주별 발병률과 요인들의 상관관계계석

```
load('../../refinedata/analysis/analysis_total_Fixed.rda')
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.6.3
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(FinCal)
```

```
## Warning: package 'FinCal' was built under R version 3.6.3
```

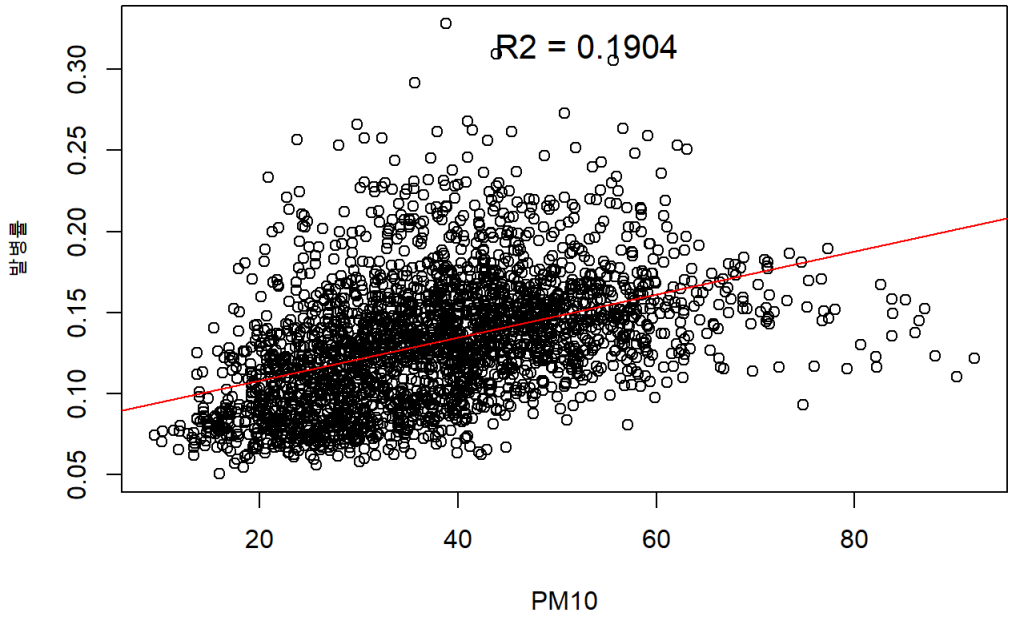
```
n <- rep(1:157,each = 7)
analysis_total_Fixed$주 <- rep(n[1:1096], 17)
analysis_total_Fixed <- as.data.frame(analysis_total_Fixed)
analysis_total_week <- analysis_total_Fixed %>%
  group_by(시도, 주) %>%
  summarise(`평균기온(°C)` = mean(`평균기온(°C)`),
            `평균 풍속(m/s)` = mean(`평균 풍속(m/s)`),
            `평균 현지기압(hPa)` = mean(`평균 현지기압(hPa)`),
            `일강수량(mm)` = mean(`일강수량(mm)`),
            SO2 = geometric.mean(SO2),
            CO = geometric.mean(CO),
            O3 = geometric.mean(O3),
            NO2 = geometric.mean(NO2),
            PM10 = geometric.mean(PM10),
            PM25 = geometric.mean(PM25),
            발병률 = sum(발병률)
            )
```

```
# 발병률과

fit <- lm(발병률 ~ PM10, analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = 발병률 ~ PM10, data = analysis_total_week)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.091286 -0.025556 -0.003096  0.017687  0.195395
