statistical inference-2

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Overview Part 2: Basic Inferential Data Analysis

Analysing the Toothgrowth data and checking the confidence interval to compare the toothgrowth by Supp and Dose The data set used for the analysis reports the effects of vitamin C on tooth growth in guinea pigs. Each of the 60 animals received one of three dose levels of vitamin C (0.5, 1, and 2 mg/day) by one of two delivery methods, orange juice (OJ) or ascorbic acid (VC) and the length of odontoblasts, the cells responsible for tooth growth, were recorded.

```
data("ToothGrowth")
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
```

Testing supplement type's influence on tooth growth: In this first test we want to see if the type of supplement given has a significant influence on the length of odontoblasts . Based on the exploratory analysis showed above we proceed to a one-sided test, with hypothesis stated as follow : • H0 : Both type of supplement (OJ/VC) have the sam

You can also embed plots, for example:

```
##
##  One Sample t-test
##
## data:  OJ$len - VC$len
## t = 3.3026, df = 29, p-value = 0.00255
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  1.408659 5.991341
## sample estimates:
## mean of x
##       3.7
```

With an alpha set at 5%, We can reject the H0 hypothesis as p value is less than alpha. The 95% confidence interval of difference doesn't contain zero and it's fully on the positive side Thus OC group has Larger

Toothlength as compared to VC group Testing dose influence on tooth growth : In this second test we want to see if the ammount of supplement given has a significant influence on the length of odontoblasts . Based on the exploratory analysis showed above we proceed to a onesided test, with hypothesis stated as follow : • H0 : The amount of supplement yields the same influence (or lack thereof) on the tooth growth. • Ha : Bigger doses induce better tooth growth.

```
t.test(dose2$len-dose1$len)$conf
```

```
## [1] 3.471814 9.258186
## attr(,"conf.level")
## [1] 0.95
```

```
t.test(dose2$len-dose1$len)$conf
```

```
## [1] 3.471814 9.258186
## attr(,"conf.level")
## [1] 0.95
```

As 95% confidence interval of difference doesn't contain zero in both cases and it's fully on the positive side Thus Dose2 group has Larger Toothlength as compared to Dose1 group and Dose1 group has Larger Toothlength as compared to Dose0.5 group