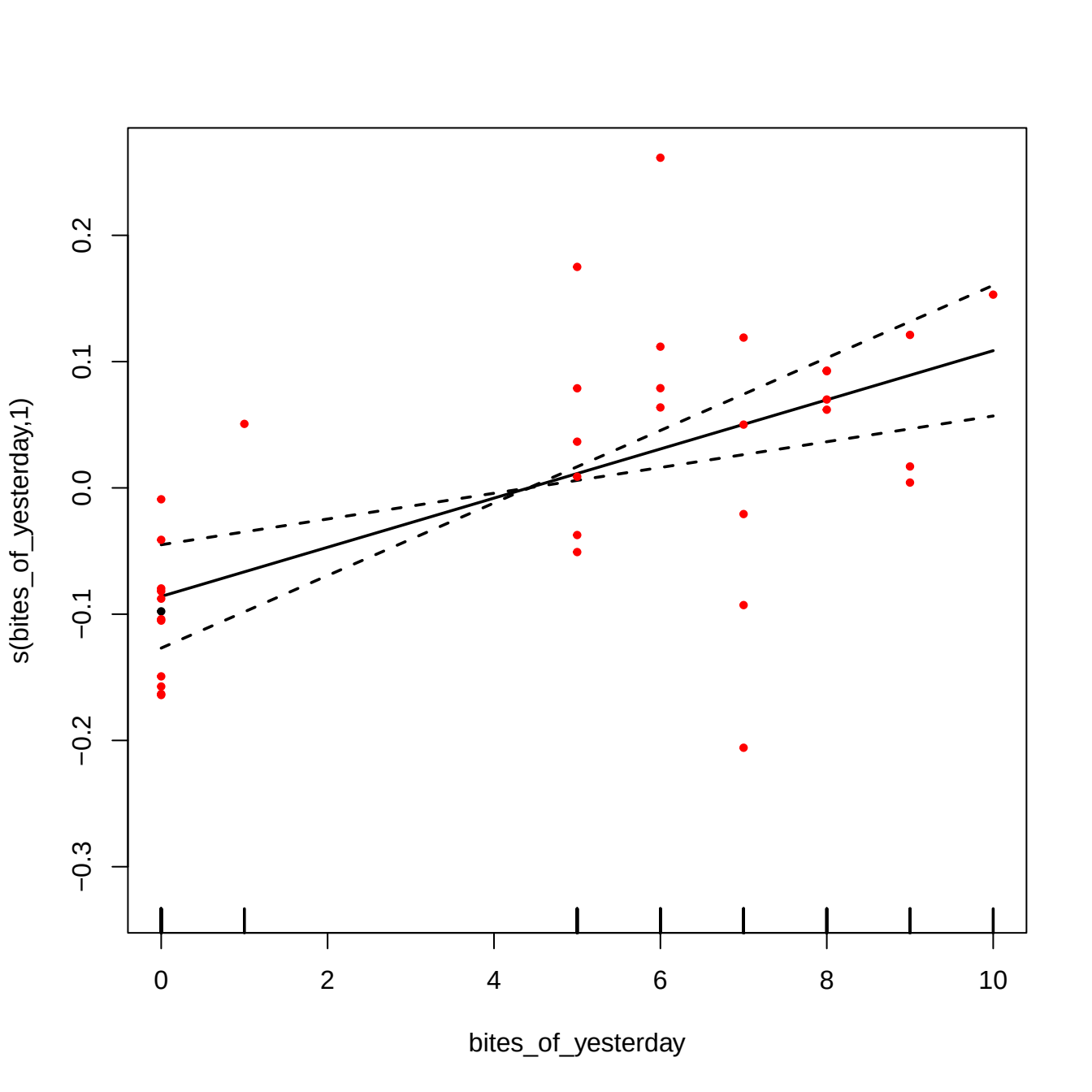
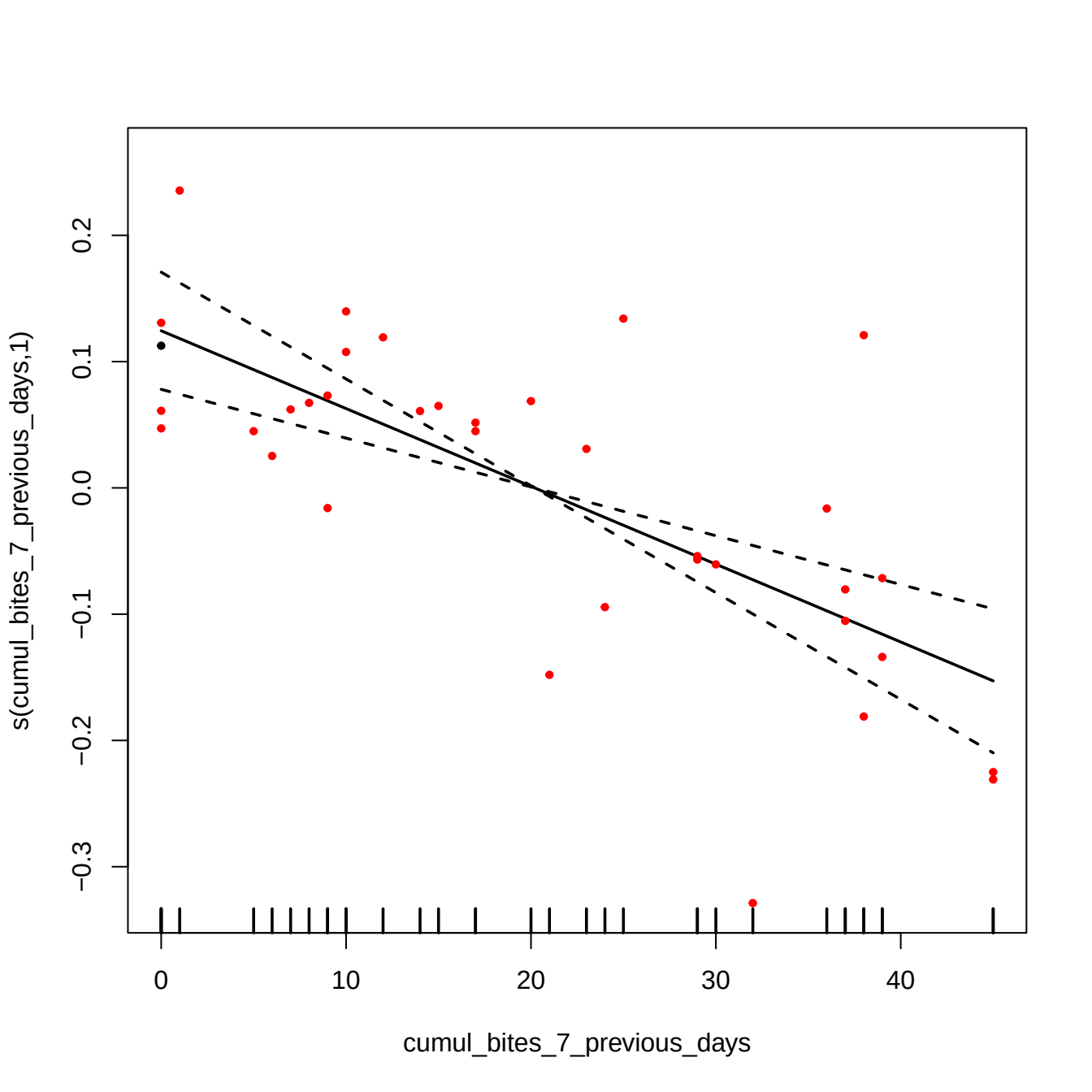
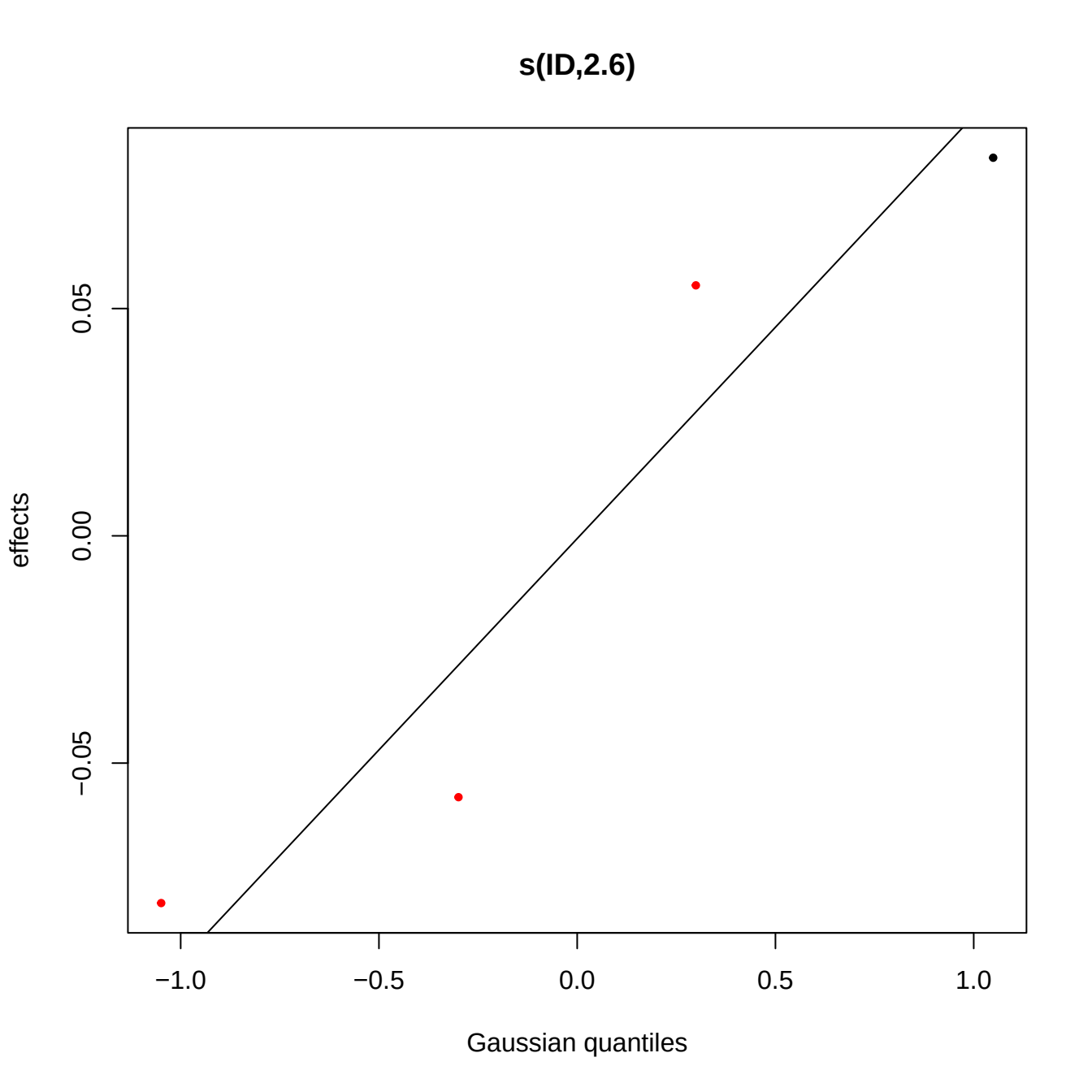
EGF

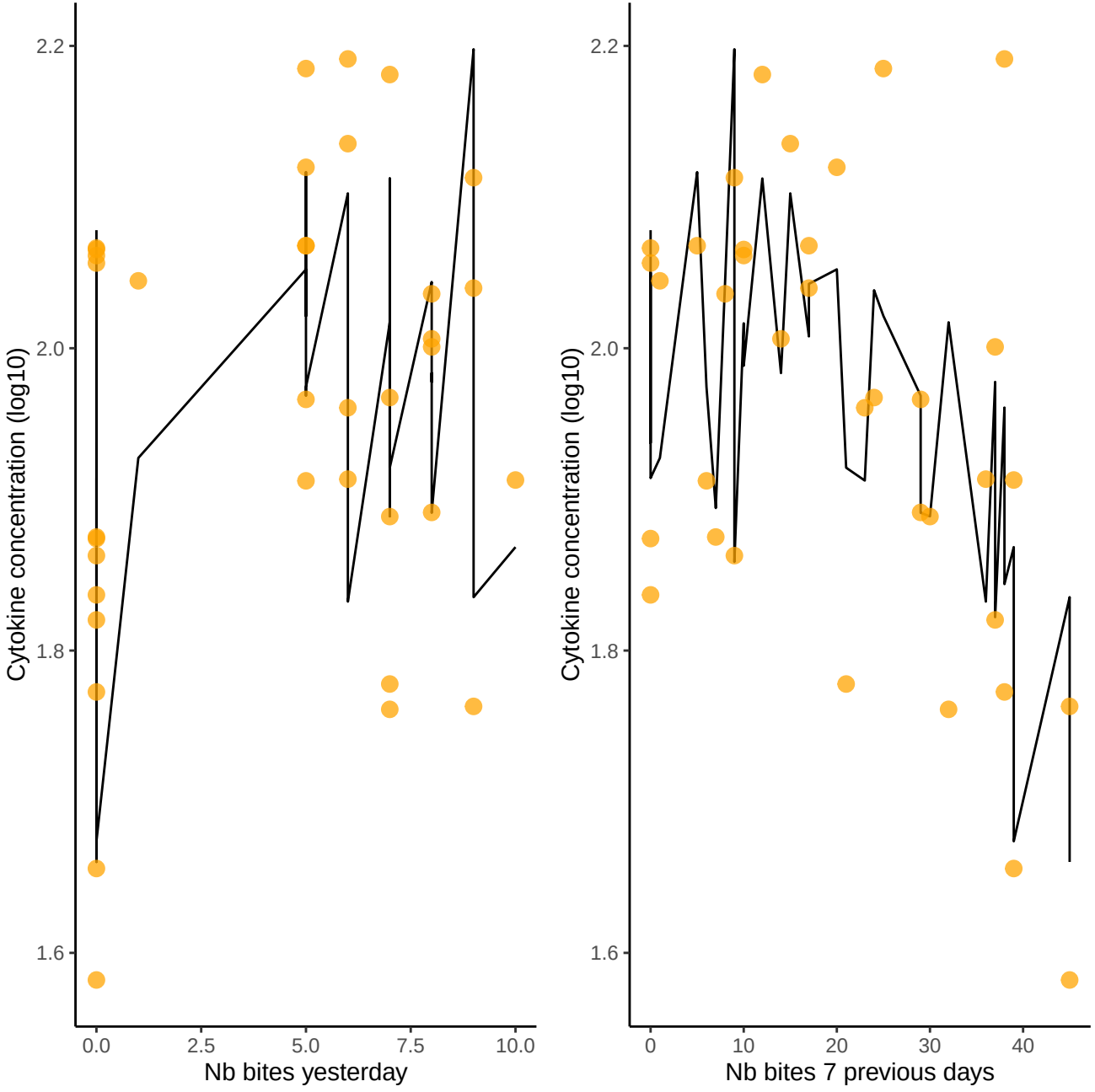
Bites in cyno

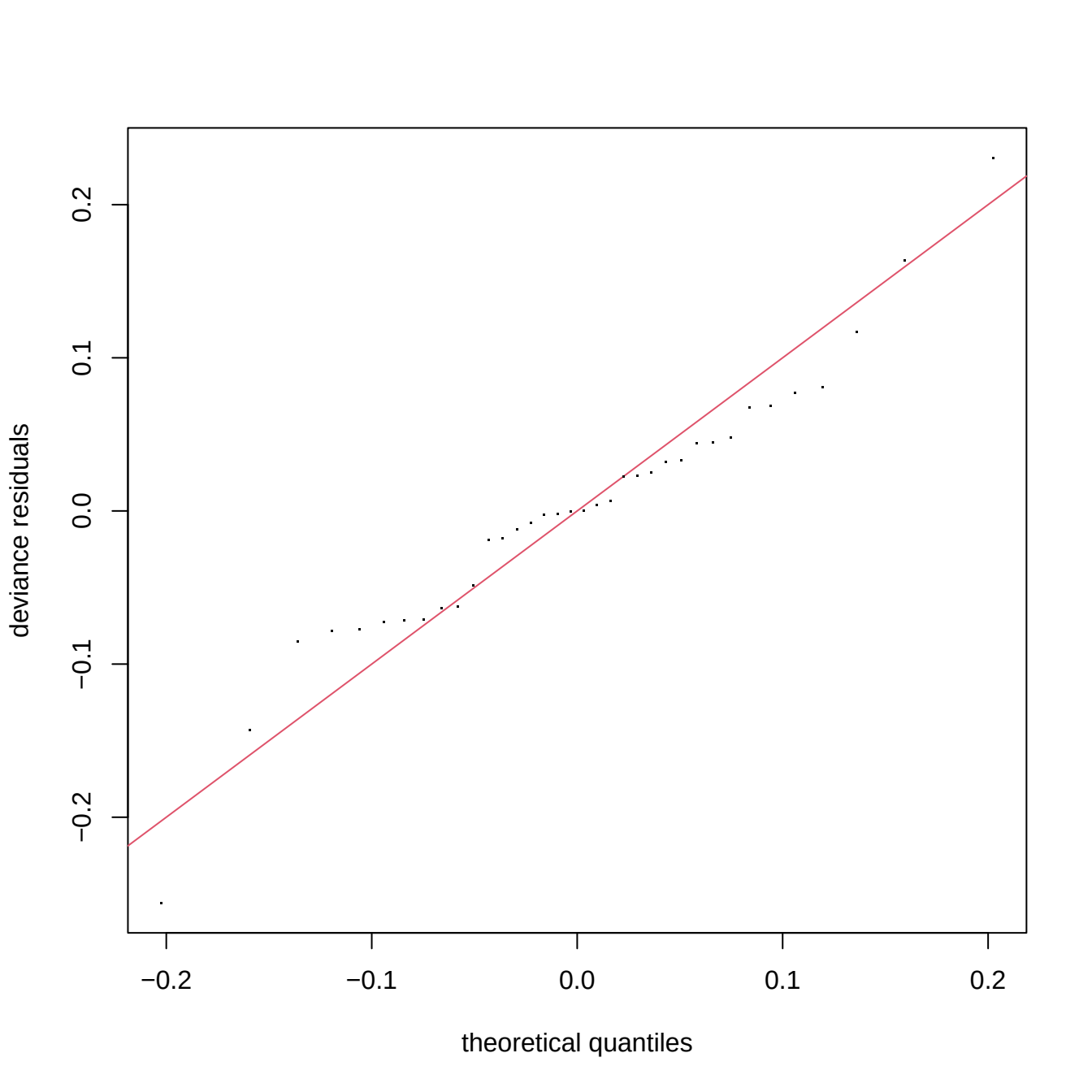
Nb obs: 36

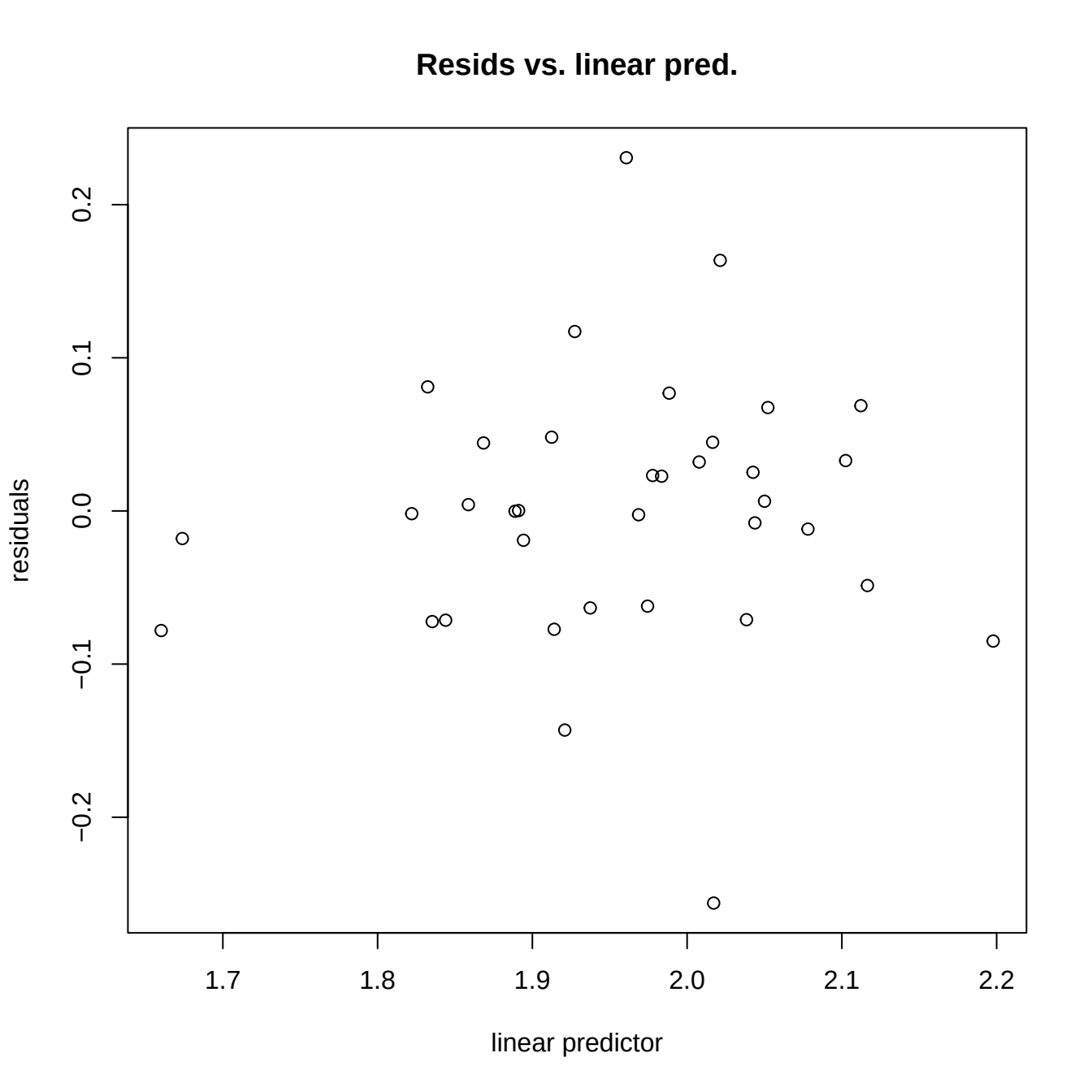

s(bites_of_yesterday,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
2
4
6
8
10
bites_of_yesterday

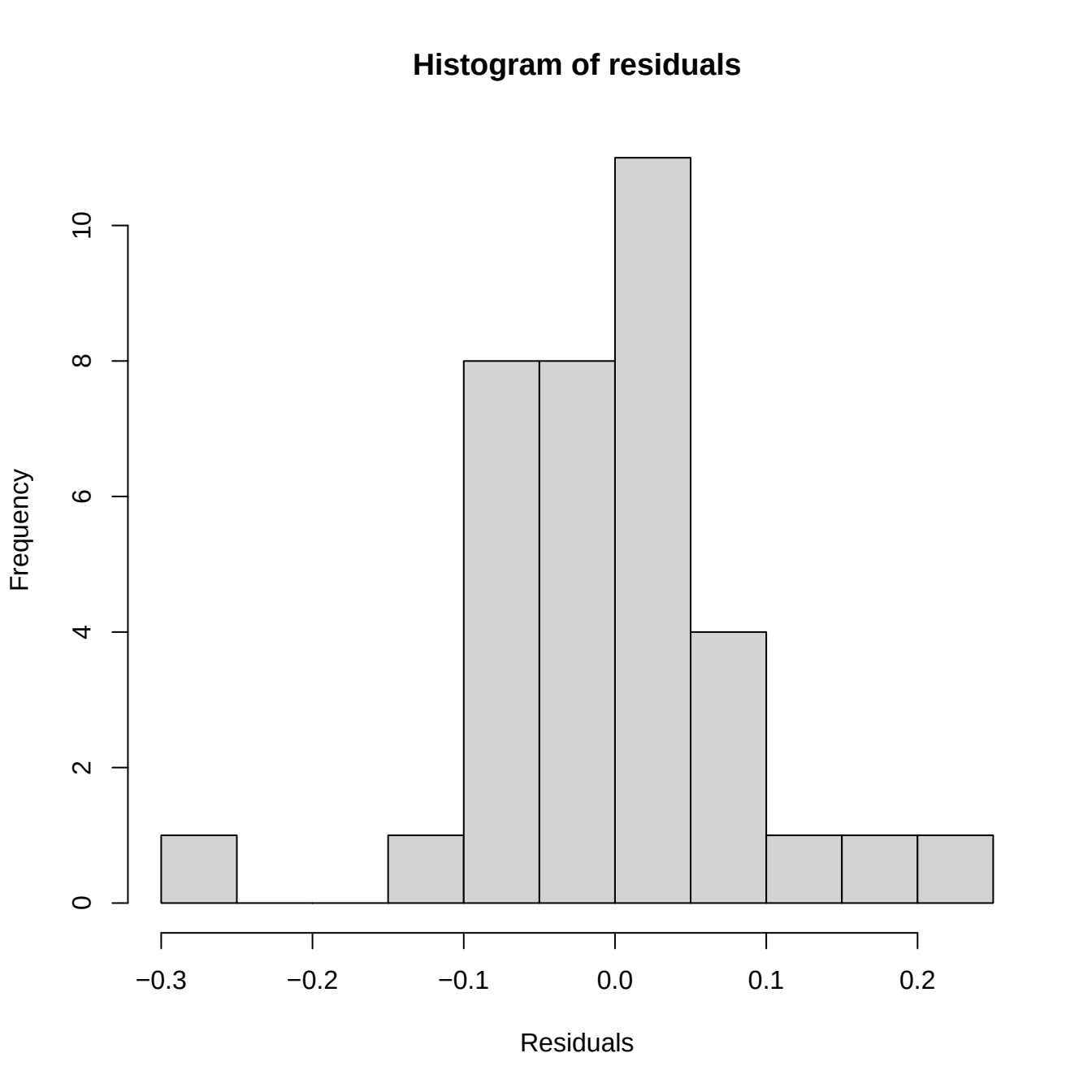

s(cumul_bites_7_previous_days,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
10
20
30
40
cumul_bites_7_previous_days

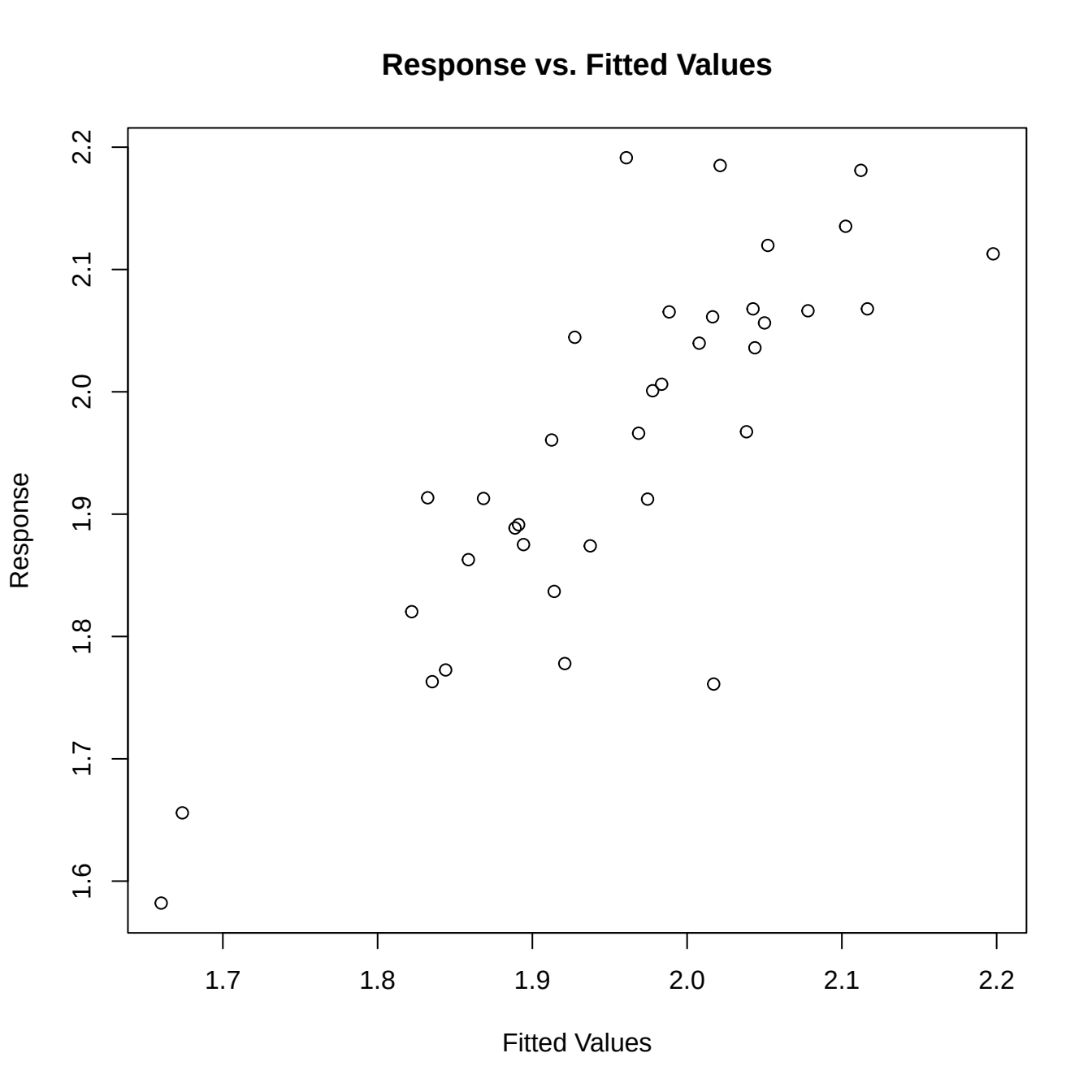

s(ID,2.6)
effects
0.05
0.00
−0.05
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.2
2.0
1.8
1.6
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
2.2
2.0
1.8
1.6
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.2
0.1
0.0
−0.1
−0.2
−0.2
−0.1
0.0
0.1
0.2
theoretical quantiles


Resids vs. linear pred.
residuals
0.2
0.1
0.0
−0.1
−0.2
1.7
1.8
1.9
2.0
2.1
2.2
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
10
−0.3
−0.2
−0.1
0.0
0.1
0.2
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.6
1.7
1.8
1.9
2.0
2.1
2.2

```
Method: ML   Optimizer: outer newton
full convergence after 12 iterations.
Gradient range [−1.512783e−05,4.621316e−06]
(score −31.99646 & scale 0.008467418).
Hessian positive definite, eigenvalue range [4.134531e−06,18.18007].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k' edf k−index p−value
s(bites_of_yesterday)          3.0 1.0    0.99    0.41
s(cumul_bites_7_previous_days) 3.0 1.0    1.26    0.93
s(ID)                          4.0 2.6      NA      NA
```

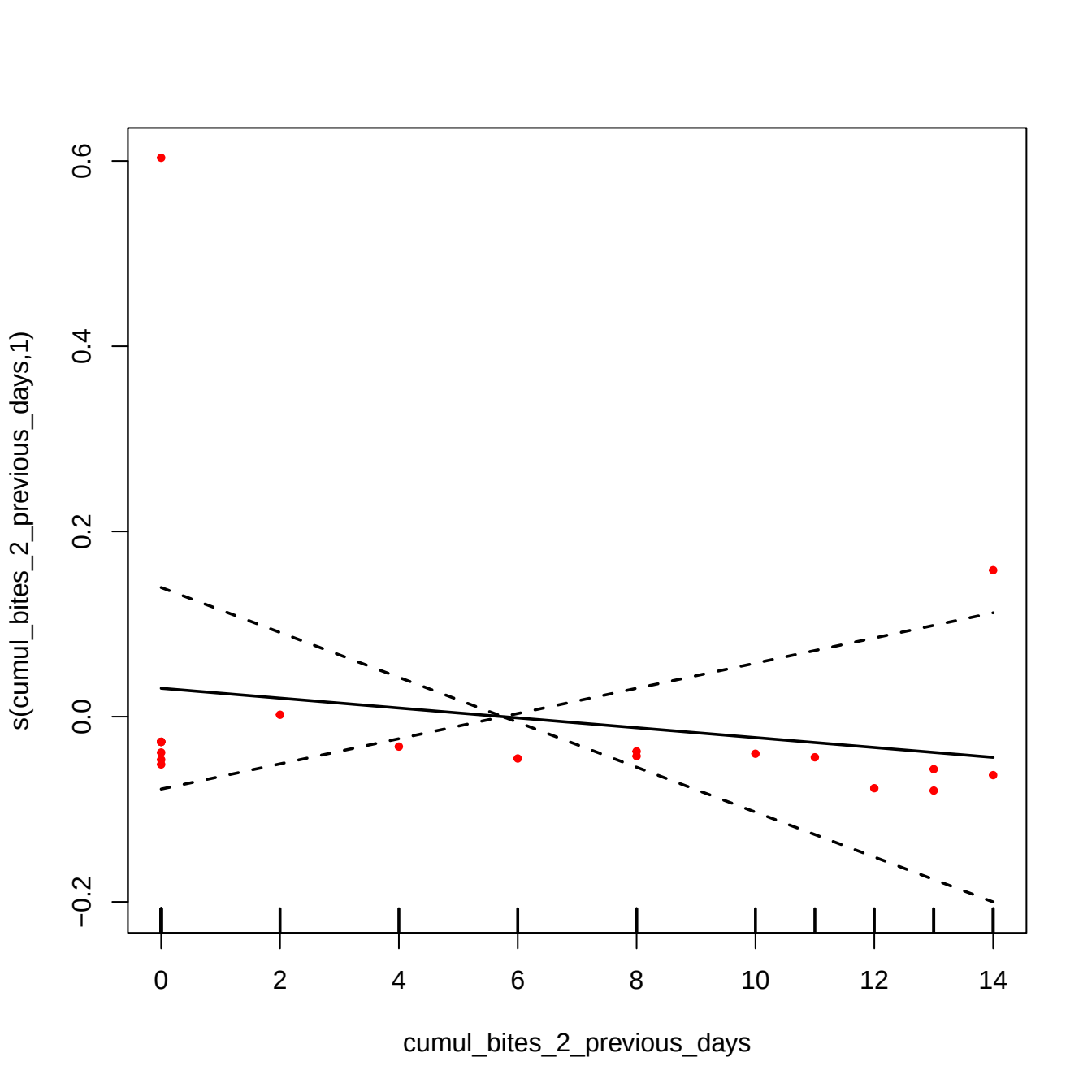
```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

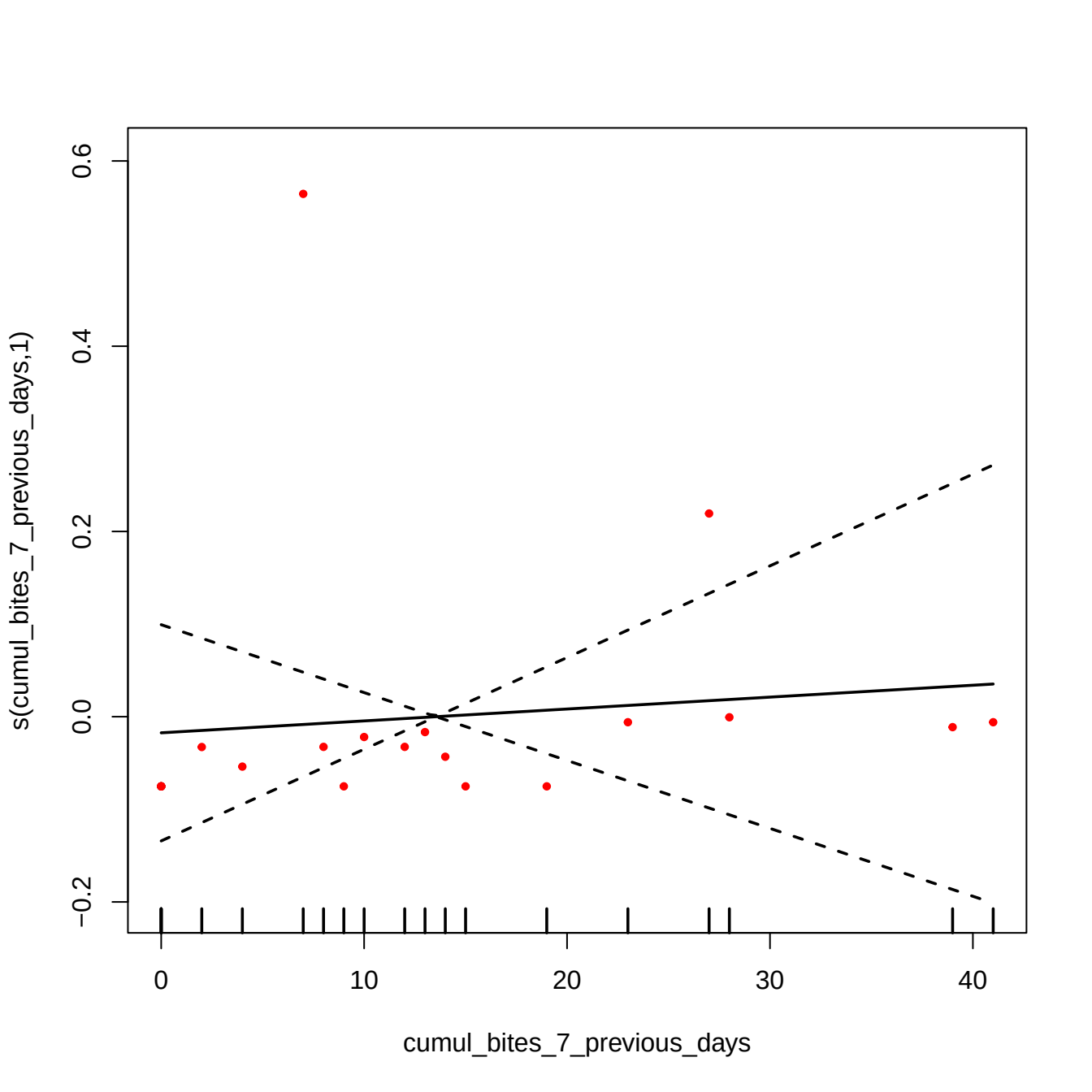
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.95643    0.04198    46.6   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F  p-value
s(bites_of_yesterday)         1.000      1 17.650 0.000219 ***
s(cumul_bites_7_previous_days) 1.000      1 28.761  8.6e-06 ***
s(ID)                         2.596      3  8.062 0.000166 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.619   Deviance explained = 66.9%
-ML = -31.996  Scale est. = 0.0084674  n = 36
```

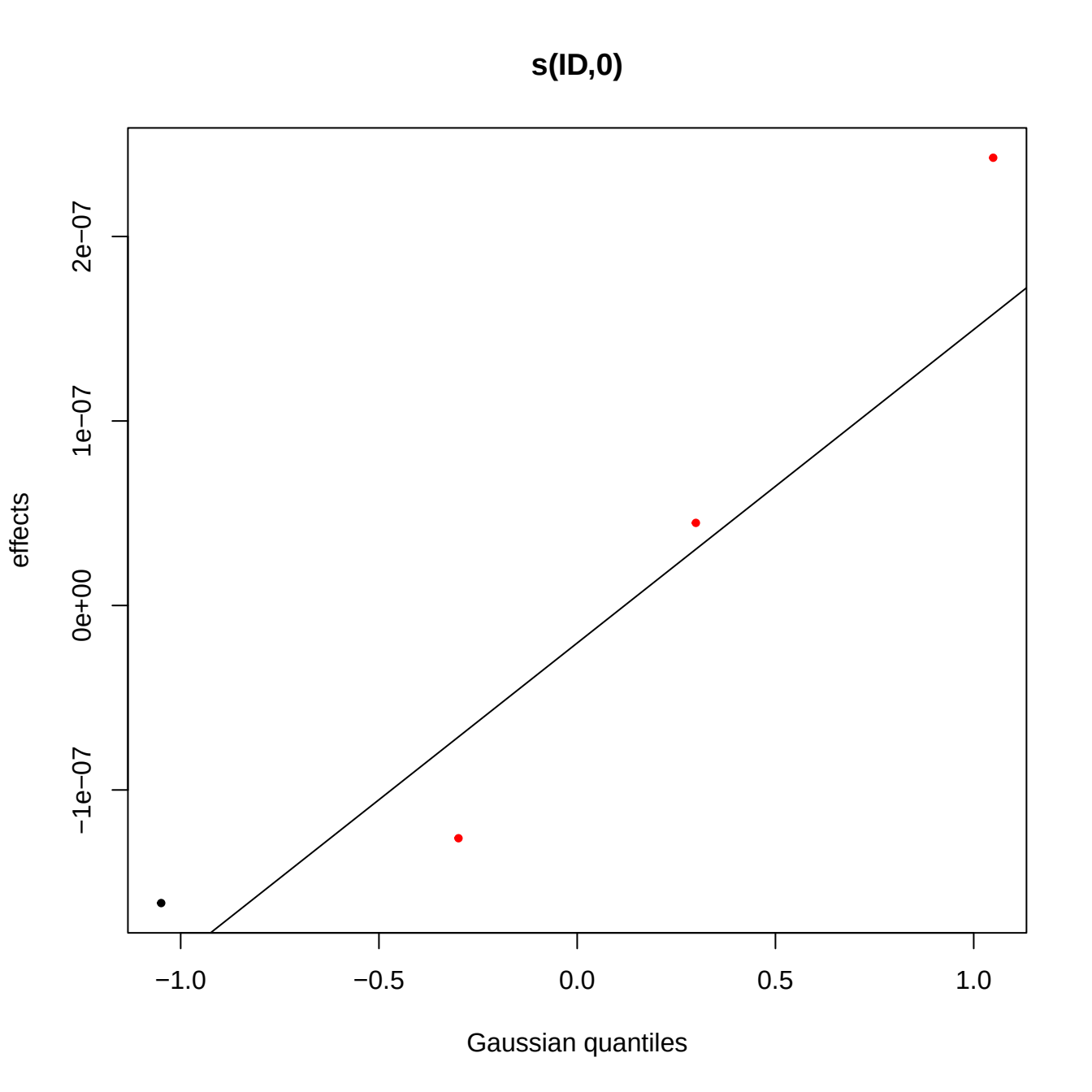
AICc [1] −57.969

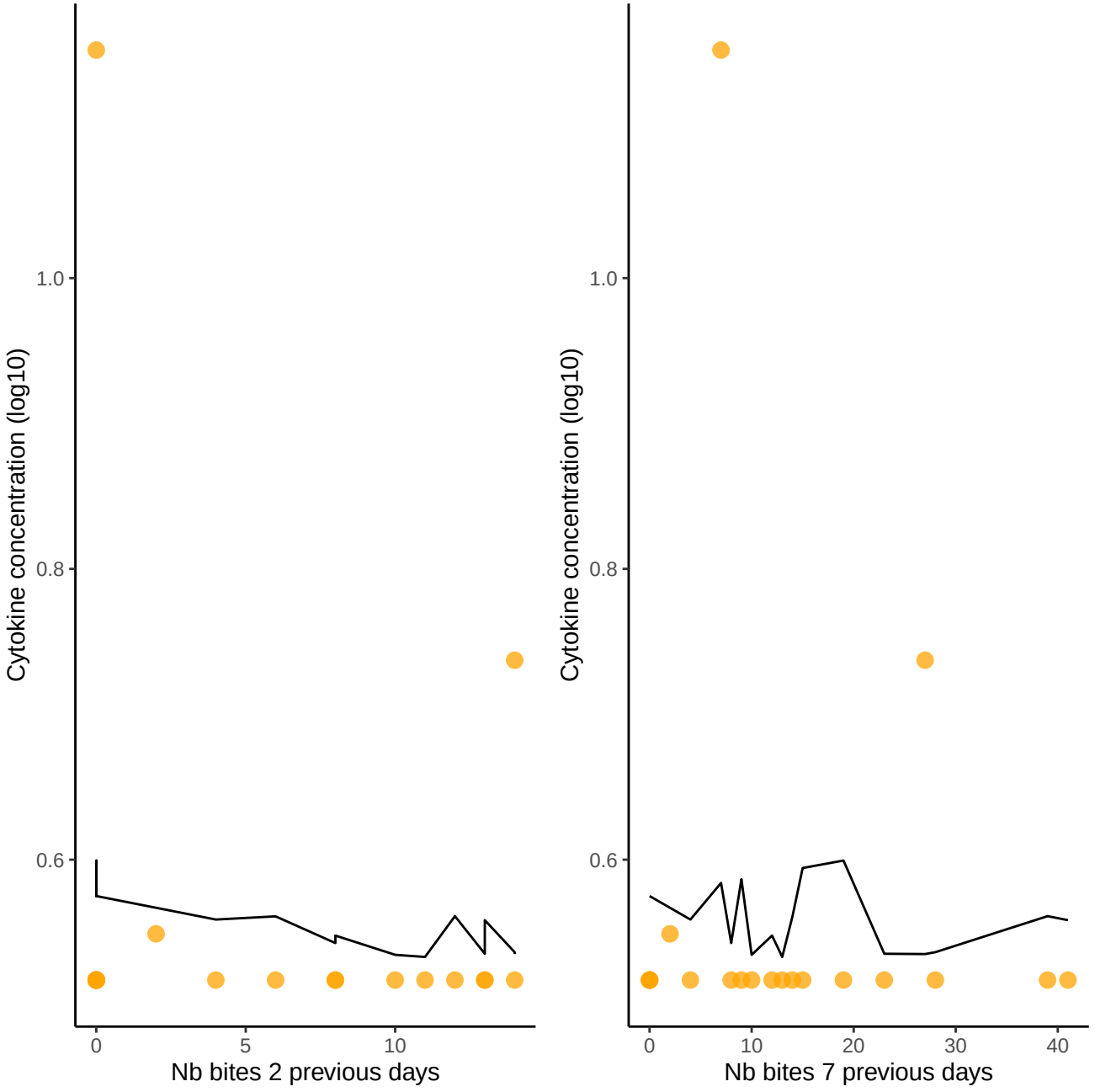
Bites in squirrel

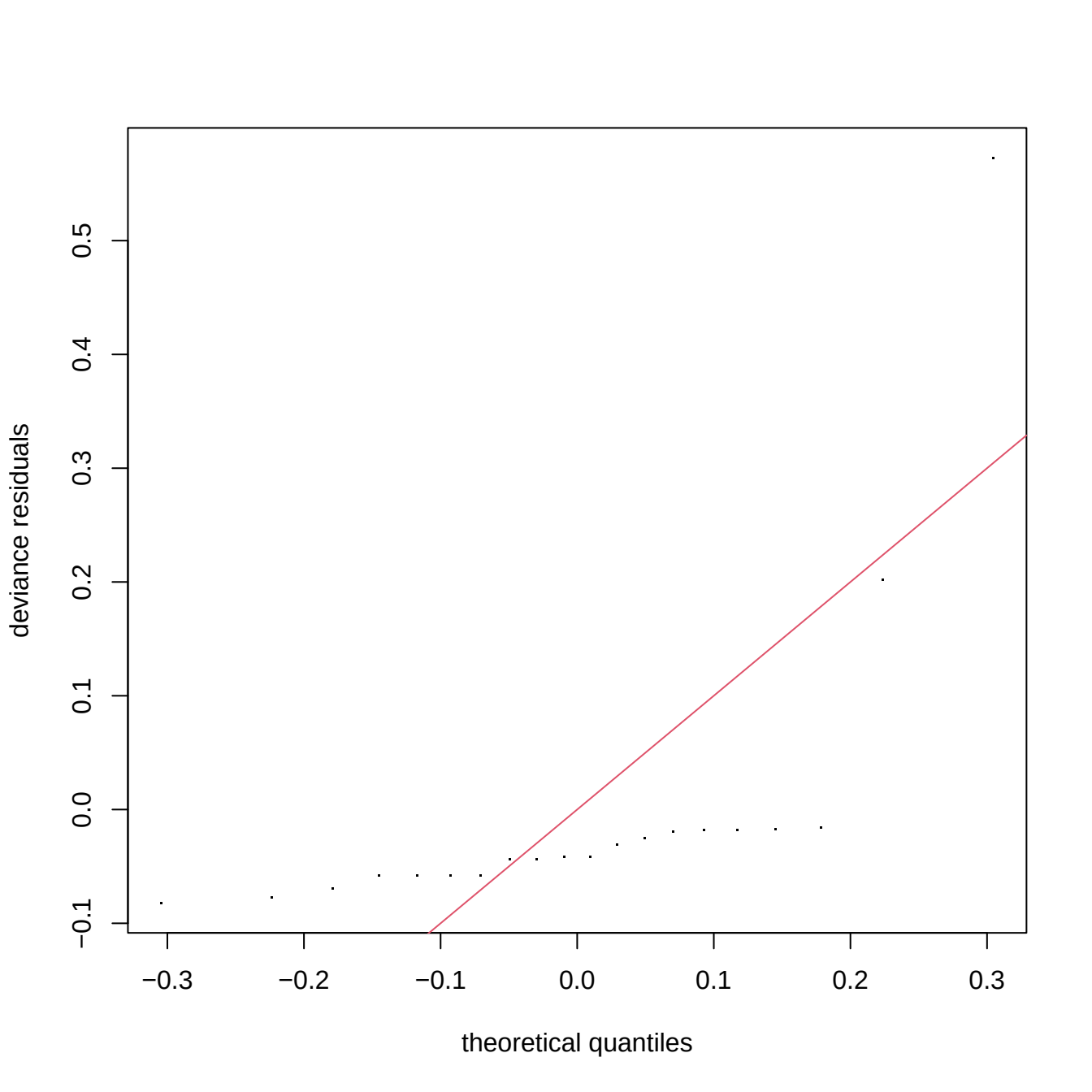
Nb obs: 20

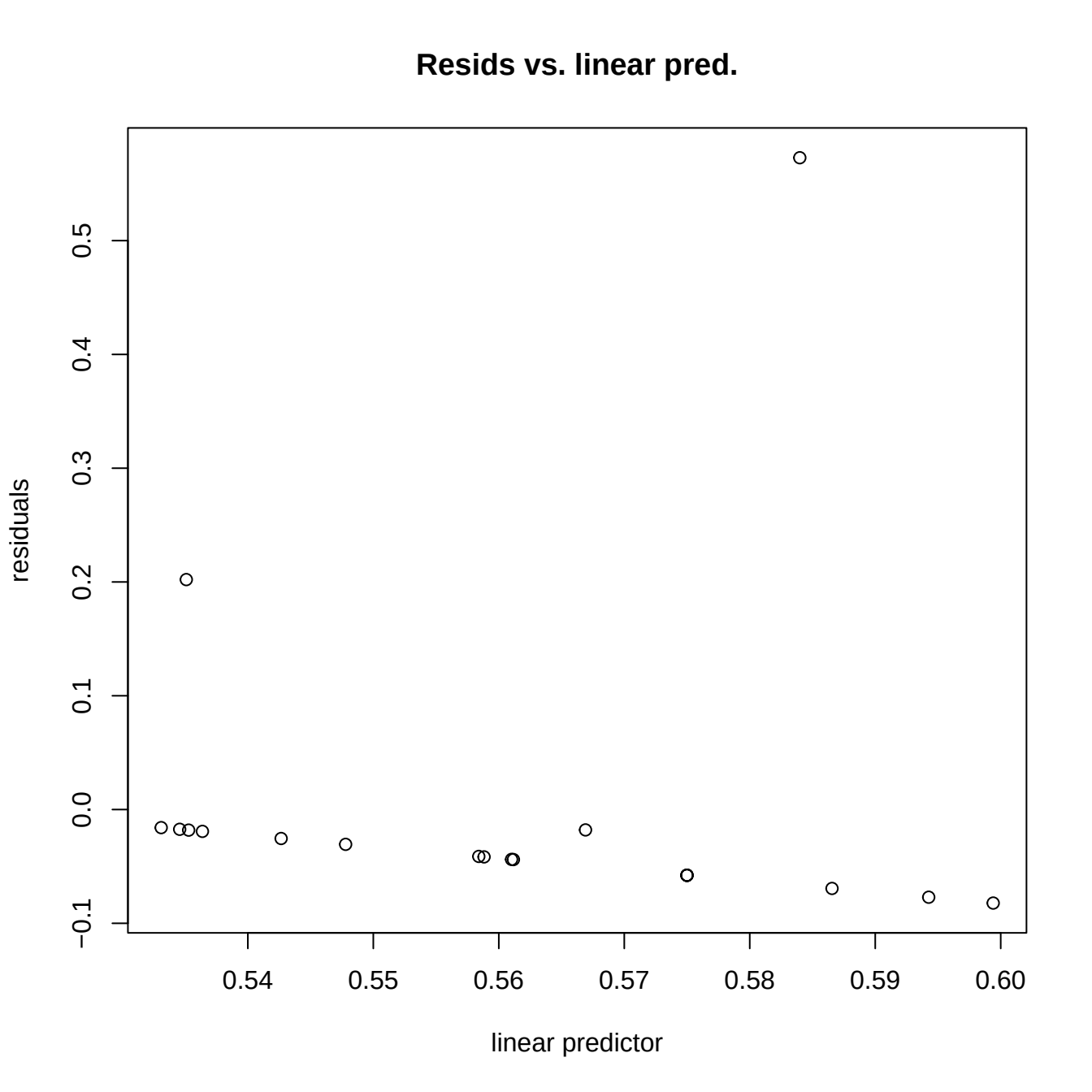

s(cumul_bites_2_previous_days,1)
0.6
0.4
0.2
0.0
−0.2
0
2
4
6
8
10
12
14
cumul_bites_2_previous_days

