

Problem 15

**Health Care: Colorado Physicians** A random sample of 5792 physicians in Colorado showed that 3139 provided at least some charity care (i.e., treated poor people at no cost). These data are based on information from *State Health Care Data: Utilization, Spending, and Characteristics* (American Medical Association).

- (a) Let  $p$  represent the proportion of all Colorado physicians who provide some charity care. Find a point estimate for  $p$ .
- (b) Find a 99% confidence interval for  $p$ . Give a brief explanation of the meaning of your answer in the context of this problem.
- (c) Is the normal approximation to the binomial justified in this problem? Explain.

```
EDIT CALC TEST
5: 1-PropZTest...
6: 2-PropZTest...
7: ZInterval...
8: TInterval...
9: 2-SampZInt...
0: 2-SampTInt...
1: 1-PropZInt...
```

```
1-PropZInt
x: 3139
n: 5792
C-Level: .99
Calculate
```

```
1-PropZInt
(.52509, .55882)
P=.5419544199
n=5792
```

Part a: The point estimate is .54195 or about 54%

Part b: The interval estimate is about .525 to .559

(You did not have to do Part c.)

Problem 16

**Law Enforcement: Escaped Convicts** Case studies showed that out of 10,351 convicts who escaped from U.S. prisons, only 7867 were recaptured (*The Book of Odds*, by Shook and Shook, Signet).

- (a) Let  $p$  represent the proportion of all escaped convicts who will eventually be recaptured. Find a point estimate for  $p$ .
- (b) Find a 99% confidence interval for  $p$ . Give a brief statement of the meaning of the confidence interval.
- (c) Is use of the normal approximation to the binomial justified in this problem? Explain.

```
1-PropZInt
x:7867
n:10351
C-Level: .99
Calculate
```

```
1-PropZInt
(.74921, .77084)
P=.7600231862
n=10351
```

### Problem 18

**Physicians: Solo Practice** A random sample of 328 medical doctors showed that 171 had a solo practice. (Source: *Practice Patterns of General Internal Medicine*, American Medical Association.)

- Let  $p$  represent the proportion of all medical doctors who have a solo practice. Find a point estimate for  $p$ .
- Find a 95% confidence interval for  $p$ . Give a brief explanation of the meaning of the interval.
- Interpretation:** As a news writer, how would you report the survey results regarding the percentage of medical doctors in solo practice? What is the margin of error based on a 95% confidence interval?

```
1-PropZInt
x:171
n:328
C-Level: .95
```

```
1-PropZInt
(.46728, .5754)
P=.5213414634
n=328
```

```
.5754-.5213
.0541
```

**Part c:** A study shows that about 52% of doctors are in solo practice. The margin of error is about 5.4%.

### Problem 20

**Marketing: Bargain Hunters** In a marketing survey, a random sample of 1001 supermarket shoppers revealed that 273 always stock up on an item when they find that item at a real bargain price. See reference in Problem 13.

- Let  $p$  represent the proportion of all supermarket shoppers who always stock up on an item when they find a real bargain. Find a point estimate for  $p$ .
- Find a 95% confidence interval for  $p$ . Give a brief explanation of the meaning of the interval.
- As a news writer, how would you report the survey results on the percentage of supermarket shoppers who stock up on items when they find the item is a real bargain? What is the margin of error based on a 95% confidence interval?

```
1-PropZInt
x:273
n:1001
C-Level:.95
Calculate
```

```
1-PropZInt
(.24514,.30032)
P=.2727272727
n=1001
```

```
.30032-.27273
.02759
```

Part c: A study shows that about 27% of supermarket shoppers always stock up on items when they see a bargain price. The margin of error is about 3%.

### Problem 21

**Lifestyle: Smoking** In a survey of 1000 large corporations, 250 said that, given a choice between a job candidate who smokes and an equally qualified nonsmoker, the nonsmoker would get the job (*USA Today*).

- Let  $p$  represent the proportion of all corporations preferring a nonsmoking candidate. Find a point estimate for  $p$ .
- Find a 0.95 confidence interval for  $p$ .
- As a news writer, how would you report the survey results regarding the proportion of corporations that would hire the equally qualified nonsmoker? What is the margin of error based on a 95% confidence interval?

```
1-PropZInt
x:250
n:1000
C-Level:.95
```

```
1-PropZInt
(.22316,.27684)
P=.25
n=1000
```

```
.27684-.25
.02684
```

Part c: A survey shows that 25% of large corporations would choose a non-smoker over a smoker. The margin of error is about 2.7%.

### Problem 22

**Opinion Poll: Crime and Violence** A *New York Times*/CBS poll asked the question, “What do you think is the most important problem facing this country today?” Nineteen percent of the respondents answered “crime and violence.” The margin of sampling error was plus or minus 3 percentage points. Following the convention that the margin of error is based on a 95% confidence interval, find a 95% confidence interval for the percentage of the population that would respond “crime and violence” to the question asked by the pollsters.

Since the margin of error is 3%, the confidence interval would be from  $19 - 3$  to  $19 + 3$ , or 16% to 22%.