Student Name(s): _____

_____

School Name: _____

Team Number: _____

Middle School
DISEASE DETECTIVES
(Tobacco - Final)

200 points

Answer Key

Final
New Jersey Science Olympiad
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Developed by
Detectives in the Classroom
Montclair State University
Department of Health and Nutrition Sciences
College of Education and Human Services

Relationship between Parental Restrictions on Movies and Adolescent Use of Tobacco and Alcohol

The description of this study was adapted from Dalton, Madeline A, et al., "Relationship between Parental Restrictions on Movies and Adolescent Use of Tobacco and Alcohol," *Effective Clinical Practice*, January / February 2002, Volume 5, Number 1, Pages 1-10. The questions are based on the same source.

Directions: After reading the summary of the epidemiological study in the box below, answer the questions that follow.

Relationship between Parental Restrictions on Movies and Adolescent Use of Tobacco and Alcohol

Context: Viewing smoking and drinking in movies may prompt adolescents to initiate these behaviors. Movies with R ratings contain more smoking than do movies in all other rating categories.

Objective: To evaluate the extent to which parents restrict the exposure of adolescents to R-rated movies and to determine whether such restrictions are associated with decreased tobacco and alcohol use in adolescents.

Design: Cross-sectional, self-administered survey.

Participants: Students in grades 5 through 8 enrolled in New Hampshire and Vermont schools.

Sampling Strategy: Fifteen schools in Vermont and New Hampshire were randomly selected from all middle schools with $\geq$150 students.

Outcome Measures: Students who had tried smoking cigarettes or tried drinking alcohol without parental knowledge.

Results: Of 4,544 students surveyed, 801 had tried cigarettes and 1,069 had tried alcohol. Although 90% were younger than 14 years of age, only 16% were completely restricted from viewing R-rated movies. The prevalence of having tried smoking was 35% for those with no restrictions on viewing R-rated movies, 12% for those with partial restrictions, and 2% for those with complete restrictions. The prevalence of having tried alcohol was 46% for those with no restrictions on viewing R-rated movies, 16% for those with partial restrictions, and 4% for those with complete restrictions. Even after controlling for other factors, children who had no restrictions from viewing R-rated movies were significantly more likely to try smoking and alcohol compared with those who had complete restrictions.

Conclusion: Limiting the exposure of adolescents to R-rated movies may prevent early use of tobacco and alcohol.

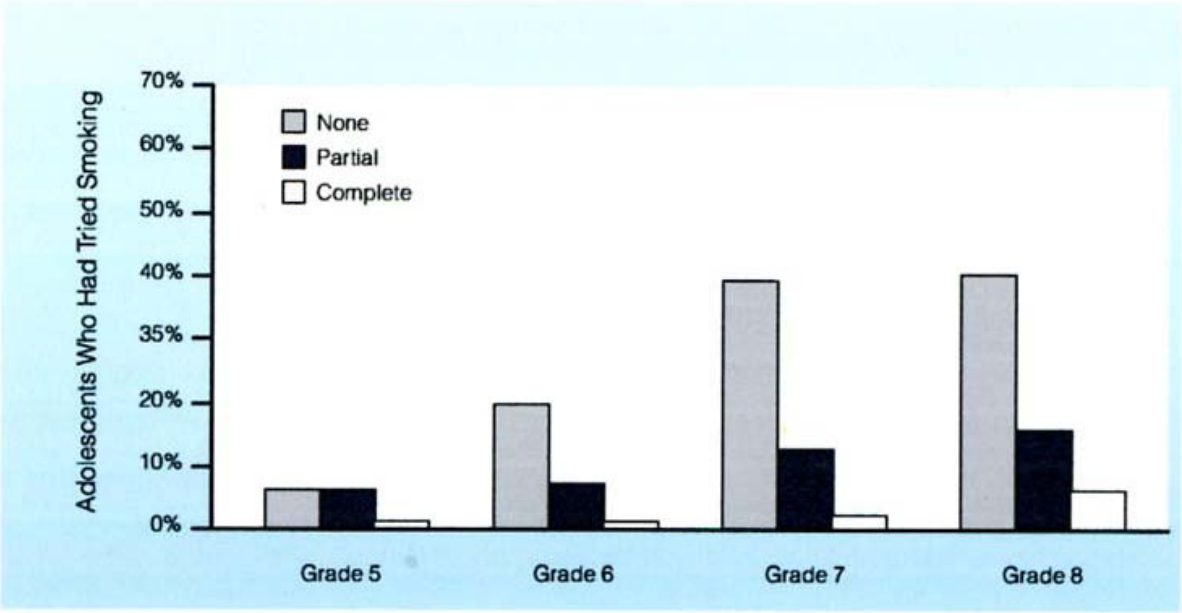
1. Identify a major strength of the cross-sectional study design. (12 points)

   Fastest, least expensive

2. Identify a major weakness of the cross-sectional study design. (12 points)

   Least confidence in findings, possible time-order confusion

3. The authors present a graph to show the differences in percentages of participants who tried smoking, by three groups of parental restrictions and also by grade. In no more than two sentences, write your interpretation of what the graph shows. (10 points)



   Two main things: 1) percentages who try smoking increase as grade level increases for all three groups; 2) these percentages are consistently greater at each grade level for those with no restrictions compared to the others. Although trying smoking is the same for none vs. partial restriction for 5th grade.