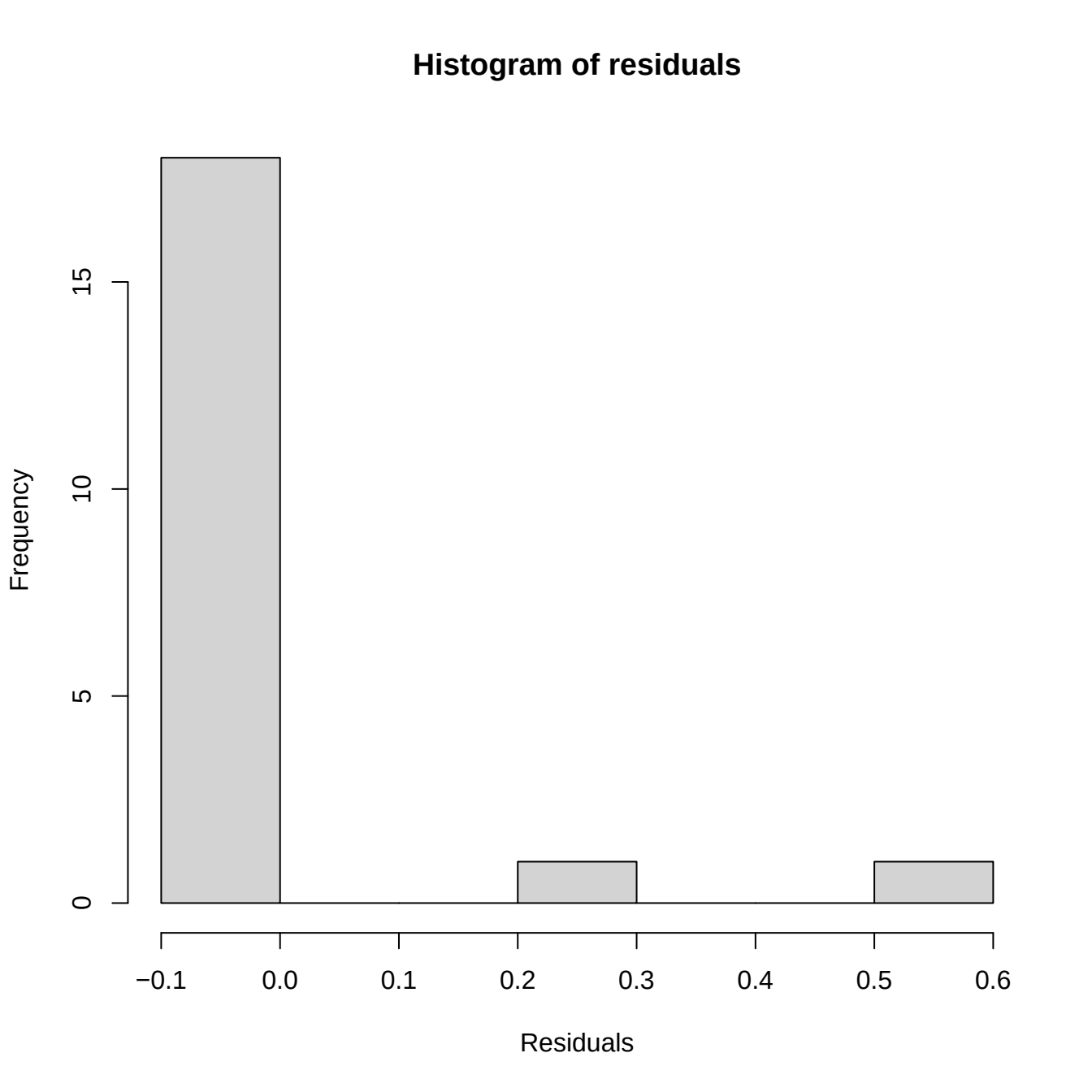

s(cumul_bites_7_previous_days,1)
0.6
0.4
0.2
0.0
−0.2
0
10
20
30
40
cumul_bites_7_previous_days

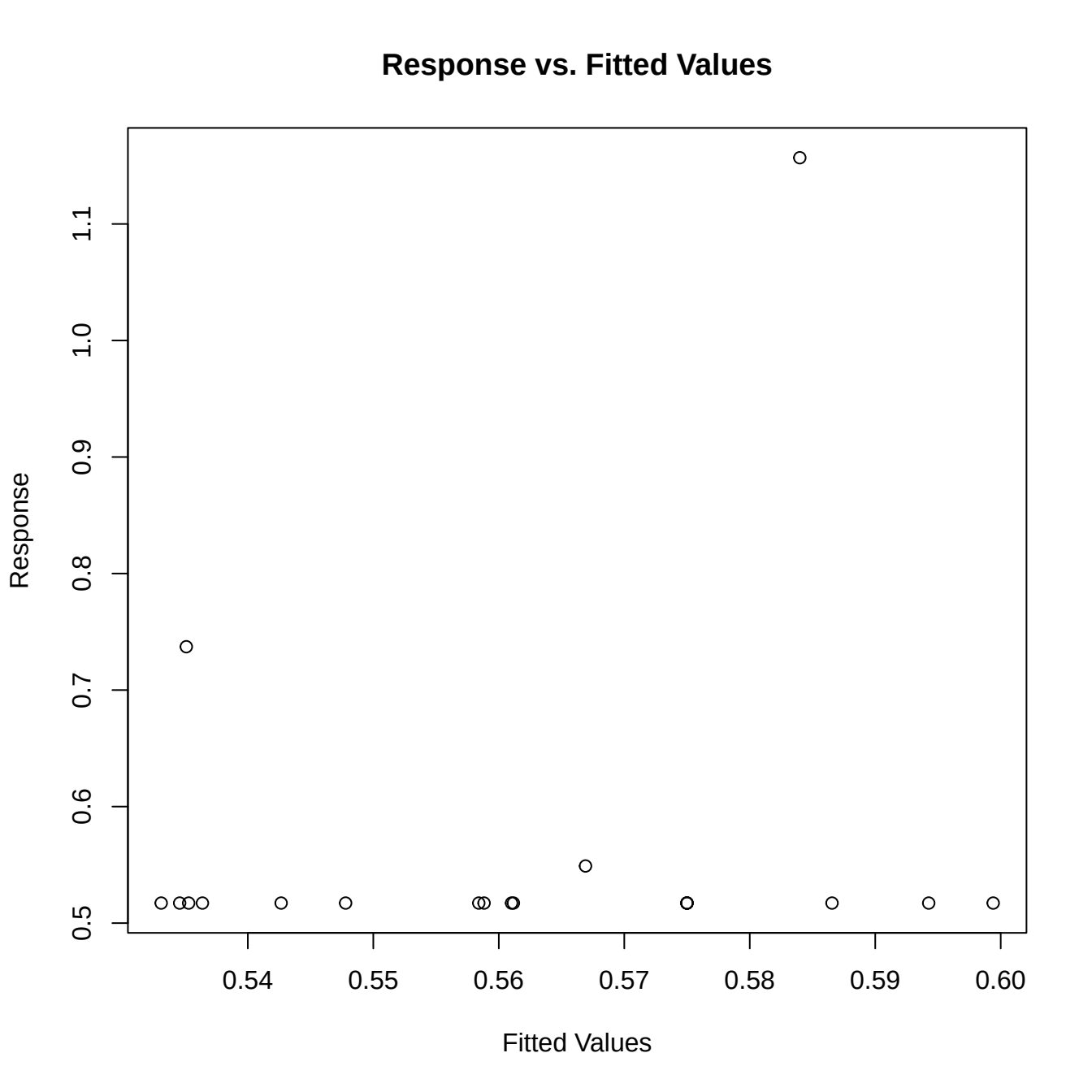

s(ID,0)
effects
2e−07
1e−07
0e+00
−1e−07
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
1.0
0.8
0.6
0
5
10
Nb bites 2 previous days
Cytokine concentration (log10)
1.0
0.8
0.6
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
−0.1
0.0
0.1
0.2
0.3
0.4
0.5
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3
theoretical quantiles


Resids vs. linear pred.
residuals
linear predictor
−0.1
0.0
0.1
0.2
0.3
0.4
0.5
0.54
0.55
0.56
0.57
0.58
0.59
0.60


Histogram of residuals
Frequency
0
5
10
15
−0.1
0.0
0.1
0.2
0.3
0.4
0.5
0.6
Residuals


Response vs. Fitted Values
Response
Fitted Values
0.5
0.6
0.7
0.8
0.9
1.0
1.1
0.54
0.55
0.56
0.57
0.58
0.59
0.60

```
Method: ML   Optimizer: outer newton
full convergence after 14 iterations.
Gradient range [−3.005317e−06,3.912863e−06]
(score −10.48654 & scale 0.02413691).
Hessian positive definite, eigenvalue range [4.335191e−07,9.999996].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                    k'      edf k−index p−value
s(cumul_bites_2_previous_days) 3.00e+00 1.00e+00    1.13    0.56
s(cumul_bites_7_previous_days) 3.00e+00 1.00e+00    1.09    0.30
s(ID)                          4.00e+00 9.46e−06      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                                Term  VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_2_previous_days, k = 4) 1.06 [1.00, 15.02]         1.03      0.94     [0.07, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.06 [1.00, 15.02]         1.03      0.94     [0.07, 1.00]
```

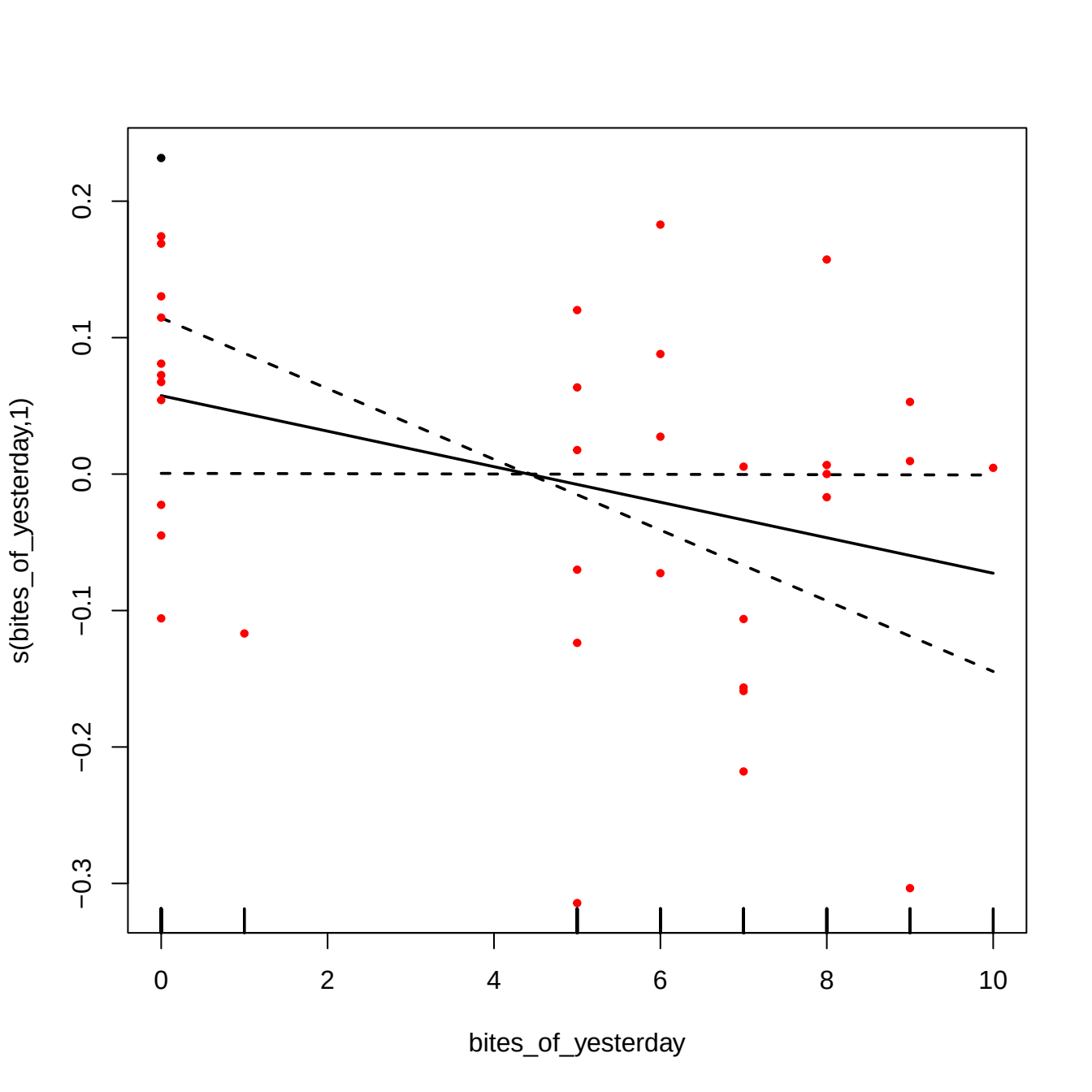
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(cumul_bites_2_previous_days, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.56177    0.03474   16.17 9.34e-12 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                   edf Ref.df     F p-value
s(cumul_bites_2_previous_days) 1.00e+00      1 0.317   0.581
s(cumul_bites_7_previous_days) 1.00e+00      1 0.089   0.769
s(ID)                          9.46e-06      3 0.000   0.582

R-sq.(adj) =  -0.0949   Deviance explained = 2.03%
-ML = -10.487  Scale est. = 0.024137  n = 20
```

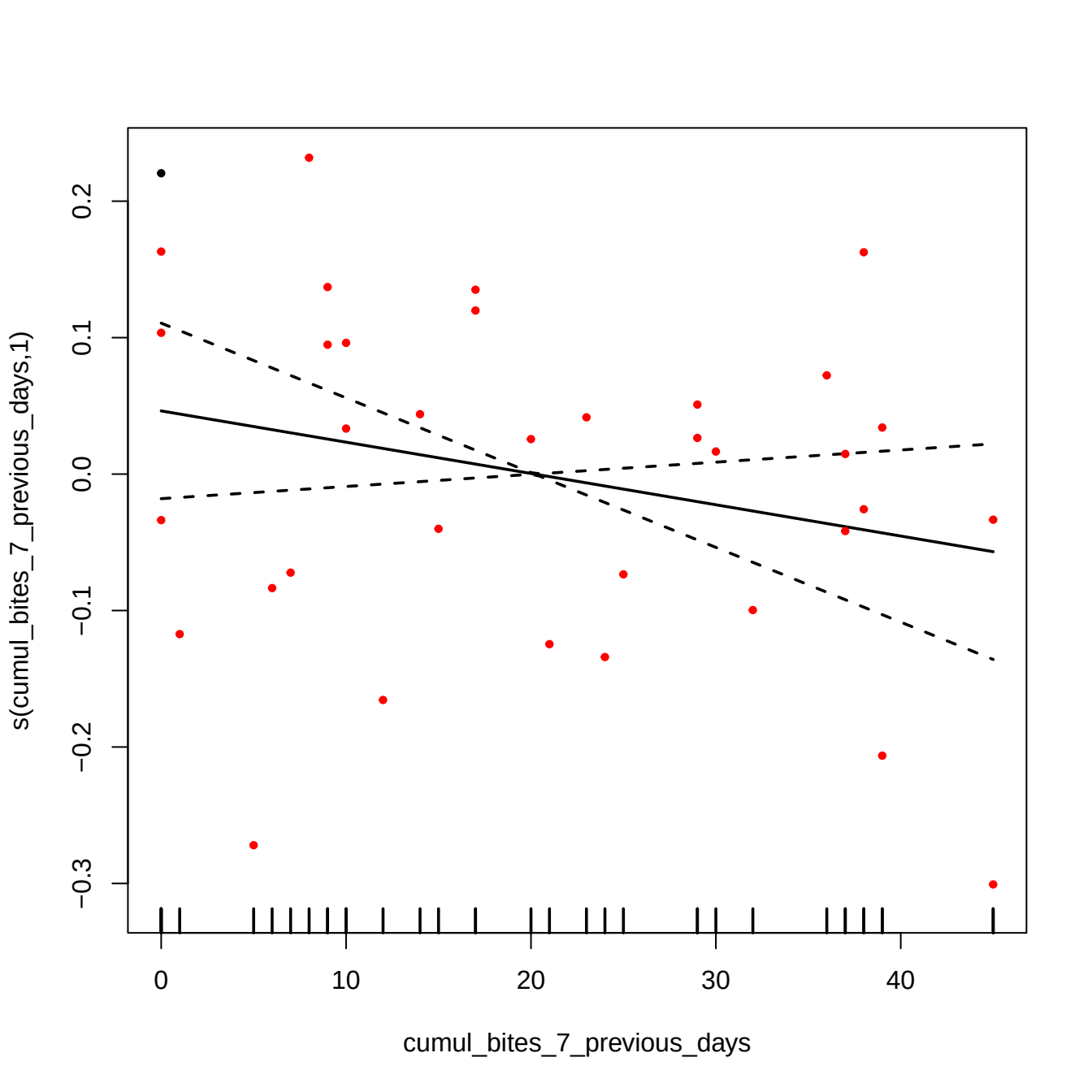
AICc [1] −10.30637

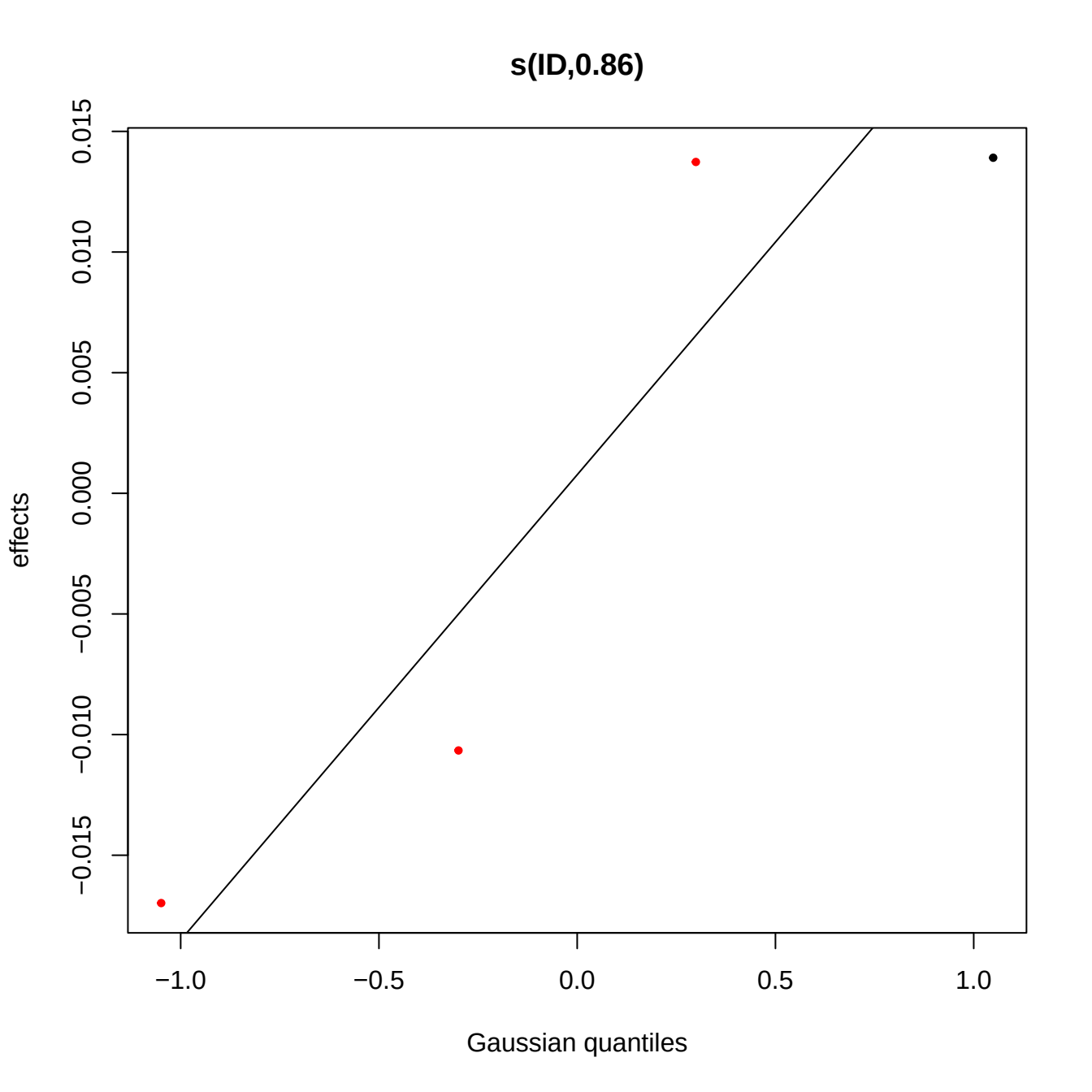
Eotaxin

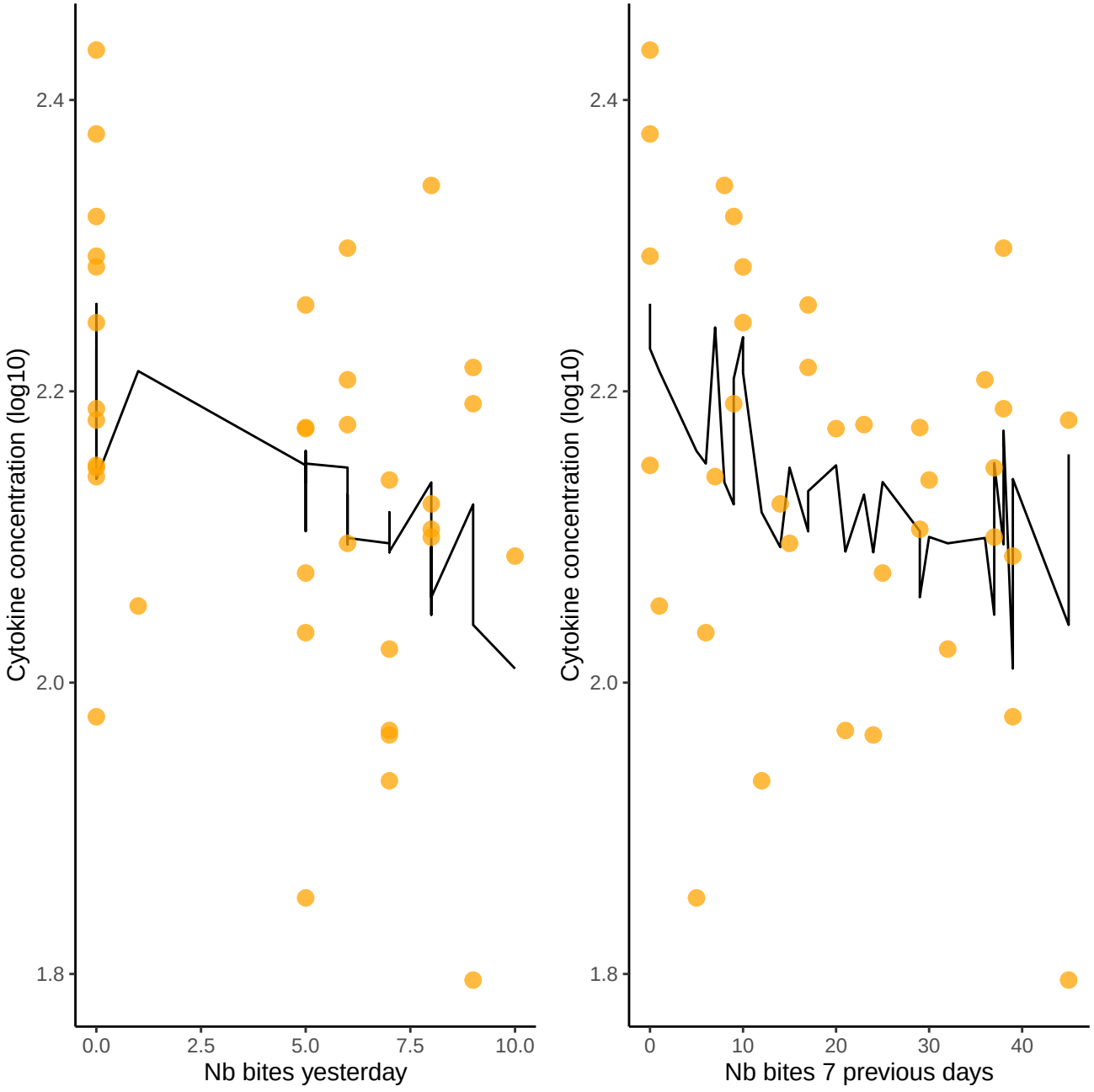
Bites in cyno

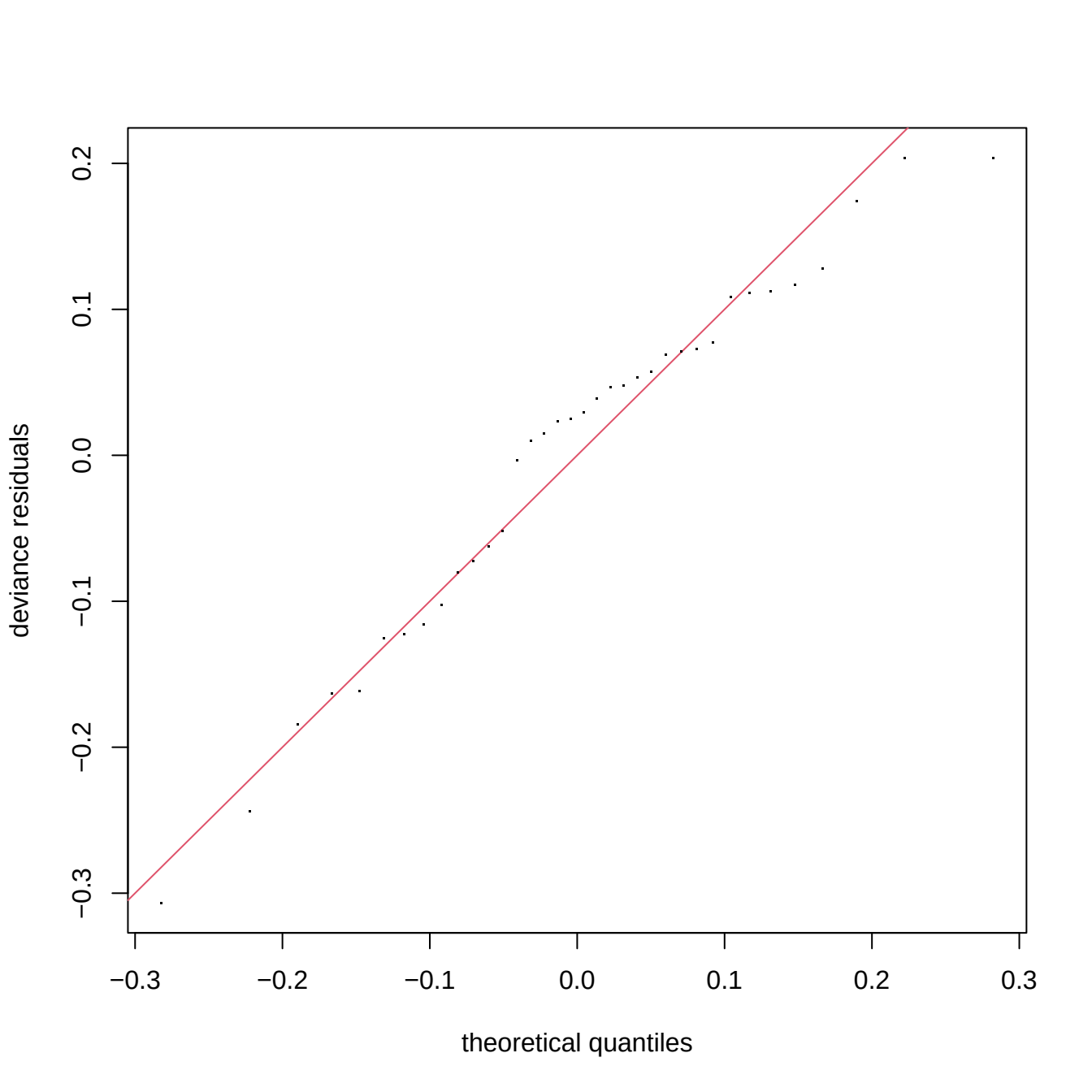
Nb obs: 36

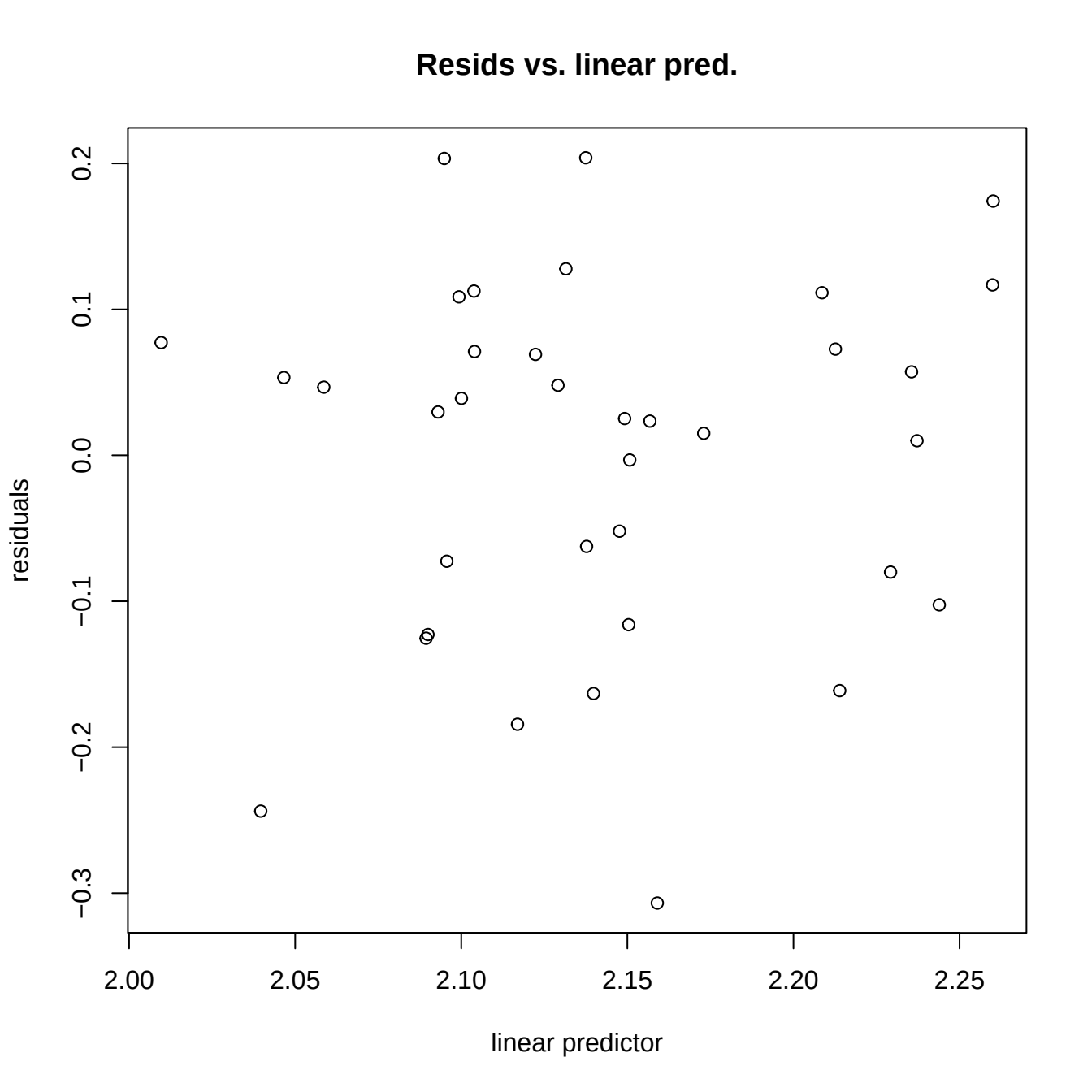

s(bites_of_yesterday,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
2
4
6
8
10
bites_of_yesterday

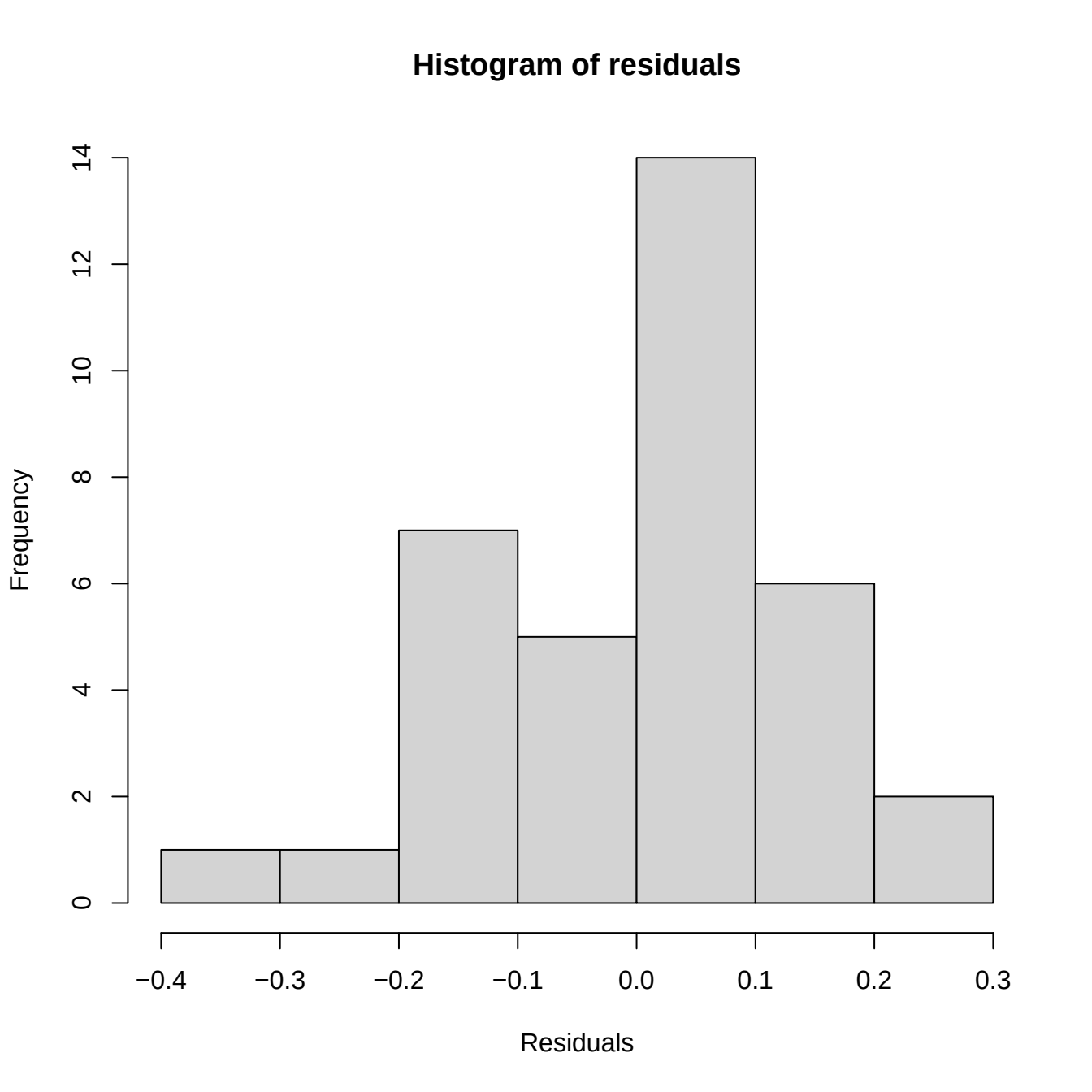

s(cumul_bites_7_previous_days,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
10
20
30
40
cumul_bites_7_previous_days

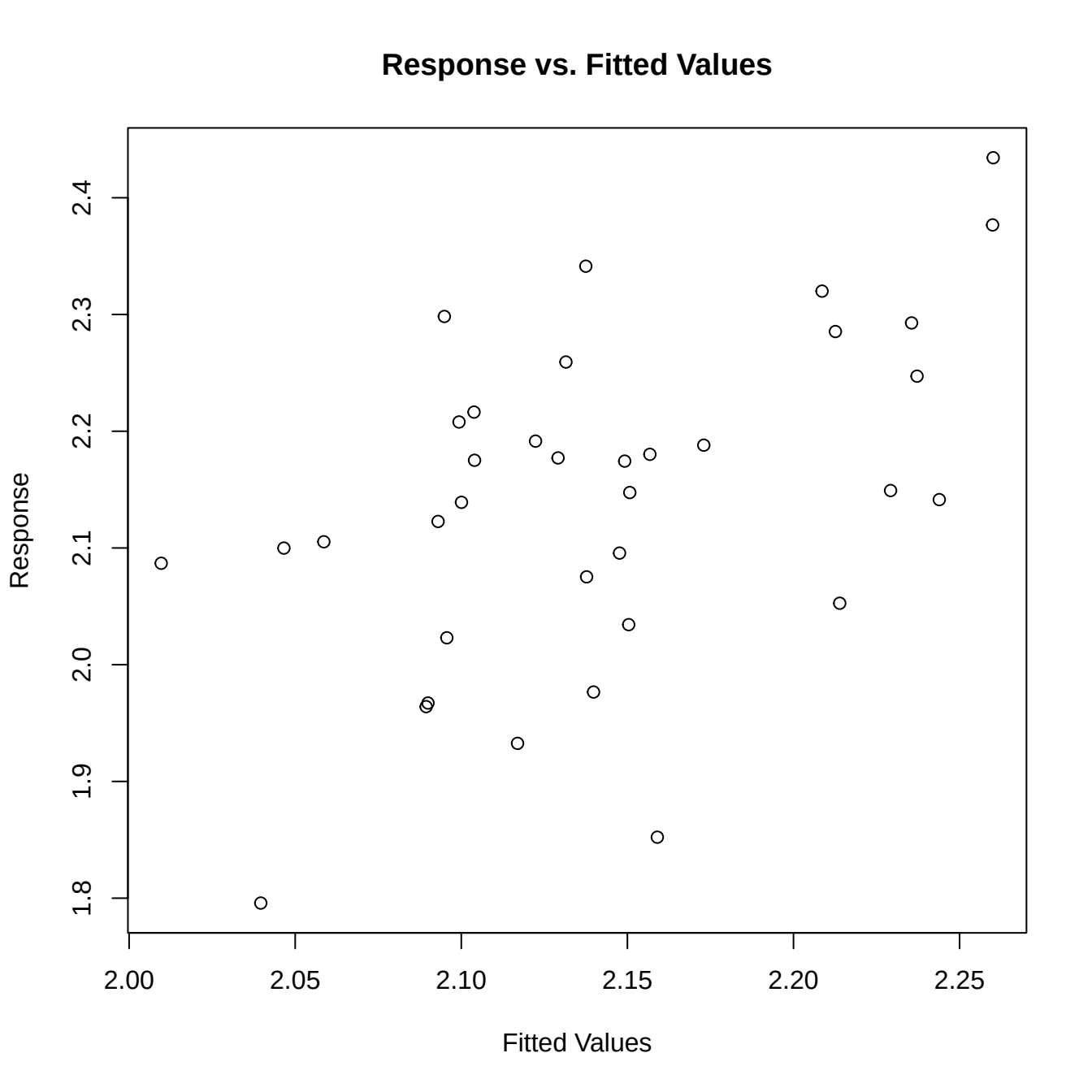

s(ID,0.86)
effects
0.015
0.010
0.005
0.000
−0.005
−0.010
−0.015
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.4
2.2
2.0
1.8
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
2.4
2.2
2.0
1.8
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3
theoretical quantiles


Resids vs. linear pred.
residuals
0.2
0.1
0.0
−0.1
−0.2
−0.3
2.00
2.05
2.10
2.15
2.20
2.25
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
10
12
14
−0.4
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.8
1.9
2.0
2.1
2.2
2.3
2.4
2.00
2.05
2.10
2.15
2.20
2.25

