A Linear Regression Analysis on The Risk of Infection & Length of Stay in Hospitals

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Contents

Our Data

```
setwd("C:/Users/RUMIL/Desktop/APU/STAT 511 - Millie Mao (Applied Regression Analysis)/Project 1/Project

load(file = "SENIC.rdata")

Infection_data <- data.frame("SENIC.rdata")

#Defining our Explanatory(X) and Response(Y) variables
infection_risk = SENIC$INFRISK #X
length_of_stay = SENIC$LOS #Y
```

some interpretations:

- Length of stay is explained by the average estimated probability of acquiring infection in hospital.
- As the risk of infection increases the average length of stay in the hospital also increases.

Part 1: Interpretation and Parameter Inference

Estimated Linear Regression Function

```
#Generating our Linear Model using lm() then summarizing
infection_lm = lm(length_of_stay ~ infection_risk, data = Infection_data)
summary(infection_lm)
```

```
##
## Call:
## lm(formula = length_of_stay ~ infection_risk, data = Infection_data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0587 -0.7776 -0.1487  0.7159  8.2805
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)      6.3368     0.5213  12.156  < 2e-16 ***
## infection_risk   0.7604     0.1144   6.645 1.18e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.624 on 111 degrees of freedom
## Multiple R-squared:  0.2846, Adjusted R-squared:  0.2781
## F-statistic: 44.15 on 1 and 111 DF,  p-value: 1.177e-09
```

```
pretty <- papeR::prettify(summary(infection_lm))
```

```
## Registered S3 method overwritten by 'papeR':
##   method    from
##   Anova.lme car
```

```
pretty
```

```
##                   Estimate CI (lower) CI (upper) Std. Error  t value Pr(>|t|)
## 1    (Intercept) 6.3367865  5.3038443  7.3697288  0.5212755 12.15631   <0.001
## 2 infection_risk 0.7604209  0.5336442  0.9871976  0.1144431  6.64453   <0.001
##
## 1 ***
## 2 ***
```

```
knitr::kable(pretty)
```

	Estimate	CI (lower)	CI (upper)	Std. Error	t value	Pr(>|t|)	
(Intercept)	6.3367865	5.3038443	7.3697288	0.5212755	12.15631	<0.001	***
infection_risk	0.7604209	0.5336442	0.9871976	0.1144431	6.64453	<0.001	***

From summarizing our Linear Regression model we get:

$\beta_0 =$ **6.3368** ***(intercept)***

$\beta_1 =$ **0.7604** ***(slope)***

and the estimated regression equation to be:

$\hat{Y} = 6.3368 + 0.7604X$