   In other words, children whose parents had no restrictions were more likely to have tried smoking than children whose parents had partial restrictions; and children whose parents had complete restrictions were least likely to have tried smoking. Also, the older children were more likely to have tried smoking than the younger children.

4. Results can also be shown using numbers rather than percentages. For example, the authors report that 1,427 participants had no restrictions of R-rated movies, 2,402 had partial restrictions, and 715 had complete restrictions. Based on this information and the information in the summary, place the appropriate numbers in Table A below. (Round-off to the closest whole number.)

Table A: Description of Participants Who Tried / Did Not Try Smoking

	Parental Restrictions on R-Rated Movies		
	No Restrictions Number = 1,427	Partial Restrictions Number = 2,402	Complete Restrictions Number = 715
Tried Smoking	499	288	14
Did Not Try Smoking	928	2,114	701

(12 points)

5. Using the information from Table A above, in the 2x2 table below, fill in the numbers for the four cells and the totals. Note that for this 2x2 table, the contrasting groups of "No Restrictions" and "Complete Restrictions" are being displayed. (The group with “Partial Restrictions” is omitted.) (Round-off to two decimal places.)

	Tried Smoking	Did Not Try Smoking	Total	Risks	Relative Risk
No Restrictions	499	928	1,427	0.35	17.50
Complete Restrictions	14	701	715	0.02	

Show work.

(27 points)

6. In a single sentence, explain the meaning of the relative risk that you have calculated. (10 points)

Students with no restrictions were 17.5 times as likely to have tried smoking compared to students with complete restrictions.

The risk of trying smoking is 17.5 times greater among participants who had no restrictions on watching R-rated movies compared to participants who had complete restrictions.

7. Using the information from Table A, in the 2x2 table below, label, fill in the numbers, and calculate the risks and relative risk comparing the groups with "No Restrictions" and "Partial Restrictions."

	Tried Smoking	Did Not Try Smoking	Total	Risks	Relative Risk
No Restrictions	499	928	1,427	0.35	2.92
Partial Restrictions	288	2,114	2,402	0.12	

Show work.

(27 points)

8. Does this relative risk make you more or less certain that the exposure is associated with the outcome? Explain. (10 points)

More certain because the results for the comparison with partial restrictions is what one would expect, that is, the relative risk is much lower for non restriction versus partial restriction (than for no restrictions vs. complete restrictions). (Suggests a dose-response relationship is a satisfactory short answer.)

9. The researchers did additional computerized analyses that "controlled for" grade, parental disapproval of smoking, maternal supervision, maternal responsiveness, peer and family smoking, and child personality characteristics.

What does "controlled for" mean? (10 points)

Controlling means to take into consideration other factors that may influence whether or not a child starts to smoke.

10. After controlling for these factors, the relative risk for trying to smoke changed to 3.4, when comparing no restrictions to complete restrictions.

    Compare this relative risk to the relative risk you calculated that did not "control for" other influences (question 5). Is it larger or smaller and does this make sense to you? Explain why or why not. (10 points)

    It is smaller. It makes sense that, when you control for other influential factors, the strength of the association for the factor of interest will diminish. What is important is that it did not go all the way down to 1 - there does appear to be an independent effect of parental restrictions (although there may be residual confounding).

11. In the actual article, the authors point out that "… 930 questionnaires were dropped because of missing data." Under what set of circumstances would this missing data have:

    a. No affect on the study's outcome (10 points)

       If the 930 questionnaires that were dropped because of missing data had identical associations between restrictions and trying smoking as the questionnaires that were included in the study.

    b. Increase the size of the association (10 points)

       If the 930 questionnaires that were dropped because of missing data were more likely to have had stronger associations between restrictions and trying smoking as the questionnaires that were included in the study.

    c. Decrease the size of the association (10 points)

       If the 930 questionnaires that were dropped because of missing data were more likely to have had weaker associations between restrictions for trying smoking as the questionnaires that were included in the study.

12. In the actual article, the authors report that "Movie restrictions were … inversely associated with … sibling smoking." What does this mean? (10 points)

    The greater the restrictions on viewing R-rated movies the less likely it was that the students had a sibling who smoked.

13. In the actual article, the authors report that “Smoking and drinking were (statistically) significantly associated with the level of restrictions for R-rated movies.” What does “association” mean? (10 points)

    That the two things, level of restrictions of watching R-rated movies and smoking / drinking, turned up together.

14. Given the conclusion that “limiting the exposure of adolescents to R-rated movies may prevent early use of alcohol and tobacco,” identify a public health strategy for limiting exposure to R-rated movies. (10 points)

    a. Make parents aware that restrictions on viewing R-rated movies seem to actually work in reducing the number of R-rated movies viewed and that these restrictions are associated with a reduced risk of smoking and drinking alcohol.
    b. Teach parents how to effectively restrict their children’s behavior.
    c. Classify movies that depict smoking and drinking alcohol as R-rated.
    d. Get movie directors to reduce the amount of smoking and drinking depicted in their movies.
    e. Make students aware that viewing R-rated movies is associated with smoking and alcohol drinking and discuss why this is so.
    f. Enforce existing regulations restricting the viewing R-rated movies.
    g. Promotion of devices on TV that “lock out” certain channels.
    h. Promote purchasing “clean” versions of movies (cleanflicks.com).
    i. Locks for VCR / DVD players.
    j. Rules for not allowing people under the age of 18 to purchase movies that are R-rated.

15. Describe how you would evaluate this strategy using a randomized controlled trial. Include a diagram(s) if you wish. (Tie Breaker)