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 8.124e-02  2.124e-03   38.25   <2e-16 ***
## PM10        1.330e-03  5.306e-05   25.07   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03529 on 2667 degrees of freedom
## Multiple R-squared:  0.1907, Adjusted R-squared:  0.1904
## F-statistic: 628.5 on 1 and 2667 DF,  p-value: < 2.2e-16
```

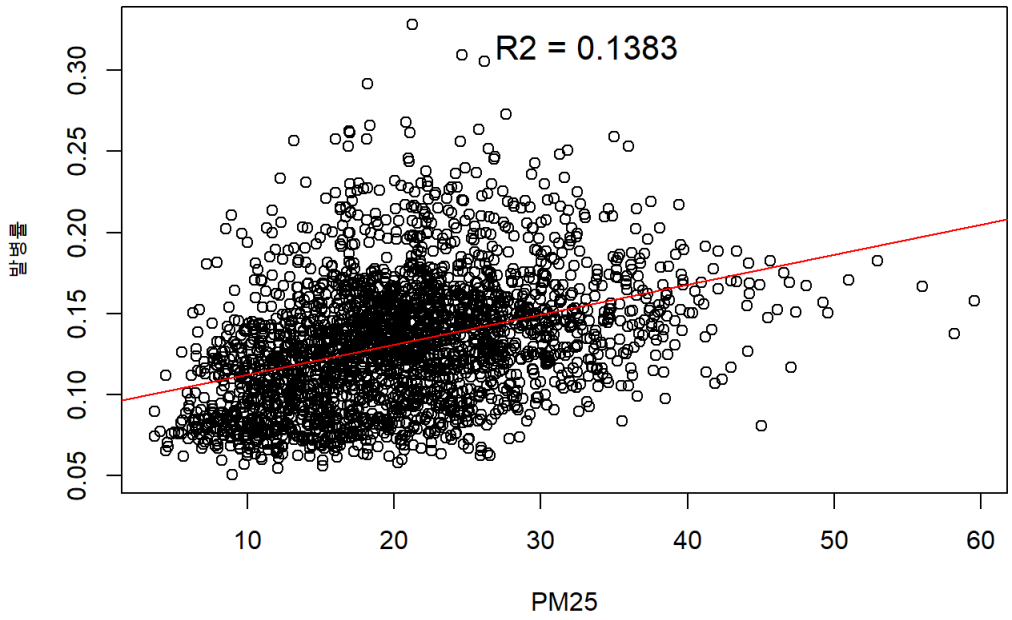
```
plot(발병률 ~ PM10, analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(발병률 ~ PM25, analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = 발병률 ~ PM25, data = analysis_total_week)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.09639 -0.02612 -0.00224  0.02016  0.19510
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 9.386e-02  1.955e-03   48.00   <2e-16 ***
## PM25        1.847e-03  8.916e-05   20.71   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03641 on 2667 degrees of freedom
## Multiple R-squared:  0.1386, Adjusted R-squared:  0.1383
## F-statistic: 429.1 on 1 and 2667 DF,  p-value: < 2.2e-16
```

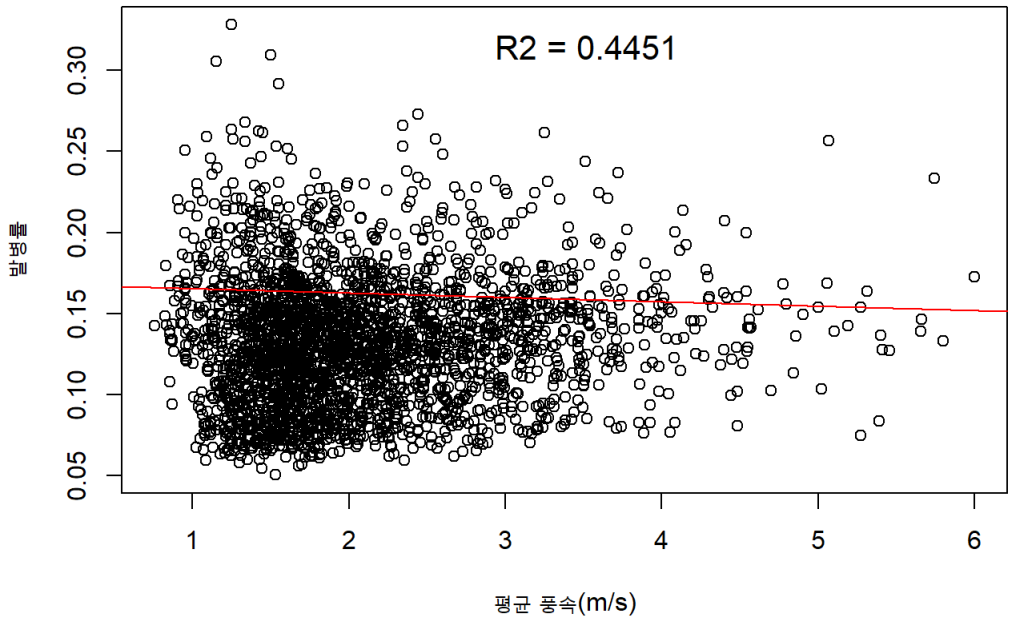
```