```
Method: ML   Optimizer: outer newton
full convergence after 10 iterations.
Gradient range [−5.488936e−06,6.609834e−07]
(score −23.6211 & scale 0.01645672).
Hessian positive definite, eigenvalue range [1.135394e−06,18.01854].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                   k'   edf k−index p−value
s(bites_of_yesterday)          3.000 1.000    1.08    0.65
s(cumul_bites_7_previous_days) 3.000 1.000    0.73    0.04 *
s(ID)                          4.000 0.857      NA      NA
−−−
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.14243    0.02533   84.57   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df     F p-value
s(bites_of_yesterday)         1.0000      1 4.075   0.052 .
s(cumul_bites_7_previous_days) 1.0000      1 2.073   0.160
s(ID)                         0.8571      3 0.494   0.181
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.186   Deviance explained = 25.3%
-ML = -23.621  Scale est. = 0.016457  n = 36
```

AICc [1] −36.43411

Bites in squirrel

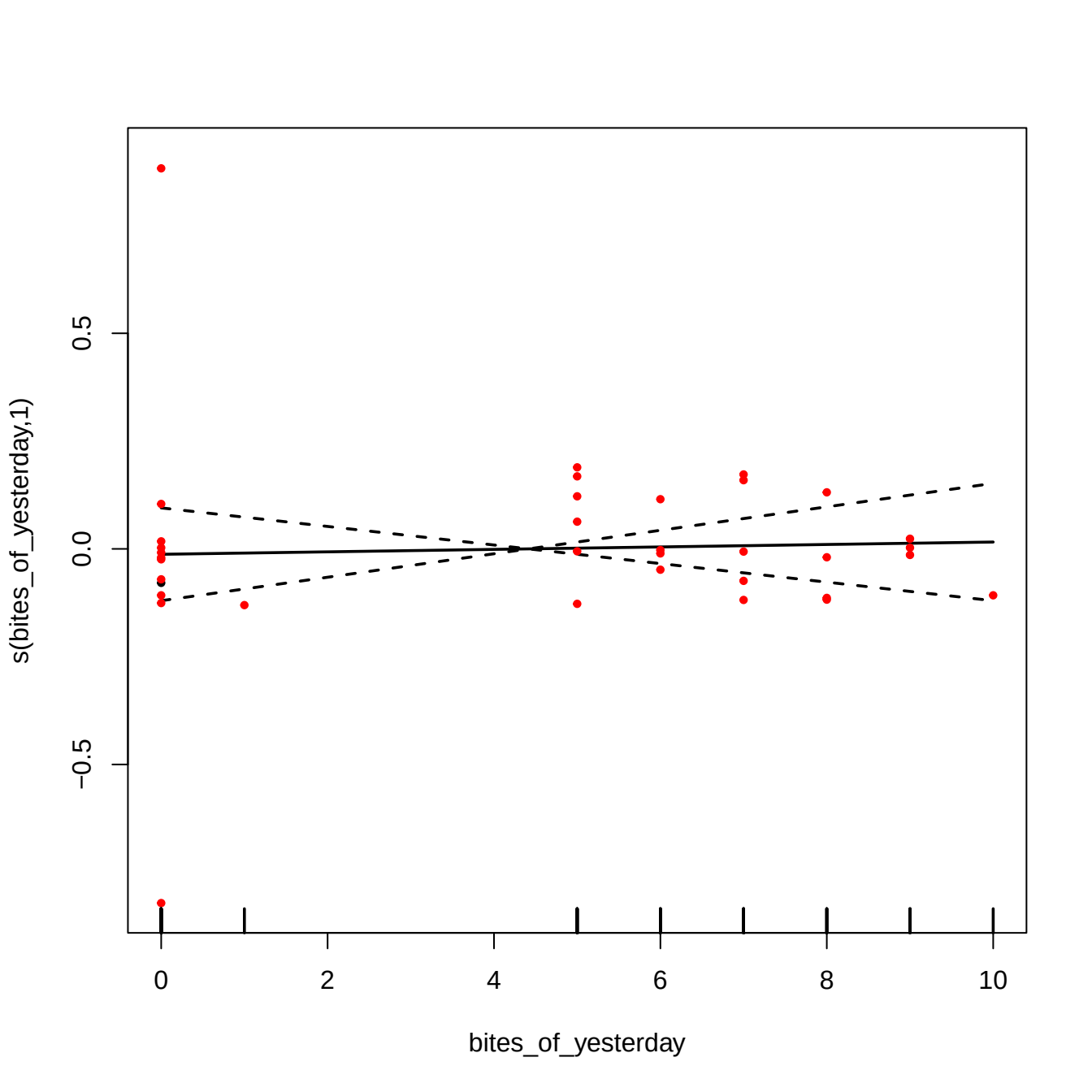
Nb obs: 20

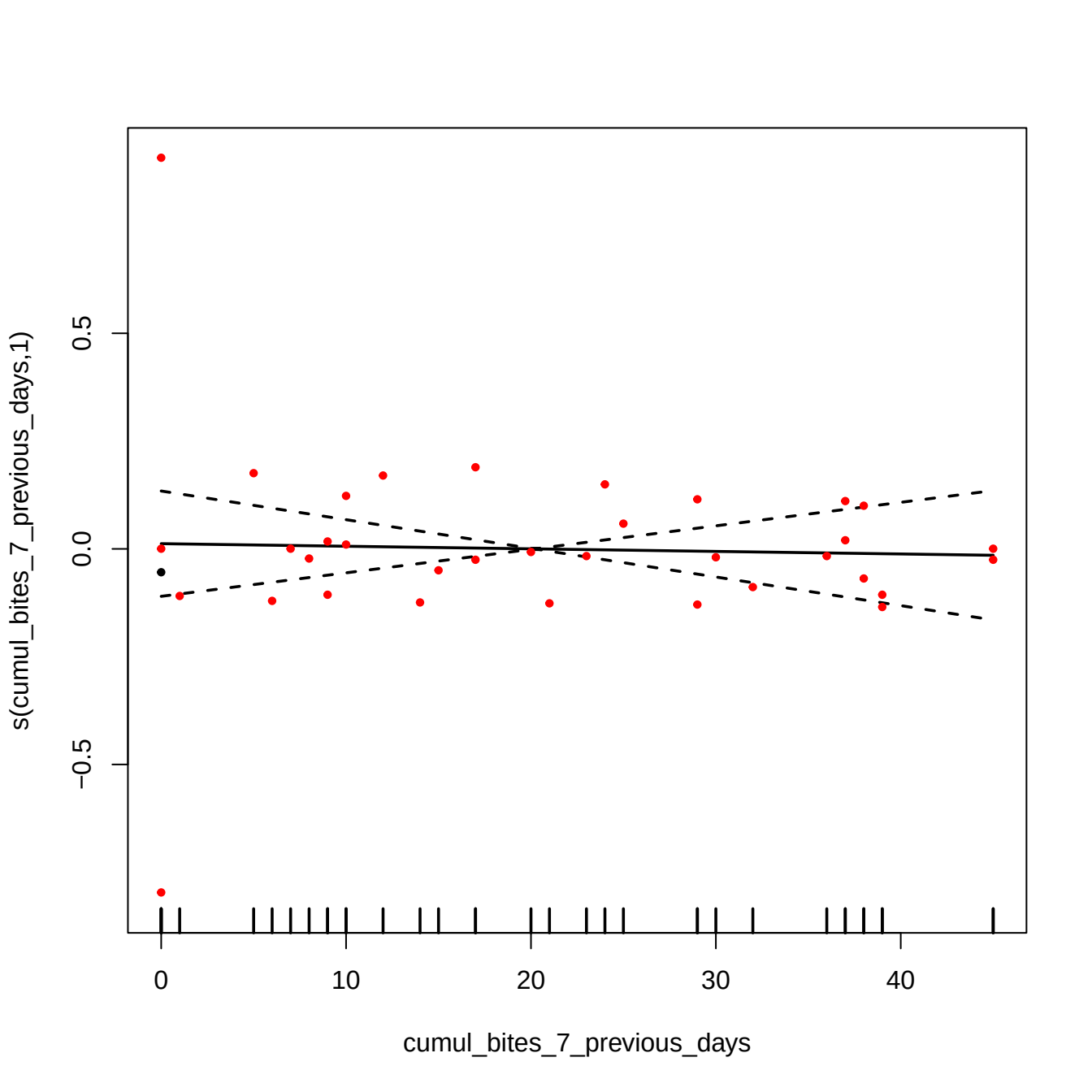
Eotaxin ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

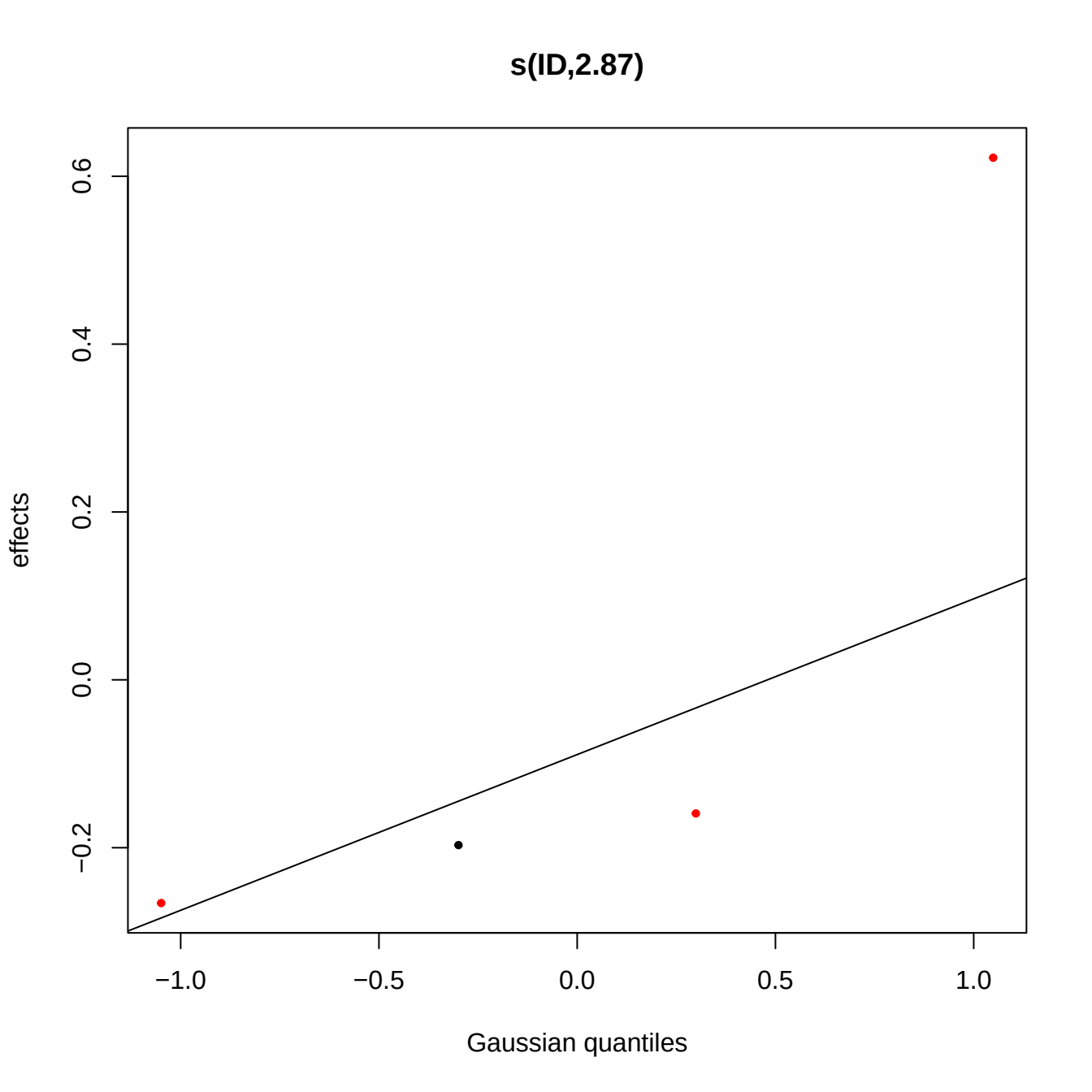
G.CSF

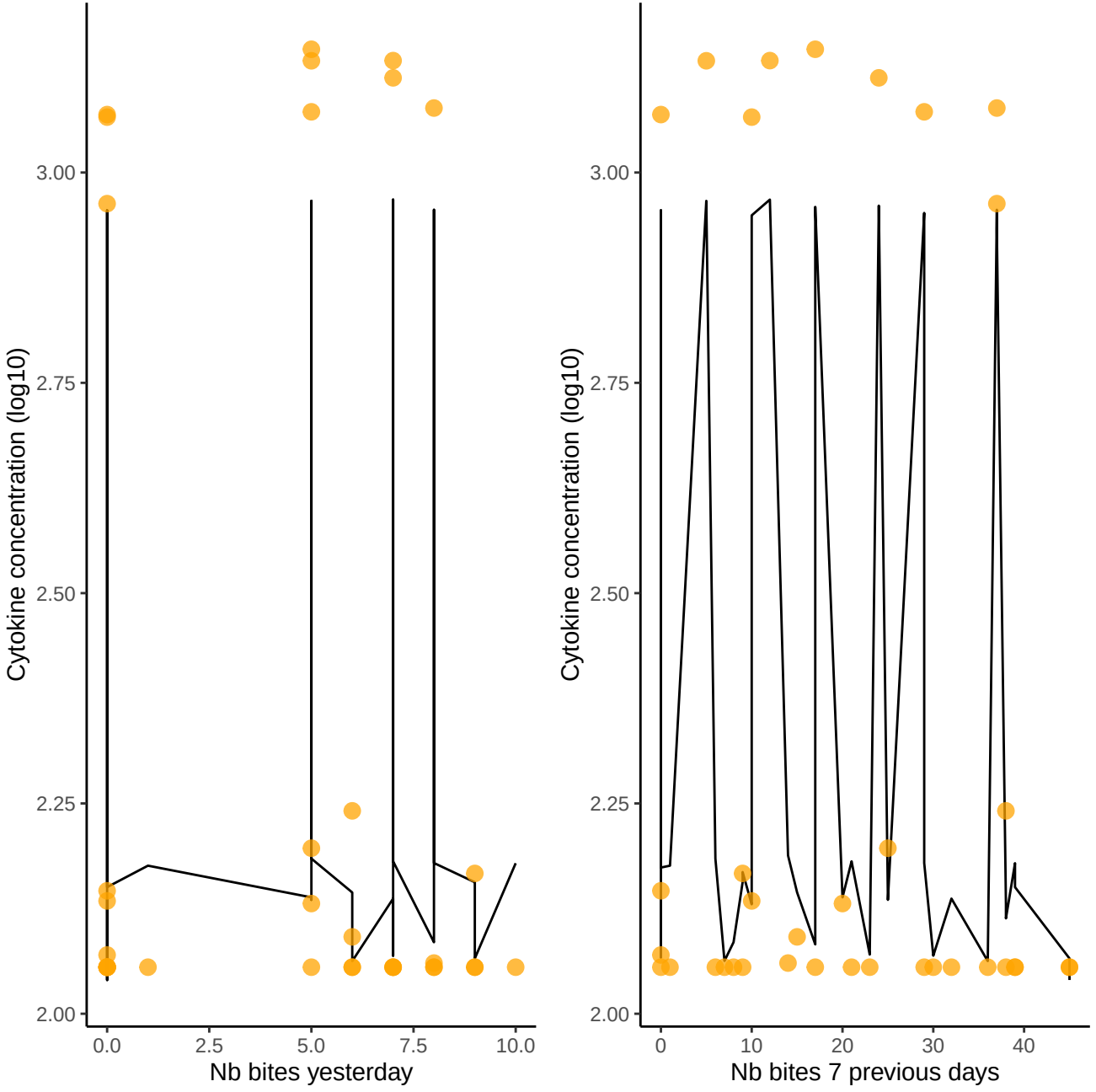
Bites in cyno

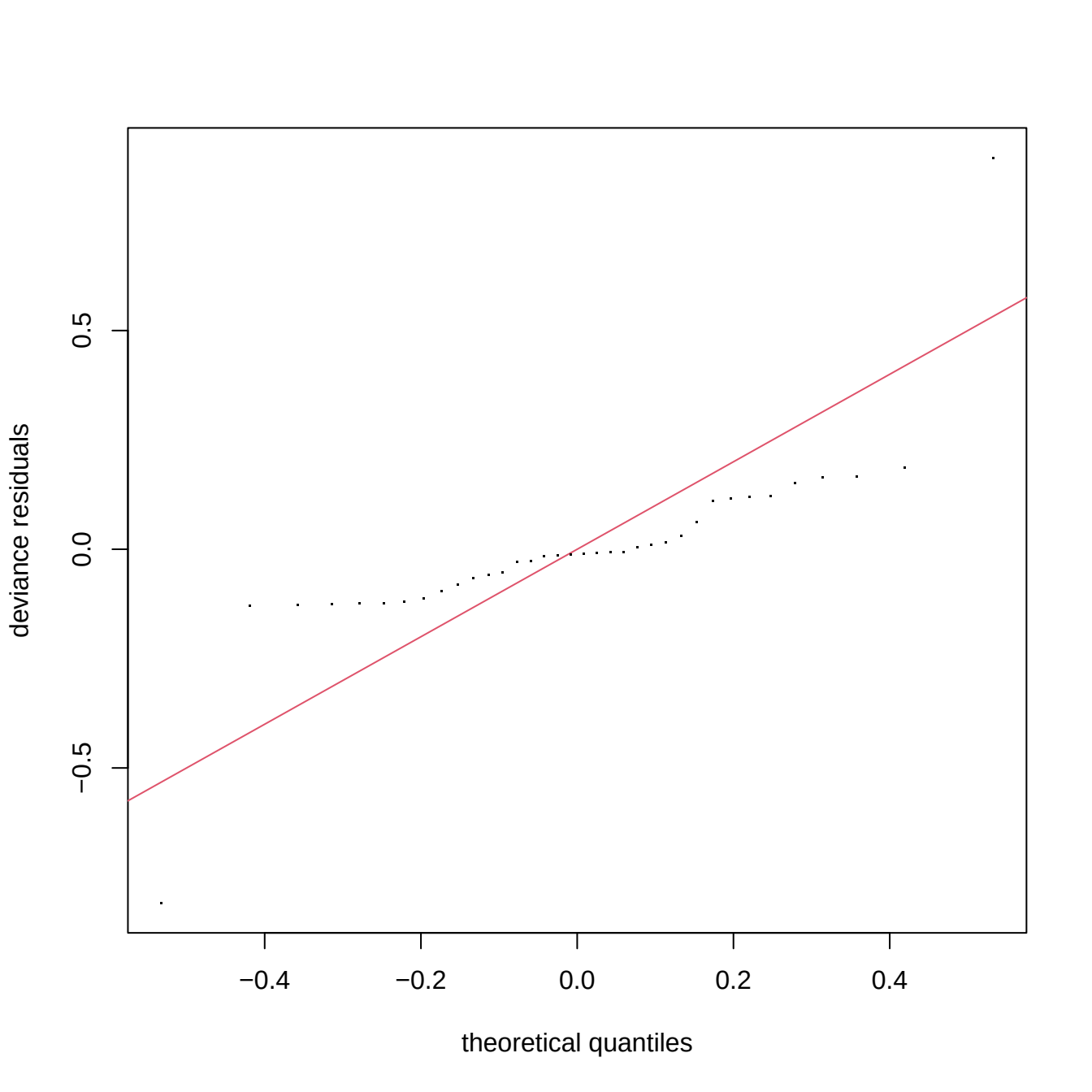
Nb obs: 36

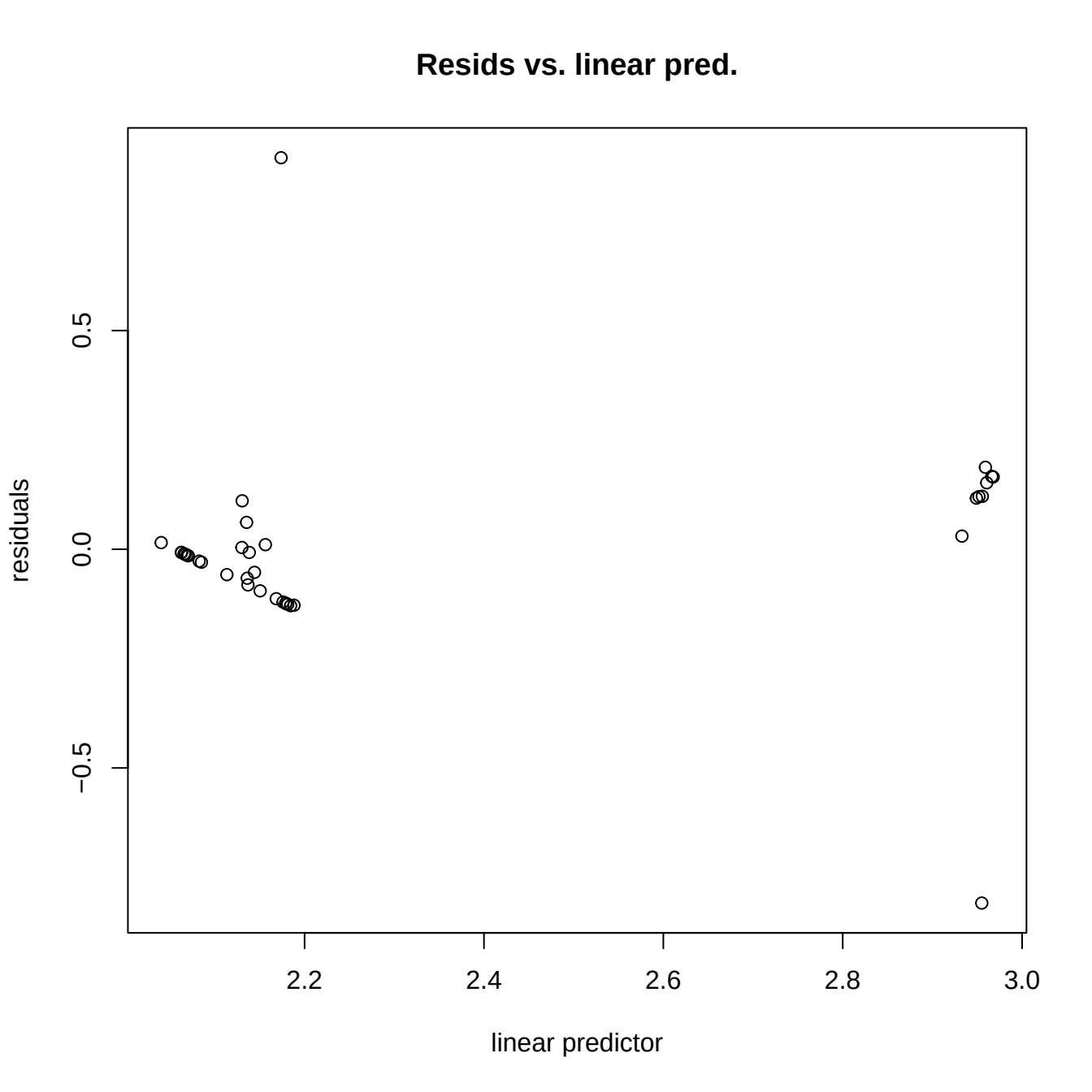

s(bites_of_yesterday,1)
0.5
0.0
−0.5
0
2
4
6
8
10
bites_of_yesterday

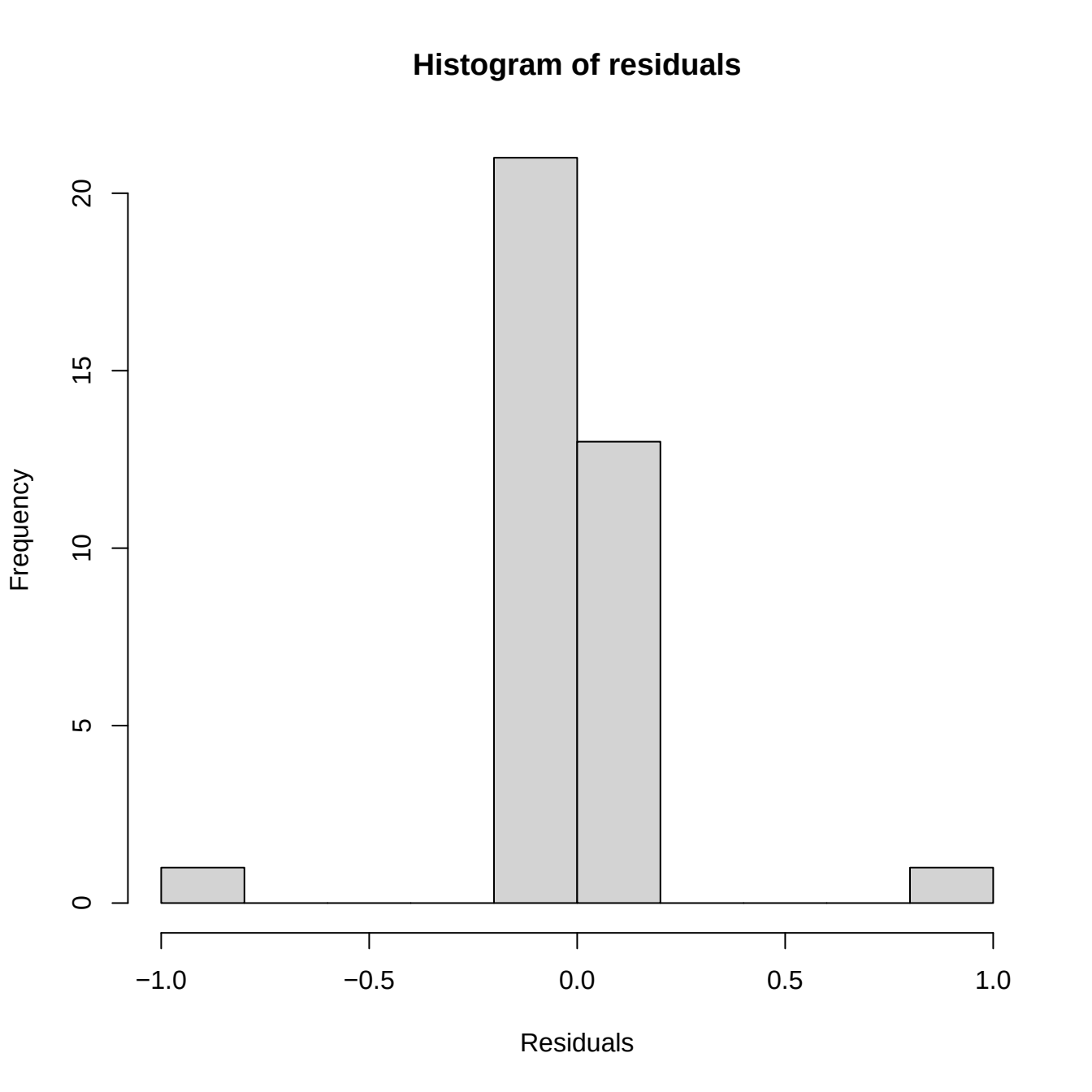

s(cumul_bites_7_previous_days,1)
0.5
0.0
−0.5
0
10
20
30
40
cumul_bites_7_previous_days

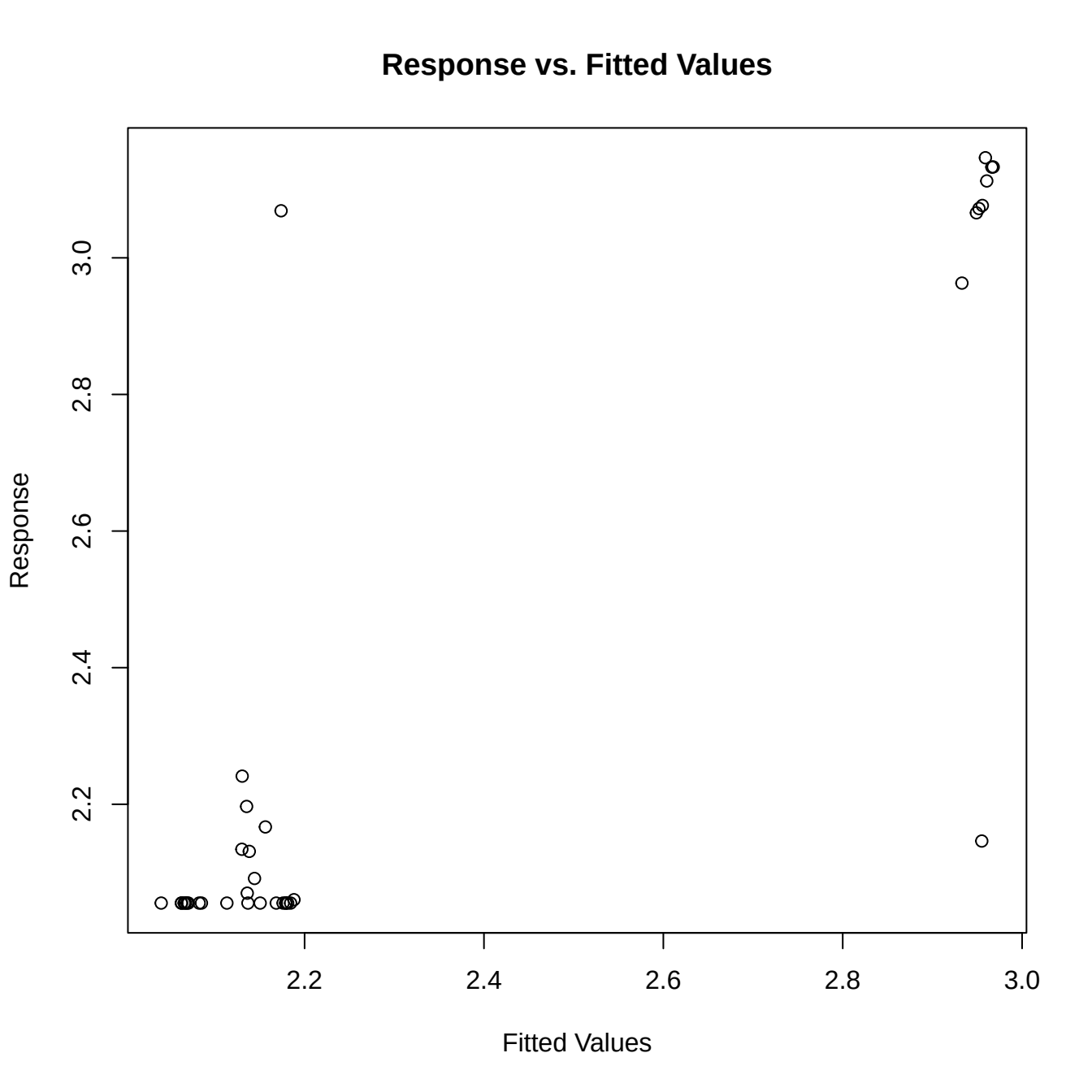

s(ID,2.87)
effects
0.6
0.4
0.2
0.0
−0.2
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
3.00
2.75
2.50
2.25
2.00
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
3.00
2.75
2.50
2.25
2.00
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.5
0.0
−0.5
−0.4
−0.2
0.0
0.2
0.4
theoretical quantiles


Resids vs. linear pred.
residuals
0.5
0.0
−0.5
2.2
2.4
2.6
2.8
3.0
linear predictor


Histogram of residuals
Frequency
0
5
10
15
20
−1.0
−0.5
0.0
0.5
1.0
Residuals


Response vs. Fitted Values
Response
Fitted Values
2.2
2.4
2.6
2.8
3.0

```
Method: ML   Optimizer: outer newton
full convergence after 13 iterations.
Gradient range [−1.798824e−06,2.675128e−07]
(score 5.124387 & scale 0.05855605).
Hessian positive definite, eigenvalue range [1.645851e−06,18.22358].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k'  edf k−index p−value
s(bites_of_yesterday)         3.00 1.00    1.08    0.78
s(cumul_bites_7_previous_days) 3.00 1.00    1.52    0.98
s(ID)                         4.00 2.87      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)    2.333      0.195   11.97 5.59e-13 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                              edf Ref.df      F p-value
s(bites_of_yesterday)         1.00      1  0.055   0.817
s(cumul_bites_7_previous_days) 1.00      1  0.039   0.845
s(ID)                         2.87      3 27.776  <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.702   Deviance explained = 74.4%
-ML = 5.1244  Scale est. = 0.058556  n = 36
```

AICc [1] 11.5171

Bites in squirrel

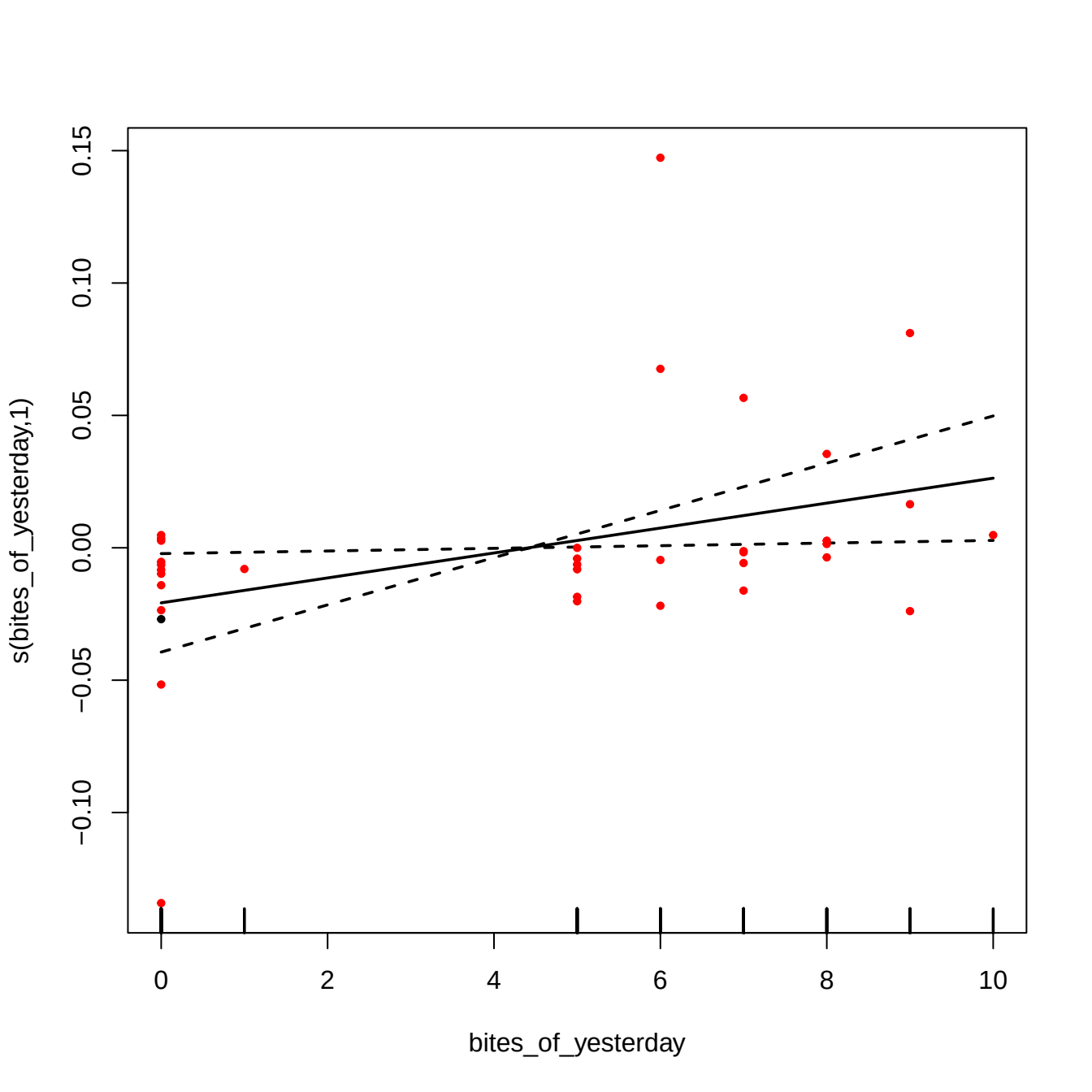
Nb obs: 20

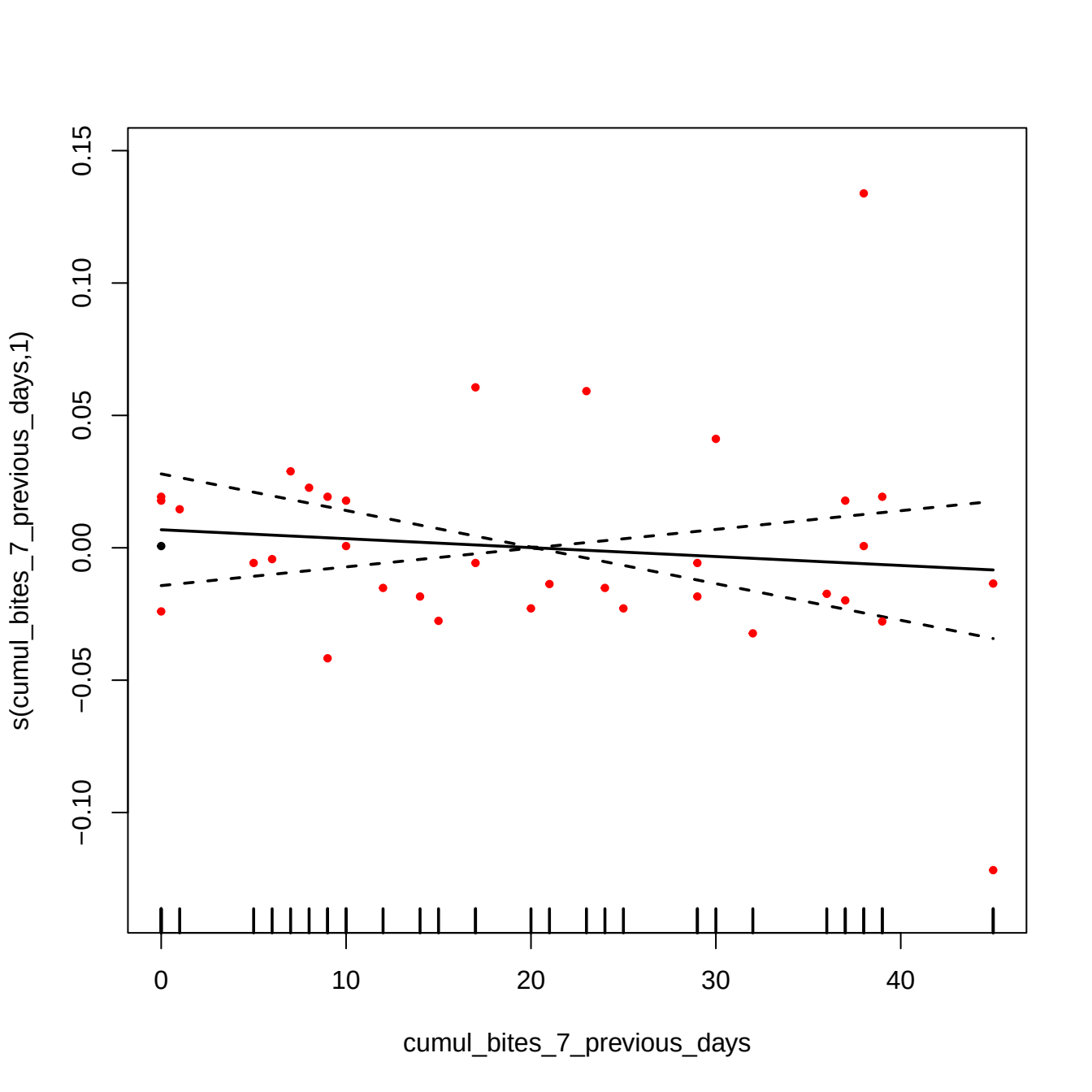
G.CSF ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

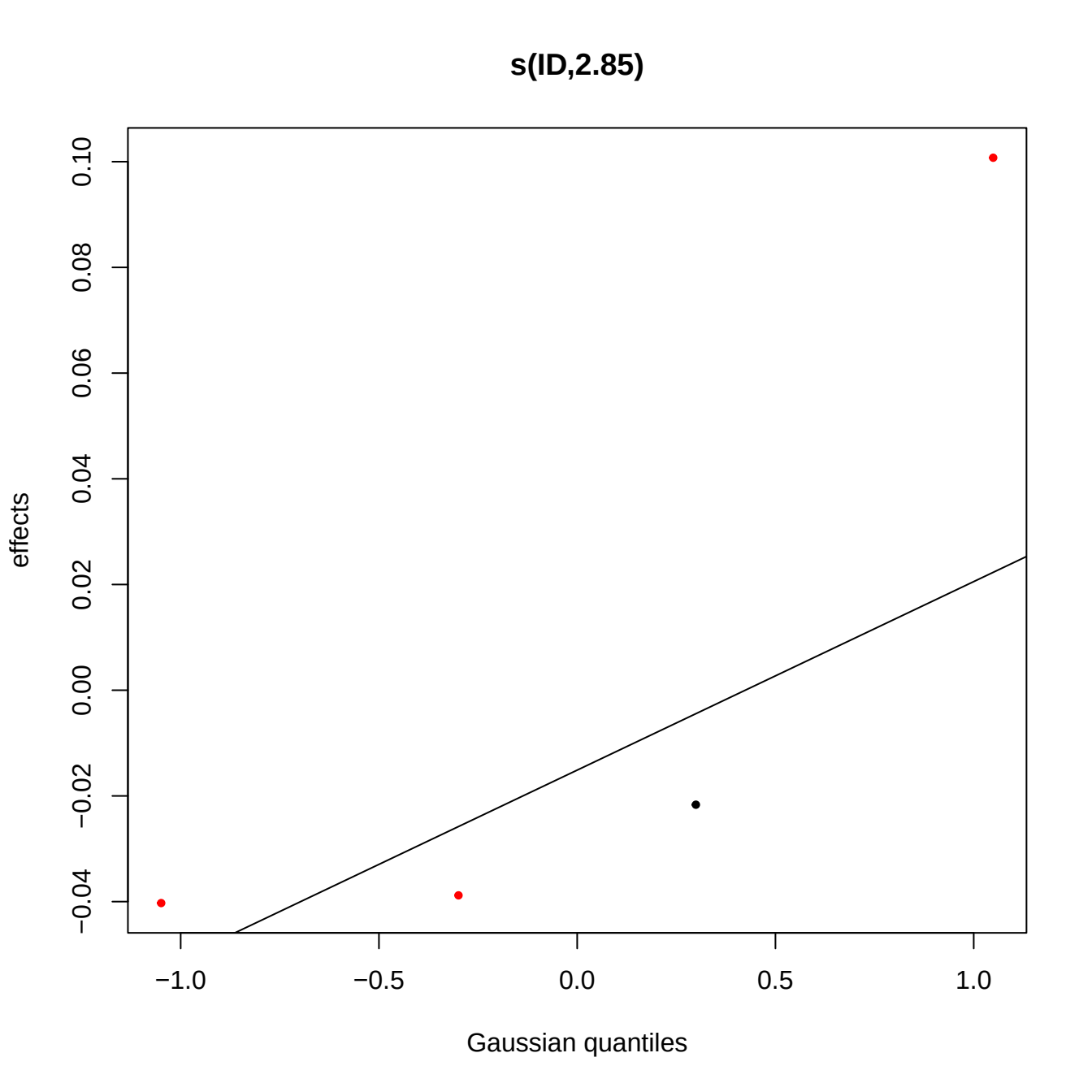
GM.CSF

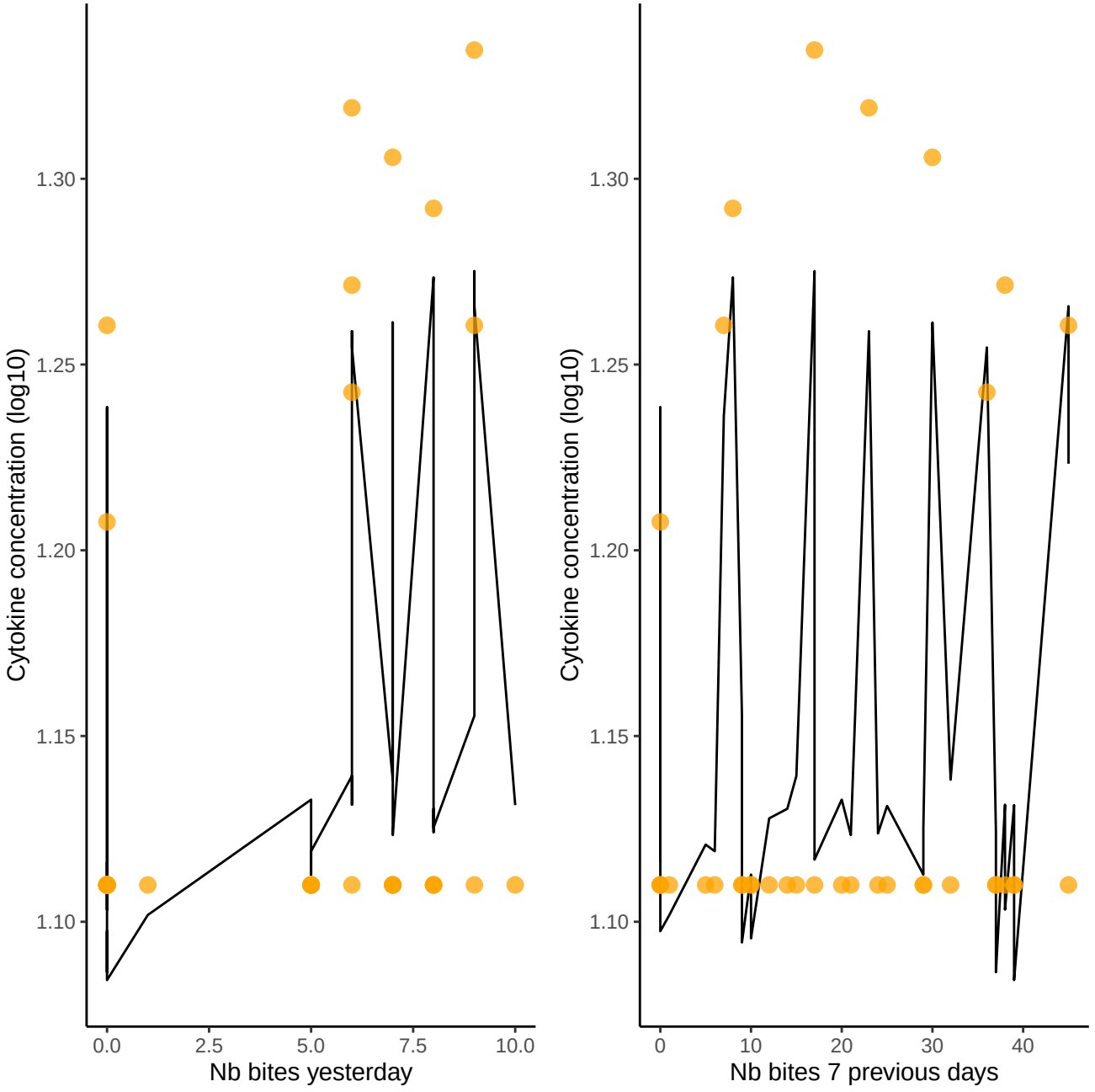
Bites in cyno

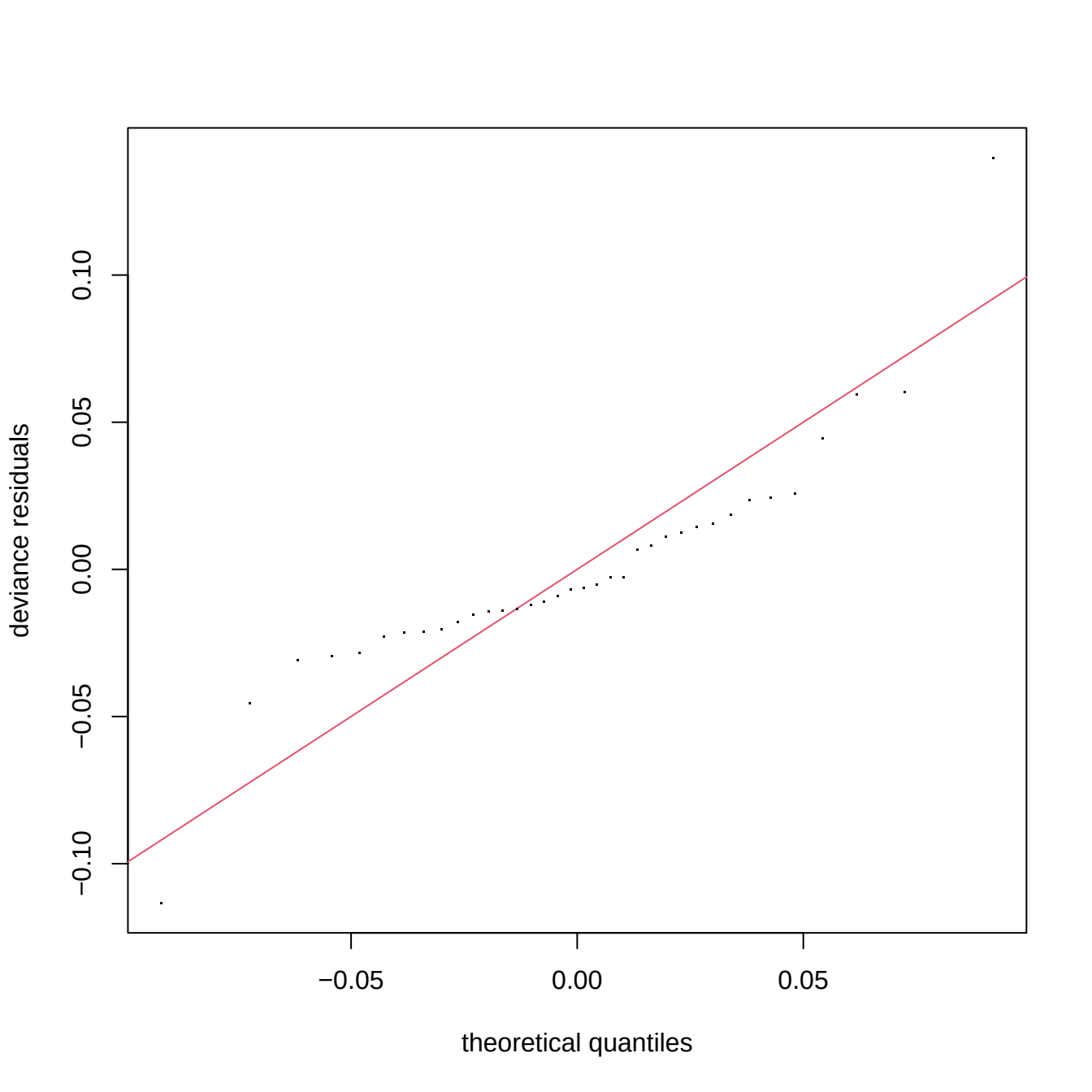
Nb obs: 36

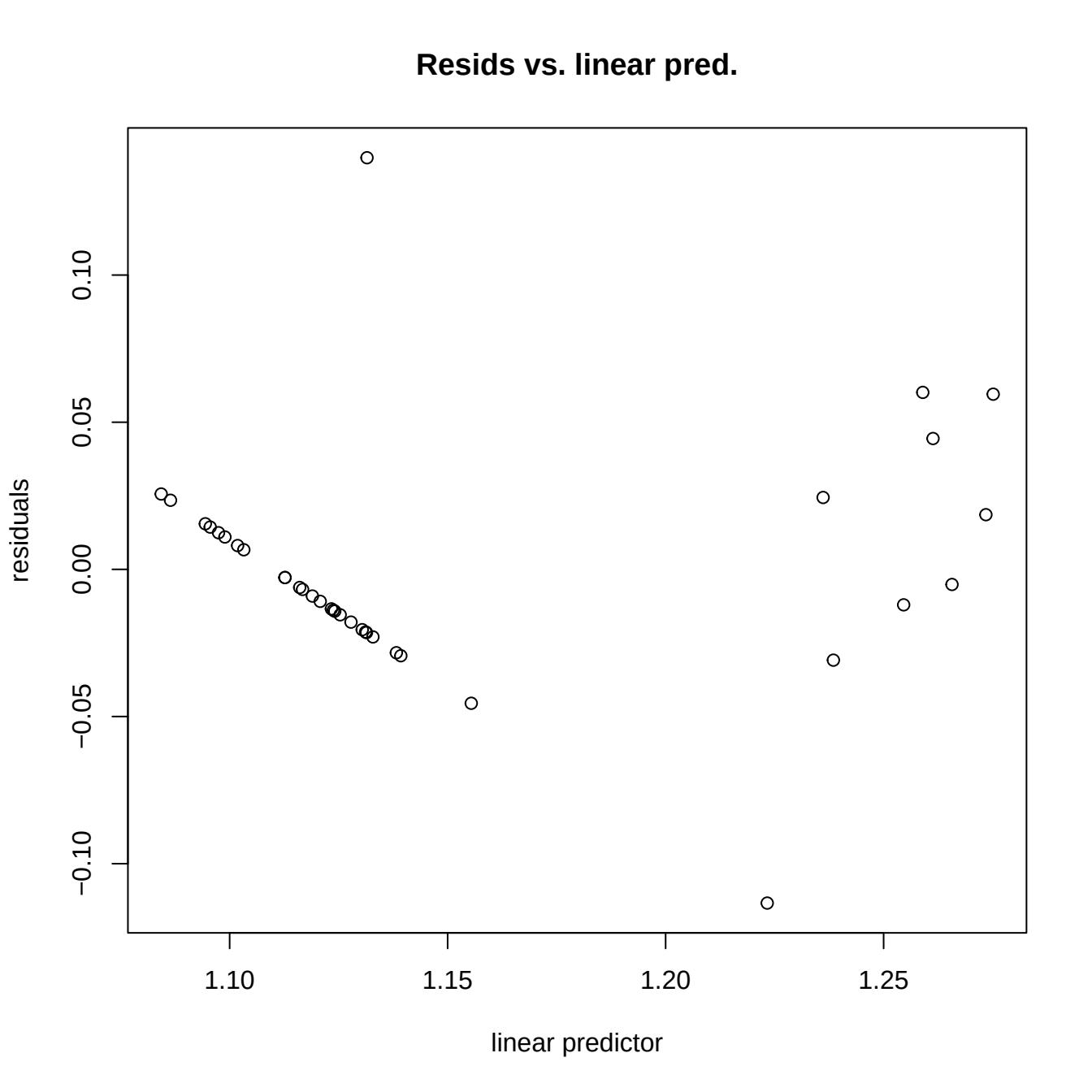

s(bites_of_yesterday,1)
0.15
0.10
0.05
0.00
−0.05
−0.10
0
2
4
6
8
10
bites_of_yesterday

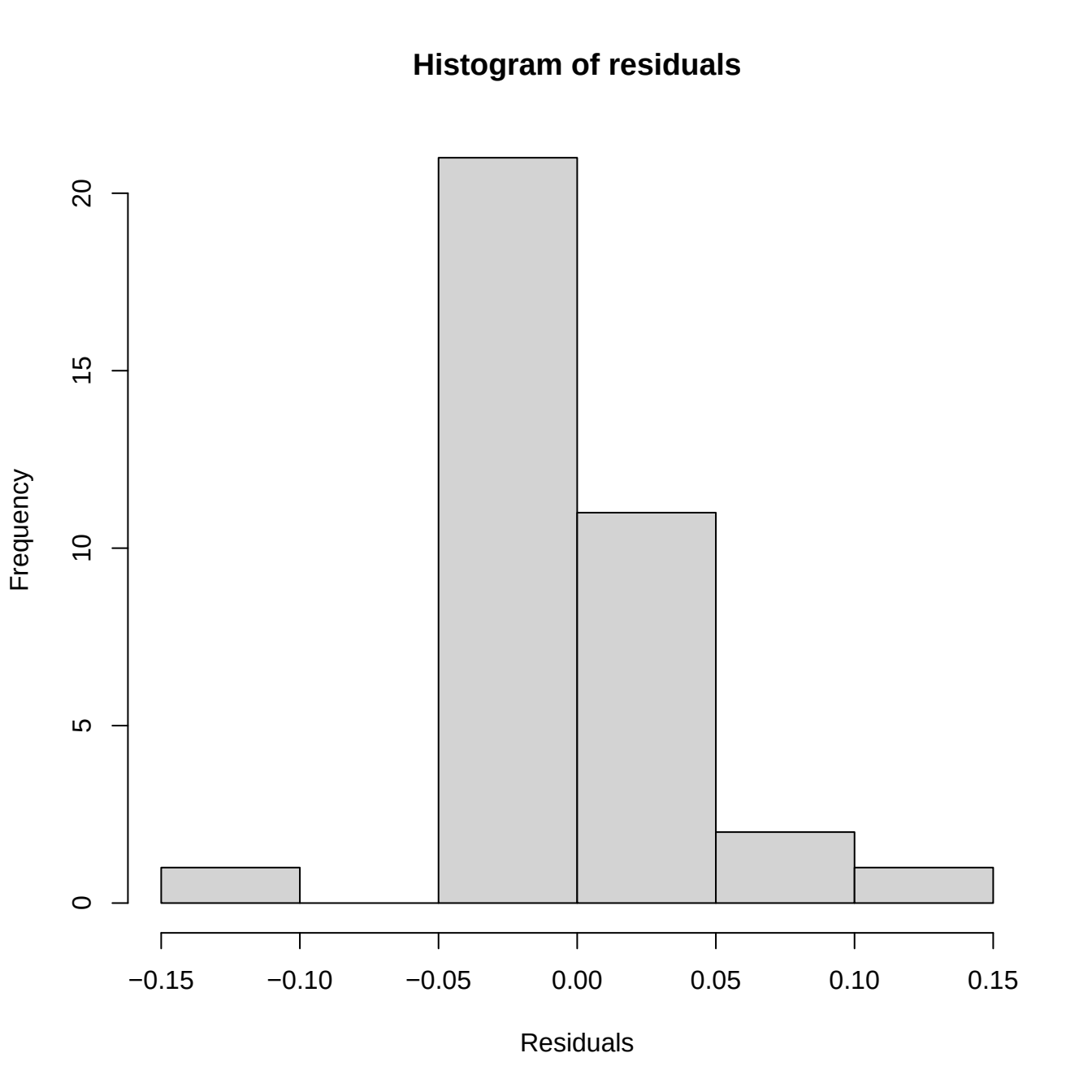

s(cumul_bites_7_previous_days,1)
0.15
0.10
0.05
0.00
−0.05
−0.10
0
10
20
30
40
cumul_bites_7_previous_days

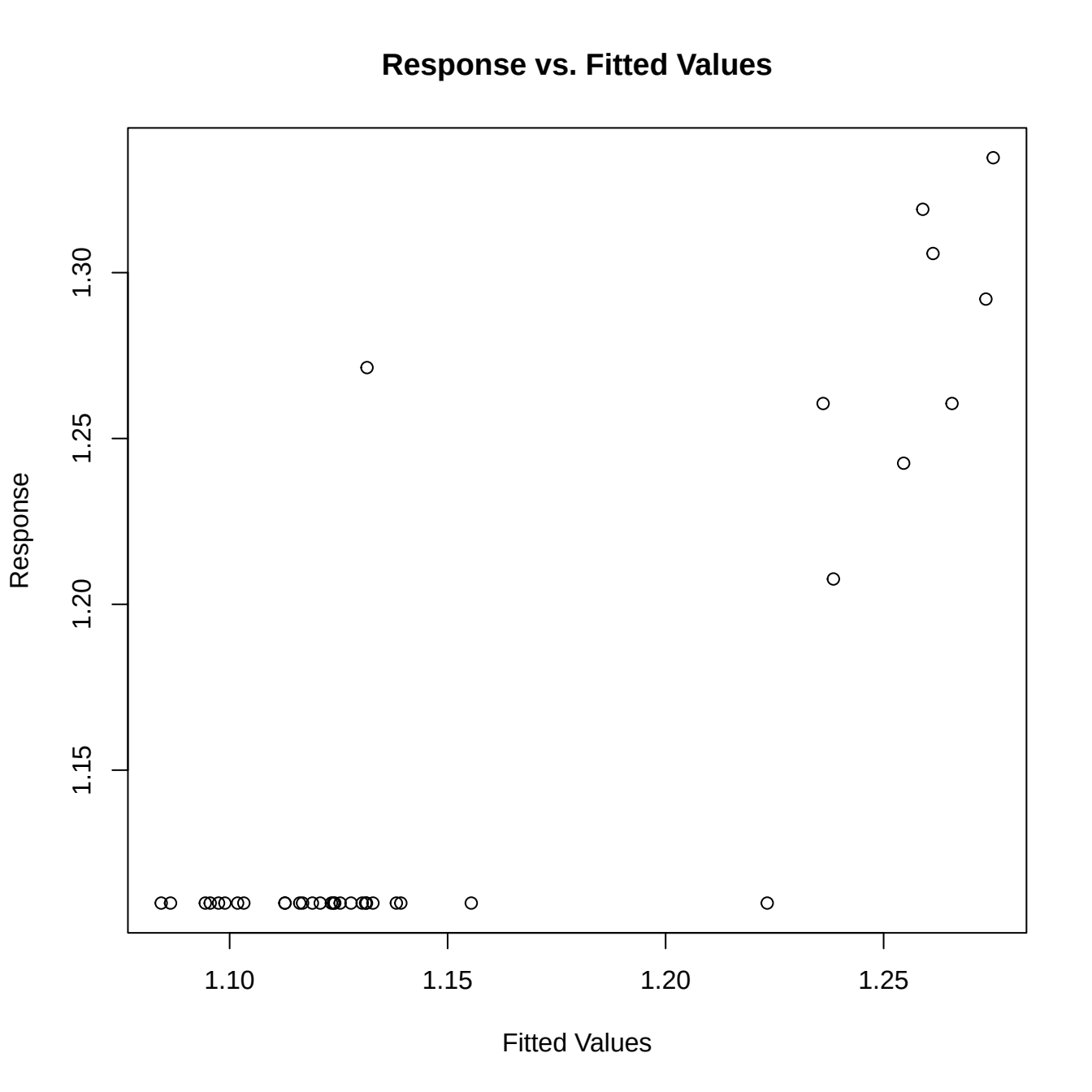

s(ID,2.85)
effects
0.10
0.08
0.06
0.04
0.02
0.00
−0.02
−0.04
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
1.30
1.25
1.20
1.15
1.10
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
1.30
1.25
1.20
1.15
1.10
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.10
0.05
0.00
−0.05
−0.10
−0.05
0.00
0.05
theoretical quantiles


Resids vs. linear pred.
residuals
0.10
0.05
0.00
−0.05
−0.10
1.10
1.15
1.20
1.25
linear predictor


Histogram of residuals
Frequency
0
5
10
15
20
−0.15
−0.10
−0.05
0.00
0.05
0.10
0.15
Residuals


Response vs. Fitted Values
Response
1.15
1.20
1.25
1.30
1.10
1.15
1.20
1.25
Fitted Values

