

Confidence Intervals for Population Proportions – Example

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Teenage Drivers

An insurance company checks police records on 582 accidents that occurred in the US, selected at random, and notes that teenagers were at the wheel in 91 of them.

(a) What is the population parameter, p ? Describe it in a sentence.

(b) What is the sample statistic, \hat{p} ? Describe it in a sentence and calculate its value.

(c) What is the standard error of \hat{p} ? Describe it in a sentence and calculate its value.

(d) What is the sampling distribution of \hat{p} ? Describe the meaning of a sampling distribution in a sentence or two, and write down the sampling distribution of \hat{p} for this particular example.

(e) Calculate a 90% confidence interval for \hat{p} . You may use the following output from R:

```
qnorm(0.9, mean = 0, sd = 1)
```

```
## [1] 1.281552
```

```
qnorm(0.95, mean = 0, sd = 1)
```

```
## [1] 1.644854
```

```
qnorm(0.975, mean = 0, sd = 1)
```

```
## [1] 1.959964
```

```
pnorm(0.9, mean = 0, sd = 1)
```

```
## [1] 0.8159399
```

```
pnorm(0.95, mean = 0, sd = 1)
```

```
## [1] 0.8289439
```

```
pnorm(0.975, mean = 0, sd = 1)
```

```
## [1] 0.8352199
```

(f) Interpret the interval you obtained in part (e) in the context of this example.

(g) Would a 95% confidence interval for \hat{p} be wider or narrower than the 90% interval you obtained in part (e)?