plot(발병률 ~ PM25, analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(발병률 ~ `평균기온(°C)`,analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = 발병률 ~ `평균기온(°C)`, data = analysis_total_week)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.107358 -0.018281 -0.002138  0.016429  0.174596
##
## Coefficients:
##                    Estimate Std. Error t value Pr(>|t|)
## (Intercept)       1.678e-01  9.655e-04  173.85   <2e-16 ***
## `평균기온(°C)` -2.669e-03  5.769e-05  -46.27   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02922 on 2667 degrees of freedom
## Multiple R-squared:  0.4453, Adjusted R-squared:  0.4451
## F-statistic:  2141 on 1 and 2667 DF,  p-value: < 2.2e-16
```

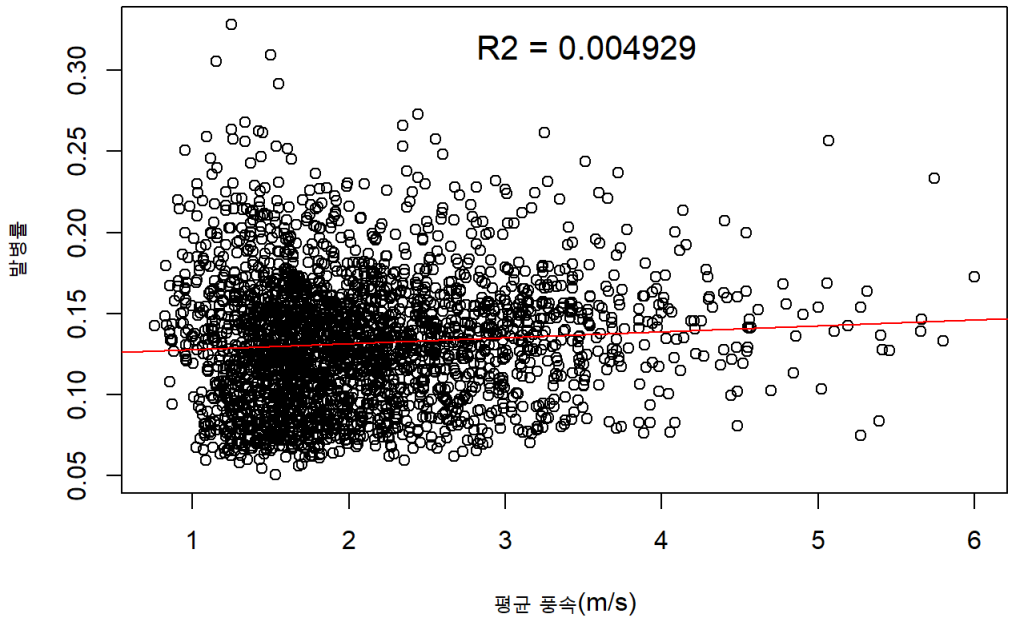
```
plot(발병률 ~ `평균 풍속(m/s)`, analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(발병률 ~ `평균 풍속(m/s)`,analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = 발병률 ~ `평균 풍속(m/s)`, data = analysis_total_week)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.079463 -0.029235 -0.001902  0.022202  0.199603