```
Method: ML   Optimizer: outer newton
full convergence after 10 iterations.
Gradient range [−2.336543e−05,3.563104e−06]
(score −58.31492 & scale 0.001747782).
Hessian positive definite, eigenvalue range [1.338984e−05,18.2209].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k'  edf k−index p−value
s(bites_of_yesterday)         3.00 1.00    1.07    0.60
s(cumul_bites_7_previous_days) 3.00 1.00    0.93    0.27
s(ID)                         4.00 2.85      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.15172    0.03182    36.2   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F p-value
s(bites_of_yesterday)         1.000      1  5.005  0.0329 *
s(cumul_bites_7_previous_days) 1.000      1  0.417  0.5233
s(ID)                         2.855      3 24.245  <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.696   Deviance explained = 73.8%
-ML = -58.315  Scale est. = 0.0017478  n = 36
```

AICc [1] −114.8871

Bites in squirrel

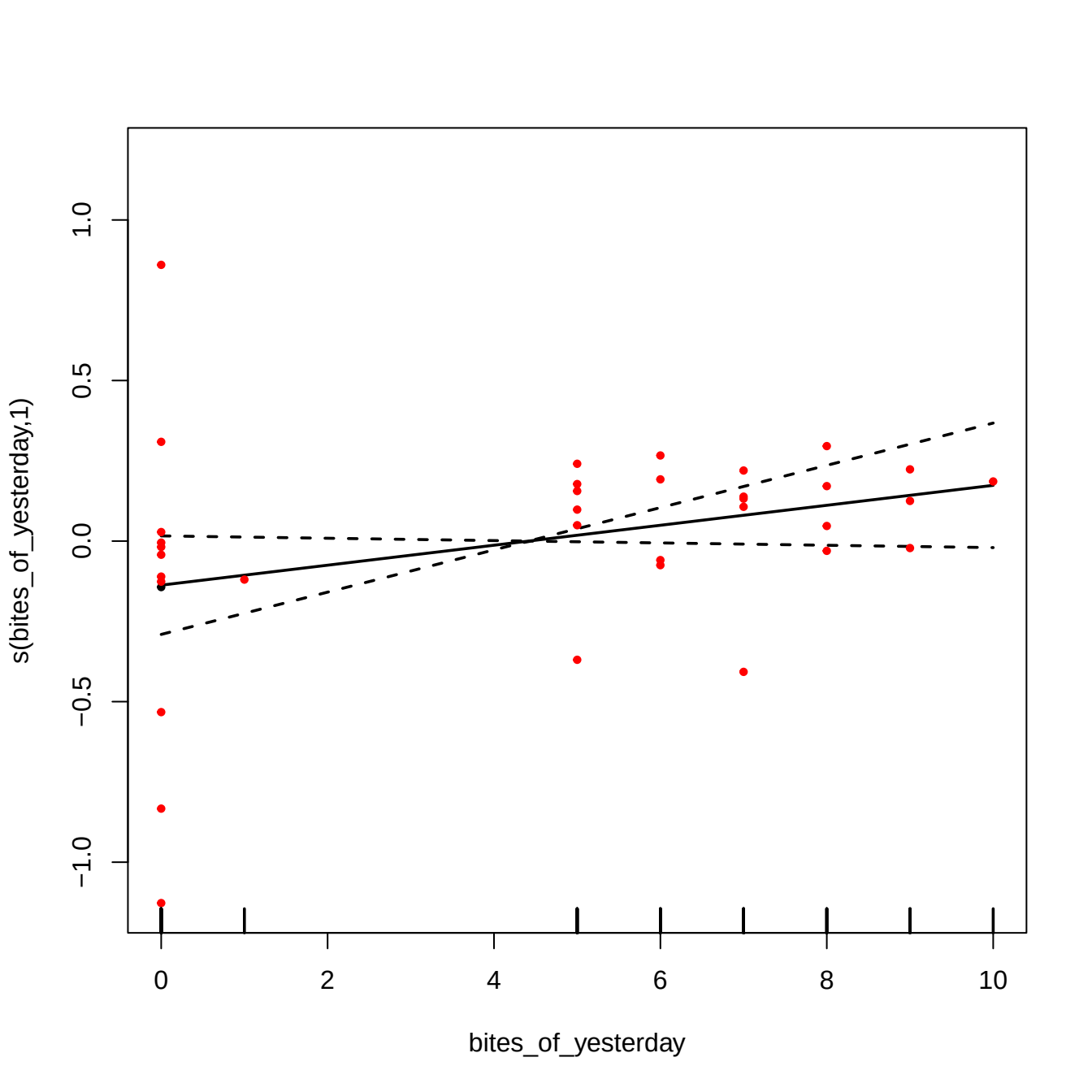
Nb obs: 20

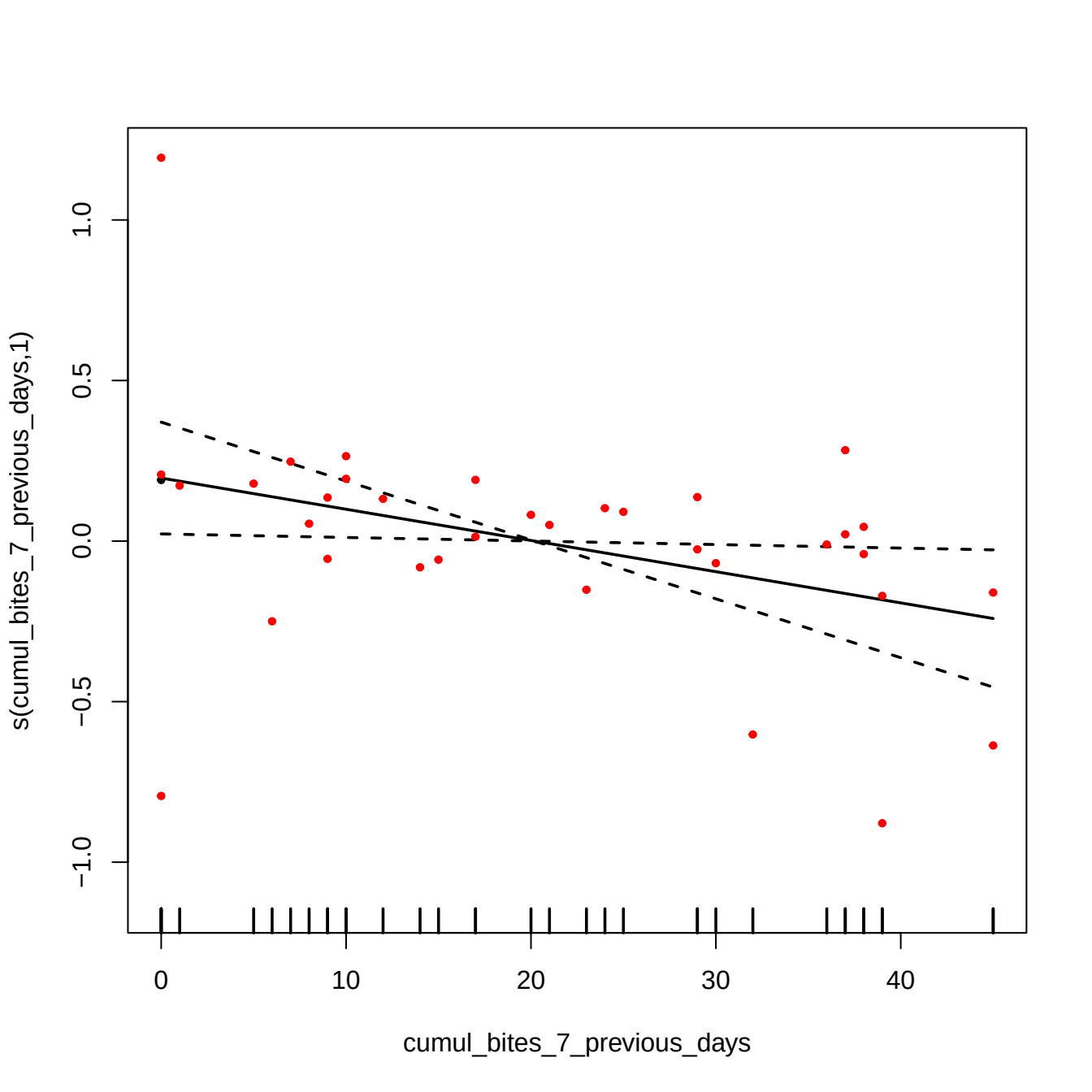
GM.CSF ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

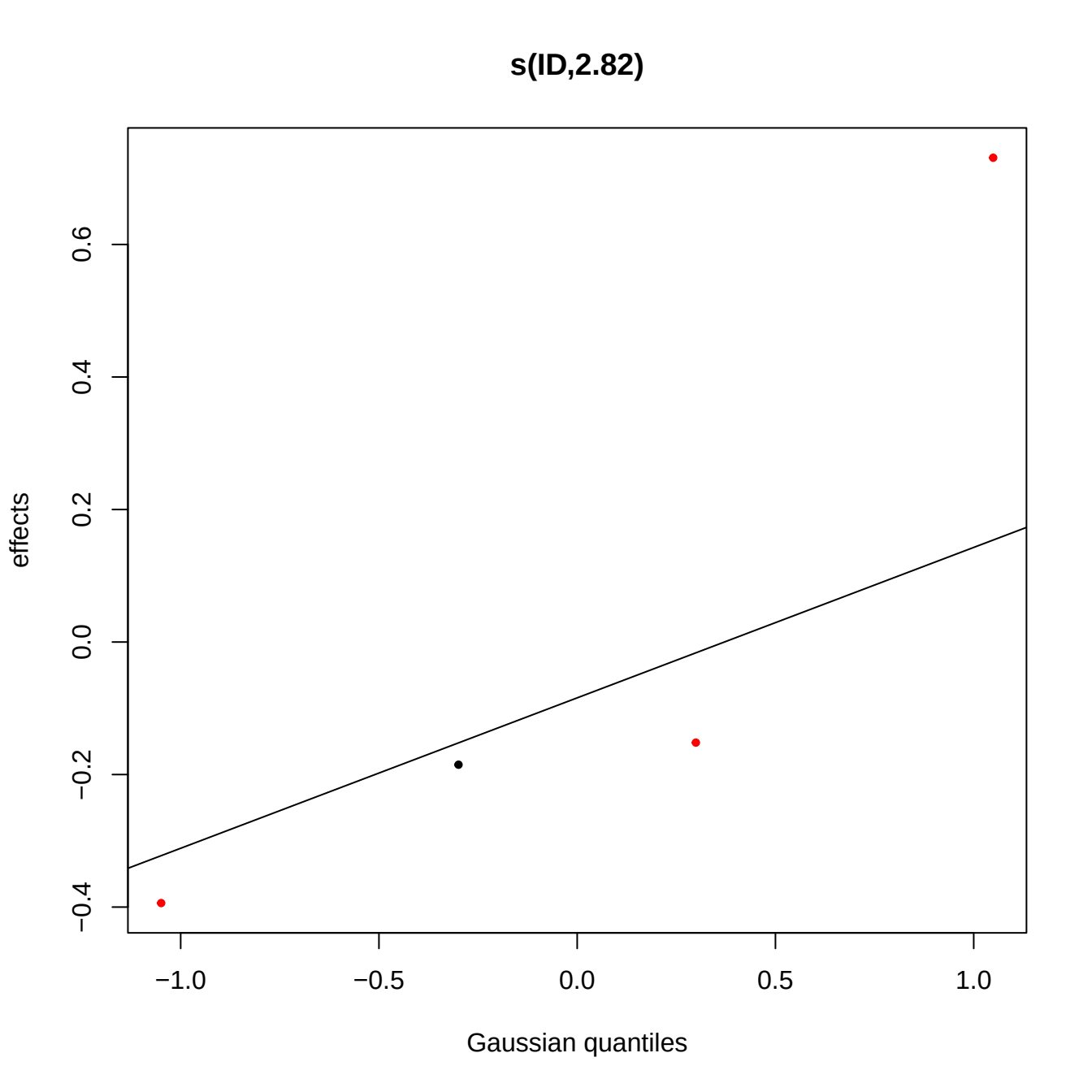
HGF

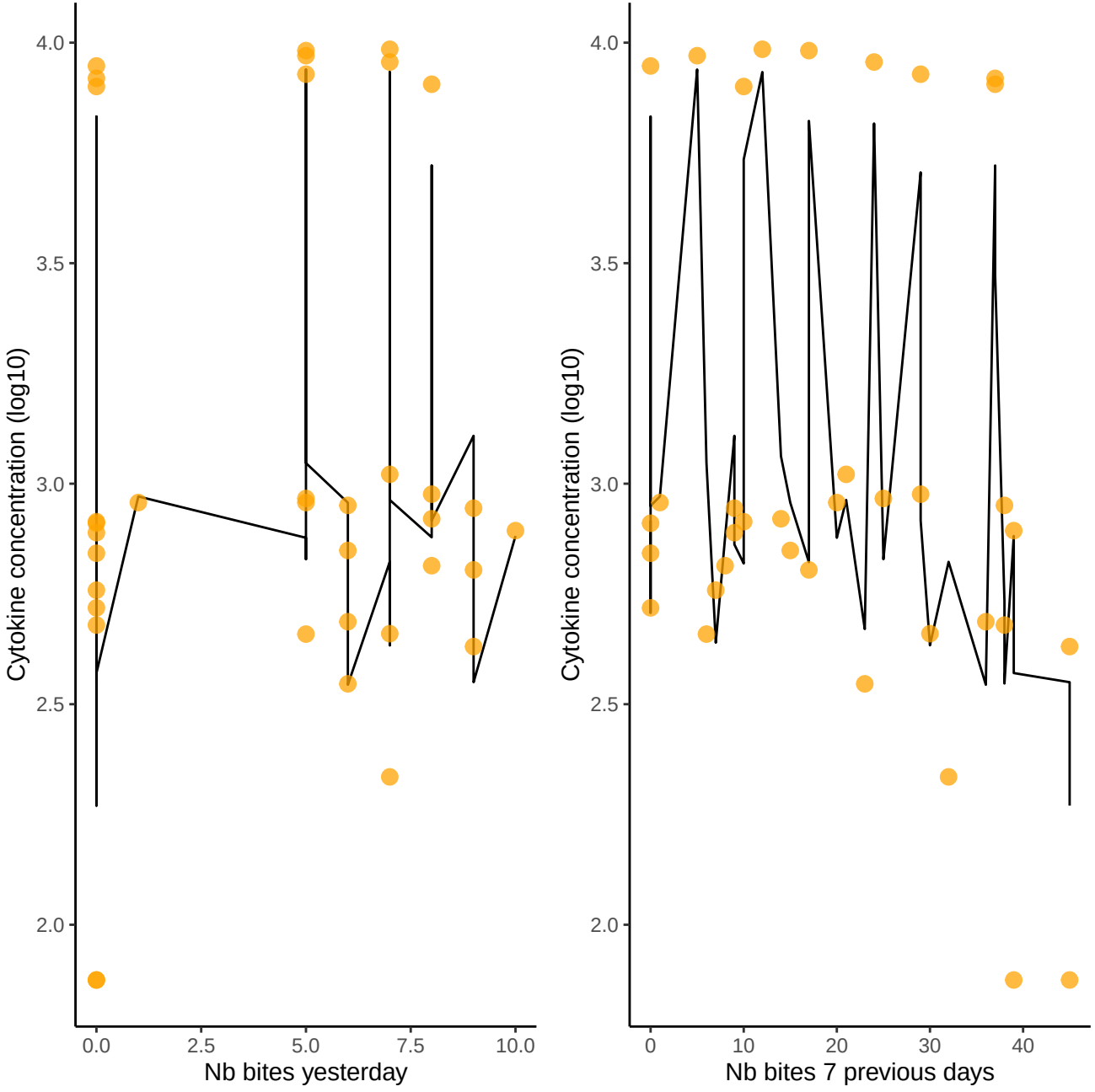
Bites in cyno

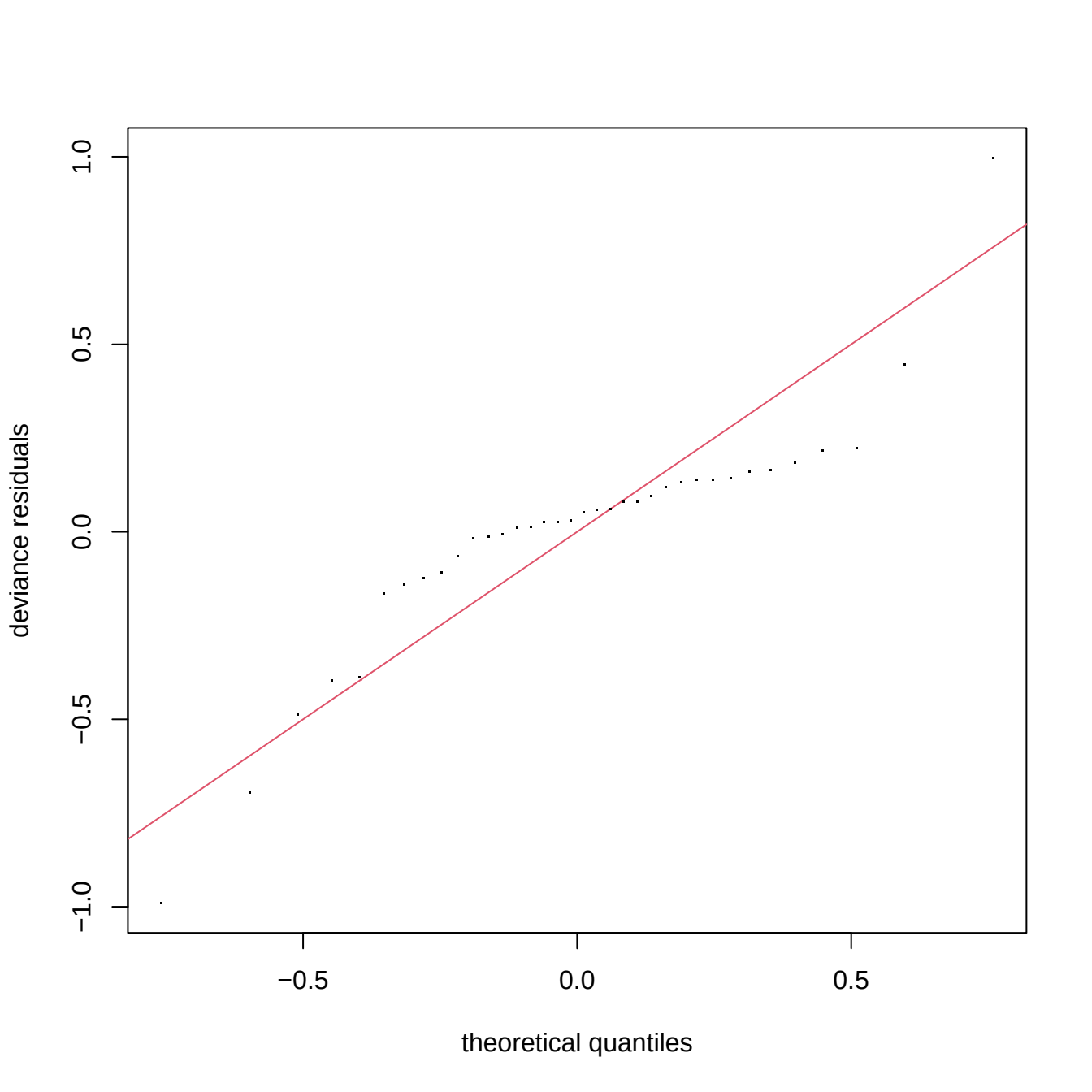
Nb obs: 36

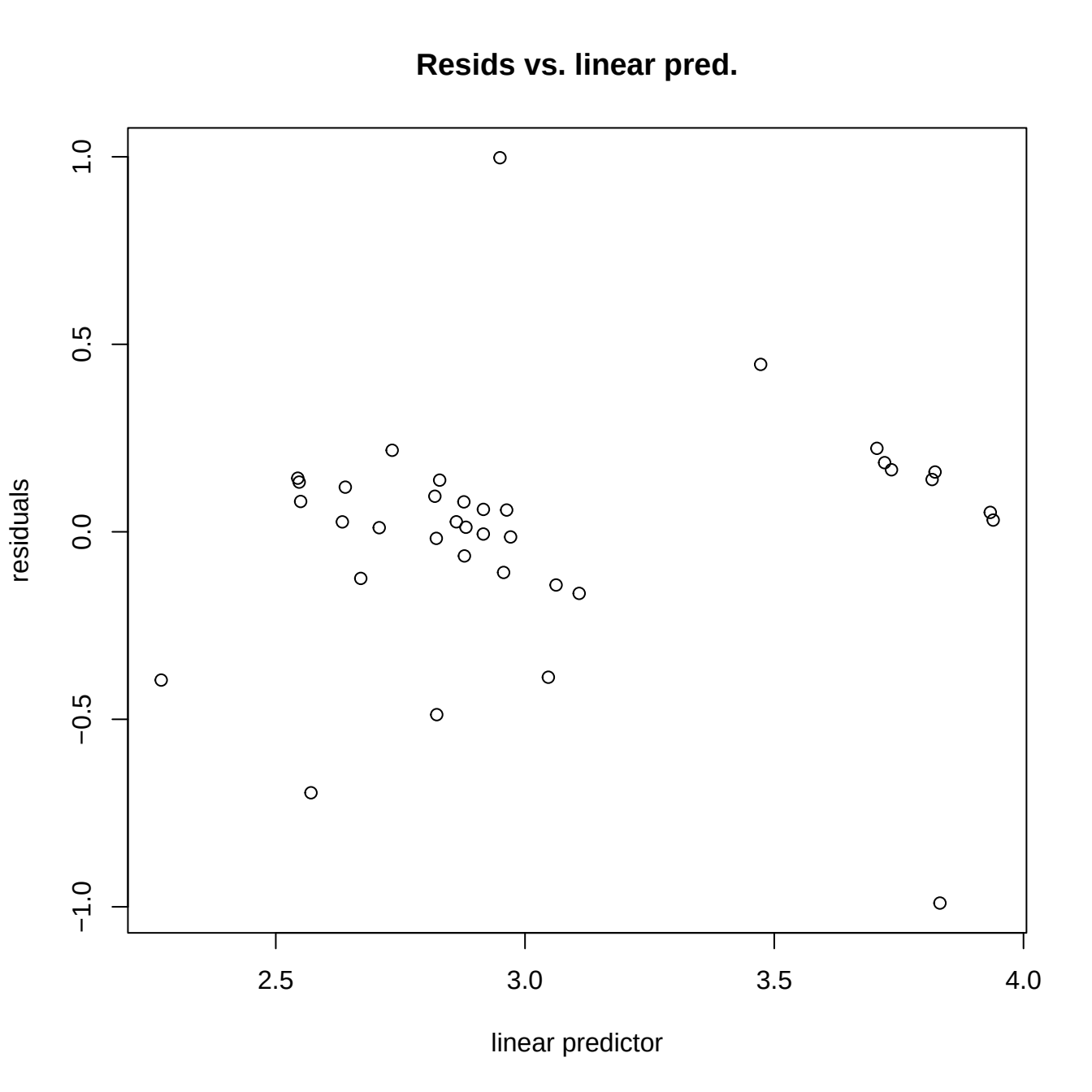

s(bites_of_yesterday,1)
1.0
0.5
0.0
−0.5
−1.0
0
2
4
6
8
10
bites_of_yesterday

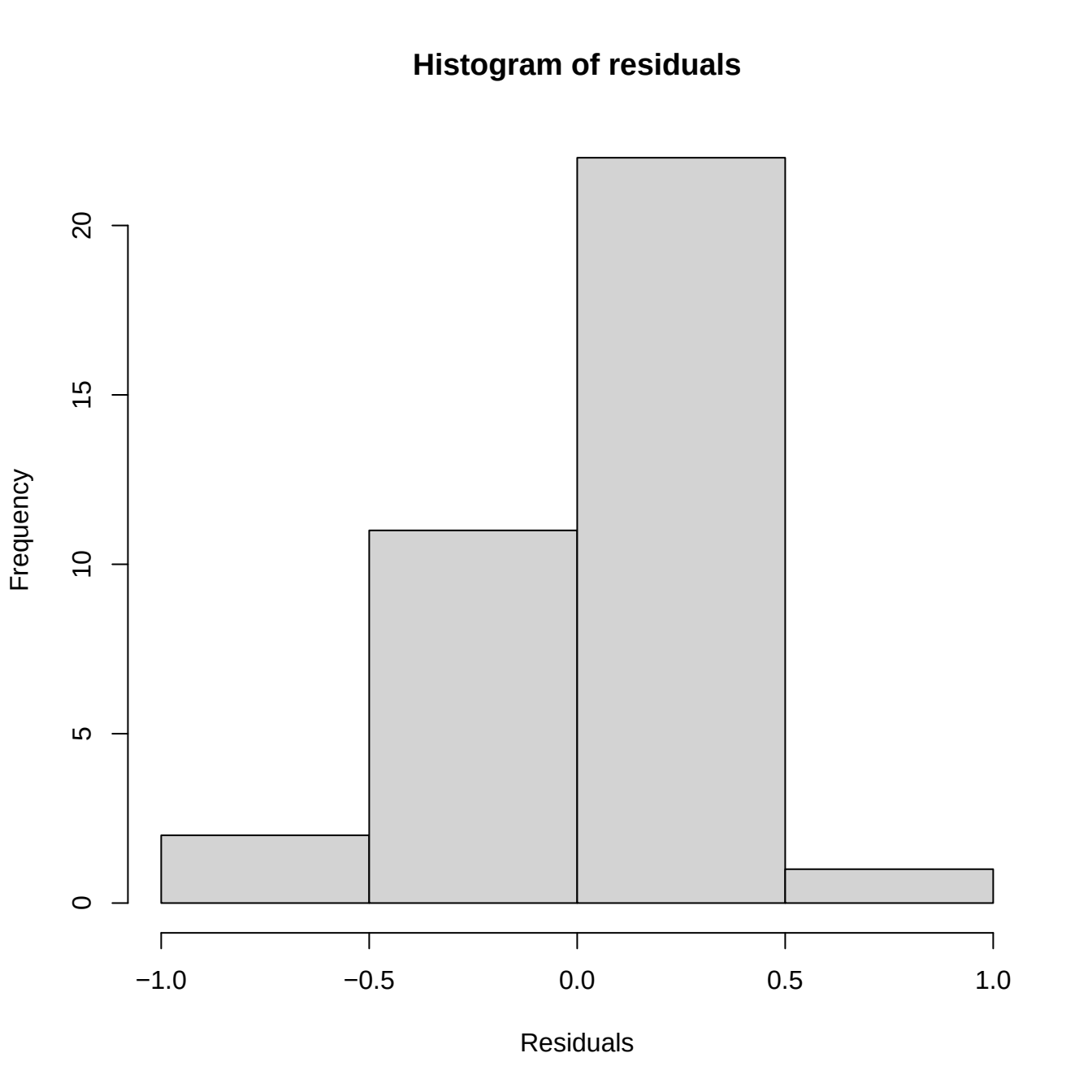

s(cumul_bites_7_previous_days,1)
1.0
0.5
0.0
−0.5
−1.0
0
10
20
30
40
cumul_bites_7_previous_days

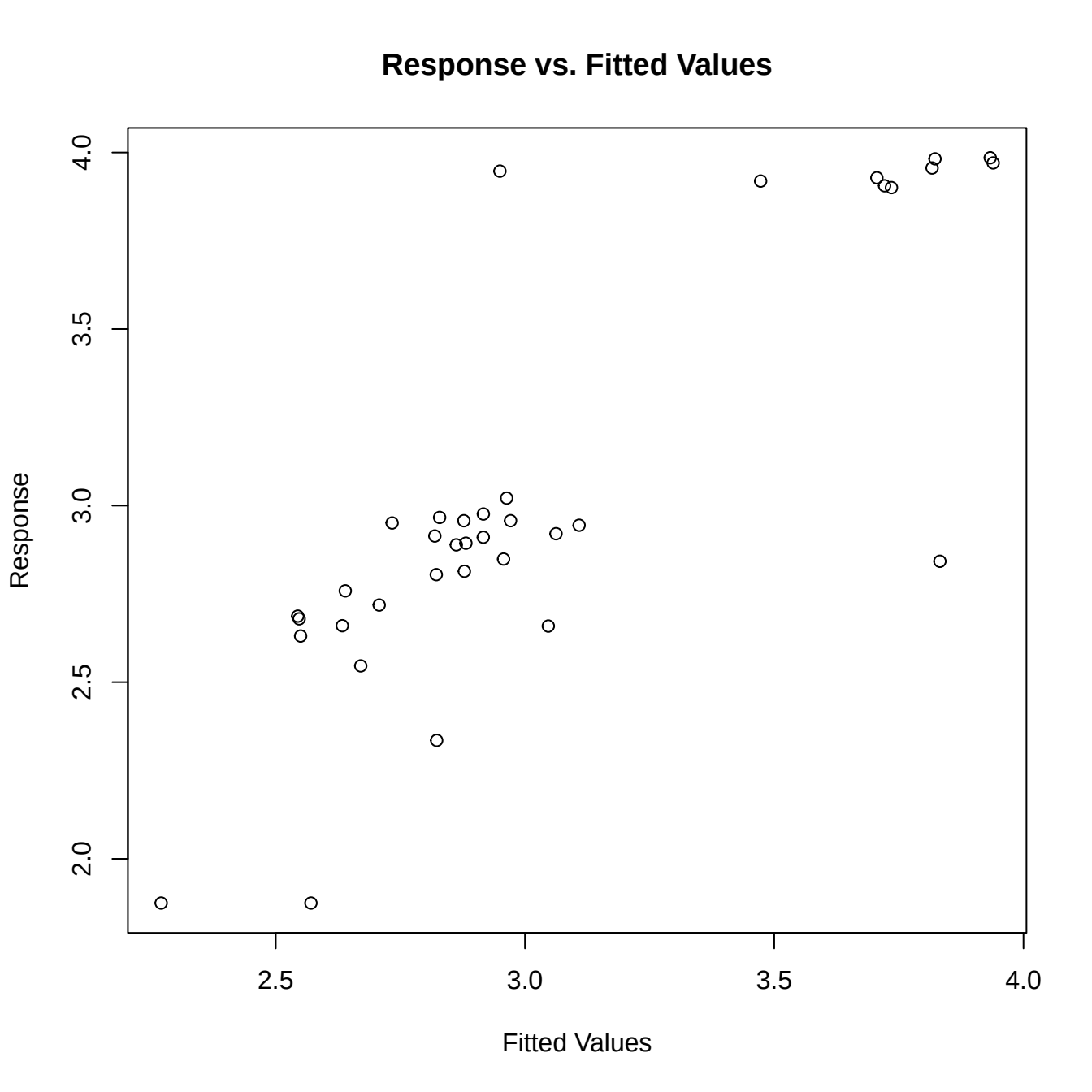

s(ID,2.82)
effects
0.6
0.4
0.2
0.0
−0.2
−0.4
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
4.0
3.5
3.0
2.5
2.0
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
4.0
3.5
3.0
2.5
2.0
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
1.0
0.5
0.0
−0.5
−1.0
−0.5
0.0
0.5
theoretical quantiles


Resids vs. linear pred.
residuals
1.0
0.5
0.0
−0.5
−1.0
2.5
3.0
3.5
4.0
linear predictor


Histogram of residuals
Frequency
0
5
10
15
20
−1.0
−0.5
0.0
0.5
1.0
Residuals


Response vs. Fitted Values
Response
Fitted Values
2.0
2.5
3.0
3.5
4.0
2.5
3.0
3.5
4.0

