persons	Number of New Cases
With culture-positive case	500	10
Without culture-positive case	10,000	10

8. What is the incidence of new cases per 1000 person-years in households that had a culture-positive case during the first survey?

a. 0.02
b. 0.01
c. 1.0
d. 10
e. 20

9. What is the incidence of new cases per 1000 person-years in households that did not have a culture-positive case during the first survey?

a. 0.001
b. 0.1
c. 0.5
d. 1.0
e. 5.0

10. What is the relative risk of acquiring tuberculosis in households with a culture-positive case compared with households without tuberculosis?

a. 0.05
b. 0.5
c. 2.0
d. 10
e. 20

11. In the study of the cause of a disease, the essential difference between an experimental study and an observational study is that in the experimental investigation

a. The study is prospective
b. The study is retrospective
c. The study and control groups are of equal size
d. The study and control groups are selected on the basis of history of exposure to the suspected causal factor
e. The investigators determine who is and who is not exposed to the suspected causal factor

Items 12–13

About 1% of boys are born with undescended testes. To determine whether prenatal exposure to tobacco smoke is a cause of undescended testes in newborns, the mothers of 100 newborns with undescended testes and those of 100 newborns whose testes had descended were questioned about smoking habits during pregnancy. The study revealed an odds ratio of 2.6 associated with exposure to smoke, with 95% confidence intervals (CI) from 1.1 to 5.3.

12. Some reviewers are concerned that the study may overestimate the association between maternal smoking and undescended testes in the offspring because of potential

a. Confounding
b. Nondifferential misclassification
c. Differential misclassification
d. Selection bias
e. Loss to follow-up

13. What is the most appropriate conclusion to be drawn from the study?

a. There is no association between maternal smoking and undescended testes in the offspring
b. The study results, if accurate, suggest that an offspring whose mother smoked is about 2.6 times more likely to be born with undescended testes than an offspring whose mother did not smoke
c. The p value > 0.05
d. The 90% confidence interval for these results would probably include 1.0
e. A larger sample size would increase the confidence interval

14. The probability of being born with condition A is 0.10 and the probability of being born with condition B is 0.50. If conditions A and B are independent, what is the probability of being born with either condition A or condition B (or both)?

a. 0.05
b. 0.40
c. 0.50
d. 0.55
e. 0.60

15. As an epidemiologist, you are asked to recommend the type of study appropriate to the needs of researchers who would like to study the causes of a rare form of sarcoma. They have discovered a registry of this form of cancer and have access to the largest database of patients with this form of cancer, which, unfortunately, is only a few years old. They have funding for only one year from the National Institutes of Health and note the budget will be tight. What type of study design do you recommend?

a. Prospective cohort
b. Retrospective cohort
c. Cross-sectional
d. Experimental
e. Case-control

16. If rapidly progressive cancers are missed by a screening test, which type of bias will occur?

a. Lead-time bias
b. Length bias
c. Selection bias
d. Surveillance bias
e. Information bias

Items 17–19

Lou Stewells, a pioneer in the study of diarrheal disease, has developed a new diagnostic test for cholera. When his agent is added to the stool, the organisms develop a characteristic ring around them. (He calls it the "Ring-Around-the-Cholera" [RAC] test.) He performs the test on 100 patients known to have cholera and 100 patients known not to have cholera with the following results:

	Cholera	No Cholera
RAC test +	91	12
RAC test –	9	88
Totals	100	100

17. Which of the following statements is INCORRECT about the RAC test?

a. The sensitivity of the test was about 91%
b. The specificity of the test was about 12%
c. The false negative rate was about 9%
d. The predictive value of a positive result cannot be determined from the preceding information
e. The predictive value of a negative result cannot be determined from the preceding information

18. Dr. Stewells next performs the test on 1000 patients with profuse diarrhea:

	Cholera	No Cholera
RAC test +	312	79
RAC test –	31	578
Totals	343	657

Which of the following statements is correct?

a. The predictive value of a positive result is 31/343
b. The predictive value of a positive result is 79/312
c. The predictive value of a negative result is 578/(578 + 31)
d. The predictive value of a negative test is 578/657
e. The incidence rate of cholera in this population is 343/1000

19. The RAC test achieves widespread acceptance. However, with improvements in hygiene, the prevalence of cholera gradually falls from 35 to 5% of hospitalized diarrhea patients. Which statement about the effect of this fall in prevalence is true?

a. The change in prevalence will reduce the predictive value of a negative result
b. The predictive value of a positive result will decline
c. The specificity of the test is likely to decline
d. The specificity of the test will increase at the expense of its sensitivity
e. It will have no impact on the predictive values of the test

20. A randomized clinical trial is undertaken to examine the effect of a new combination of antiretroviral drugs on HIV viral load compared to usual therapy. Randomization is used for allocation of subjects to either treatment or control (usual care) groups in experimental studies. Randomization ensures that

a. Assignment occurs by chance
b. Treatment and control (usual care) groups are alike in all respects except treatment
c. Bias in observations is eliminated
d. Placebo effects are eliminated
e. An equal number of persons will be followed in the treatment and control group

21. In a study of the cause of lung cancer, patients who had the disease were matched with controls by age, sex, place of residence, and social class. The frequency of cigarette smoking was then compared in the two groups. What type of study was this?

a. Prospective cohort
b. Retrospective cohort
c. Clinical trial
d. Case-control
e. Correlation

Items 22–24

The incidence rate of lung cancer is 120/100,000 person-years for smokers and 10/100,000 person-years for nonsmokers. The prevalence of smoking is 20% in the community.

22. What is the relative risk of developing lung cancer for smokers compared with nonsmokers?

a. 5
b. 12
c. 50
d. 100
e. 120

23. What percentage of lung cancer can be attributed to smoking?

a. 52%
b. 78%
c. 80%
d. 92%
e. 99%

24. If the prevalence of smoking in the community was decreased to 10%, the excess incidence rate of lung cancer that could be averted in that community would be

a. 11/100,000
b. 22/100,000
c. 50/100,000
d. 60/100,000
e. 110/100,000

25. The Coronary Drug Project was a randomized trial to evaluate the efficacy of several lipid-lowering drugs. The five-year mortality of the men who adhered to the regimen of clofibrate (i.e., took 80% of their medicine or more) was 15%; among those assigned to the clofibrate group who were less compliant, it was 24.6%. The result was highly statistically significant ($p < 0.0001$). From this one can conclude

a. Clofibrate was very beneficial to the patients who took it reliably
b. Clofibrate is not effective unless patients take at least 80% of the recommended doses
c. Either clofibrate or something associated with taking it reliably is strongly associated with reduced total mortality
d. There was a problem with blinding in this study
e. Only those who were compliant should be included in the data

26. The use of matching as a technique to control for confounding is most appropriate for which type of study?

a. A large-scale cohort study
b. A case-control study with a small number of cases
c. A clinical trial with a factorial design
d. A cross-sectional study with multiple variables
e. A correlation study with a small number of countries

Items 27–28

An investigator is designing a randomized, double-blind, placebo-controlled clinical trial to see whether vitamin E will prevent lung cancer.

27. Which technique is likely to maximize compliance with the allocated regimen?

a. Using the placebo
b. Performing a run-in phase
c. Using intent-to-treat analysis
d. Double blinding the study
e. Limiting the number of subjects enrolled