##
## Coefficients:
##                    Estimate Std. Error t value Pr(>|t|)
## (Intercept)       0.1241073  0.0021375  58.061  < 2e-16 ***
## `평균 풍속(m/s)` 0.0036219  0.0009606   3.771 0.000166 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03913 on 2667 degrees of freedom
## Multiple R-squared:  0.005302,   Adjusted R-squared:  0.004929
## F-statistic: 14.22 on 1 and 2667 DF,  p-value: 0.0001665
```

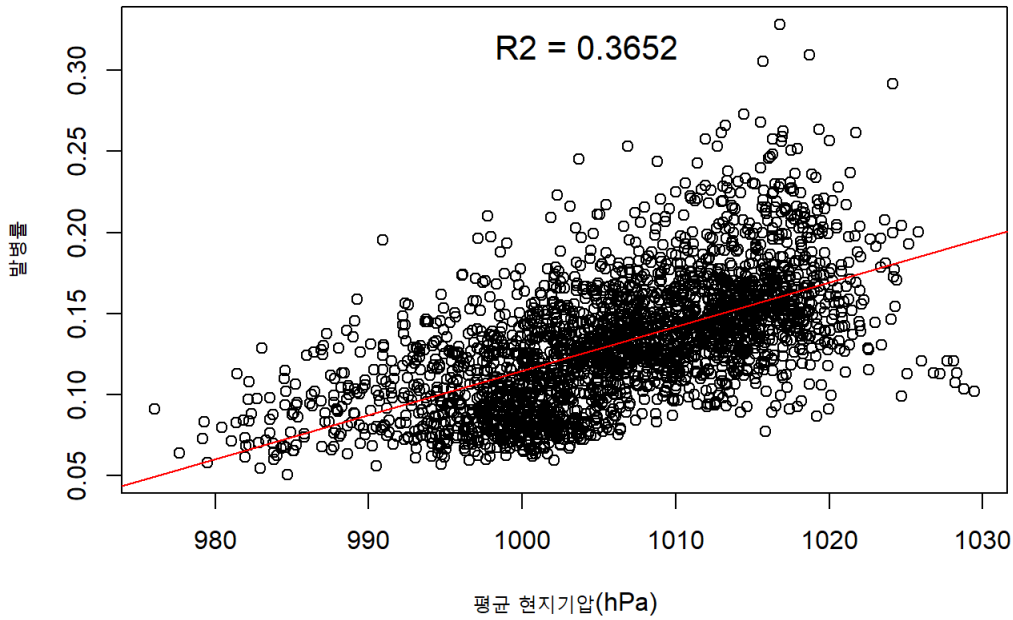
```
plot(발병률 ~ `평균 풍속(m/s)`,analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(발병률 ~ `평균 현지기압(hPa)`,analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = 발병률 ~ `평균 현지기압(hPa)`, data = analysis_total_week)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.092825 -0.020686 -0.003094  0.017704  0.168082
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)           -2.614e+00  7.006e-02  -37.31   <2e-16 ***
## `평균 현지기압(hPa)`  2.729e-03  6.962e-05   39.19   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03125 on 2667 degrees of freedom
## Multiple R-squared:  0.3655, Adjusted R-squared:  0.3652
## F-statistic:  1536 on 1 and 2667 DF,  p-value: < 2.2e-16
```

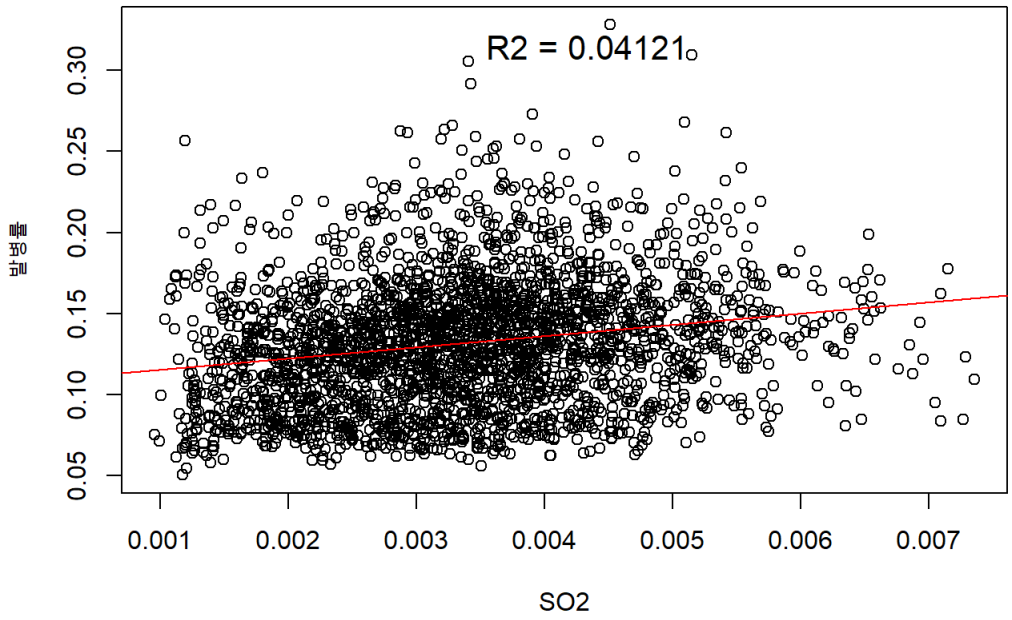
```