```
Method: ML   Optimizer: outer newton
full convergence after 13 iterations.
Gradient range [−3.127138e−06,2.829025e−07]
(score 17.24499 & scale 0.1189739).
Hessian positive definite, eigenvalue range [2.205709e−06,18.2155].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k'  edf k−index p−value
s(bites_of_yesterday)         3.00 1.00    0.87    0.15
s(cumul_bites_7_previous_days) 3.00 1.00    1.27    0.94
s(ID)                         4.00 2.82      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   3.0425     0.2372   12.83 9.46e-14 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F  p-value
s(bites_of_yesterday)         1.000      1  3.204   0.0836 .
s(cumul_bites_7_previous_days) 1.000      1  5.087   0.0316 *
s(ID)                         2.822      3 19.855 4.04e-07 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.654   Deviance explained = 70.1%
-ML = 17.245  Scale est. = 0.11897   n = 36
```

AICc [1] 37.06418

Bites in squirrel

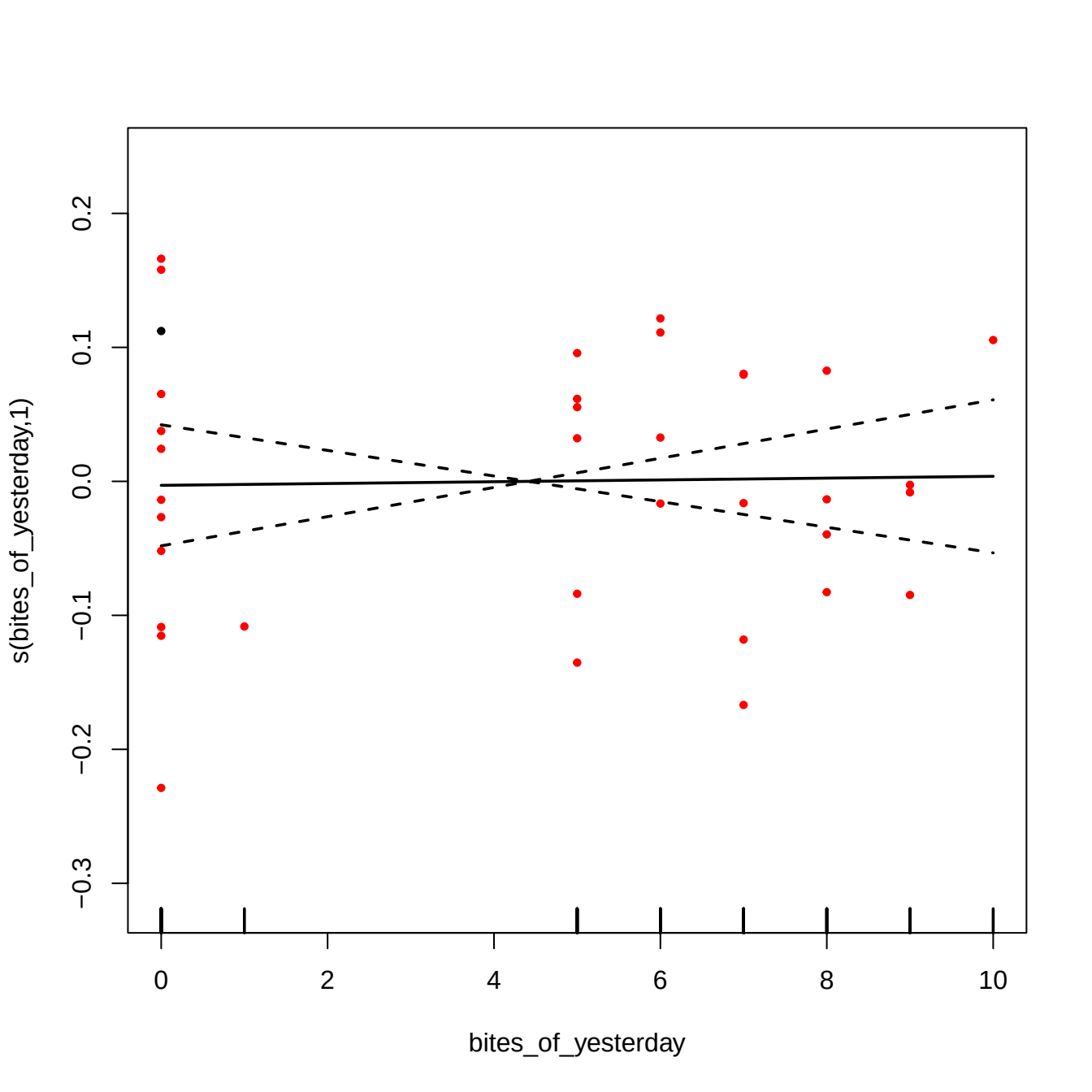
Nb obs: 20

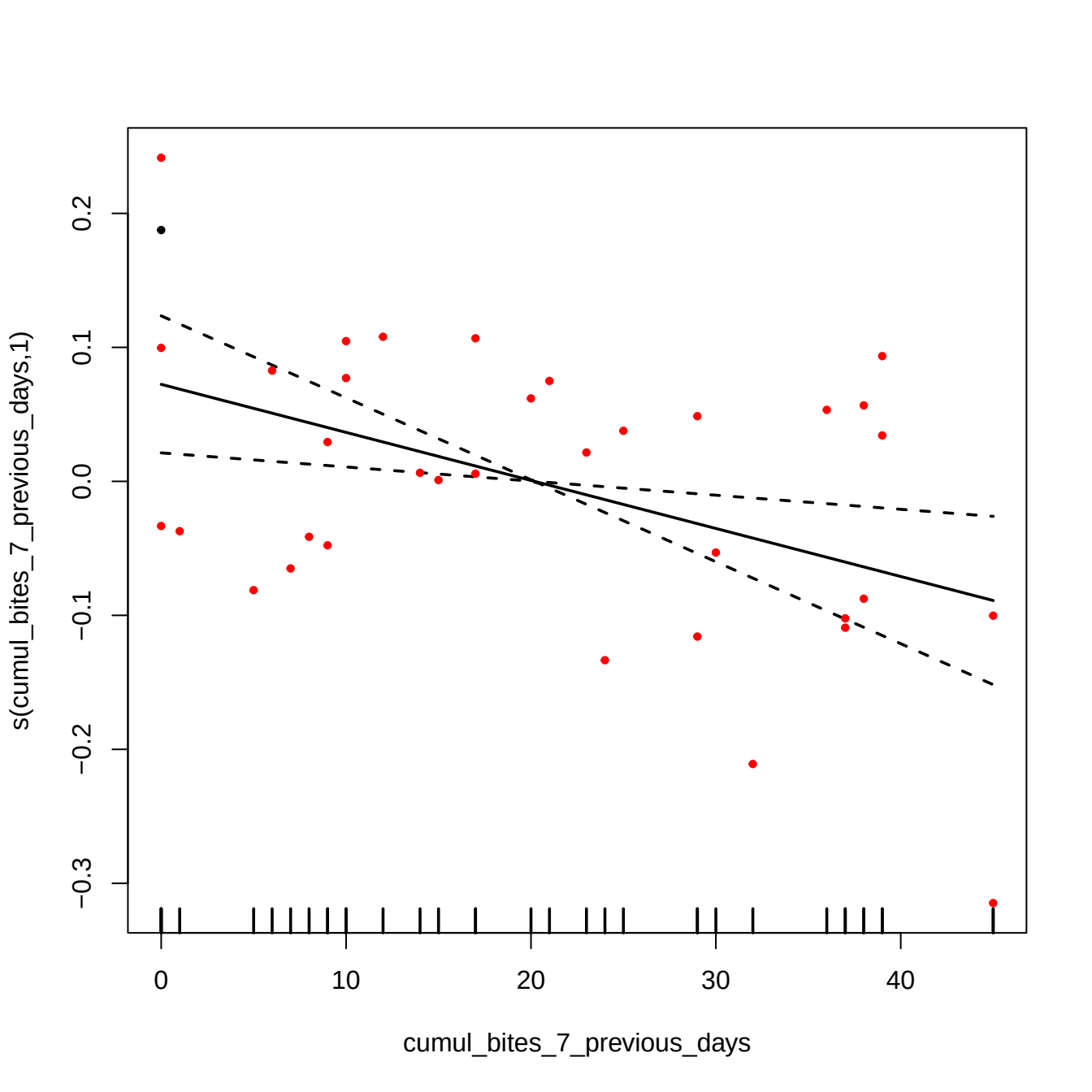
HGF ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

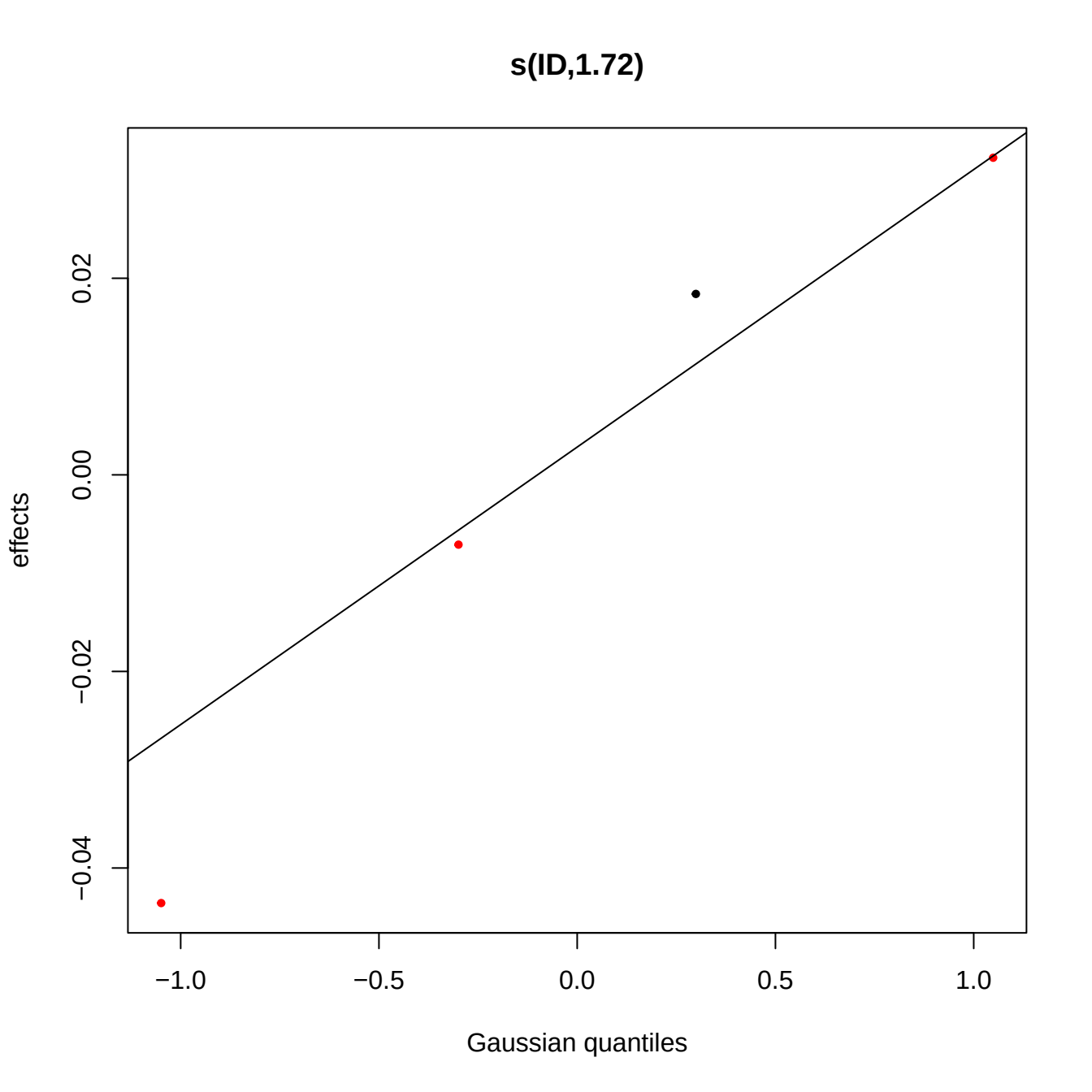
I.TAC

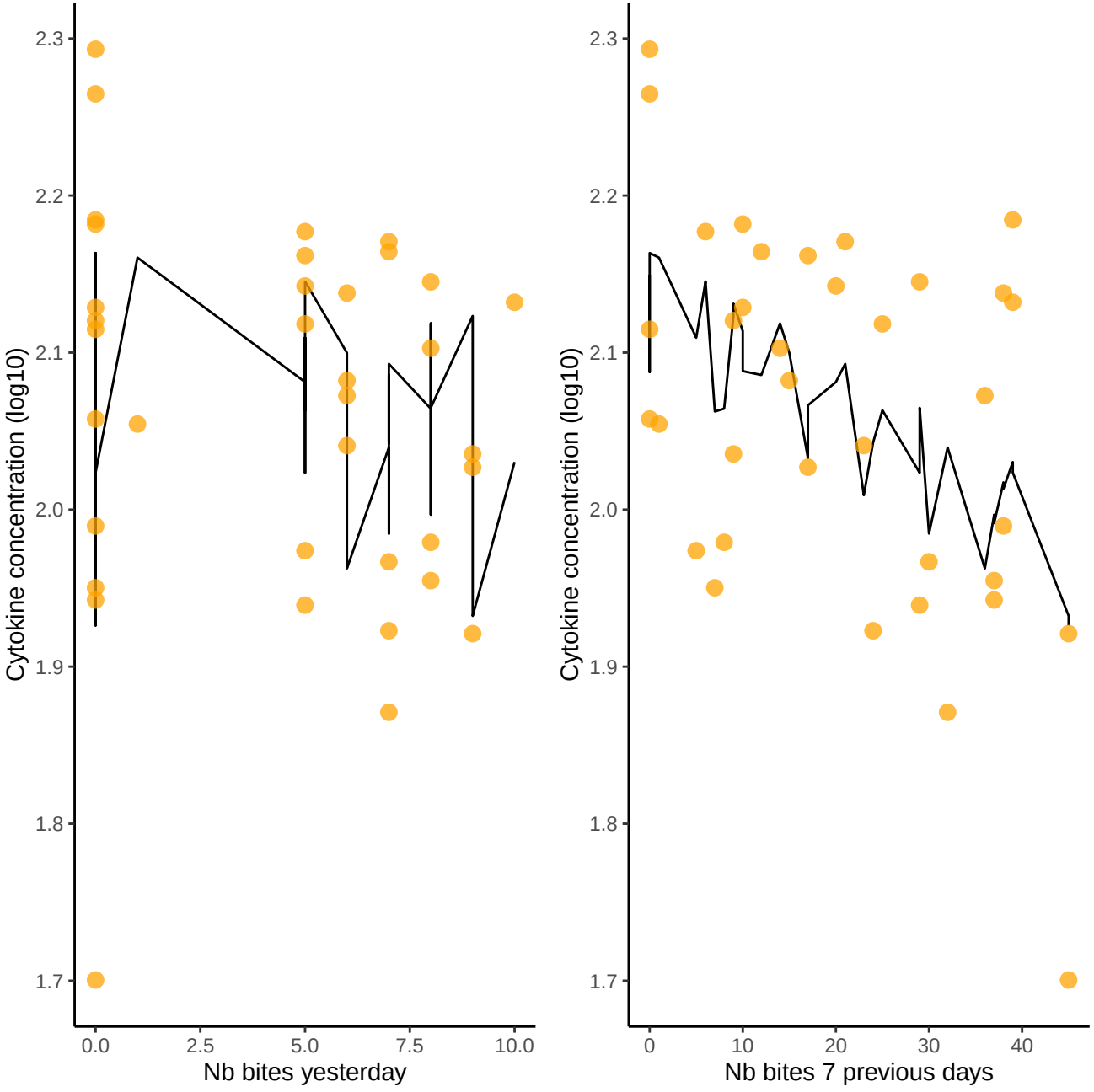
Bites in cyno

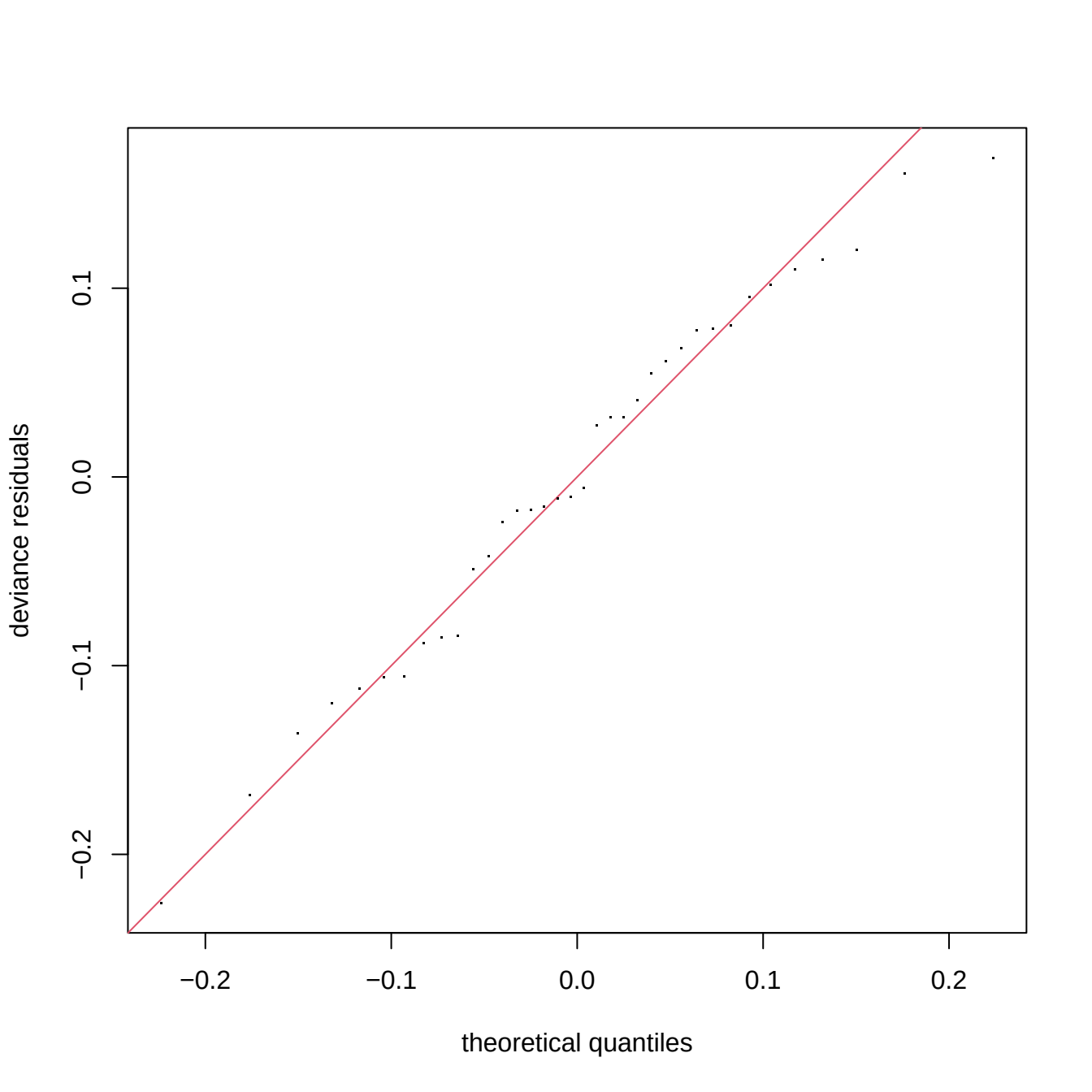
Nb obs: 36

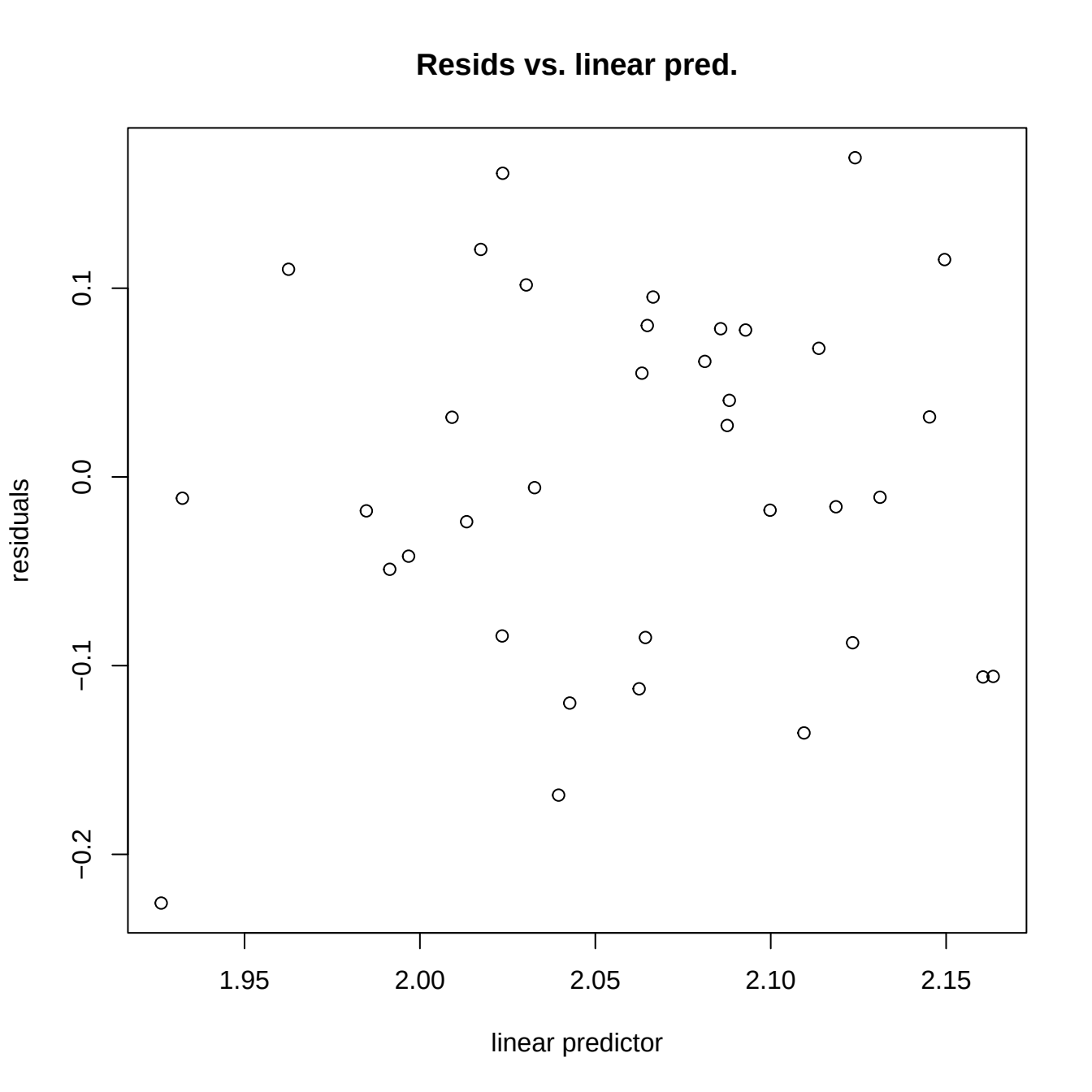

s(bites_of_yesterday,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
2
4
6
8
10
bites_of_yesterday

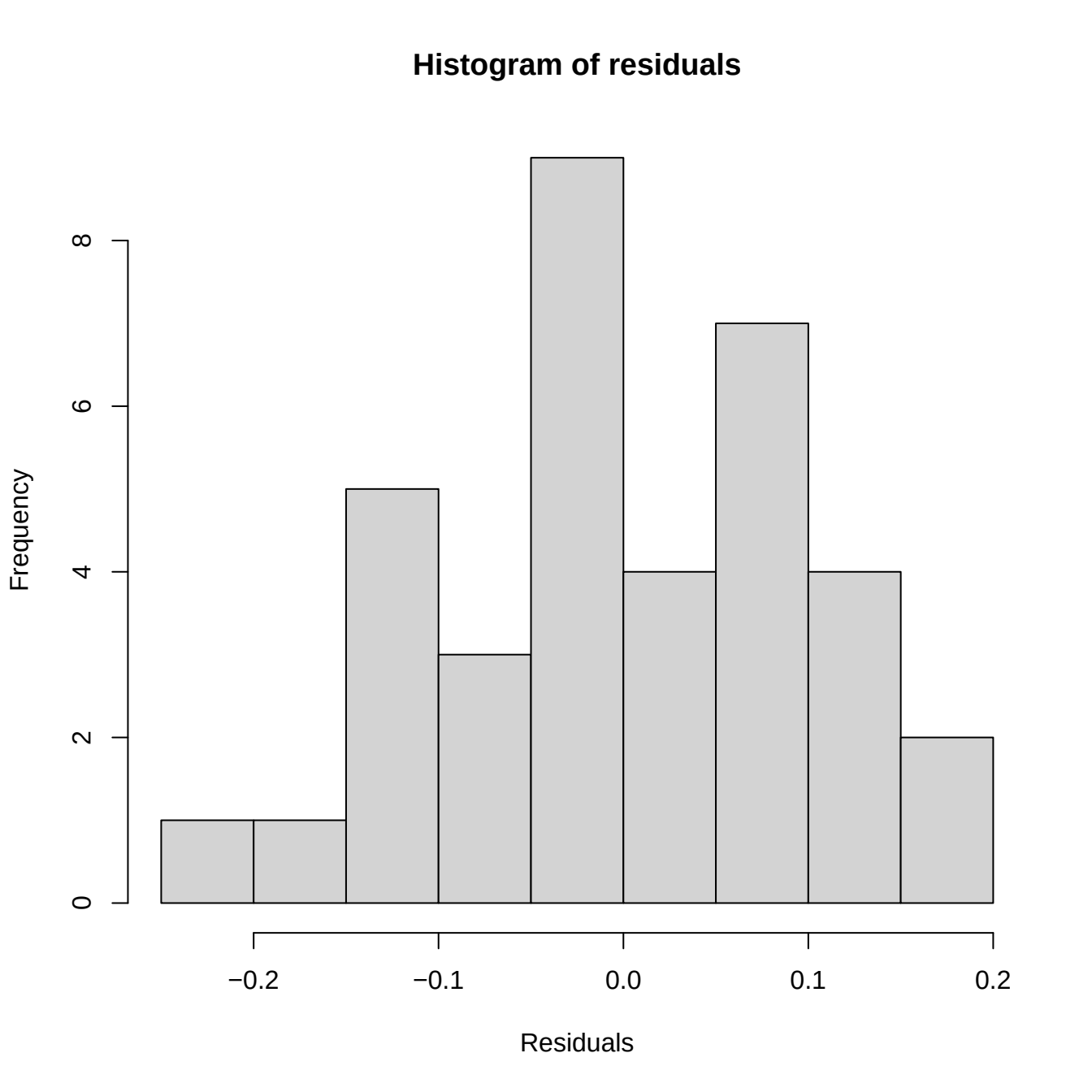

s(cumul_bites_7_previous_days,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
10
20
30
40
cumul_bites_7_previous_days

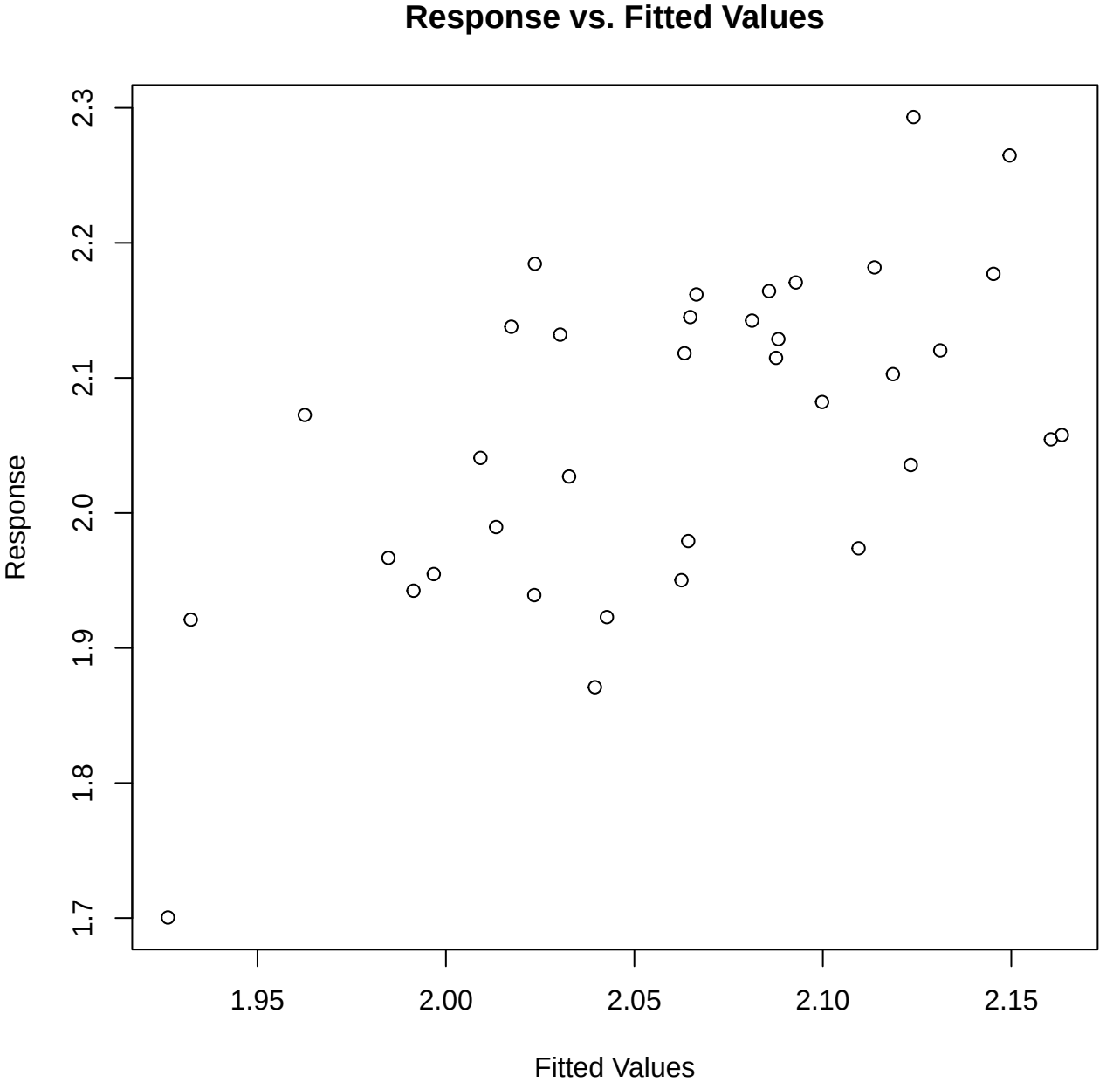

s(ID,1.72)
effects
0.02
0.00
−0.02
−0.04
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.3
2.2
2.1
2.0
1.9
1.8
1.7
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
2.3
2.2
2.1
2.0
1.9
1.8
1.7
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.1
0.0
−0.1
−0.2
−0.2
−0.1
0.0
0.1
0.2
theoretical quantiles


Resids vs. linear pred.
residuals
0.1
0.0
−0.1
−0.2
1.95
2.00
2.05
2.10
2.15
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
−0.2
−0.1
0.0
0.1
0.2
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.7
1.8
1.9
2.0
2.1
2.2
2.3
1.95
2.00
2.05
2.10
2.15

```
Method: ML   Optimizer: outer newton
full convergence after 11 iterations.
Gradient range [−9.919645e−06,5.394079e−07]
(score −30.83559 & scale 0.01034001).
Hessian positive definite, eigenvalue range [4.613939e−06,18.07603].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k'  edf k−index p−value
s(bites_of_yesterday)         3.00 1.00    1.29    0.93
s(cumul_bites_7_previous_days) 3.00 1.00    0.90    0.24
s(ID)                         4.00 1.72      NA      NA
```

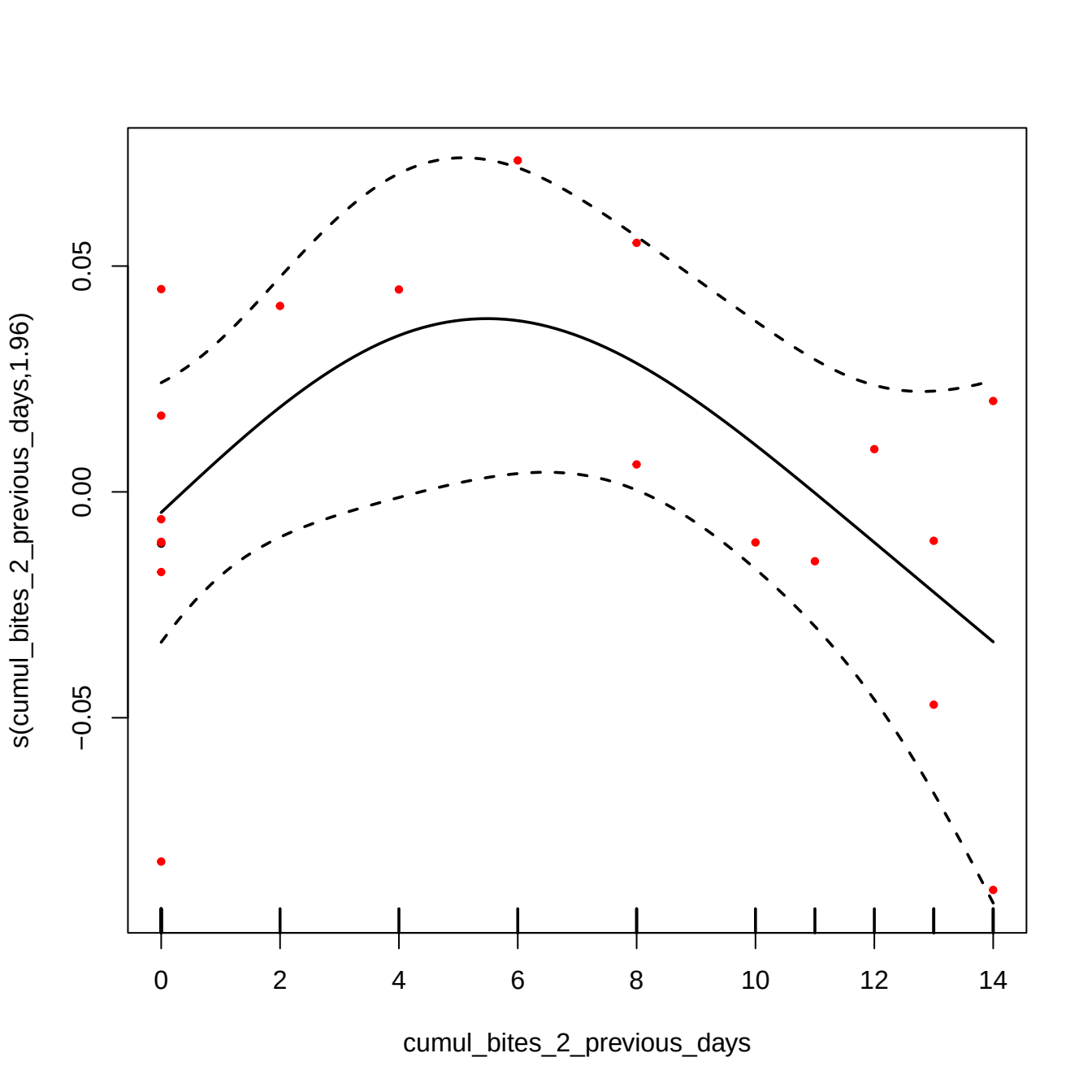
```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

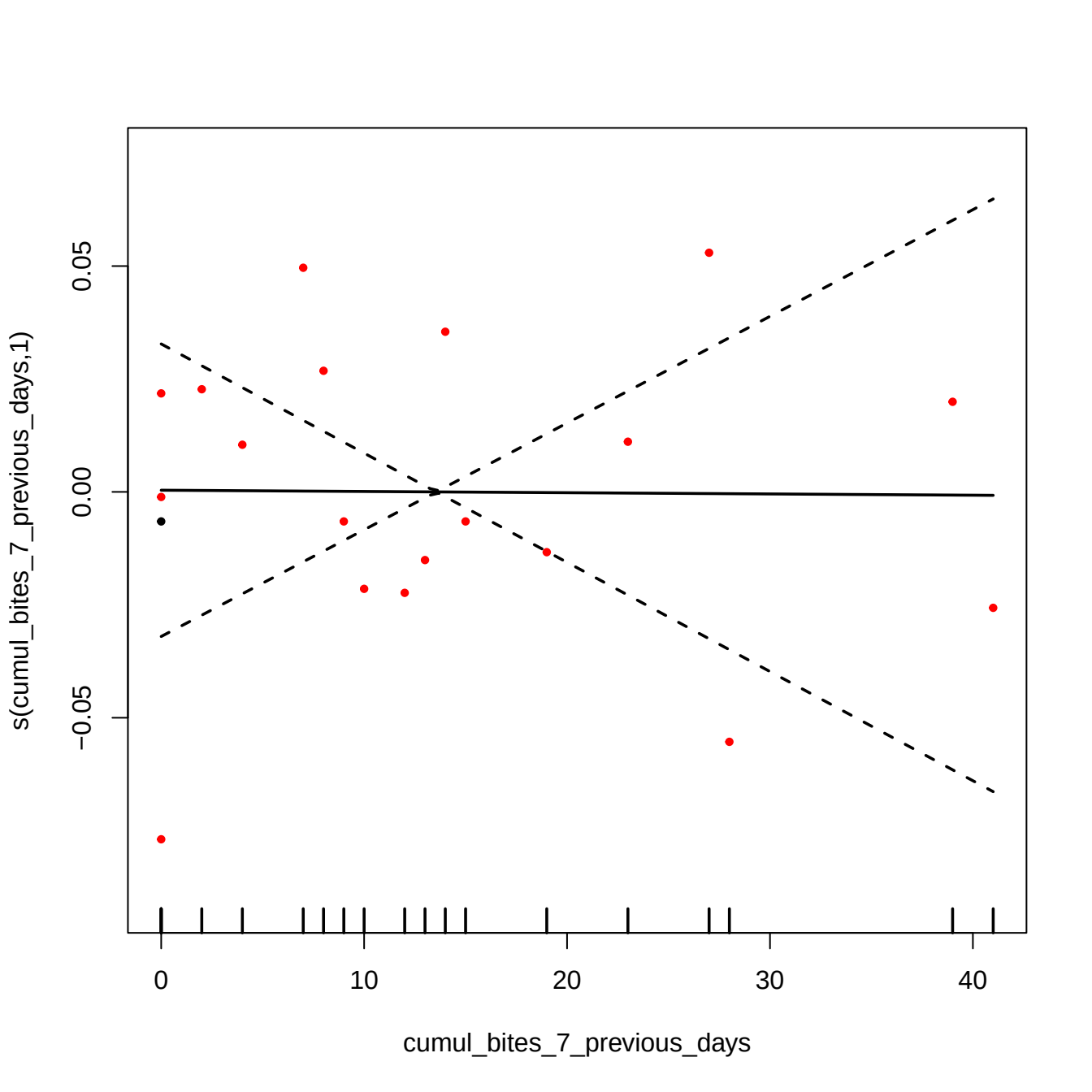
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.06172    0.02601   79.26   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df     F p-value
s(bites_of_yesterday)         1.000      1 0.017 0.89635
s(cumul_bites_7_previous_days) 1.000      1 8.022 0.00805 **
s(ID)                         1.719      3 1.661 0.05069 .
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.277   Deviance explained = 35.4%
-ML = -30.836  Scale est. = 0.01034   n = 36
```

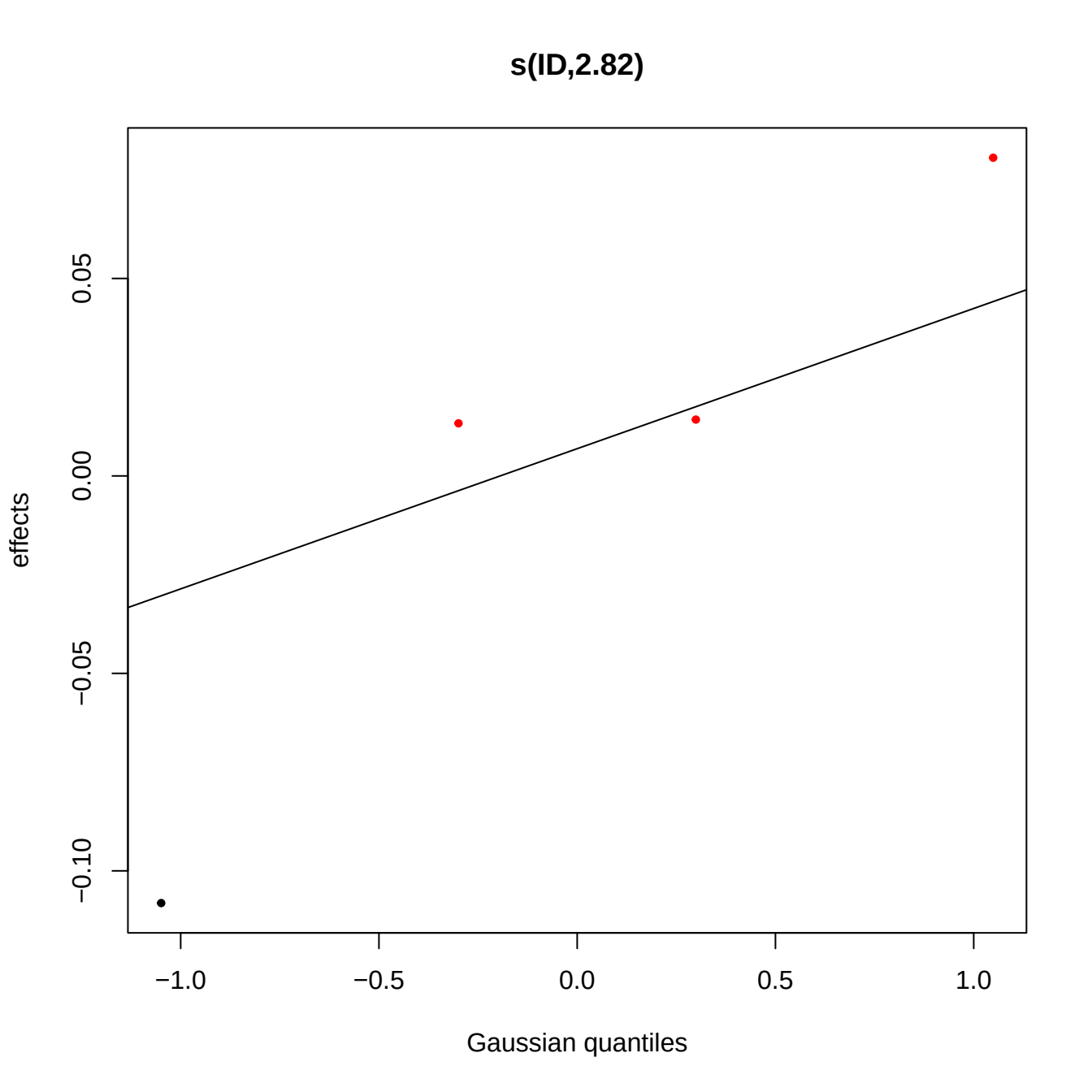
AICc [1] −51.20138

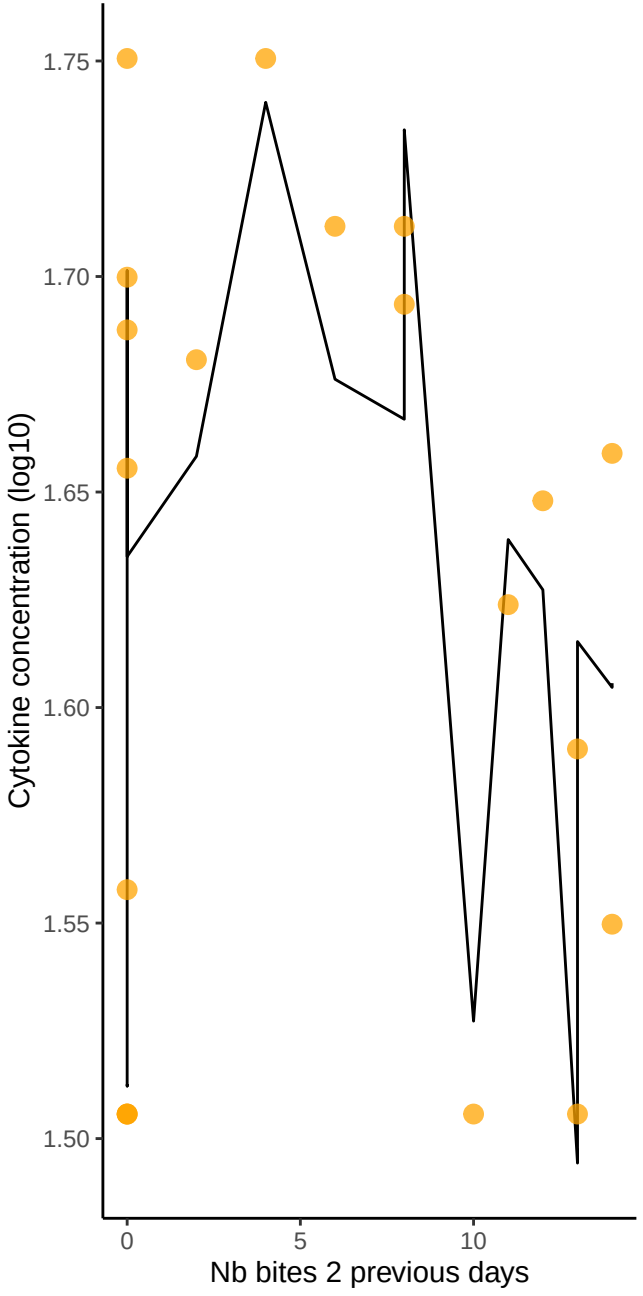
Bites in squirrel

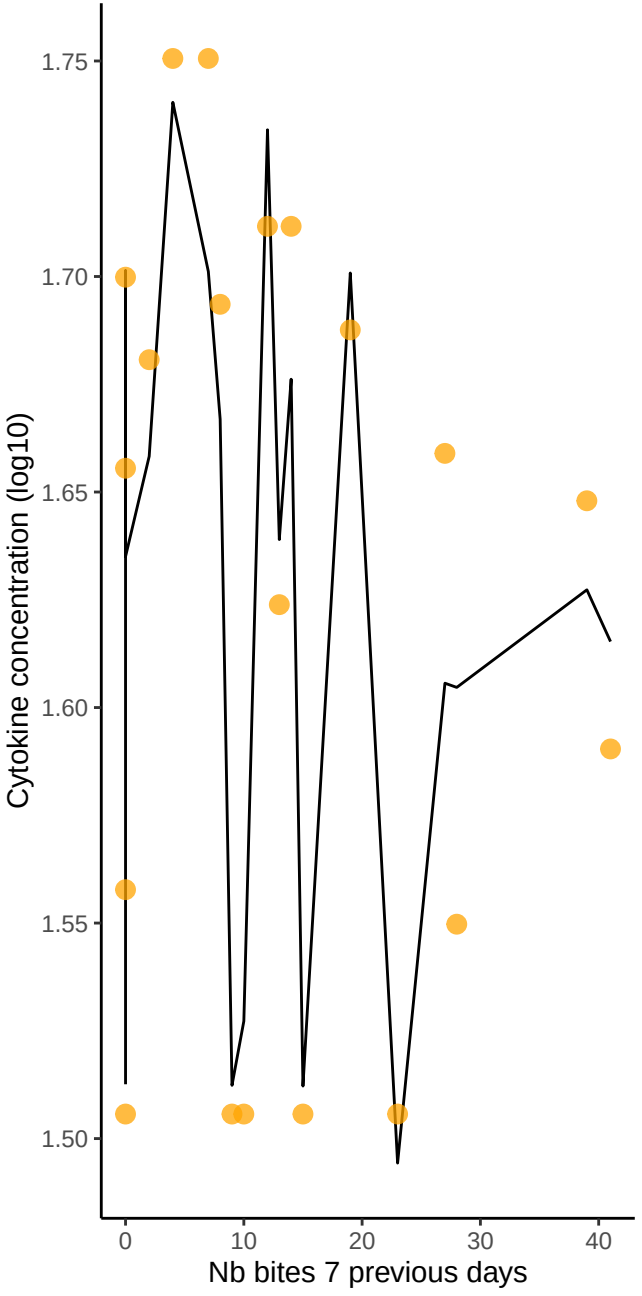
Nb obs: 20

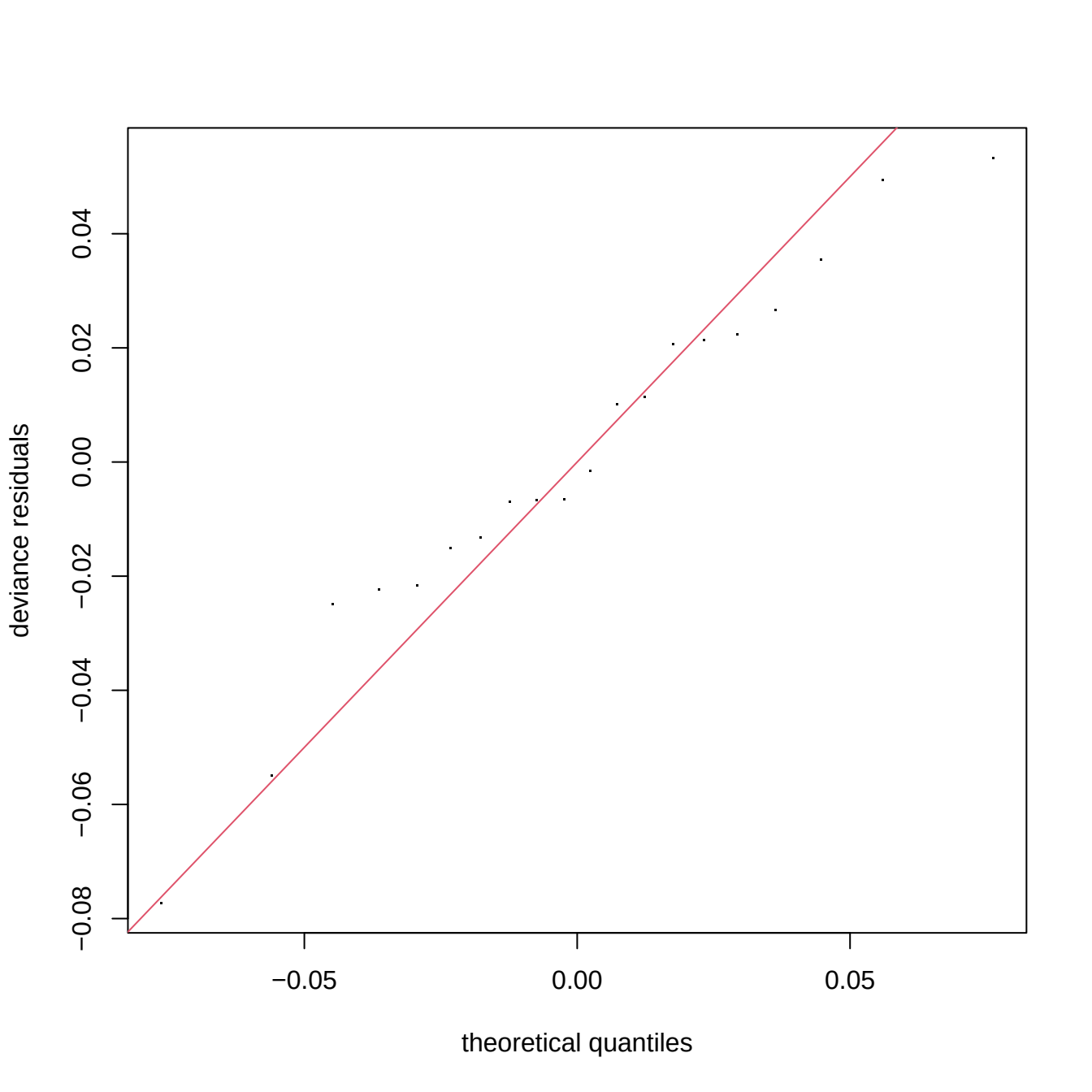

s(cumul_bites_2_previous_days,1.96)
0.05
0.00
−0.05
0
2
4
6
8
10
12
14
cumul_bites_2_previous_days

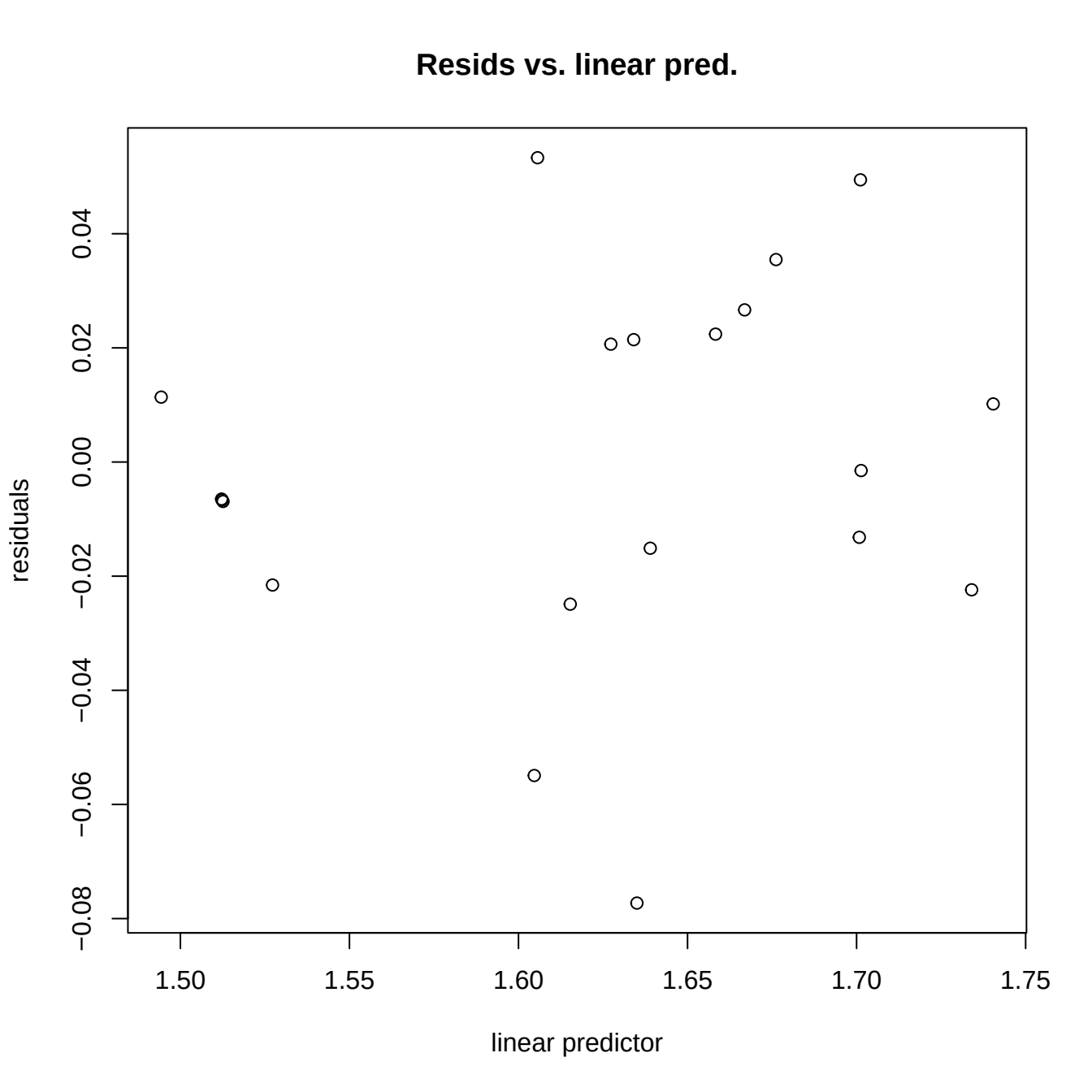

s(cumul_bites_7_previous_days,1)
0.05
0.00
−0.05
0
10
20
30
40
cumul_bites_7_previous_days

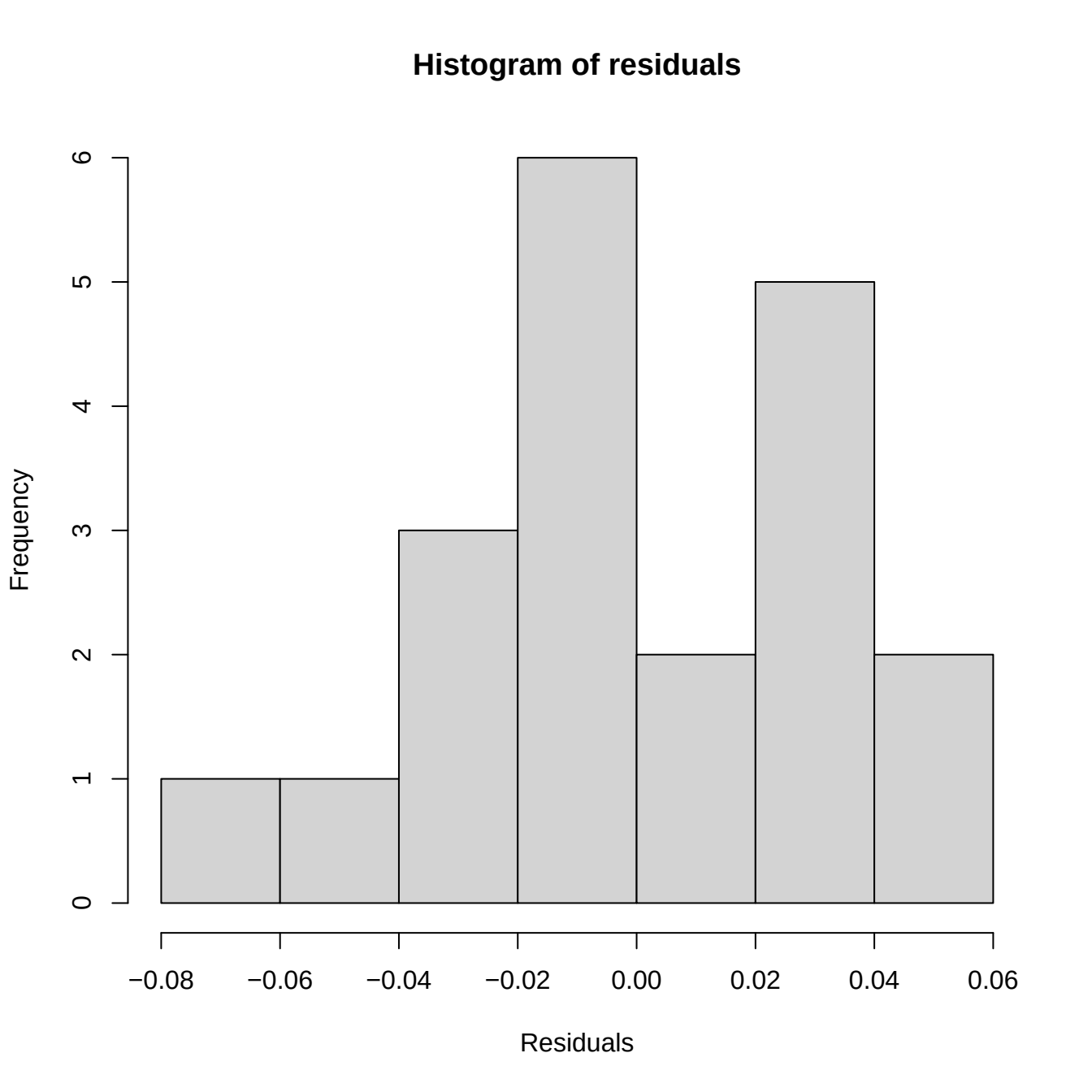

s(ID,2.82)
effects
0.05
0.00
−0.05
−0.10
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles

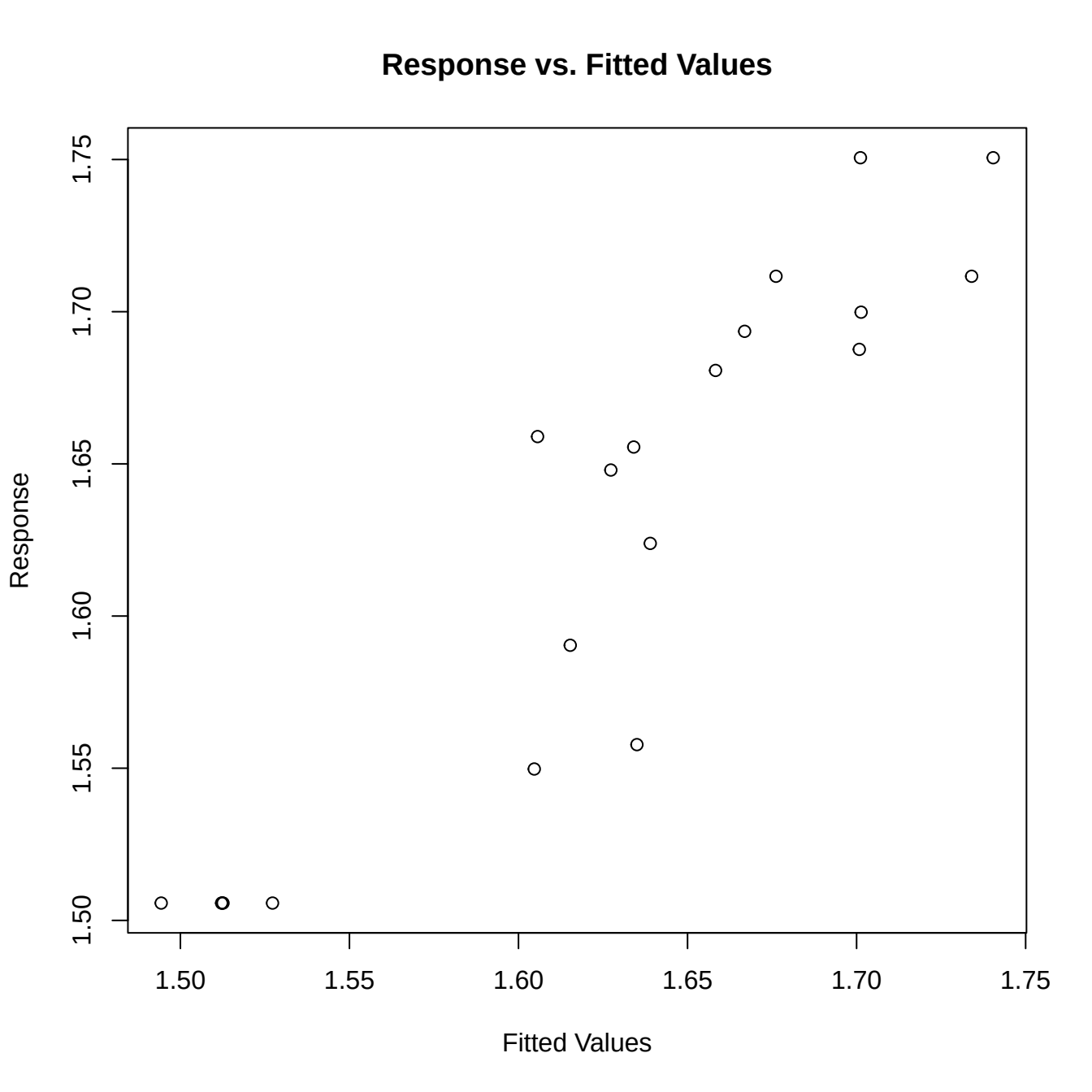

1.75
1.70
1.65
1.60
1.55
1.50
Cytokine concentration (log10)
0
5
10
Nb bites 2 previous days


1.75
1.70
1.65
1.60
1.55
1.50
Cytokine concentration (log10)
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.04
0.02
0.00
−0.02
−0.04
−0.06
−0.08
−0.05
0.00
0.05
theoretical quantiles


Resids vs. linear pred.
residuals
0.04
0.02
0.00
−0.02
−0.04
−0.06
−0.08
1.50
1.55
1.60
1.65
1.70
1.75
linear predictor


Histogram of residuals
Frequency
0
1
2
3
4
5
6
−0.08
−0.06
−0.04
−0.02
0.00
0.02
0.04
0.06
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.50
1.55
1.60
1.65
1.70
1.75

