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title: "Week 4 Project, Part 2 -- Basic Inference"

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output:

pdf\_document: default

html\_document: default

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## PART 0: SETUP

echo settings for embedding code

```{r setup, include=FALSE}

knitr::opts\_chunk$set(echo = TRUE)

```

Setting Directory

```{r dir}

getwd()

setwd("C:/Dhruv/misc/data/R\_6\_statistical\_inference/wk4\_power\_sampling")

```

[1] "C:/Dhruv/misc/data/R\_6\_statistical\_inference/wk4\_power\_sampling"

## PART II: Basic Inference

Step 1: Loading tooth growth package

```{r packages}

# install.packages('datasets', repos='http://cran.us.r-project.org')

library(datasets)

```

Loading tooth growth data

```{r datasets}

data("ToothGrowth")

str(ToothGrowth)

```

'data.frame': 60 obs. of 3 variables:

$ len : num 4.2 11.5 7.3 5.8 6.4 10 11.2 11.2 5.2 7 ...

$ supp: Factor w/ 2 levels "OJ","VC": 2 2 2 2 2 2 2 2 2 2 ...

$ dose: num 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 ...

Step 2: Basic Data Summary

```{r summary}

summary(ToothGrowth)

```

len supp dose

Min. : 4.20 OJ:30 Min. :0.500

1st Qu.:13.07 VC:30 1st Qu.:0.500

Median :19.25 Median :1.000

Mean :18.81 Mean :1.167

3rd Qu.:25.27 3rd Qu.:2.000

Max. :33.90 Max. :2.000

Step 3: Confidence intervals

```{r confint}

fit <- lm(len ~ dose + supp, ToothGrowth)

summary(fit)

```

Call:

lm(formula = len ~ dose + supp, data = ToothGrowth)

Residuals:

Min 1Q Median 3Q Max

-6.600 -3.700 0.373 2.116 8.800

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 9.2725 1.2824 7.231 1.31e-09 \*\*\*

dose 9.7636 0.8768 11.135 6.31e-16 \*\*\*

suppVC -3.7000 1.0936 -3.383 0.0013 \*\*

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 4.236 on 57 degrees of freedom

Multiple R-squared: 0.7038, Adjusted R-squared: 0.6934

F-statistic: 67.72 on 2 and 57 DF, p-value: 8.716e-16

hypothesis testing

```{r hyp}

confint(fit, "dose")

```

2.5 % 97.5 %

dose 8.007741 11.5194

Step 4: Write-up

```{r conclusions}

# with 95 % confidence level, we can say that the dose of tooth growth meds affects tooth length by a factor of 8 to 11 units.

# assuming normality in distribution of tooth length data

```