plot(발병률 ~ `평균 현지기압(hPa)`,analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(발병률 ~ SO2, analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = 발병률 ~ SO2, data = analysis_total_week)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.078266 -0.027932 -0.001777  0.021788  0.188636
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.108169   0.002306   46.91   <2e-16 ***
## SO2         6.961786   0.647331   10.76   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03841 on 2667 degrees of freedom
## Multiple R-squared:  0.04157,    Adjusted R-squared:  0.04121
## F-statistic: 115.7 on 1 and 2667 DF,  p-value: < 2.2e-16
```

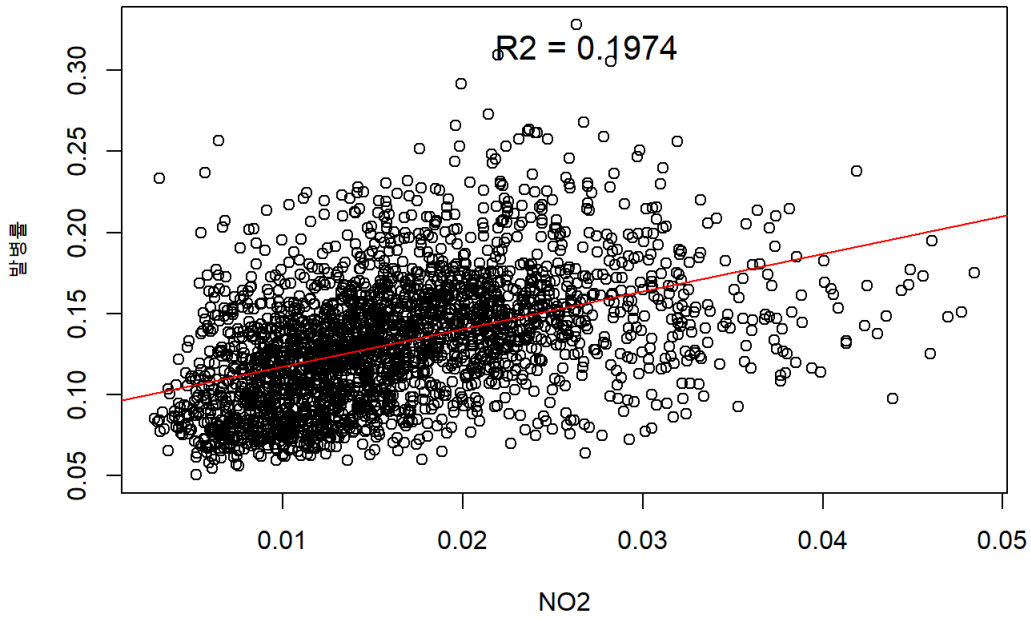
```
plot(발병률 ~ SO2, analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(발병률 ~ NO2, analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = 발병률 ~ NO2, data = analysis_total_week)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.098312 -0.025751 -0.001683  0.020516  0.173425
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.093704   0.001629   57.53   <2e-16 ***
## NO2         2.322884   0.090610   25.64   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03514 on 2667 degrees of freedom
## Multiple R-squared:  0.1977, Adjusted R-squared:  0.1974
## F-statistic: 657.2 on 1 and 2667 DF,  p-value: < 2.2e-16
```