```
Method: ML   Optimizer: outer newton
full convergence after 10 iterations.
Gradient range [−1.60955e−05,2.215215e−06]
(score −29.6184 & scale 0.001512809).
Hessian positive definite, eigenvalue range [1.609524e−05,10.48349].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                 k'  edf k−index p−value
s(cumul_bites_2_previous_days) 3.00 1.96    1.07    0.45
s(cumul_bites_7_previous_days) 3.00 1.00    1.23    0.81
s(ID)                          4.00 2.82      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                                Term  VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_7_previous_days, k = 4) 2.04 [1.42,  3.58]         1.43      0.49     [0.28, 0.70]

High Correlation

                                Term   VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_2_previous_days, k = 4) 11.18 [6.34, 20.37]         3.34      0.09     [0.05, 0.16]
```

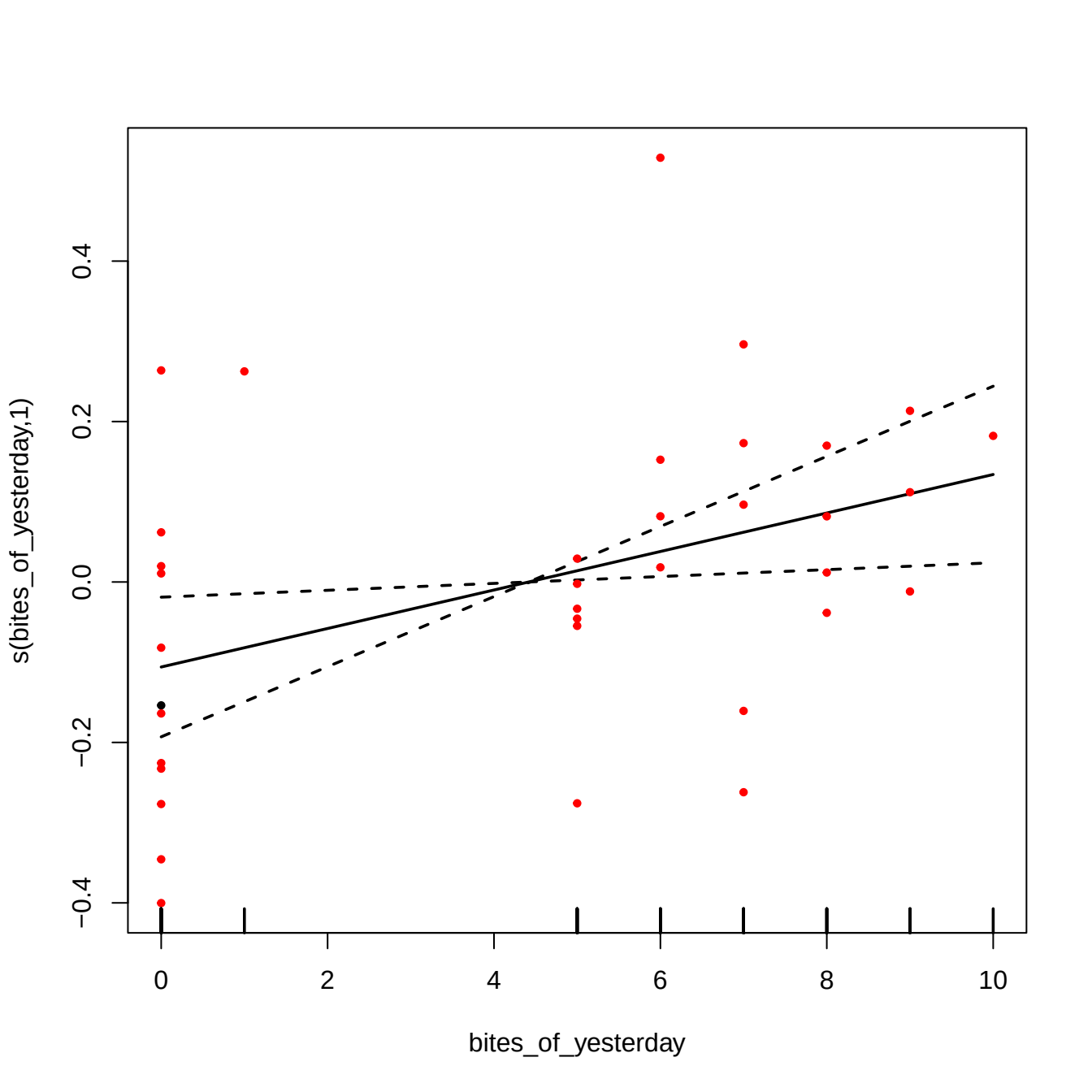
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(cumul_bites_2_previous_days, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.62494    0.03778   43.01 1.36e-15 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                               edf Ref.df      F  p-value
s(cumul_bites_2_previous_days) 1.959  2.329  1.873    0.153
s(cumul_bites_7_previous_days) 1.000  1.000  0.001    0.982
s(ID)                          2.824  3.000 20.358 2.75e-05 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.807   Deviance explained = 86.6%
-ML = -29.618  Scale est. = 0.0015128  n = 20
```

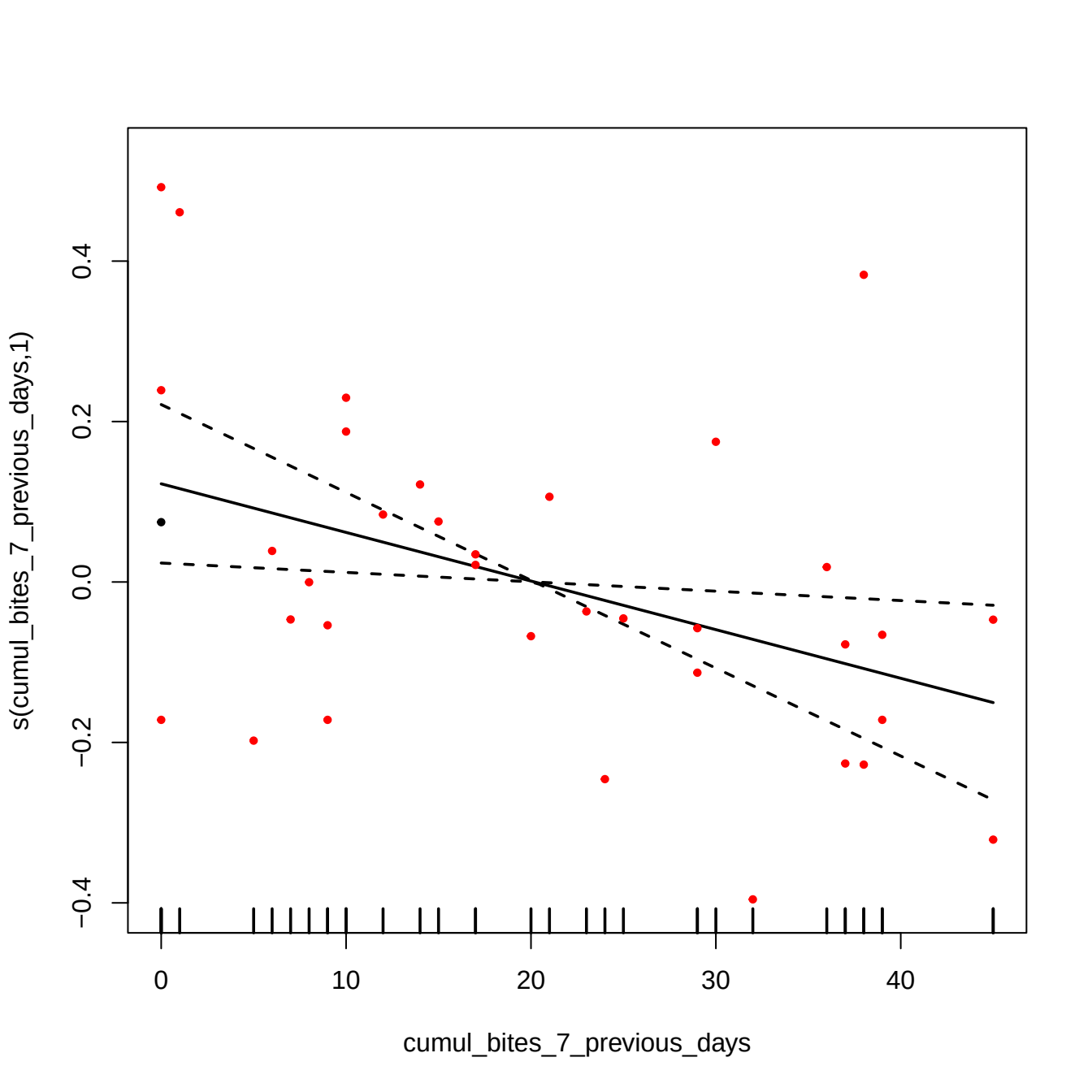
AICc [1] −50.26557

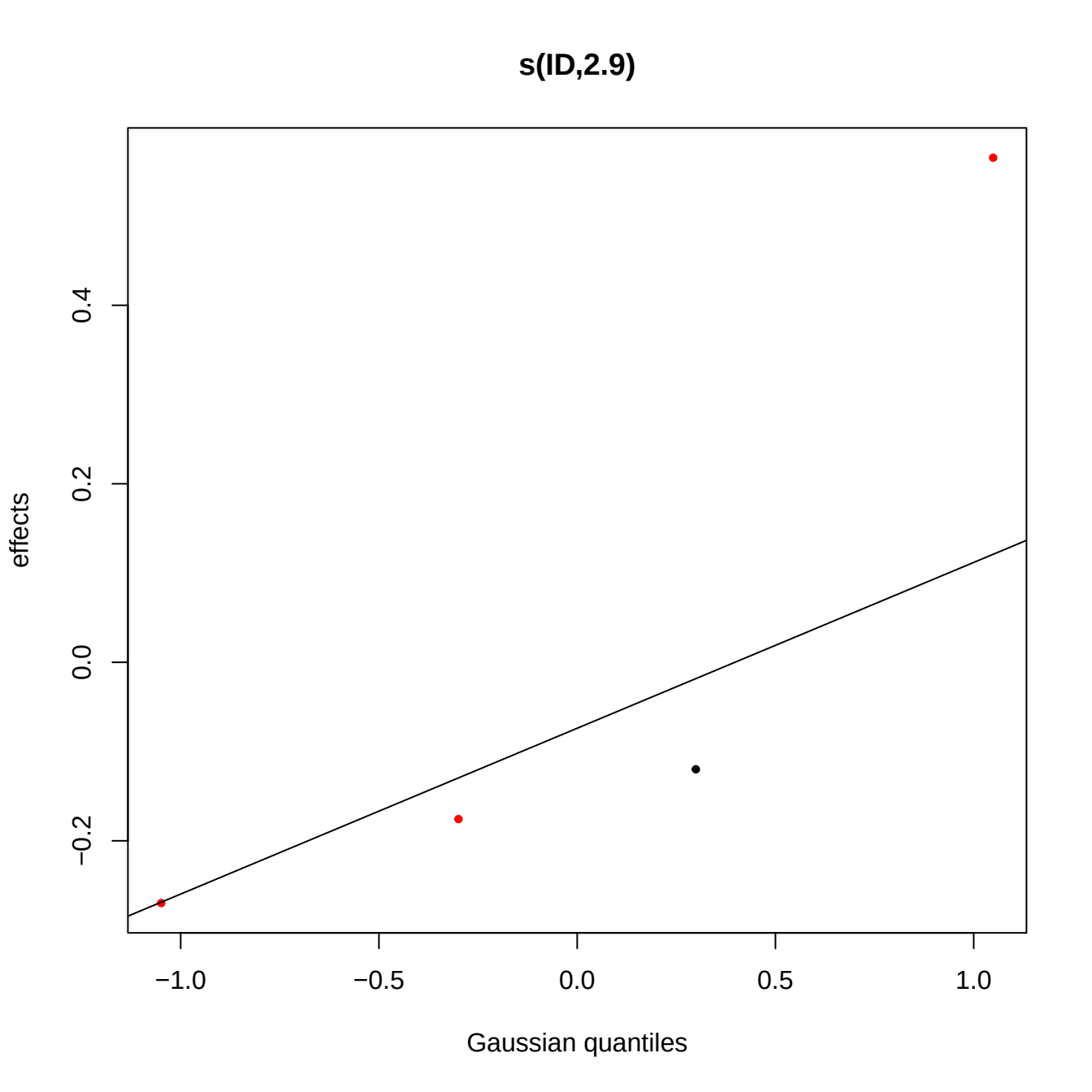
IFN.g

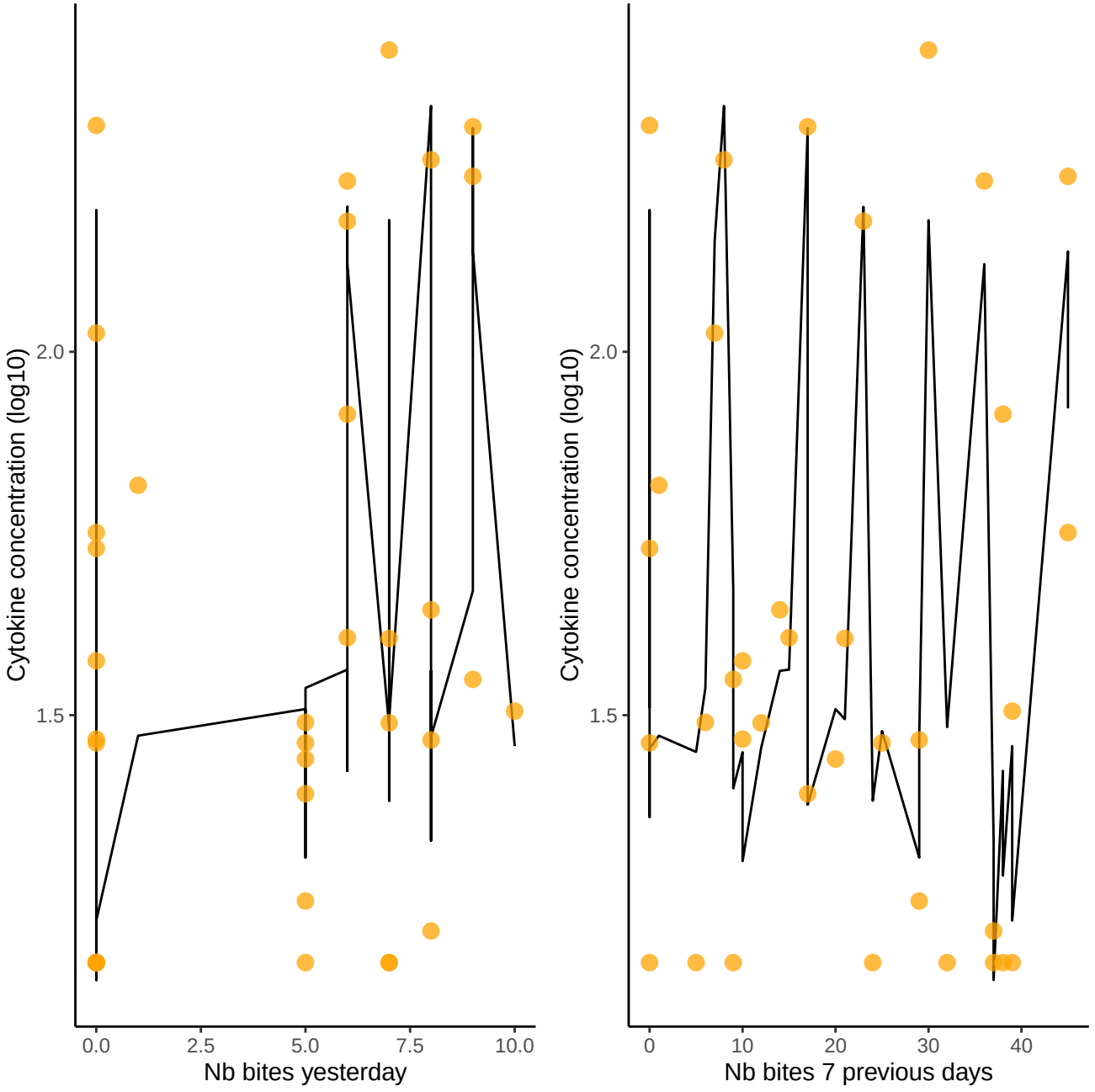
Bites in cyno

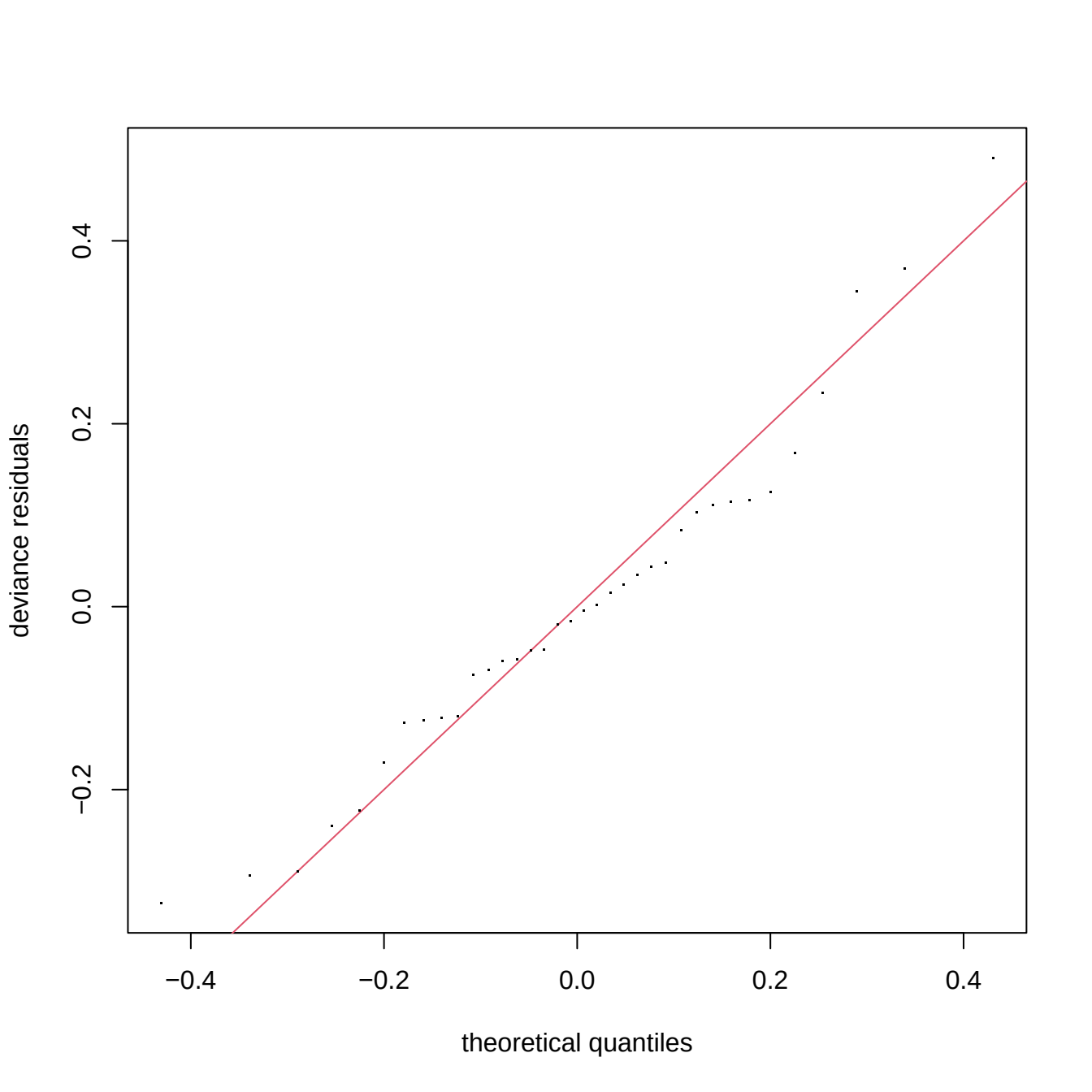
Nb obs: 36

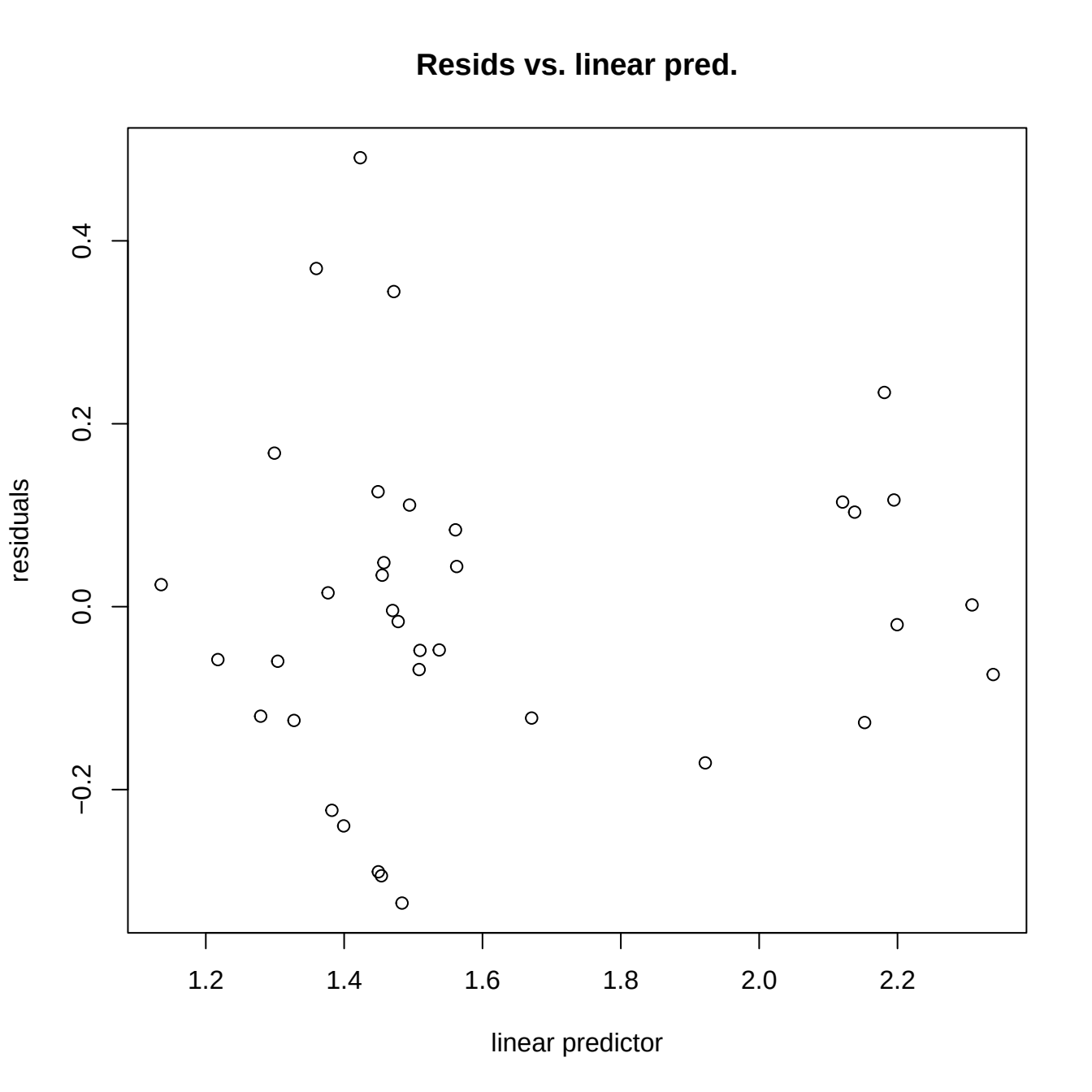

s(bites_of_yesterday,1)
0.4
0.2
0.0
−0.2
−0.4
0
2
4
6
8
10
bites_of_yesterday

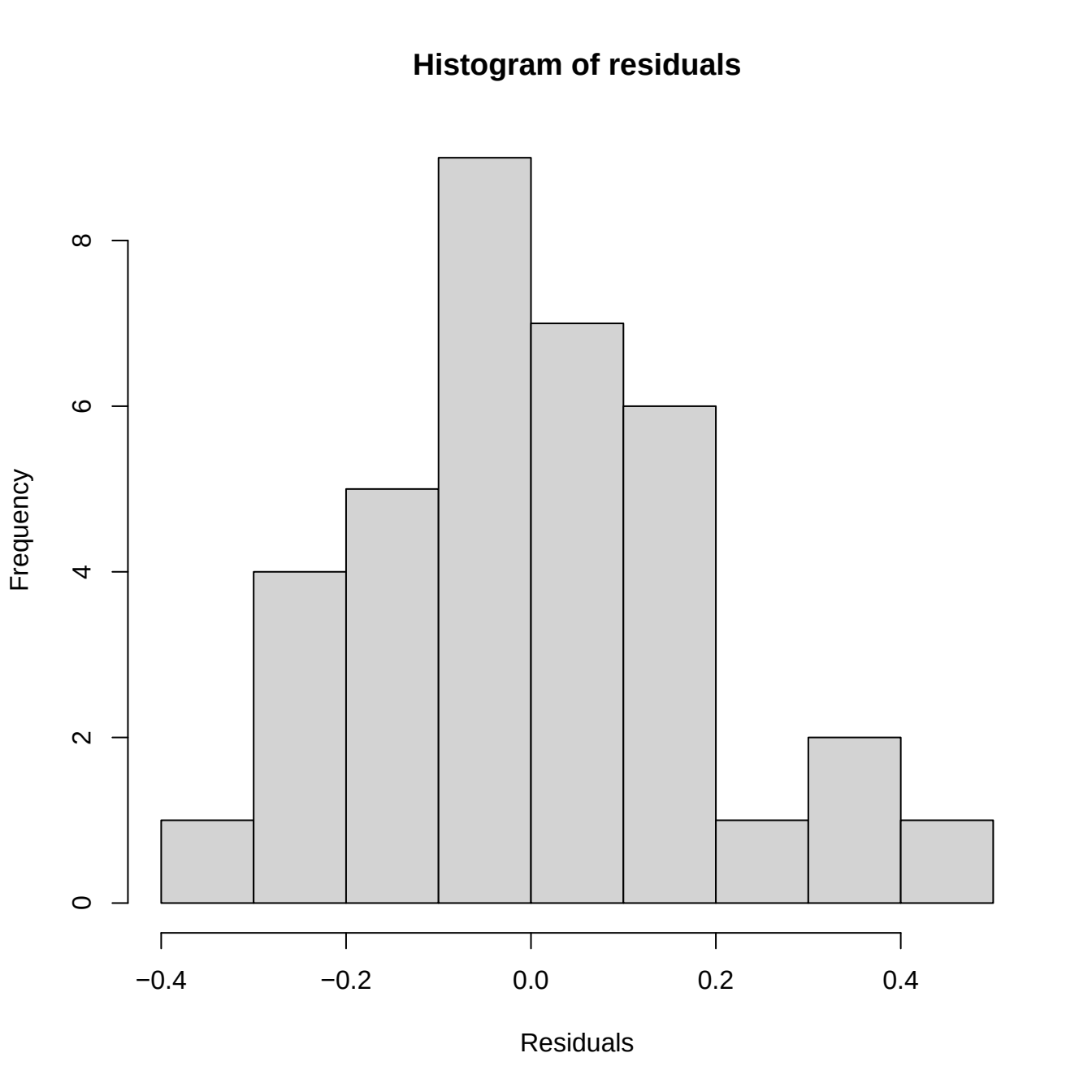

s(cumul_bites_7_previous_days,1)
0.4
0.2
0.0
−0.2
−0.4
0
10
20
30
40
cumul_bites_7_previous_days

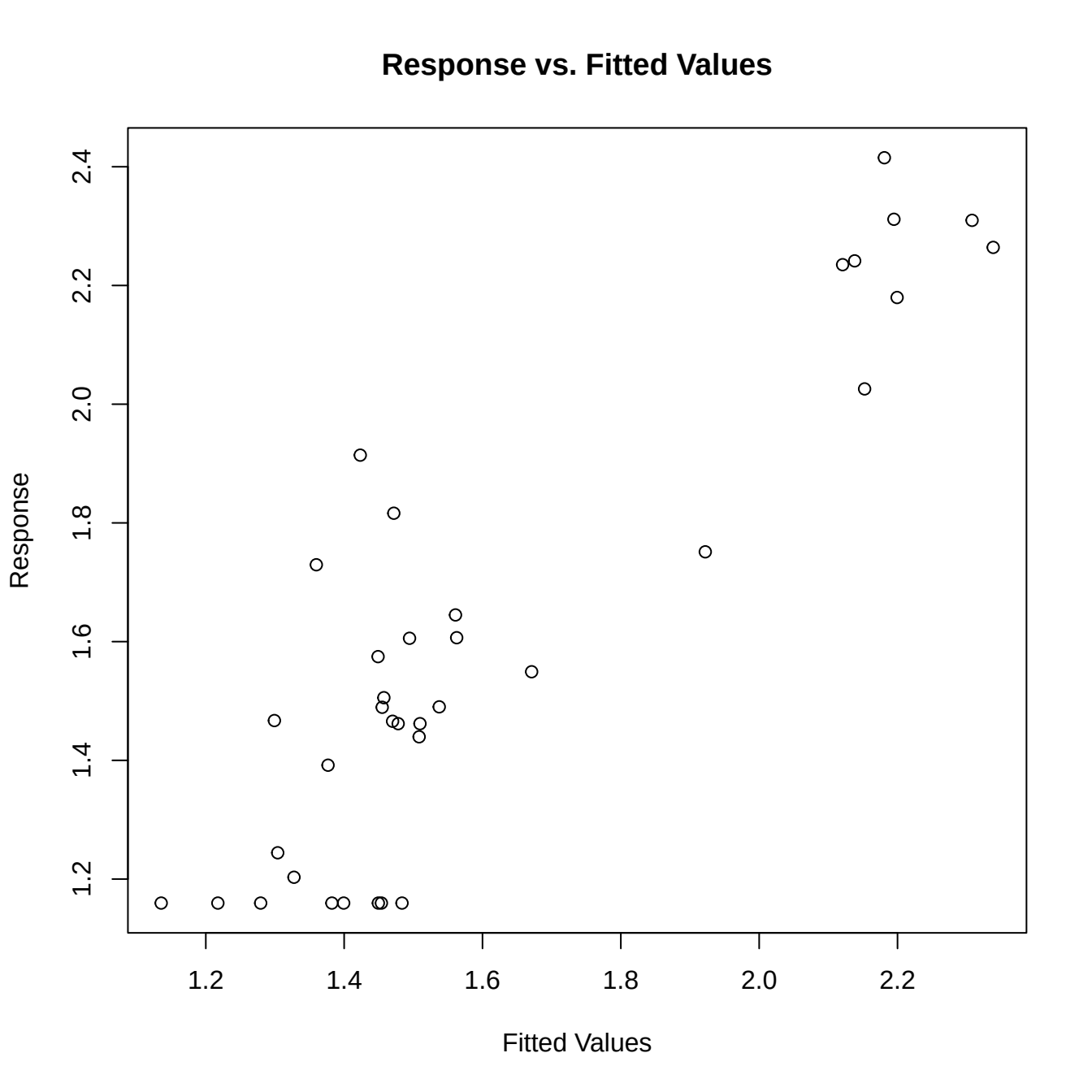

s(ID,2.9)
effects
0.4
0.2
0.0
−0.2
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.0
1.5
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
2.0
1.5
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.4
0.2
0.0
−0.2
−0.4
−0.2
0.0
0.2
0.4
theoretical quantiles


Resids vs. linear pred.
residuals
0.4
0.2
0.0
−0.2
1.2
1.4
1.6
1.8
2.0
2.2
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
−0.4
−0.2
0.0
0.2
0.4
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.2
1.4
1.6
1.8
2.0
2.2
2.4
1.2
1.4
1.6
1.8
2.0
2.2

```
Method: ML   Optimizer: outer newton
full convergence after 14 iterations.
Gradient range [−6.991728e−07,6.488436e−08]
(score −2.051074 & scale 0.03830552).
Hessian positive definite, eigenvalue range [6.369434e−07,18.22809].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k' edf k−index p−value
s(bites_of_yesterday)          3.0 1.0    1.14    0.78
s(cumul_bites_7_previous_days) 3.0 1.0    1.38    0.99
s(ID)                          4.0 2.9      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   1.6131     0.1769   9.119 3.63e-10 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F p-value
s(bites_of_yesterday)         1.000      1  5.930  0.0210 *
s(cumul_bites_7_previous_days) 1.000      1  6.141  0.0191 *
s(ID)                         2.897      3 34.720  <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.762   Deviance explained = 79.6%
-ML = -2.0511  Scale est. = 0.038306  n = 36
```

AICc [1] −3.77152

Bites in squirrel

Nb obs: 20

IFN.g ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

IL.10

Bites in cyno

Nb obs: 36

IL.10 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

Bites in squirrel

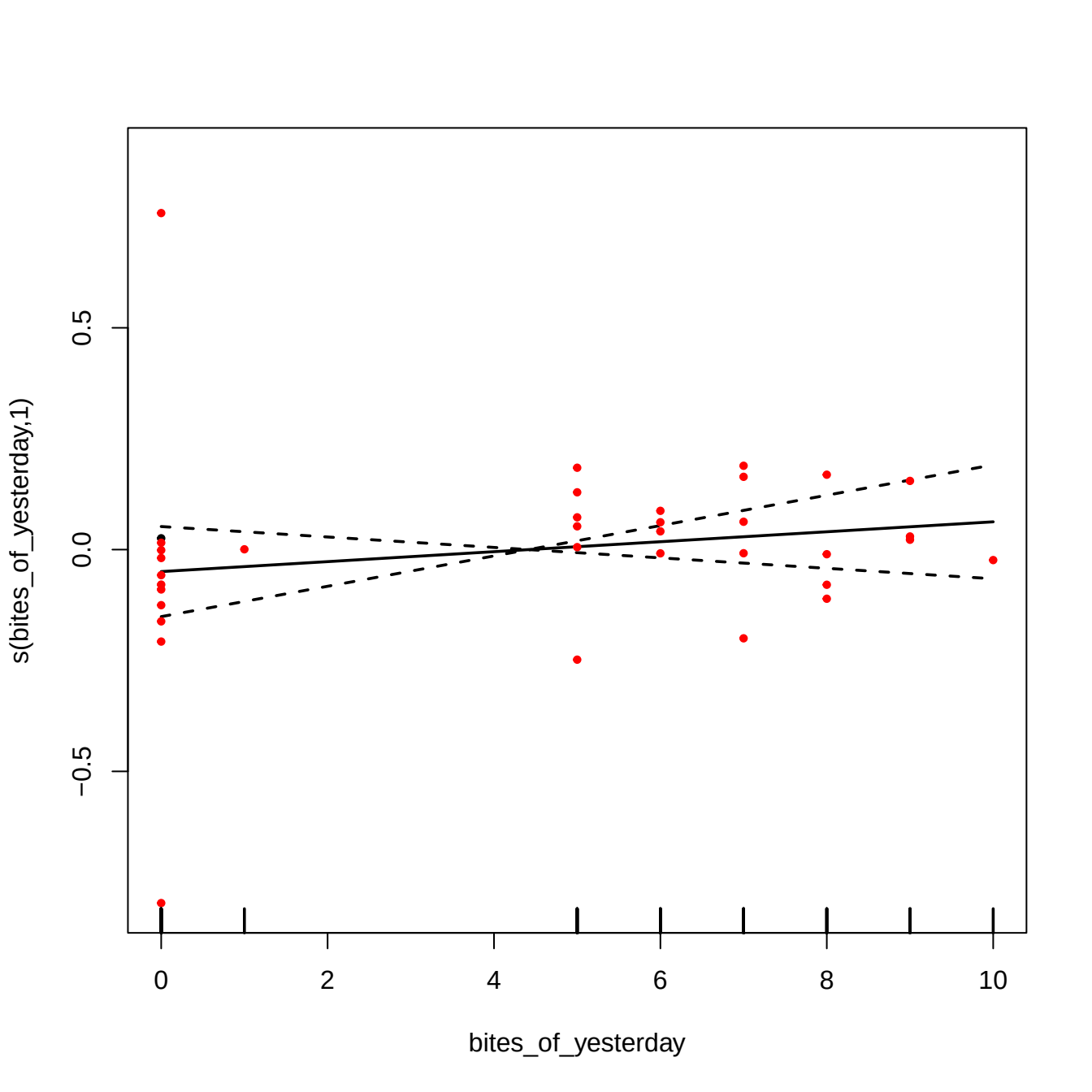
Nb obs: 20

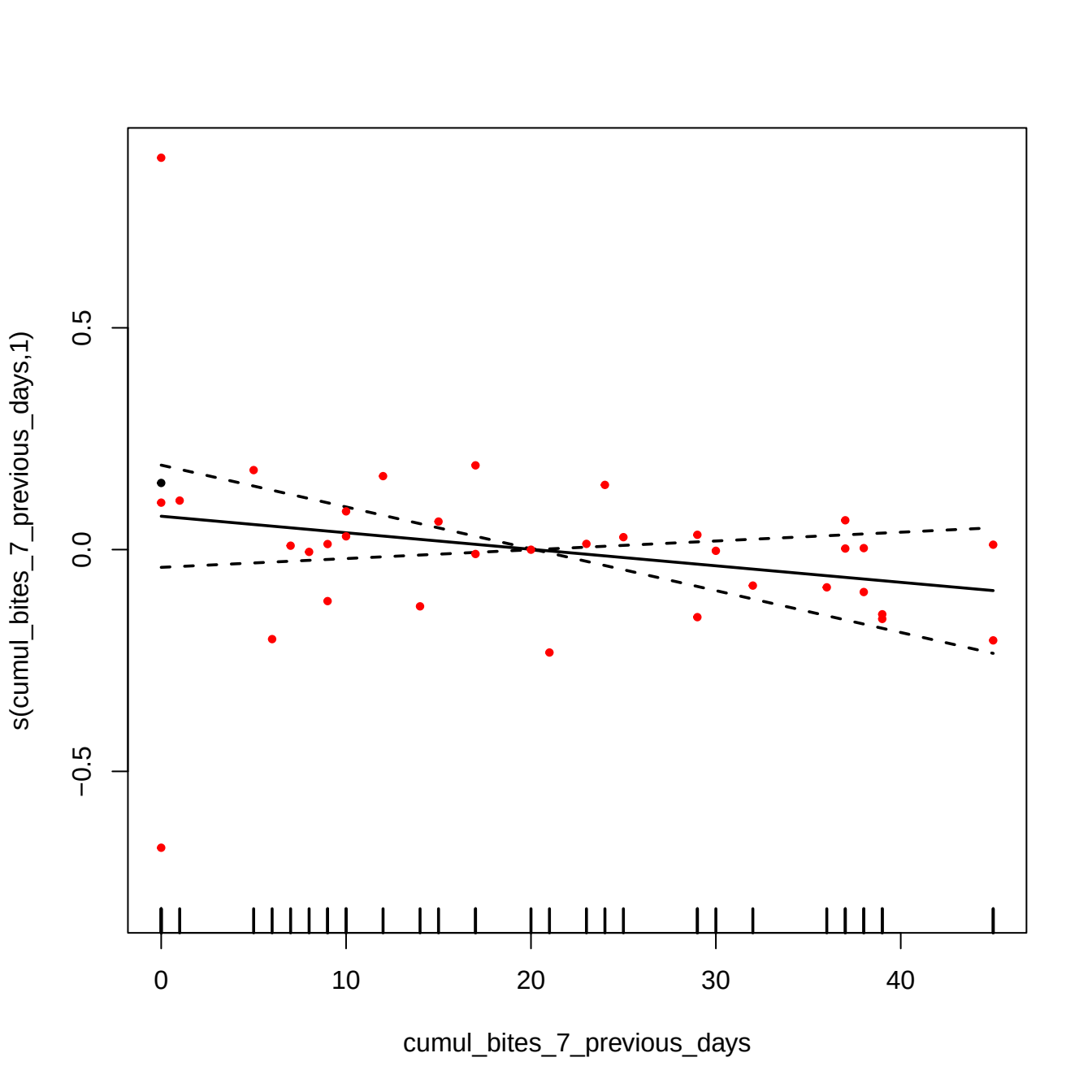
IL.10 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

