

Name: _____ Section: (day/time) _____

AMS5 - MIDTERM
Thursday 30th April, 2009

A Normal Table is on the last page of this exam.

You must explain all answers and/or show working for full credit.

1. Instead of driving from Palo Alto to Santa Cruz, I now take the vanpool. The vanpool has two drivers, a primary and a backup. The primary driver is available to drive with probability 0.95, and the backup driver is available with chance 0.92.

(a) What is the chance that, on any given day, the van will not run, due to neither driver being available?

(b) What additional assumption did you make?

Aside from the driver's seat, there are 11 passenger seats in the van. There are 14 people signed up to ride as passengers. The chance that any given passenger shows up on a particular day is 0.8.

(c) What is the chance that exactly 11 passengers show up to ride the van on a particular day?

(d) What is the chance that on a given day one or more of the potential passengers who show up don't get a seat?

(e) One day I decide to work from home. What is the chance that exactly 11 people (not including the driver) ride the van on that day?

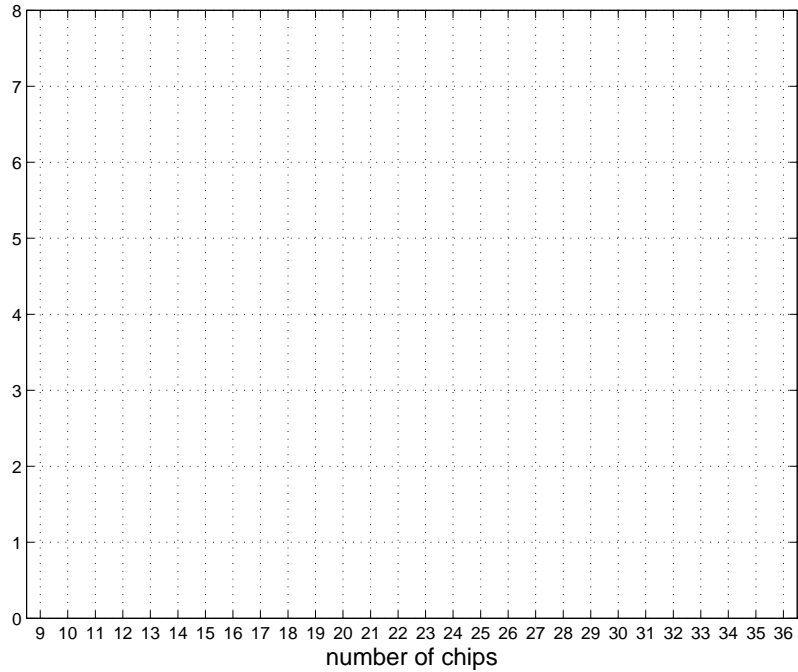
[TURN OVER]

2. We recorded the number of chips in a batch of 161 chocolate chip cookies in class. The frequencies of different numbers of chips is summarized in the first two columns of the table below.

Class Interval (chips)	Frequency	percentage	percent-per-chip
9-12	1		
13-16	8		
17-20	39		
21-24	51		
25-28	44		
29-32	15		
33-36	3		

- (a) Complete the table.
- (b) Sketch the histogram on the graph at the top of page 3. Label the axes.
- (c) Does the histogram appear to follow the normal curve? Explain briefly.
- (d) The mean number of chips was 23, and the SD was 4.38. The cookie manufacturer claims “25 chips per cookie”. Using the Normal Approximation, what is the estimate of how many students had 25 or more chips in their cookie? How many students actually had 25 or more chips in their cookie?

[CONTINUED]



(e) Considering only the cookies that had 25 or more chips, the mean was 27.6 and the SD was 2.4. Does the histogram for only these cookies follow the Normal Curve? Answer yes/no, and explain briefly.

3. Cervical cancer is more common among women who have been exposed to the herpes virus, according to many observational studies. Is it fair to conclude that the virus causes cervical cancer? Explain your answer.

[TURN OVER]

4. A (hypothetical) study is carried out to determine the effect of party affiliation on voting behavior in a certain city. The city is divided up into wards. In each ward, the percentage of registered Democrats who votes is higher than the percentage of registered Republicans who vote. True or false: for the city as a whole, the percentage of registered Democrats who vote must be higher than the percentage of registered Republicans who vote. If true, why? If false, give an example.
5. Which of the following are true? false? Explain or give examples.
- (a) The median and the average of any list are always close together.
 - (b) Half a list is always below average.
 - (c) With a large, representative sample, the histogram is bound to follow the normal curve quite closely.
 - (d) If two lists of numbers have exactly the same average of 50, and the same SD of 10, then the percentage of entries between 40 and 60 must be exactly the same for both lists.

[TURN OVER]

6. Read the abstract of the paper “Beliefs About the Health Effects of “Thirdhand” Smoke and Home Smoking Bans” printed at the end of this exam paper.