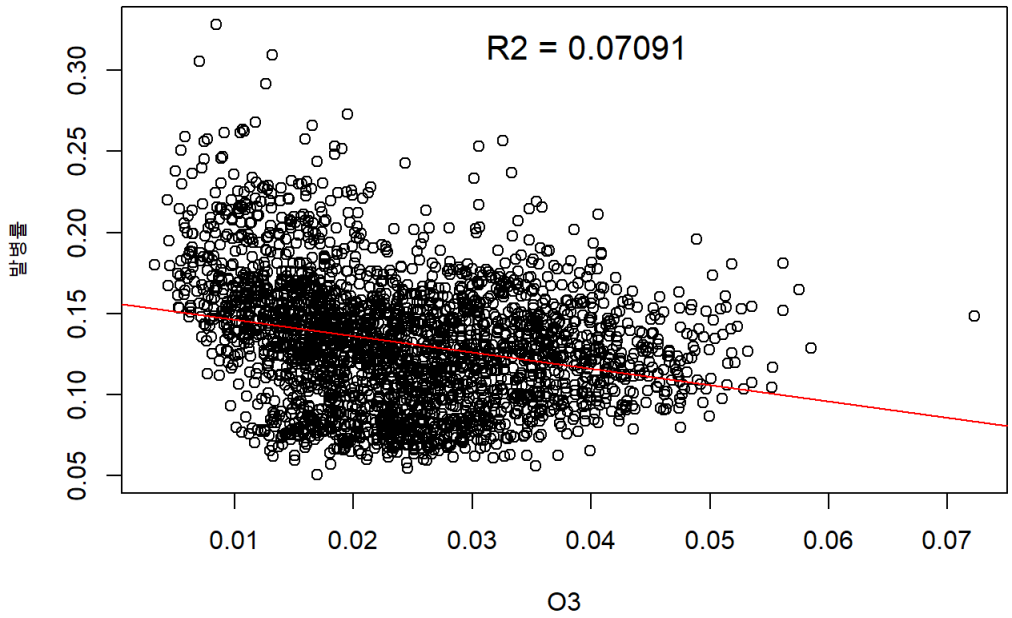
```
plot(발병률 ~ NO2, analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(발병률 ~ O3, analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = 발병률 ~ O3, data = analysis_total_week)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.088917 -0.025399 -0.000192  0.022411  0.180563
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.156185   0.001865   83.74   <2e-16 ***
## O3          -1.008816   0.070525  -14.30   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03781 on 2667 degrees of freedom
## Multiple R-squared:  0.07125,    Adjusted R-squared:  0.07091
## F-statistic: 204.6 on 1 and 2667 DF,  p-value: < 2.2e-16
```

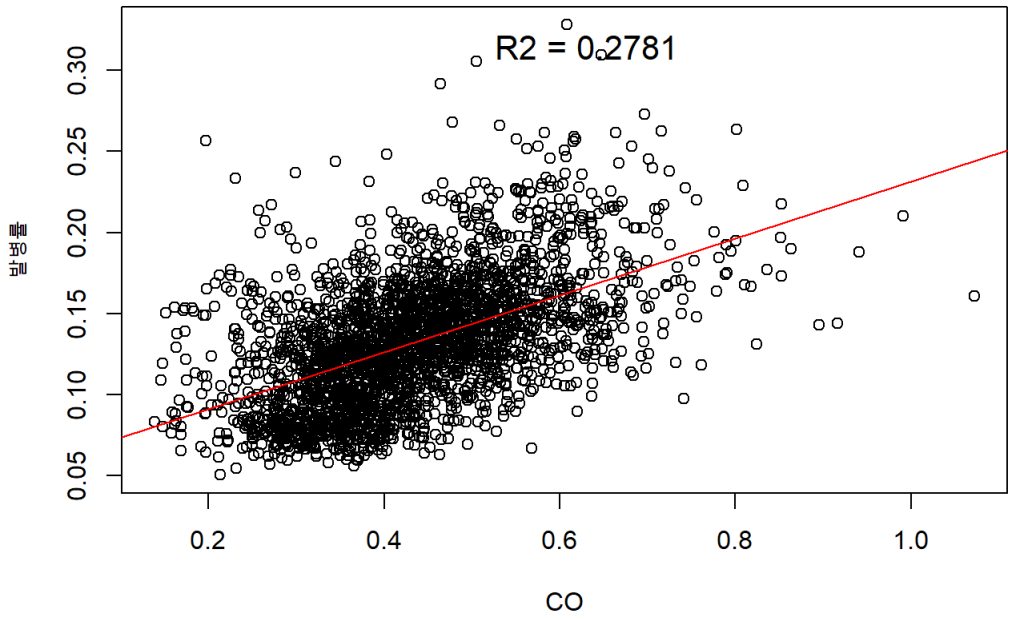
```
plot(발병률 ~ O3, analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(발병률 ~ CO, analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = 발병률 ~ CO, data = analysis_total_week)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.088707 -0.024213 -0.002432  0.019765  0.166664
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.055547   0.002459   22.59   <2e-16 ***