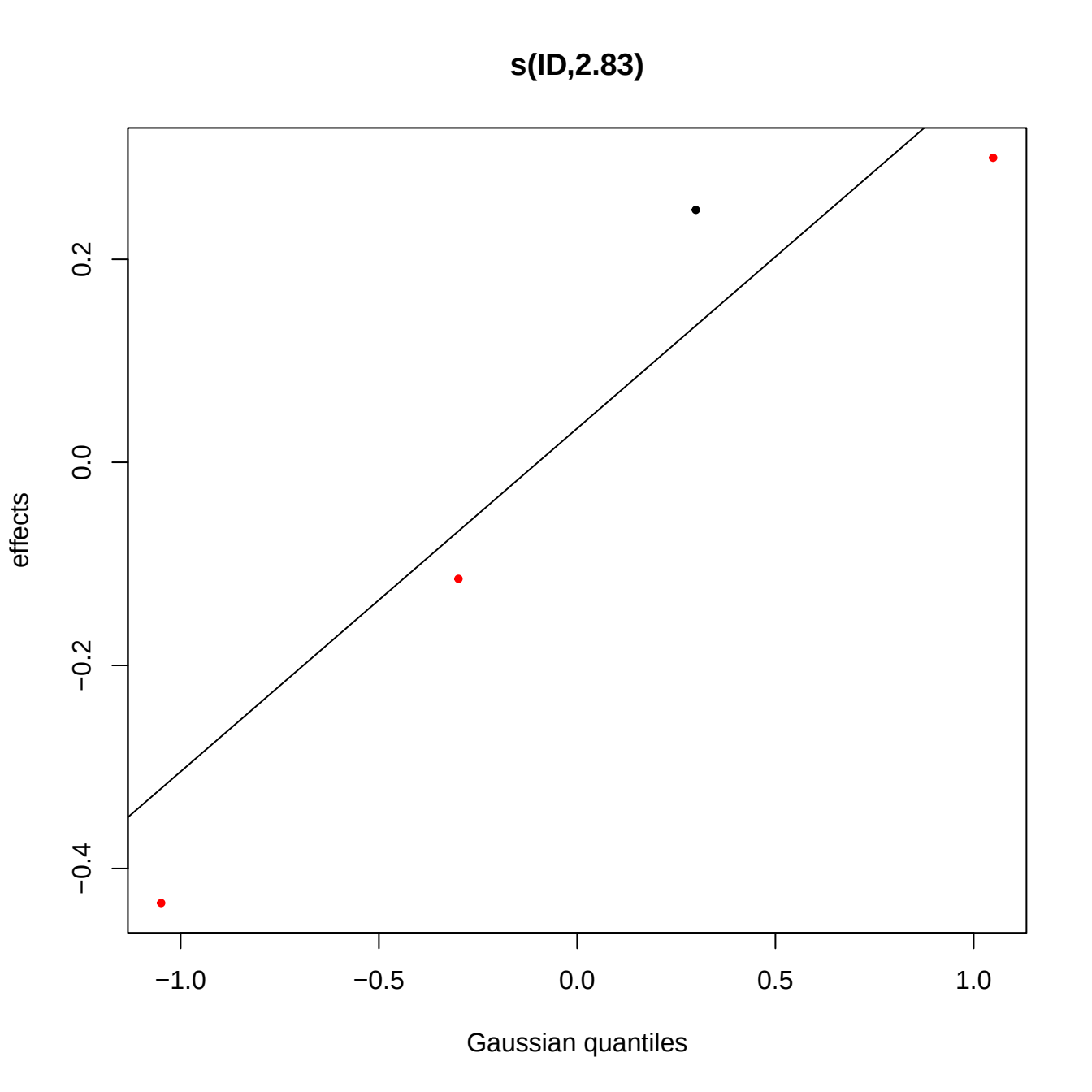
IL.12

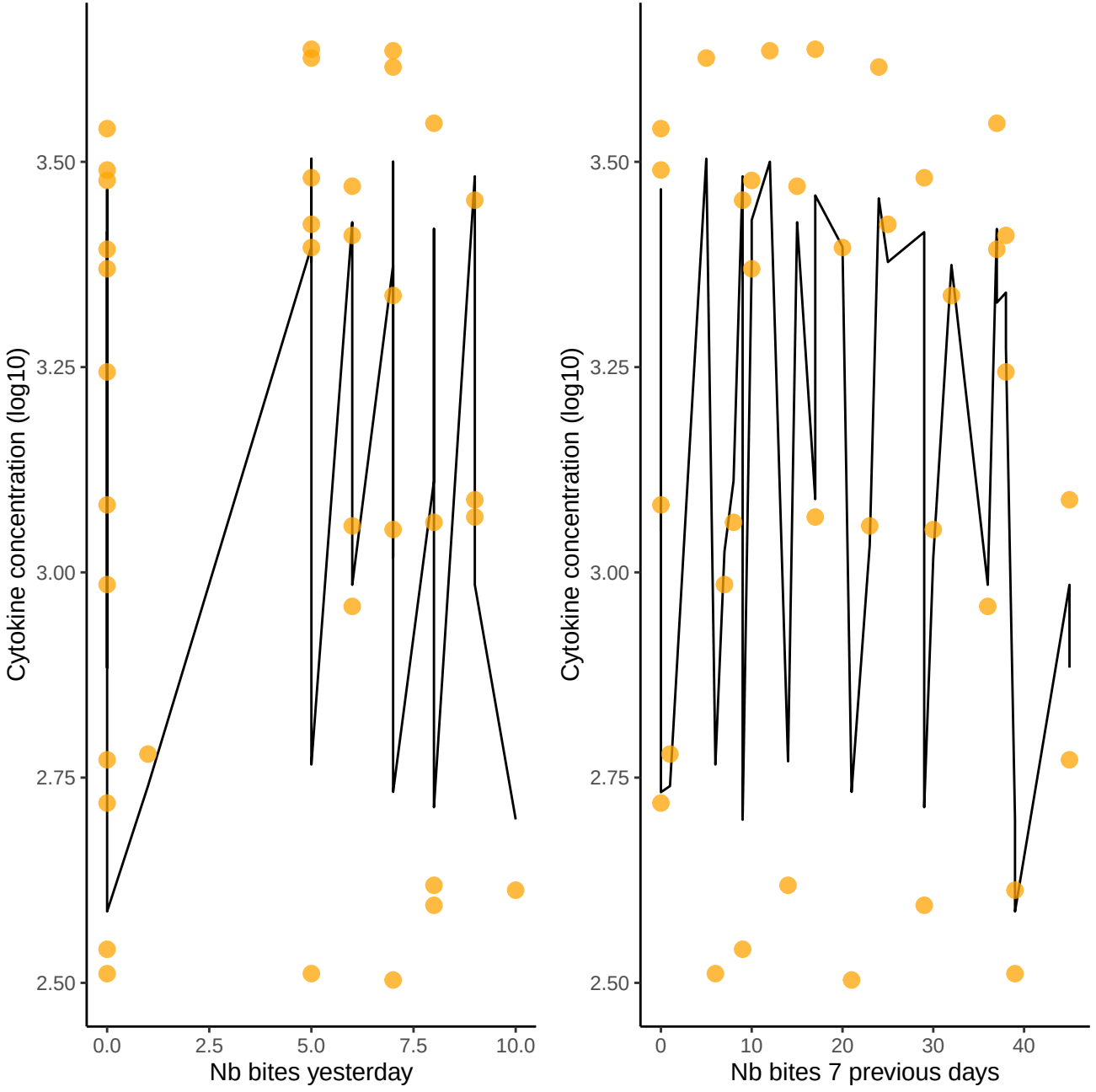
Bites in cyno

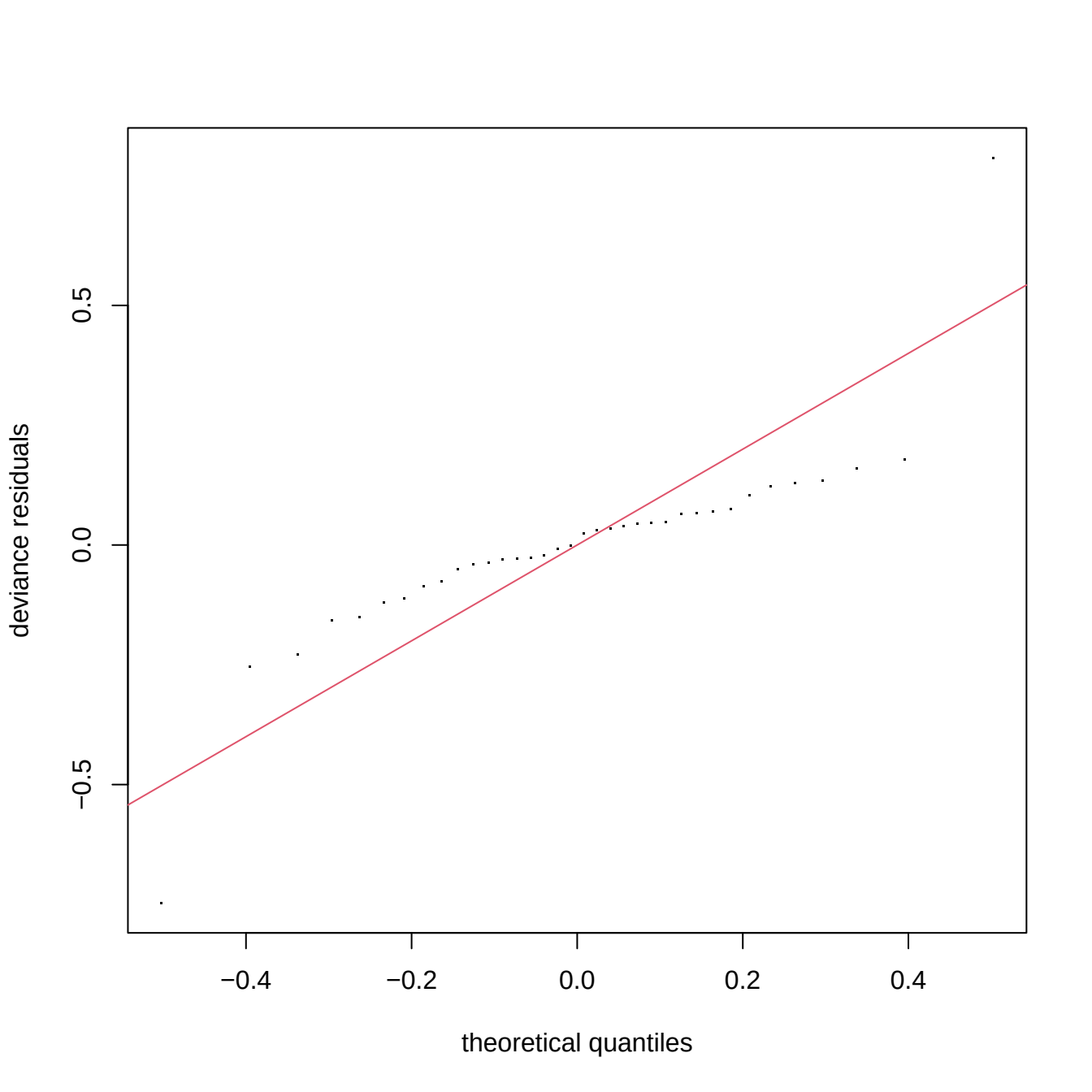
Nb obs: 36

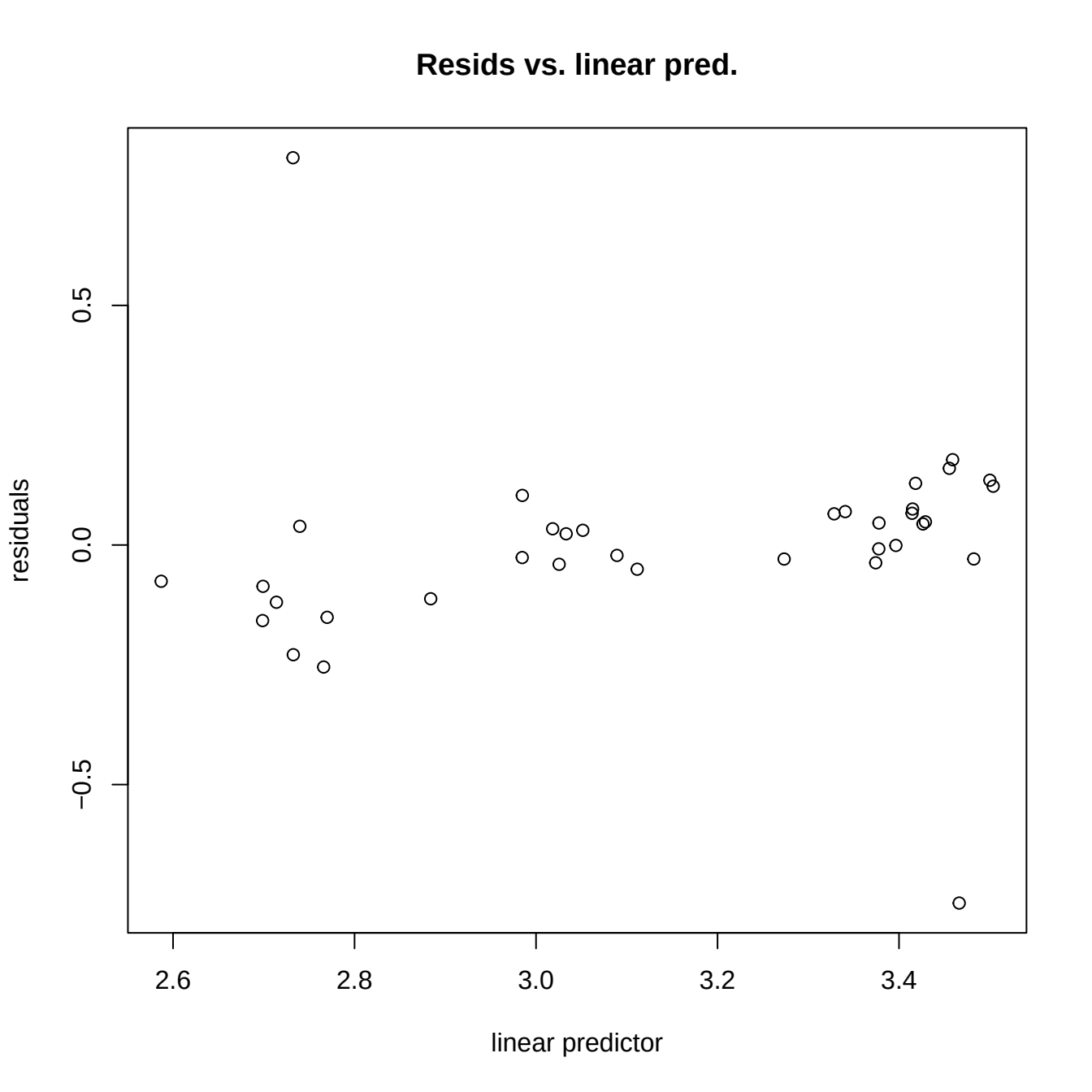

s(bites_of_yesterday,1)
0.5
0.0
−0.5
0
2
4
6
8
10
bites_of_yesterday

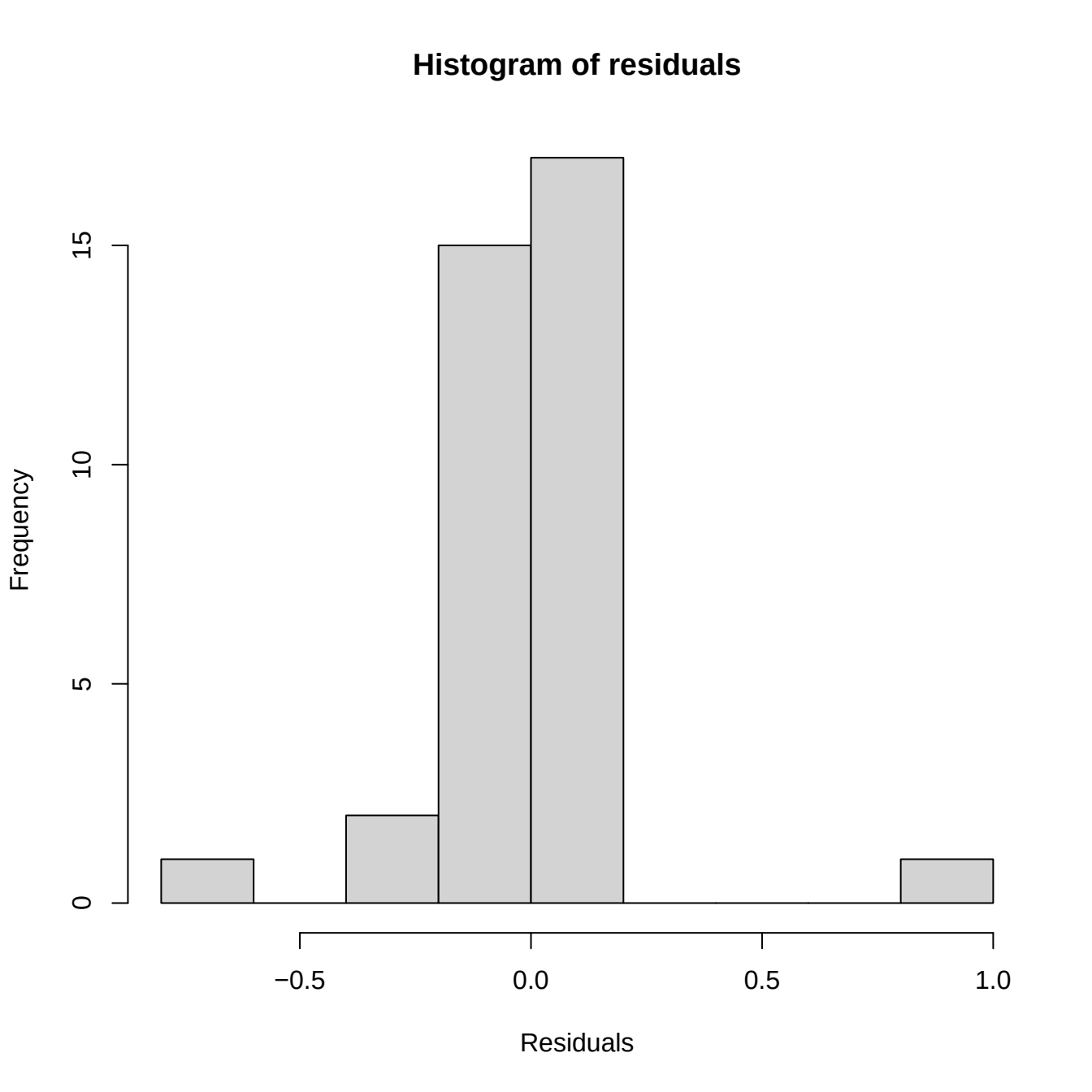

s(cumul_bites_7_previous_days,1)
0.5
0.0
−0.5
0
10
20
30
40
cumul_bites_7_previous_days

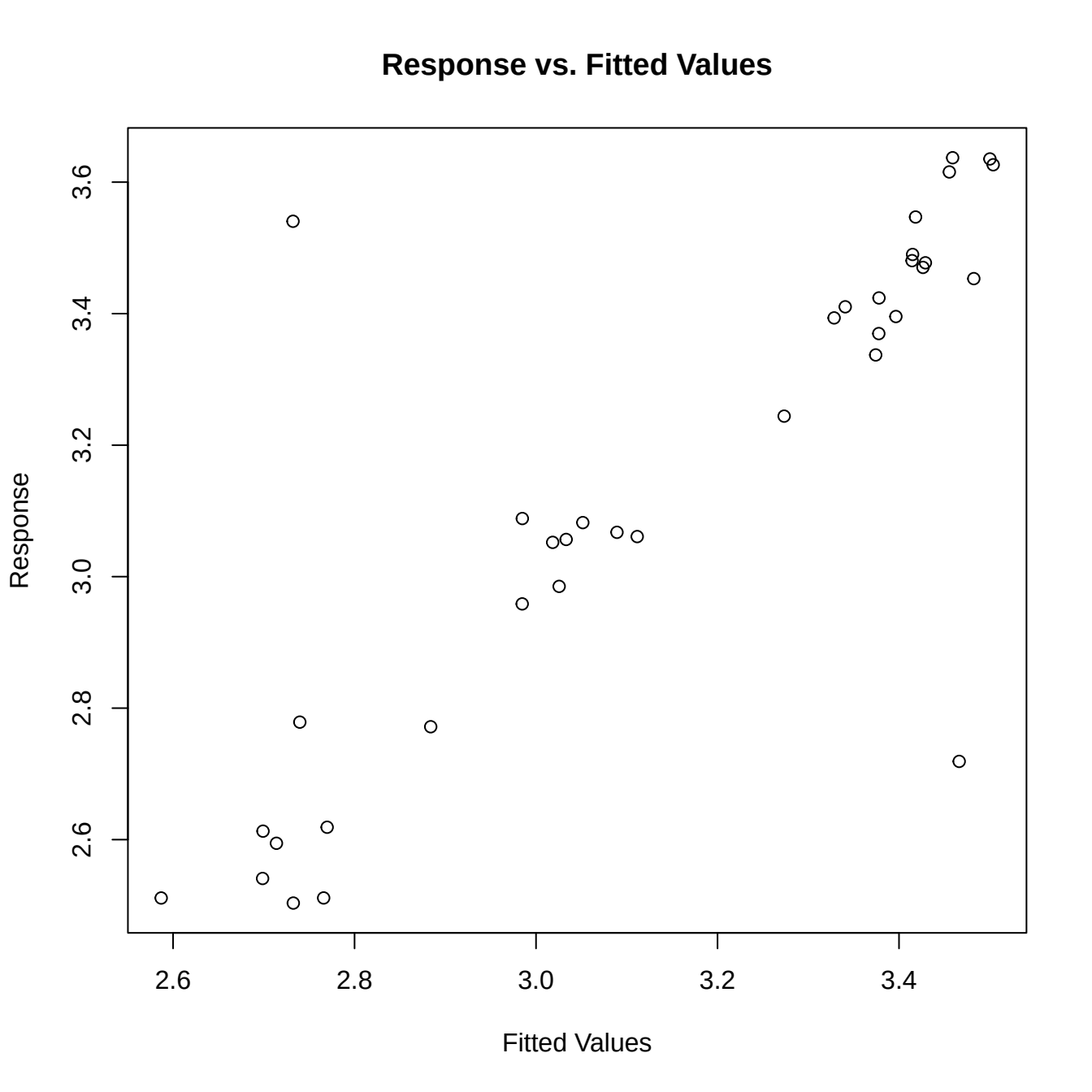

s(ID,2.83)
effects
0.2
0.0
−0.2
−0.4
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
3.50
3.25
3.00
2.75
2.50
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
3.50
3.25
3.00
2.75
2.50
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.5
0.0
−0.5
−0.4
−0.2
0.0
0.2
0.4
theoretical quantiles


Resids vs. linear pred.
residuals
0.5
0.0
−0.5
2.6
2.8
3.0
3.2
3.4
linear predictor


Histogram of residuals
Frequency
0
5
10
15
−0.5
0.0
0.5
1.0
Residuals


Response vs. Fitted Values
Response
Fitted Values
2.6
2.8
3.0
3.2
3.4
3.6

```
Method: ML   Optimizer: outer newton
full convergence after 15 iterations.
Gradient range [−1.039541e−06,5.268573e−08]
(score 2.533338 & scale 0.05213652).
Hessian positive definite, eigenvalue range [7.566821e−07,18.21747].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k'  edf k−index p−value
s(bites_of_yesterday)         3.00 1.00    1.03    0.46
s(cumul_bites_7_previous_days) 3.00 1.00    1.44    0.98
s(ID)                         4.00 2.83      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   3.1406     0.1625   19.32   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F p-value
s(bites_of_yesterday)         1.000      1  0.952   0.337
s(cumul_bites_7_previous_days) 1.000      1  1.705   0.202
s(ID)                         2.834      3 21.436  <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.646   Deviance explained = 69.5%
-ML = 2.5333  Scale est. = 0.052137  n = 36
```

AICc [1] 7.355133

Bites in squirrel

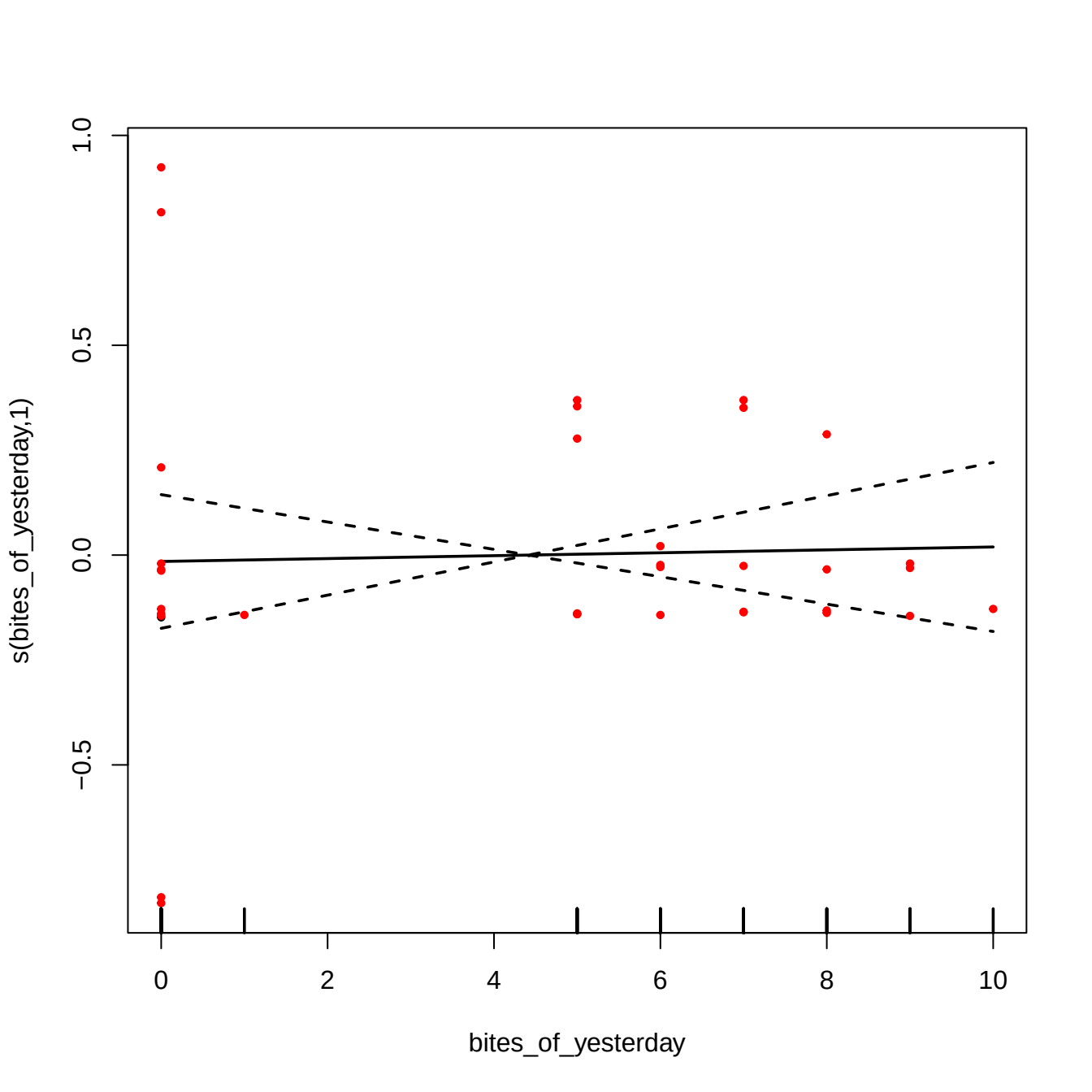
Nb obs: 20

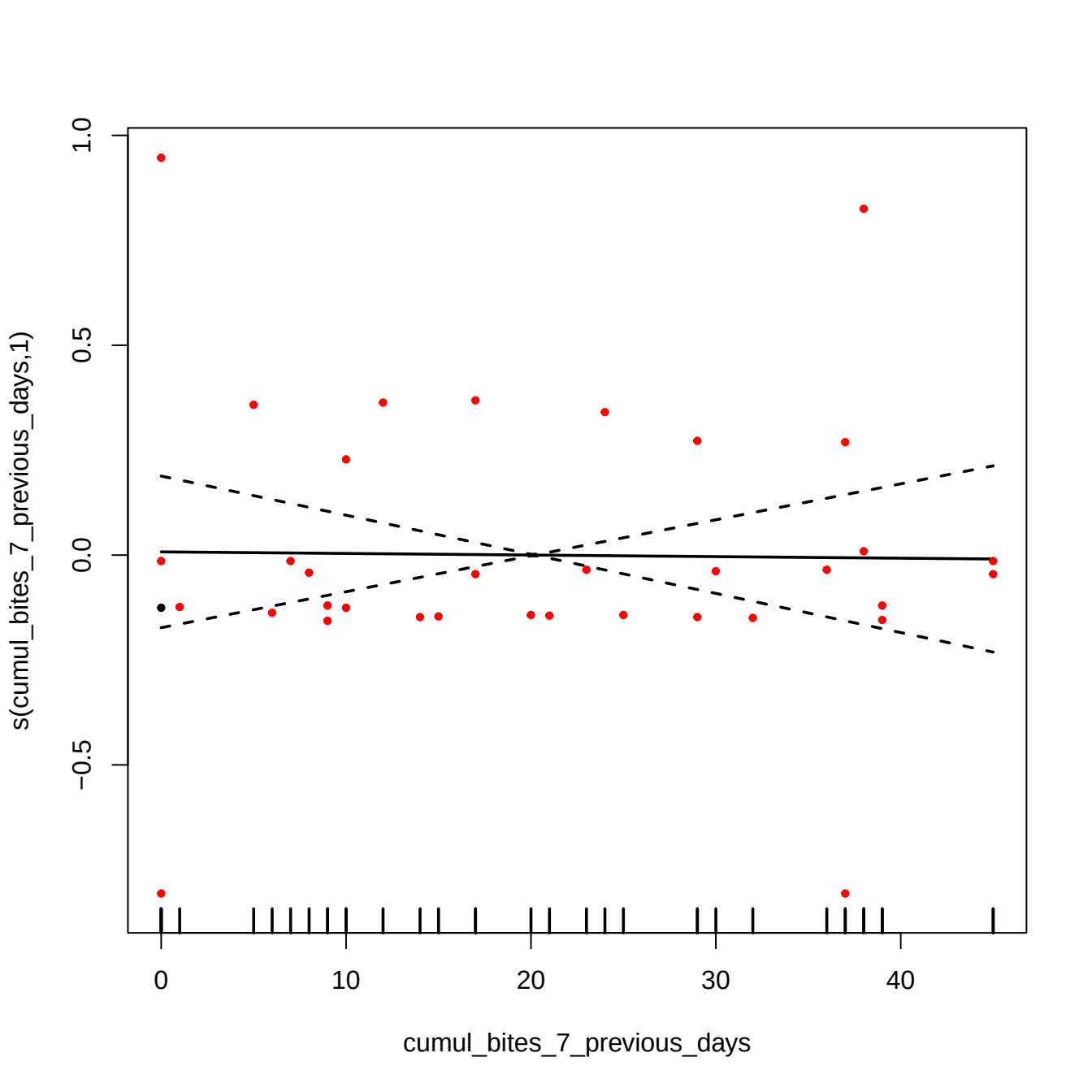
IL.12 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

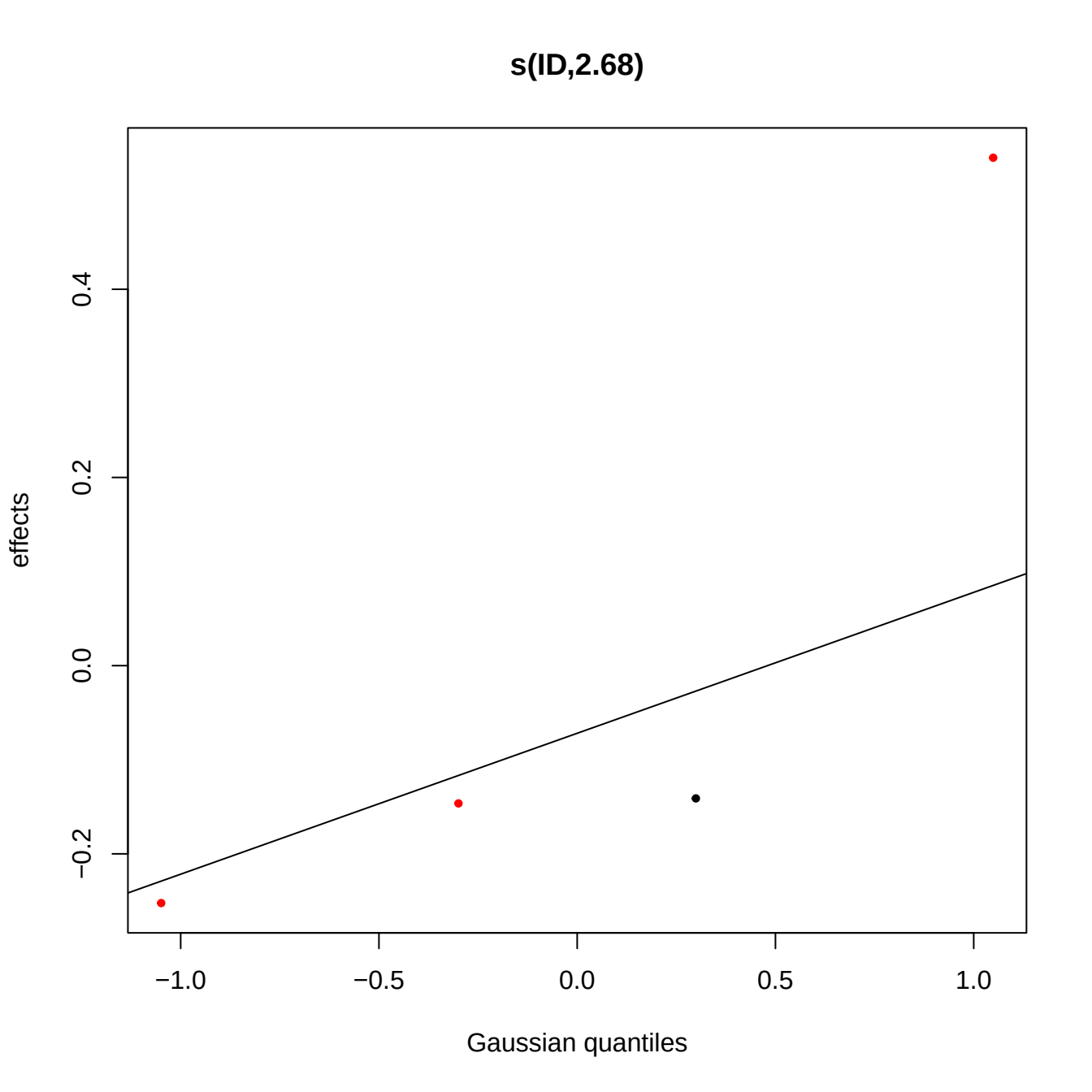
IL.15

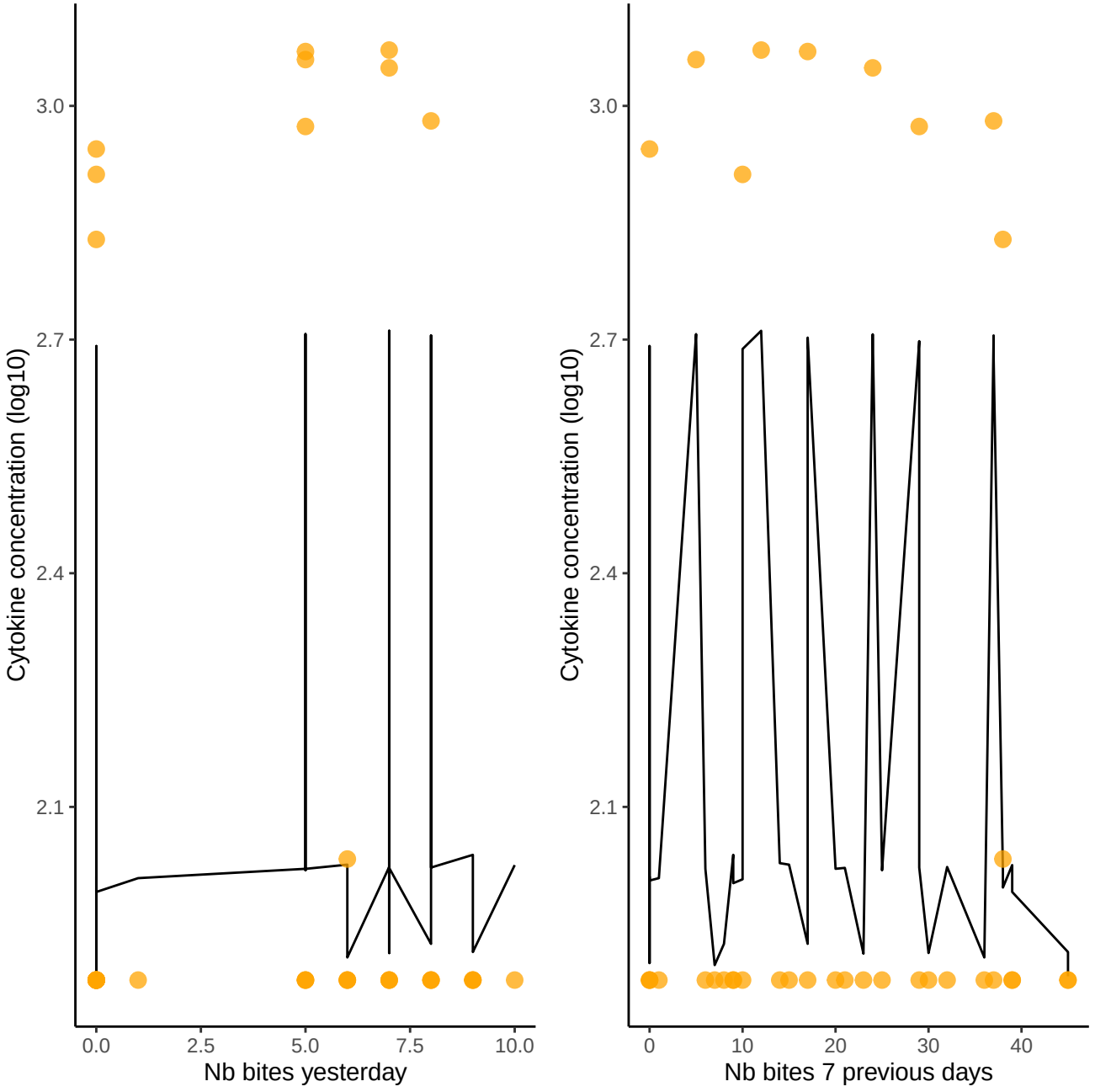
Bites in cyno

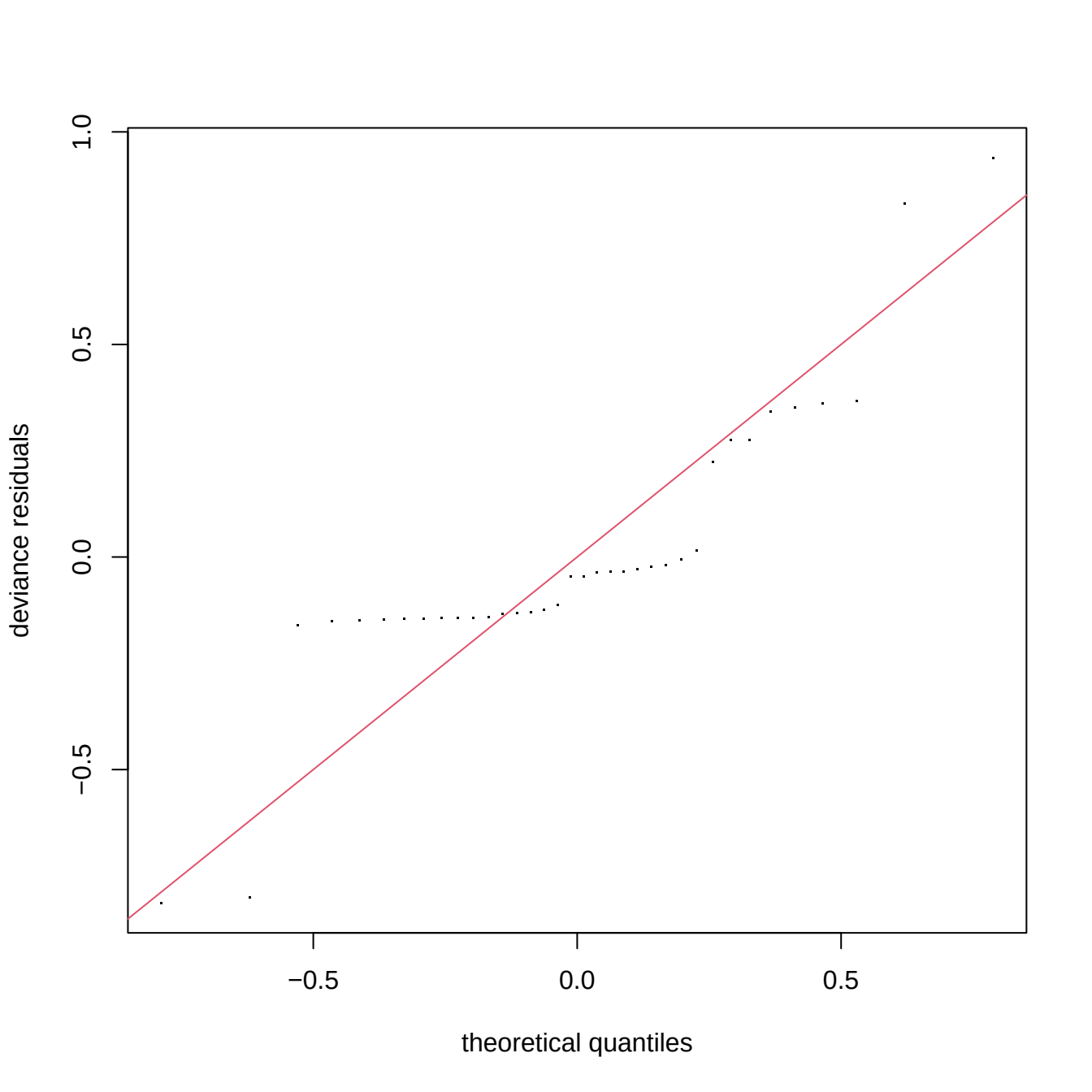
Nb obs: 36

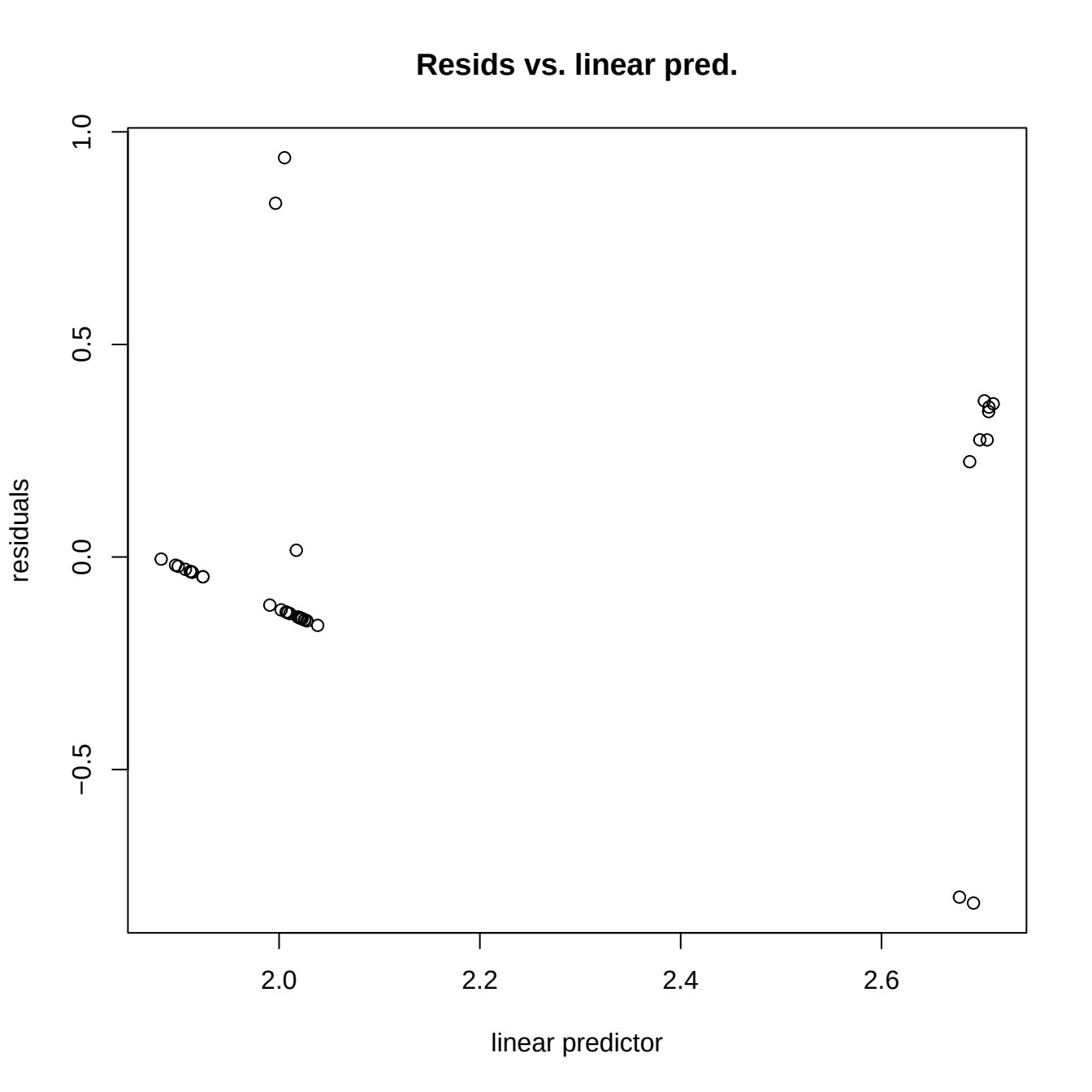

s(bites_of_yesterday,1)
1.0
0.5
0.0
−0.5
0
2
4
6
8
10
bites_of_yesterday

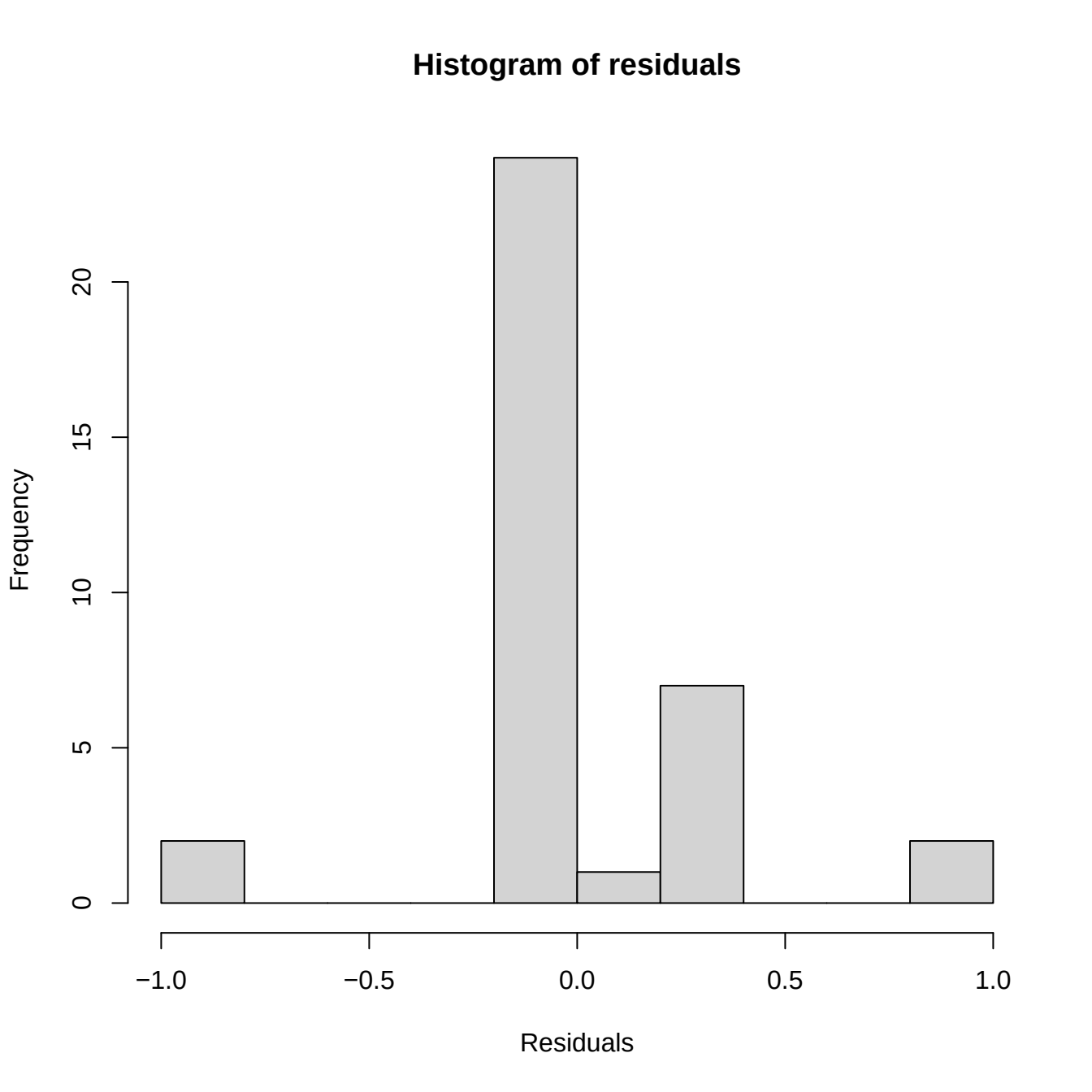

s(cumul_bites_7_previous_days,1)
1.0
0.5
0.0
−0.5
0
10
20
30
40
cumul_bites_7_previous_days

