Solutions to Homework 1.

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- 2.1 False. You need to know how much people fly by commuter airlines versus scheduled carriers. Then you can compare rates. Just looking at the absolute number of deaths does not give any information about relative safety.

- 2.2 (a) False. There were a lot more Berettas on the street. You need to look at rates: $300/47,598$ is about 6 per 1000 and 134/18,398 is about 7 per 1000; if anything, thieves prefer Corvettes, a much snappier car.

  (b) False. We are comparing rates here in the first places and that takes care of difference in production figures. That is the whole point of using rates and percents.

- 2.5 No. The data from the double-blinded study are more reliable (we have discussed this issue in class before in the context of the Salk vaccine trials) and suggest that the results from the single-blind were biased. Knowledge about what the subject had been getting (the treatment or the placebo) could influence the evaluations made by the doctors.

- 2.7 (a) This is an observational study (so confounding may be a problem).

  (b) Rates of cervical cancer go up with age; women of different marital status have different patterns of sexual activity, as do women of different levels' of education. These are therefore potential confounders and have to be adjusted for.

  (c) Pill users are generally sexually more active than non-users, and

have more partners. This could be responsible for the increased incidence of cervical cancer among such women.

(d) No. See (c) for the explanation.

- 2.8 Not really. Memorial Day is at the end of May, Labor Day is in early September; just over 25% of the days of the year fall in between. Even if burglars work the same amount every day, over 25% of the burglaries would occur between Memorial Day and Labor Day.

- 2.9 (a) False. (b) True. (c) False; randomized controlled experiments take care of confounding through the random allocation procedure.

- 2.12 False; Simpson's paradox can kick in. The Democrats can be concentrated in wards with low turnouts. Here is an example with only two wards involved (Alternatively, you can cook up an example by altering slightly, the second example I discussed in class, on sex bias in graduate admissions).

  Consider two wards, Ward A and Ward B. Suppose that in Ward A there are 1000 democrats out of whom only 100 vote and there are 100 Republicans out of whom only 5 vote. Suppose that in Ward B there are 100 Democrats out of whom 60 vote and 1000 Republicans out of whom 500 vote. Then ward by ward we have a higher proportion of Eemocrats voting, but for the two wards combined, the proportion of Democrats that vote is much less than the proportion of Republicans.