## CO          0.175808   0.005482   32.07   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03333 on 2667 degrees of freedom
## Multiple R-squared:  0.2783, Adjusted R-squared:  0.2781
## F-statistic:  1029 on 1 and 2667 DF,  p-value: < 2.2e-16
```

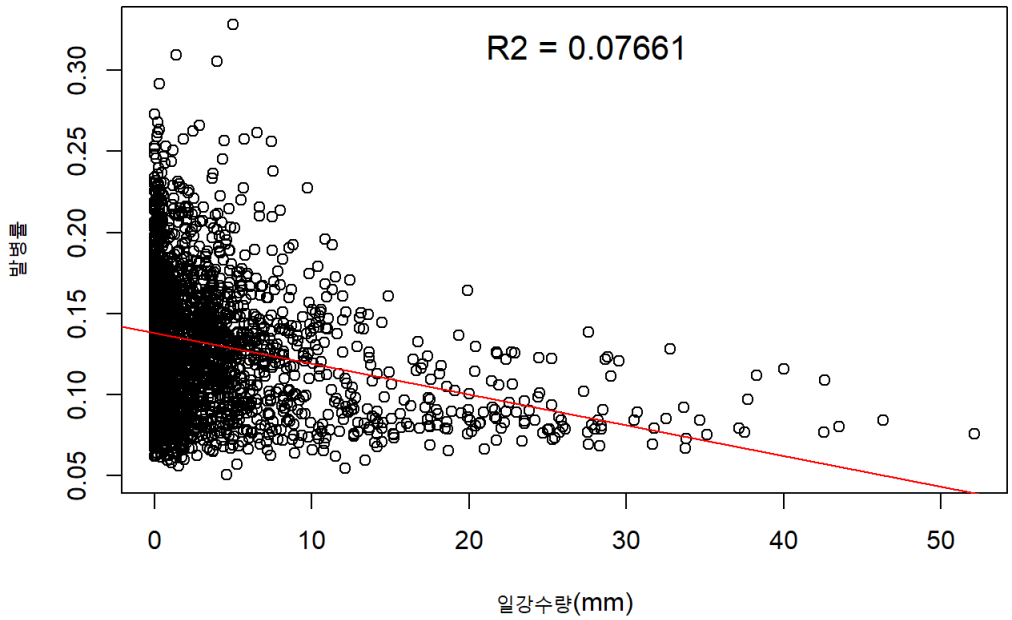
```
plot(발병률 ~ CO,analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(발병률 ~ `일강수량(mm)`,analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = 발병률 ~ `일강수량(mm)`, data = analysis_total_week)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.079594 -0.025500 -0.001718  0.020867  0.199629
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)     0.1380752  0.0008475  162.92   <2e-16 ***
## `일강수량(mm)` -0.0018987  0.0001273  -14.91   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.03769 on 2667 degrees of freedom
## Multiple R-squared:  0.07696,    Adjusted R-squared:  0.07661
## F-statistic: 222.4 on 1 and 2667 DF,  p-value: < 2.2e-16
```

```
plot(발병률 ~ `일강수량(mm)`,analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```


R2 = 0.07661
발병률
0.05
0.10
0.15
0.20
0.25
0.30
0
10
20
30
40
50
일강수량(mm)