(a) Was this a controlled experiment or an observational study? Explain briefly.

(b) What was the investigators’ objective?

(c) What method did the investigators use to gather their data? Give one important problem with this methodology.

(d) The investigators say that the sample was weighted by race and gender using census data. Explain what this means.

(e) Do the results say anything about the effect of third hand smoke on children’s’ health? Explain your answer briefly.

[TURN OVER]

7. One hundred draws are going to be made at random with replacement from the box



True or false, and explain.

- (a) The expected value for the sum of the draws is 300.
- (b) The expected value for the sum of the draws is 300, give or take 20 or so.
- (c) The sum of the draws will be 300.
- (d) The sum of the draws will be around 300, give or take 20 or so.
8. At Nevada roulette tables, the “house special” is a bet on the numbers 0, 00, 1, 2, 3. The bet pays 6 to 1 (i.e, if you bet \$1 and you win, you get your original dollar back, plus 6 more), and there are 5 chances in 38 to win.
- (a) For all the other bets at Nevada roulette tables, the house expects to make about 5 cents on every dollar put on the table. How much does it expect to make per dollar on the house special?
- (b) Someone plays roulette 100 times, betting a dollar on the house special each time. Estimate the chance that this person comes out ahead.

[TURN OVER]

Beliefs About the Health Effects of “Thirdhand” Smoke and Home Smoking Bans

Jonathan P. Winickoff, MD, MPH^{a,b}, Joan Friebely, EdD^a, Susanne E. Tanski, MD^{b,c}, Cheryl Sherrod^a, Georg E. Matt, PhD^d, Melbourne F. Hovell, PhD, MPH^e, Robert C. McMillen, PhD^{b,f}

^aCenter for Child and Adolescent Health Policy, Massachusetts General Hospital, Boston, Massachusetts; ^bAmerican Academy of Pediatrics Tobacco Consortium and Julius B. Richmond Center; ^cDepartment of Pediatrics, Dartmouth Medical School, Lebanon, New Hampshire; ^dDepartment of Psychology, San Diego State University, San Diego, California; ^eCenter for Behavioral Epidemiology and Community Health, Graduate School of Public Health, San Diego State University, San Diego, California; ^fSocial Science Research Center and Department of Psychology, Mississippi State University, Starkville, Mississippi

The authors have indicated they have no financial relationships relevant to this article to disclose.

What’s Known on This Subject

There is no safe level of exposure to tobacco smoke. Thirdhand smoke is residual tobacco smoke contamination that remains after the cigarette is extinguished. Children are uniquely susceptible to thirdhand smoke exposure.

What This Study Adds

No studies have explored whether beliefs toward thirdhand smoke are associated with behaviors that affect the health of children, such as setting strict no-smoking policies in the home.

ABSTRACT

OBJECTIVE. There is no safe level of exposure to tobacco smoke. Thirdhand smoke is residual tobacco smoke contamination that remains after the cigarette is extinguished. Children are uniquely susceptible to thirdhand smoke exposure. The objective of this study was to assess health beliefs of adults regarding thirdhand smoke exposure of children and whether smokers and nonsmokers differ in those beliefs. We hypothesized that beliefs about thirdhand smoke would be associated with household smoking bans.

METHODS. Data were collected by a national random-digit-dial telephone survey from September to November 2005. The sample was weighted by race and gender within Census region on the basis of US Census data. The study questions assessed the level of agreement with statements that breathing air in a room today where people smoked yesterday can harm the health of children.

RESULTS. Of 2000 eligible respondents contacted, 1510 (87%) completed surveys, 1478 (97.9%) answered all questions pertinent to this analysis, and 273 (18.9%) were smokers. Overall, 95.4% of nonsmokers versus 84.1% of smokers agreed that secondhand smoke harms the health of children, and 65.2% of nonsmokers versus 43.3% of smokers agreed that thirdhand smoke harms children. Strict rules prohibiting smoking in the home were more prevalent among nonsmokers: 88.4% vs 26.7%. In multivariate logistic regression, after controlling for certain variables, belief that thirdhand smoke harms the health of children remained independently associated with rules prohibiting smoking in the home. Belief that secondhand smoke harms the health of children was not independently associated with rules prohibiting smoking in the home and car.

CONCLUSIONS. This study demonstrates that beliefs about the health effects of thirdhand smoke are independently associated with home smoking bans. Emphasizing that thirdhand smoke harms the health of children may be an important element in encouraging home smoking bans. *Pediatrics* 2009;123:e74–e79

www.pediatrics.org/cgi/doi/10.1542/peds.2008-2184

doi:10.1542/peds.2008-2184

The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of the Office of Rural Health Policy or the American Academy of Pediatrics.

This work was presented in part at the annual meetings of the Pediatric Academic Societies; April 29–May 2, 2006; Washington, DC.

Key Words

smoking, tobacco, pediatrics, family practice, parent, smoking cessation, secondhand smoke, environmental tobacco smoke, tobacco control

Abbreviations

SHS—secondhand smoke
SCS-TC—Social Climate Survey of Tobacco Control
aOR—adjusted odds ratio
CI—confidence interval

Accepted for publication Sep 29, 2008

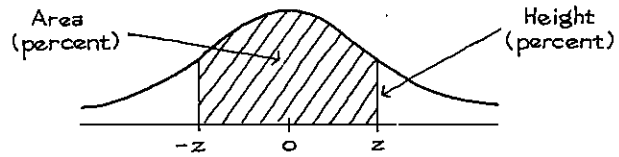
Address correspondence to Jonathan P. Winickoff, MD, MPH, MGH Center for Child and Adolescent Health Policy, 50 Staniford St, Suite 901, Boston, MA 02114. E-mail: jwinickoff@partners.org

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275). Copyright © 2009 by the American Academy of Pediatrics

THE 2006 SURGEON General’s report on involuntary smoking concluded that more than 126 million people are exposed to secondhand smoke (SHS), 50 000 deaths per year are caused by SHS, and there is no “safe” level of exposure.¹ An increasing number of states have created laws on smoking to protect employees in restaurants, bars, and workplaces, but the home remains a place of intense and consistent exposure for nonsmoking children and adults.² The home is the predominant location for exposure of children and adults to tobacco smoke.¹

The majority of adults are aware that visible SHS is harmful to health, and some smokers take measures to protect nonsmokers from this widely recognized harm.³ These measures of highly variable efficacy, include opening windows, smoking in other rooms, turning on fans, or simply waiting until the smoke dissipates to mitigate the harmful effects of their smoking on others. Research has documented the association between smoking in the home

Tables



A NORMAL TABLE

<i>z</i>	<i>Height</i>	<i>Area</i>	<i>z</i>	<i>Height</i>	<i>Area</i>	<i>z</i>	<i>Height</i>	<i>Area</i>
0.00	39.89	0	1.50	12.95	86.64	3.00	0.443	99.730
0.05	39.84	3.99	1.55	12.00	87.89	3.05	0.381	99.771
0.10	39.69	7.97	1.60	11.09	89.04	3.10	0.327	99.806
0.15	39.45	11.92	1.65	10.23	90.11	3.15	0.279	99.837
0.20	39.10	15.85	1.70	9.40	91.09	3.20	0.238	99.863
0.25	38.67	19.74	1.75	8.63	91.99	3.25	0.203	99.885
0.30	38.14	23.58	1.80	7.90	92.81	3.30	0.172	99.903
0.35	37.52	27.37	1.85	7.21	93.57	3.35	0.146	99.919
0.40	36.83	31.08	1.90	6.56	94.26	3.40	0.123	99.933
0.45	36.05	34.73	1.95	5.96	94.88	3.45	0.104	99.944
0.50	35.21	38.29	2.00	5.40	95.45	3.50	0.087	99.953
0.55	34.29	41.77	2.05	4.88	95.96	3.55	0.073	99.961
0.60	33.32	45.15	2.10	4.40	96.43	3.60	0.061	99.968
0.65	32.30	48.43	2.15	3.96	96.84	3.65	0.051	99.974
0.70	31.23	51.61	2.20	3.55	97.22	3.70	0.042	99.978
0.75	30.11	54.67	2.25	3.17	97.56	3.75	0.035	99.982
0.80	28.97	57.63	2.30	2.83	97.86	3.80	0.029	99.986
0.85	27.80	60.47	2.35	2.52	98.12	3.85	0.024	99.988
0.90	26.61	63.19	2.40	2.24	98.36	3.90	0.020	99.990
0.95	25.41	65.79	2.45	1.98	98.57	3.95	0.016	99.992
1.00	24.20	68.27	2.50	1.75	98.76	4.00	0.013	99.9937
1.05	22.99	70.63	2.55	1.54	98.92	4.05	0.011	99.9949
1.10	21.79	72.87	2.60	1.36	99.07	4.10	0.009	99.9959
1.15	20.59	74.99	2.65	1.19	99.20	4.15	0.007	99.9967
1.20	19.42	76.99	2.70	1.04	99.31	4.20	0.006	99.9973
1.25	18.26	78.87	2.75	0.91	99.40	4.25	0.005	99.9979
1.30	17.14	80.64	2.80	0.79	99.49	4.30	0.004	99.9983
1.35	16.04	82.30	2.85	0.69	99.56	4.35	0.003	99.9986
1.40	14.97	83.85	2.90	0.60	99.63	4.40	0.002	99.9989
1.45	13.94	85.29	2.95	0.51	99.68	4.45	0.002	99.9991