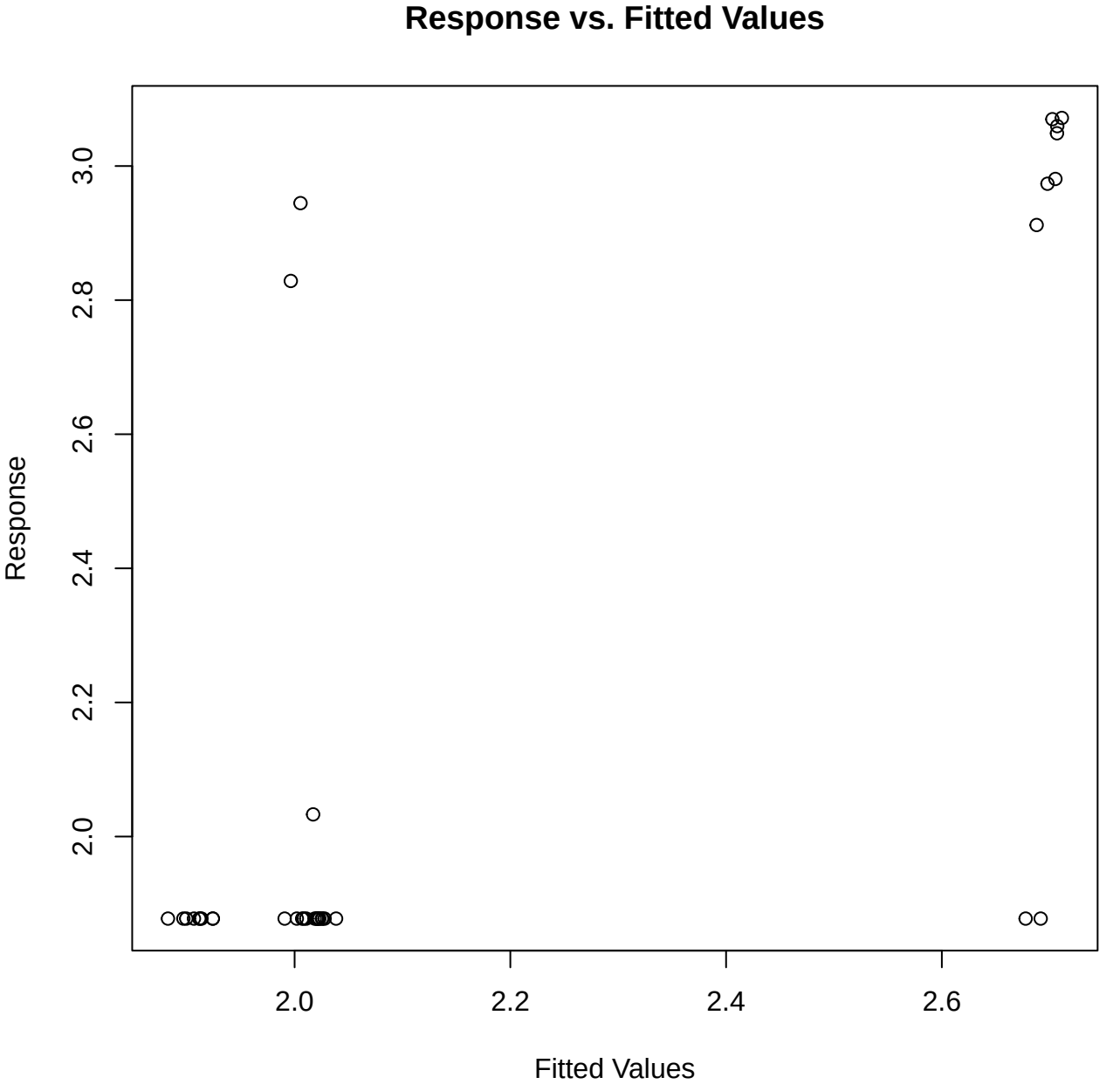

s(ID,2.68)
effects
0.4
0.2
0.0
−0.2
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
3.0
2.7
2.4
2.1
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
3.0
2.7
2.4
2.1
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
1.0
0.5
0.0
−0.5
−0.5
0.0
0.5
theoretical quantiles


Resids vs. linear pred.
residuals
1.0
0.5
0.0
−0.5
2.0
2.2
2.4
2.6
linear predictor


Histogram of residuals
Frequency
0
5
10
15
20
−1.0
−0.5
0.0
0.5
1.0
Residuals


Response vs. Fitted Values
Response
Fitted Values
2.0
2.2
2.4
2.6
2.8
3.0
2.0
2.2
2.4
2.6

```
Method: ML   Optimizer: outer newton
full convergence after 14 iterations.
Gradient range [−2.728227e−06,2.768502e−07]
(score 17.3784 & scale 0.1282965).
Hessian positive definite, eigenvalue range [1.945693e−06,18.19206].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                 k'  edf k−index p−value
s(bites_of_yesterday)          3.00 1.00    1.29    0.93
s(cumul_bites_7_previous_days) 3.00 1.00    1.39    0.98
s(ID)                          4.00 2.68      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   2.1595     0.1823   11.85 6.63e-13 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F  p-value
s(bites_of_yesterday)         1.000      1  0.037    0.850
s(cumul_bites_7_previous_days) 1.000      1  0.007    0.933
s(ID)                         2.675      3 10.324 3.34e-05 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =   0.46   Deviance explained = 53.2%
-ML = 17.378  Scale est. = 0.1283    n = 36
```

AICc [1] 39.84918

Bites in squirrel

Nb obs: 20

IL.15 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

IL.17

Bites in cyno

Nb obs: 36

IL.17 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

Bites in squirrel

Nb obs: 20

IL.17 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

IL.1B

Bites in cyno

Nb obs: 36

IL.1B ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

Bites in squirrel

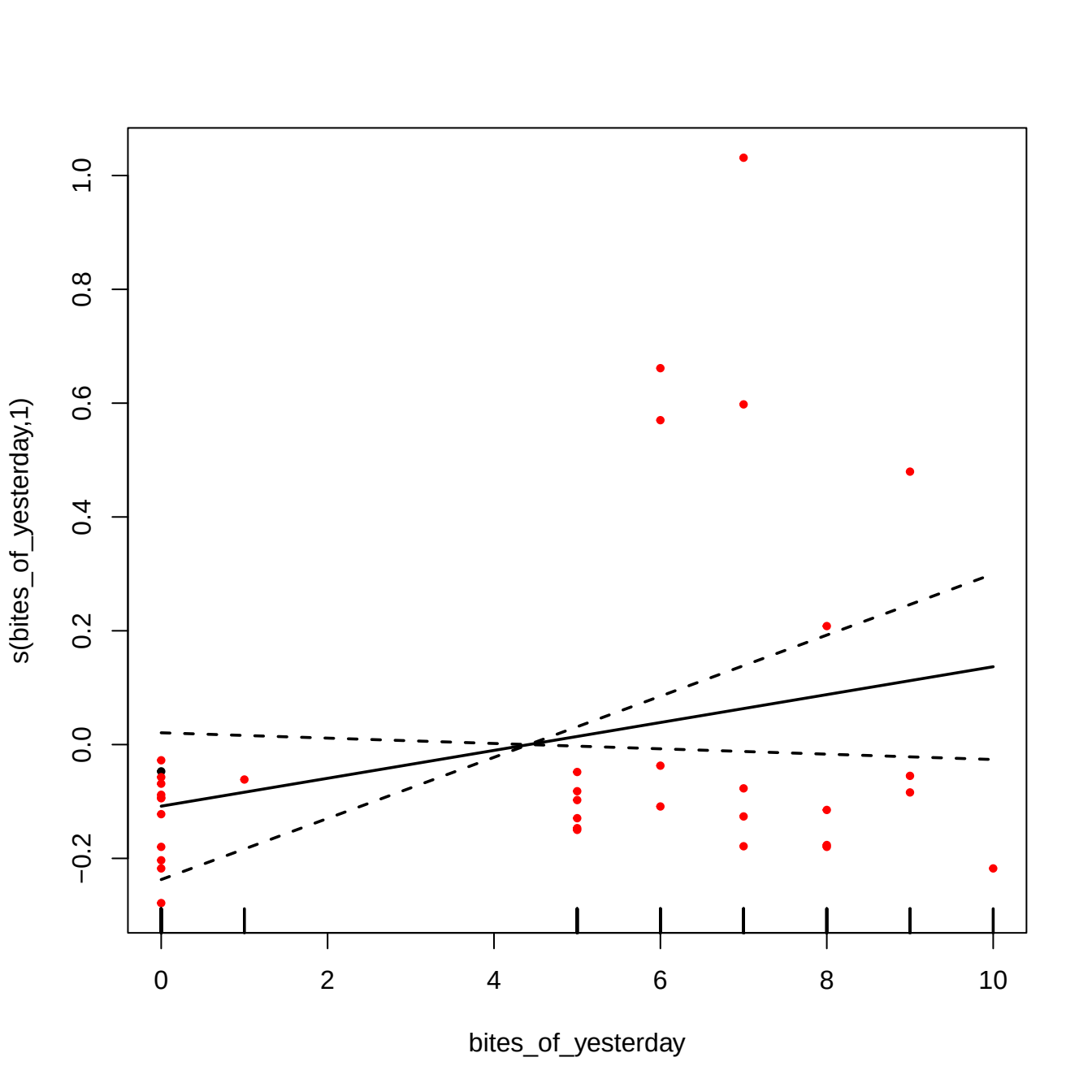
Nb obs: 20

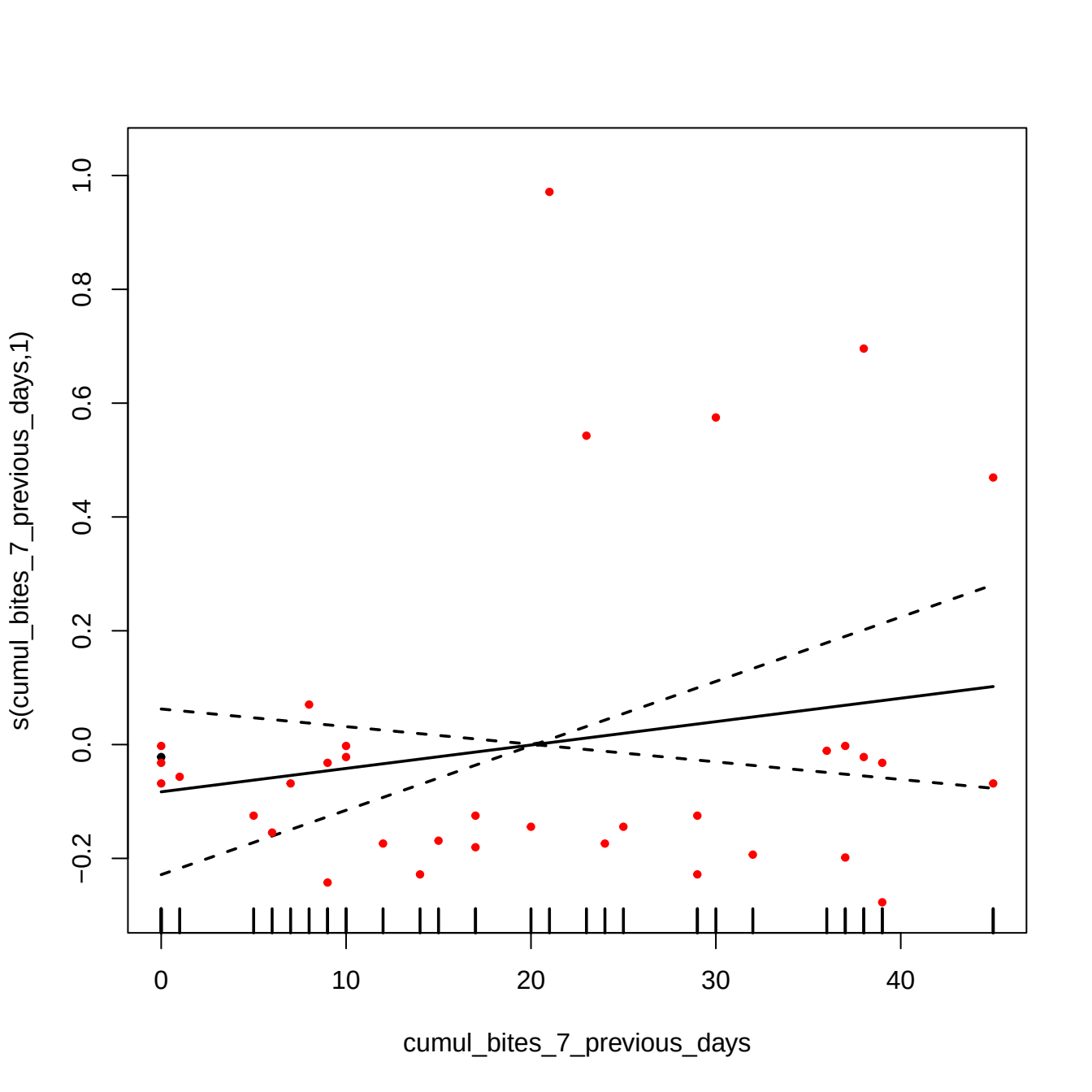
IL.1B ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

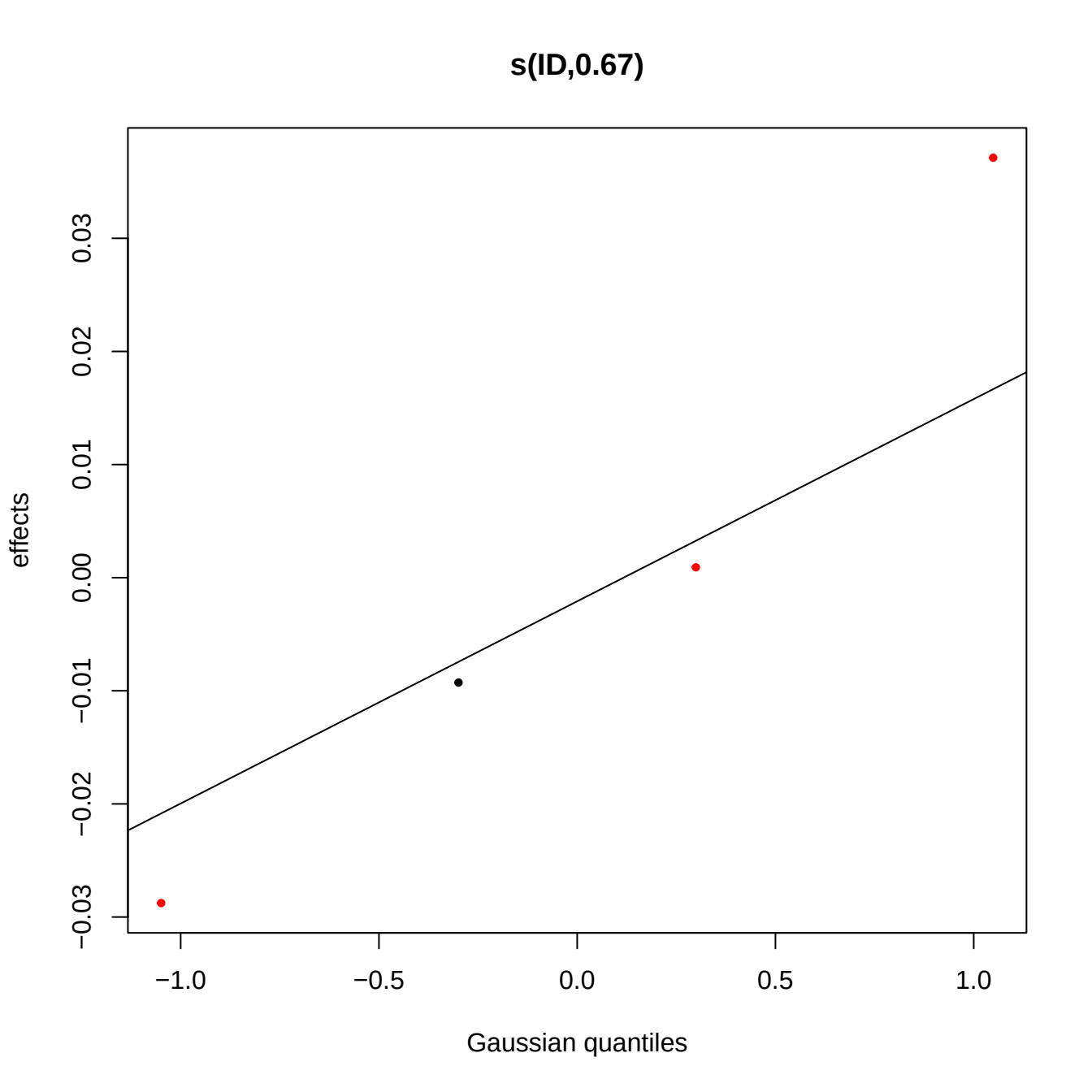
IL.2

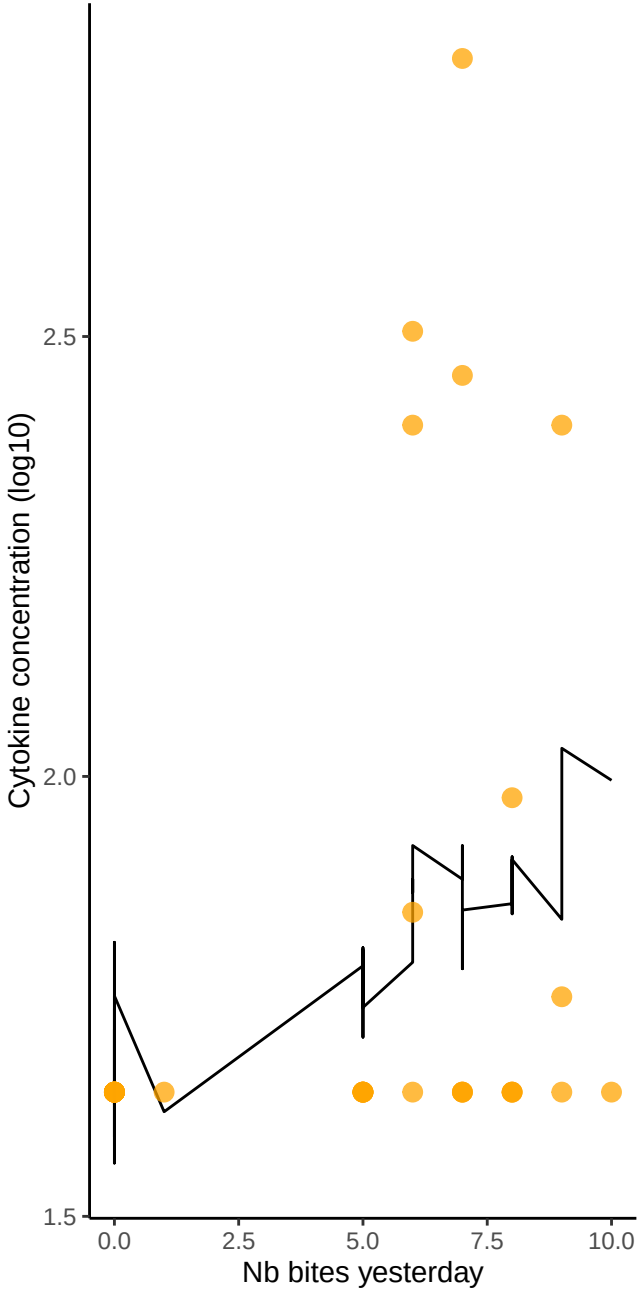
Bites in cyno

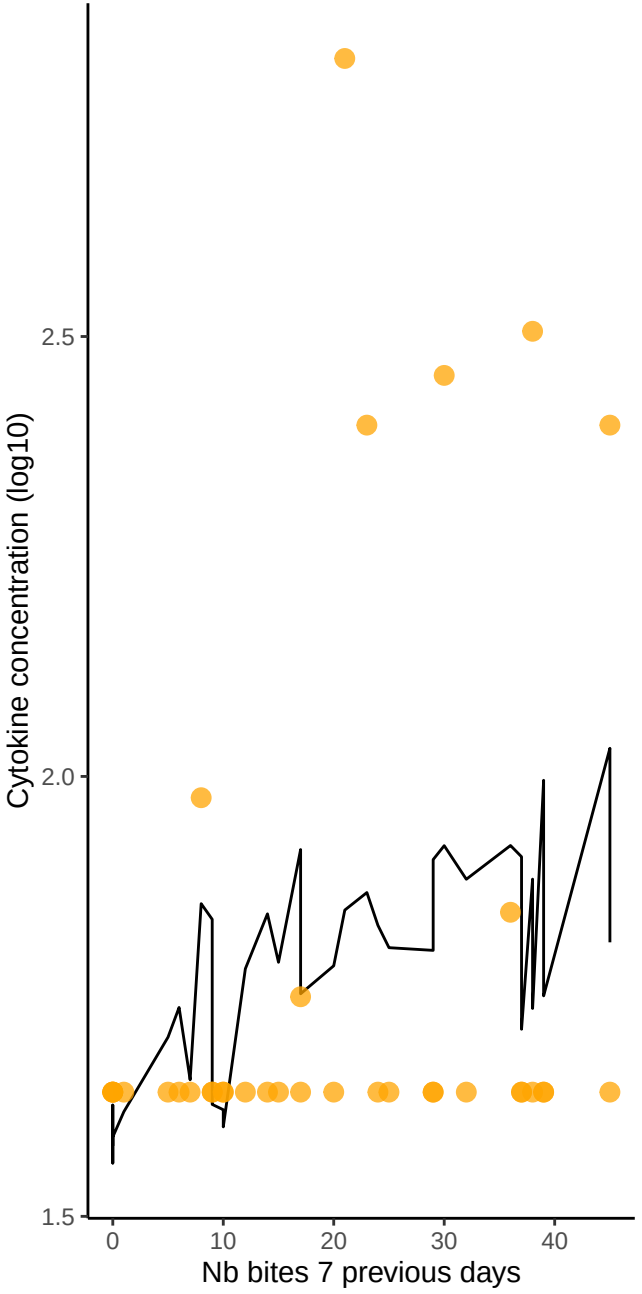
Nb obs: 36

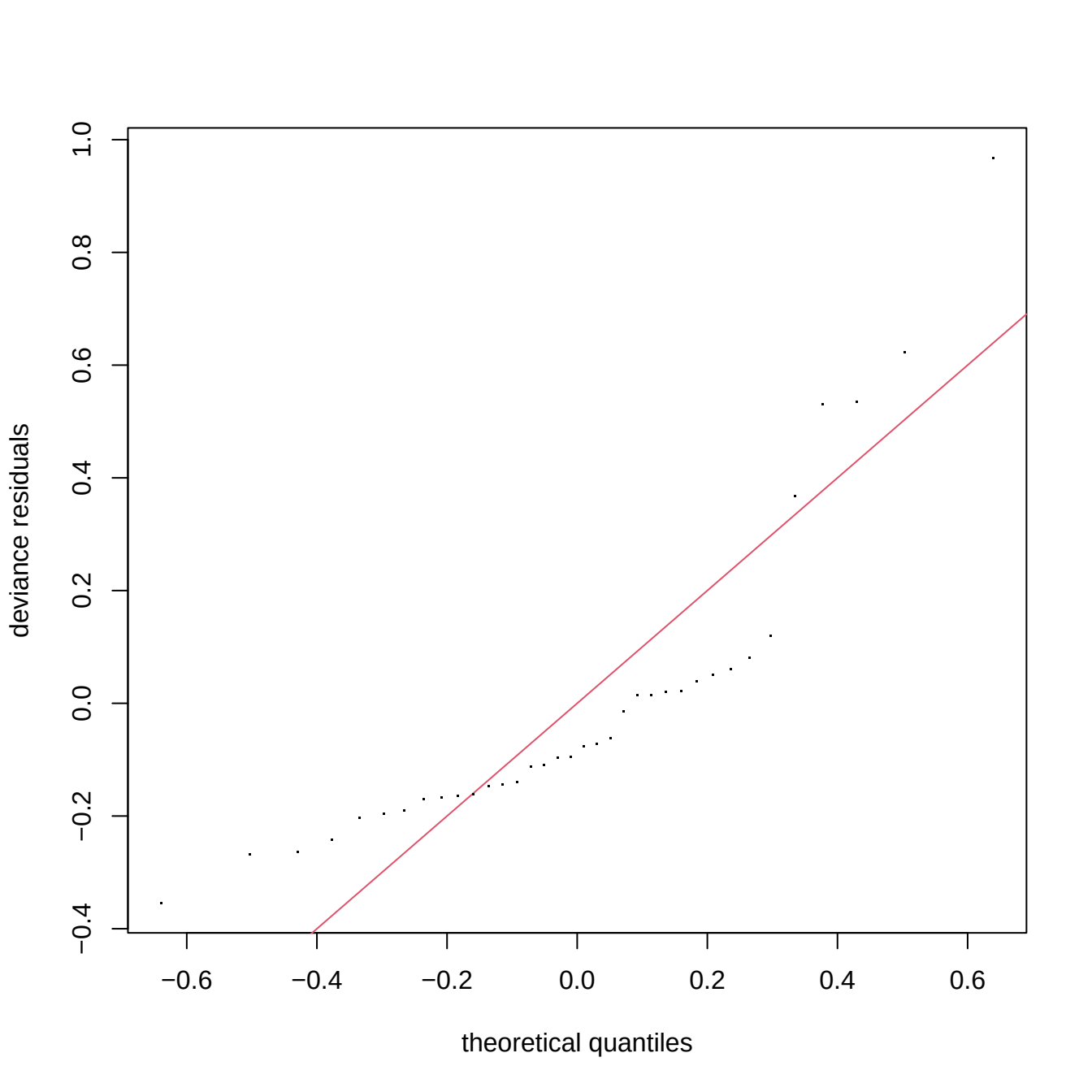

s(bites_of_yesterday,1)
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
2
4
6
8
10
bites_of_yesterday

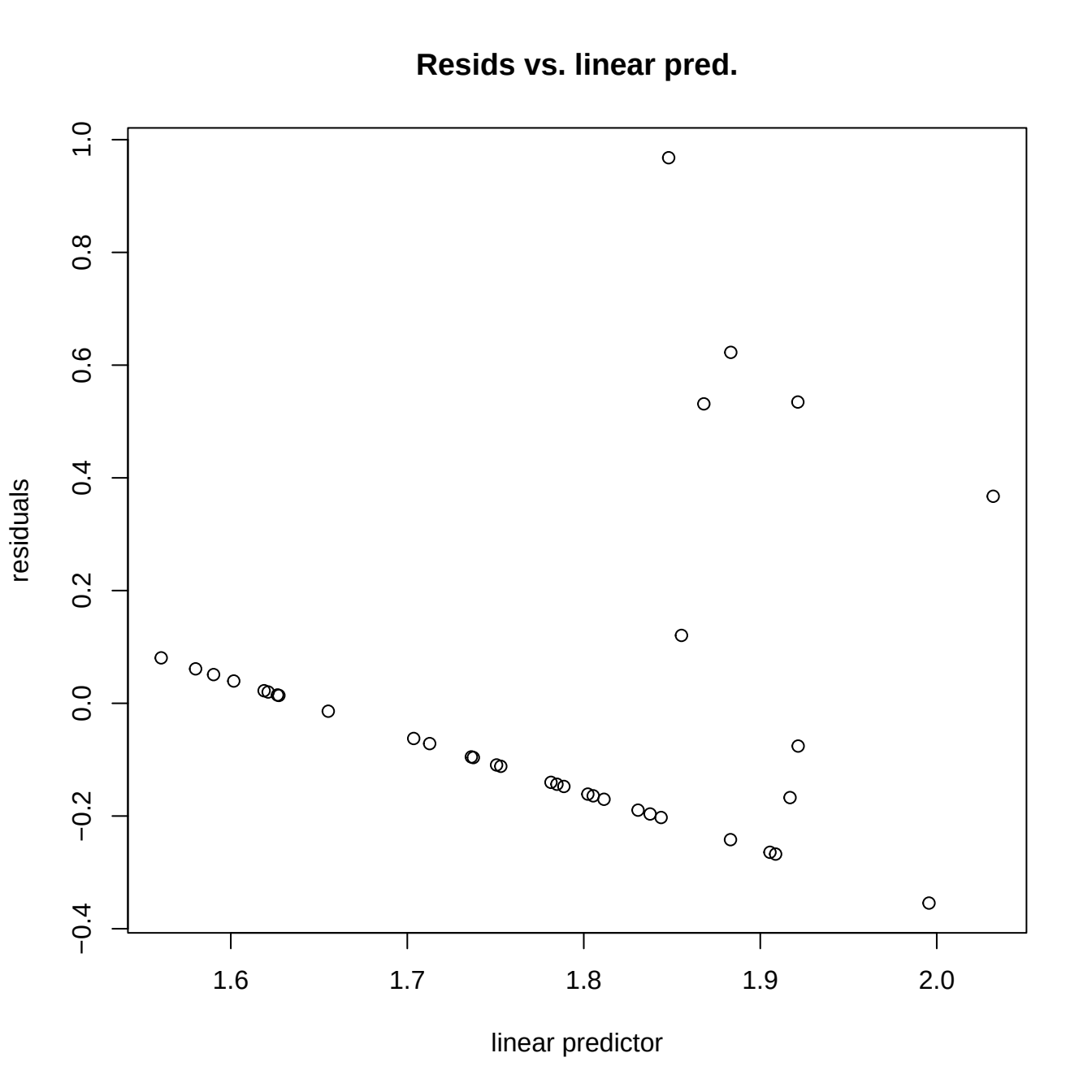

s(cumul_bites_7_previous_days,1)
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0
10
20
30
40
cumul_bites_7_previous_days

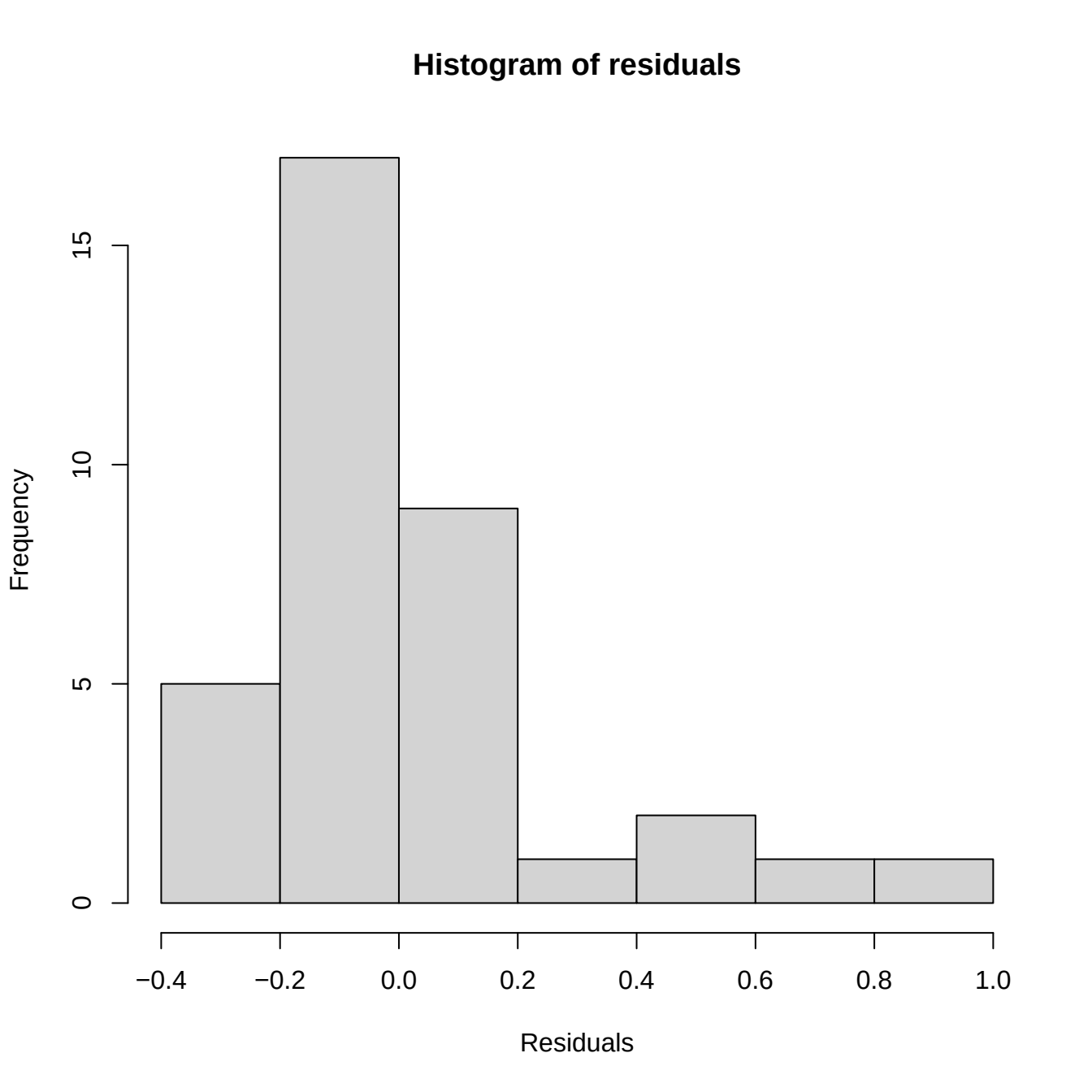

s(ID,0.67)
effects
0.03
0.02
0.01
0.00
−0.01
−0.02
−0.03
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles

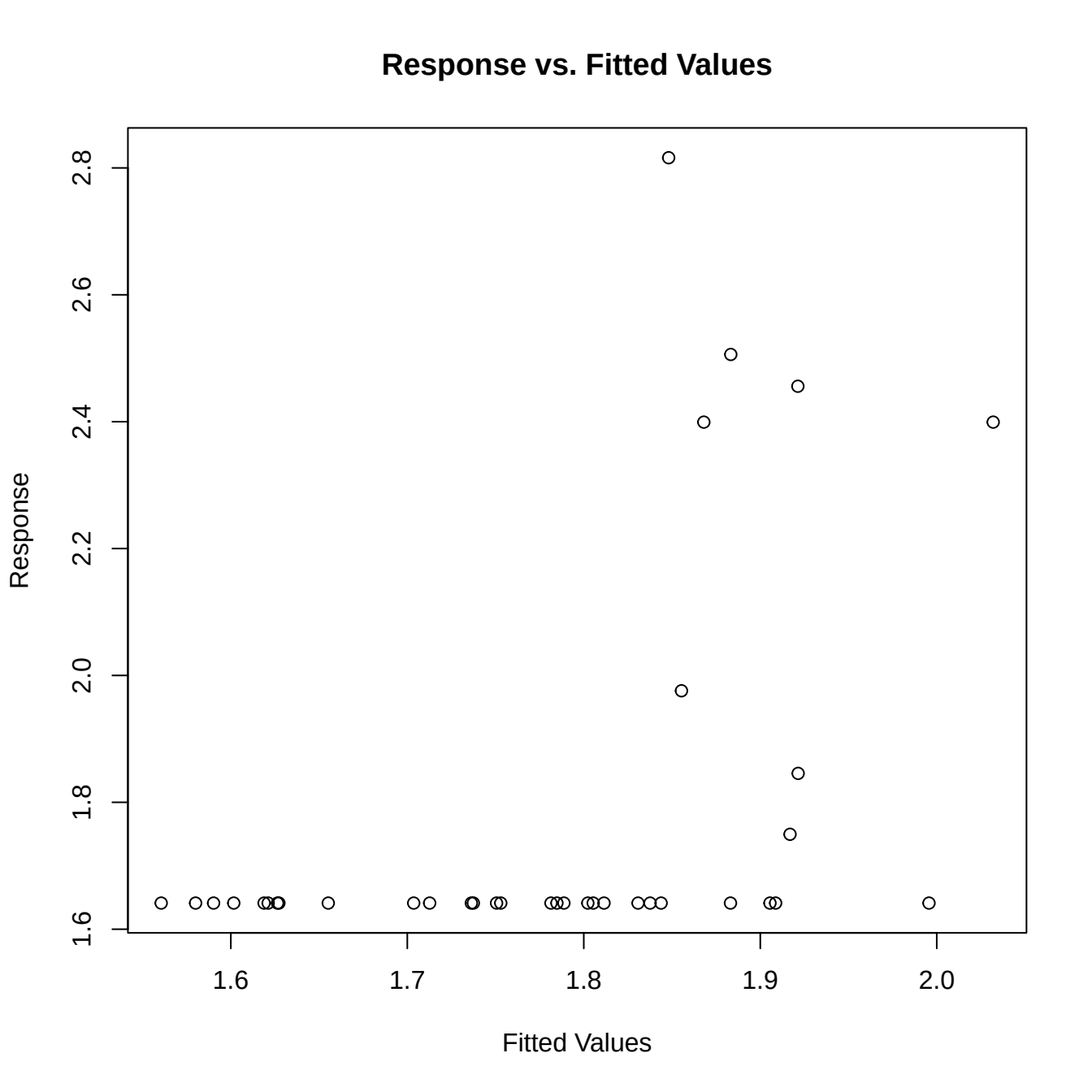

Cytokine concentration (log10)
2.5
2.0
1.5
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday


Cytokine concentration (log10)
2.5
2.0
1.5
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6
theoretical quantiles


Resids vs. linear pred.
residuals
linear predictor
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
1.6
1.7
1.8
1.9
2.0


Histogram of residuals
Frequency
0
5
10
15
−0.4
−0.2
0.0
0.2
0.4
0.6
0.8
1.0
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.6
1.8
2.0
2.2
2.4
2.6
2.8
1.6
1.7
1.8
1.9
2.0

```
Method: ML   Optimizer: outer newton
full convergence after 14 iterations.
Gradient range [−1.456899e−06,1.78794e−07]
(score 5.618909 & scale 0.08440841).
Hessian positive definite, eigenvalue range [6.347374e−07,18.01146].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                   k'   edf k−index p−value
s(bites_of_yesterday)          3.000 1.000    1.00    0.41
s(cumul_bites_7_previous_days) 3.000 1.000    0.97    0.34
s(ID)                          4.000 0.674      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.78056    0.05506   32.34   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df     F p-value
s(bites_of_yesterday)         1.0000      1 2.817   0.103
s(cumul_bites_7_previous_days) 1.0000      1 1.301   0.262
s(ID)                         0.6744      3 0.358   0.210

R-sq.(adj) =  0.133   Deviance explained = 19.9%
-ML = 5.6189  Scale est. = 0.084408  n = 36
```

AICc [1] 21.84841

Bites in squirrel

Nb obs: 20

IL.2 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

IL.4

Bites in cyno

Nb obs: 36

IL.4 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

Bites in squirrel

Nb obs: 20

IL.4 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

IL.5

Bites in cyno

Nb obs: 36

IL.5 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

Bites in squirrel

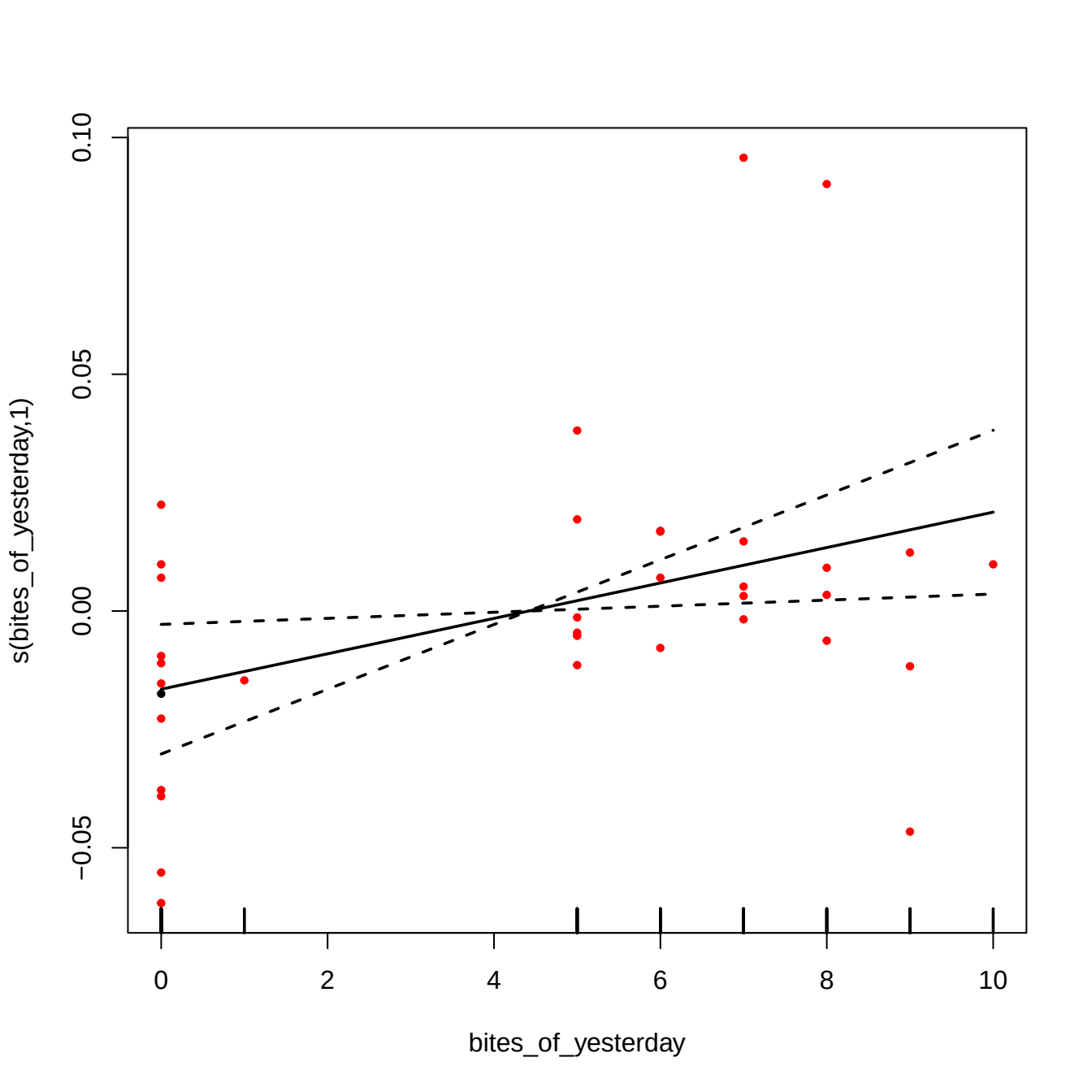
Nb obs: 20

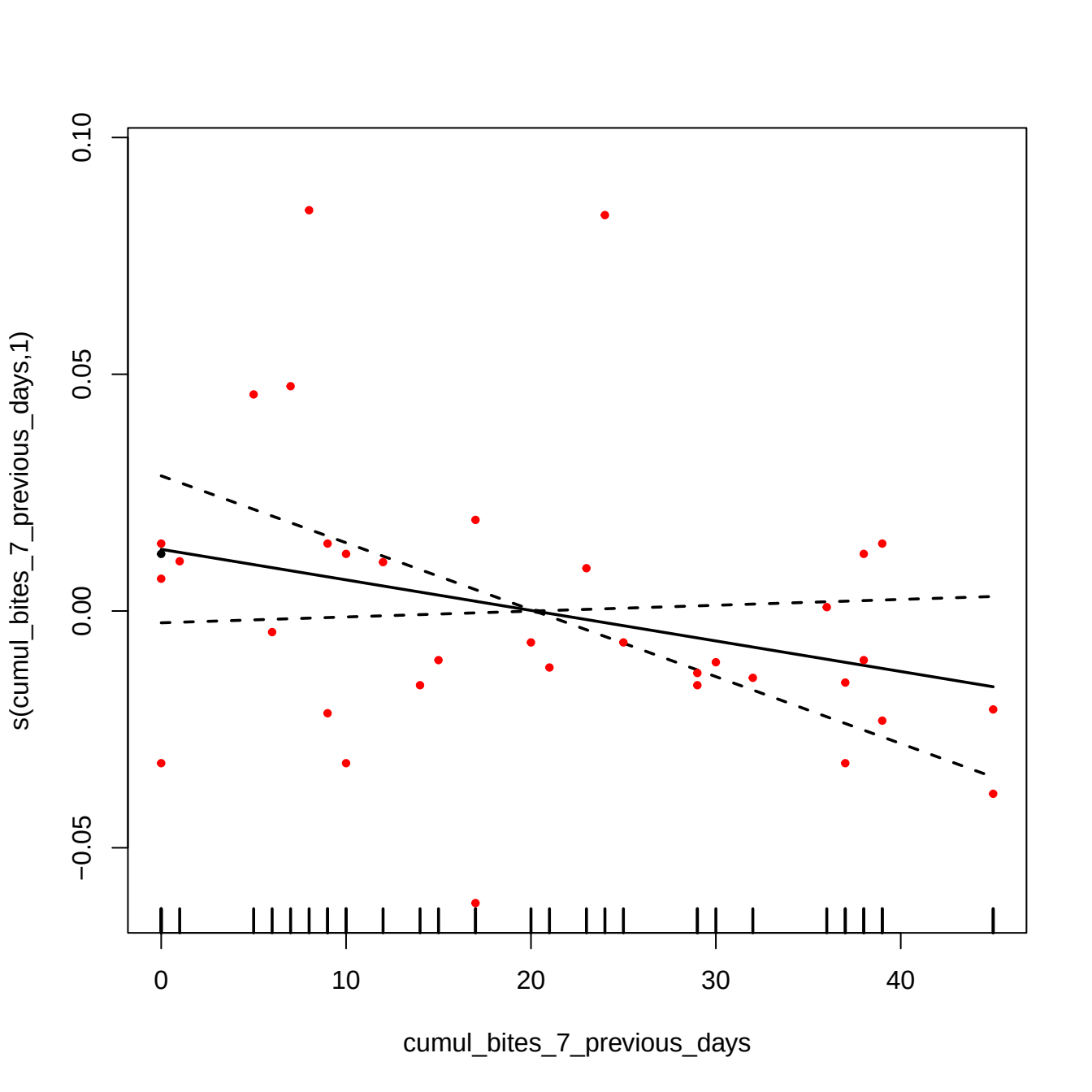
IL.5 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

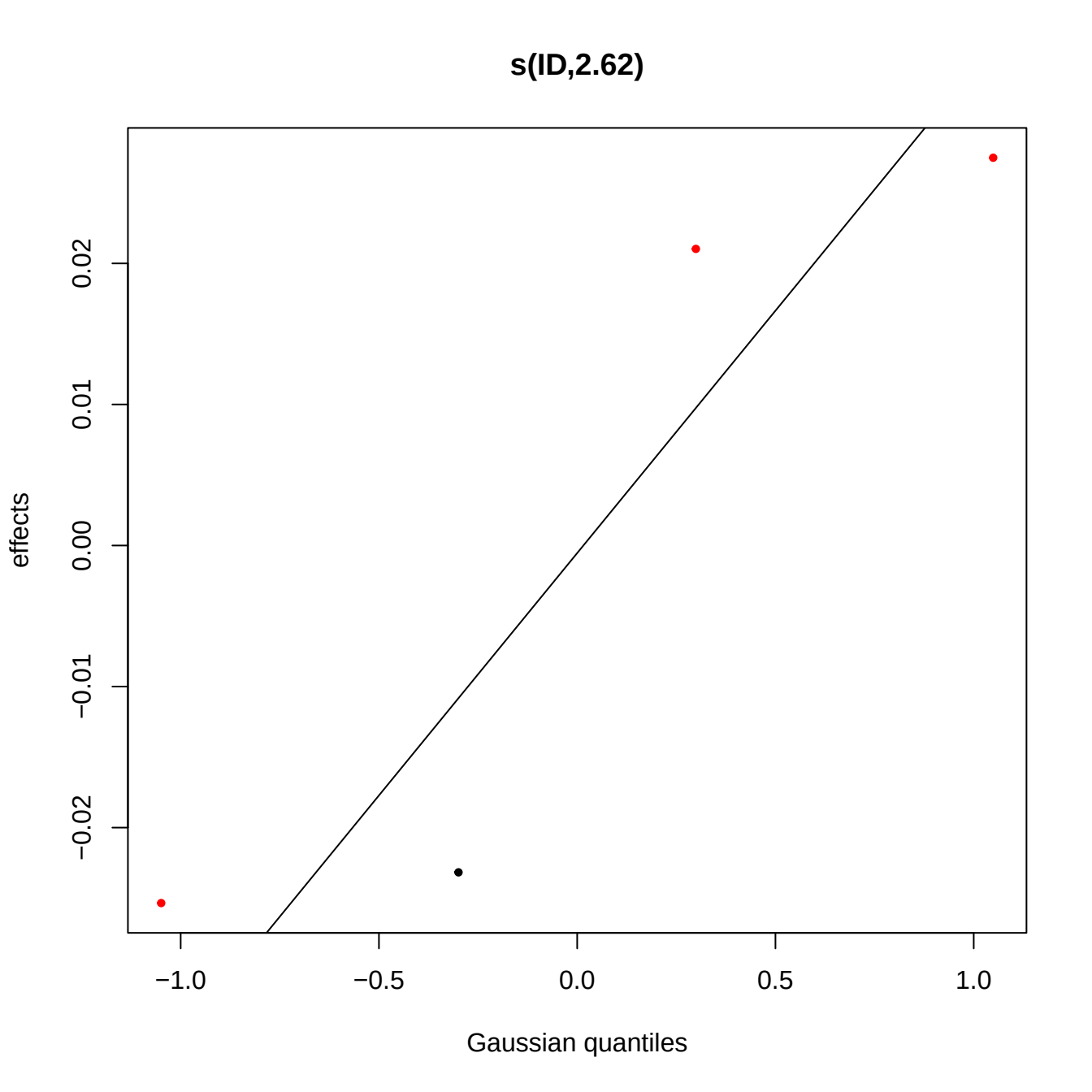
IL.6

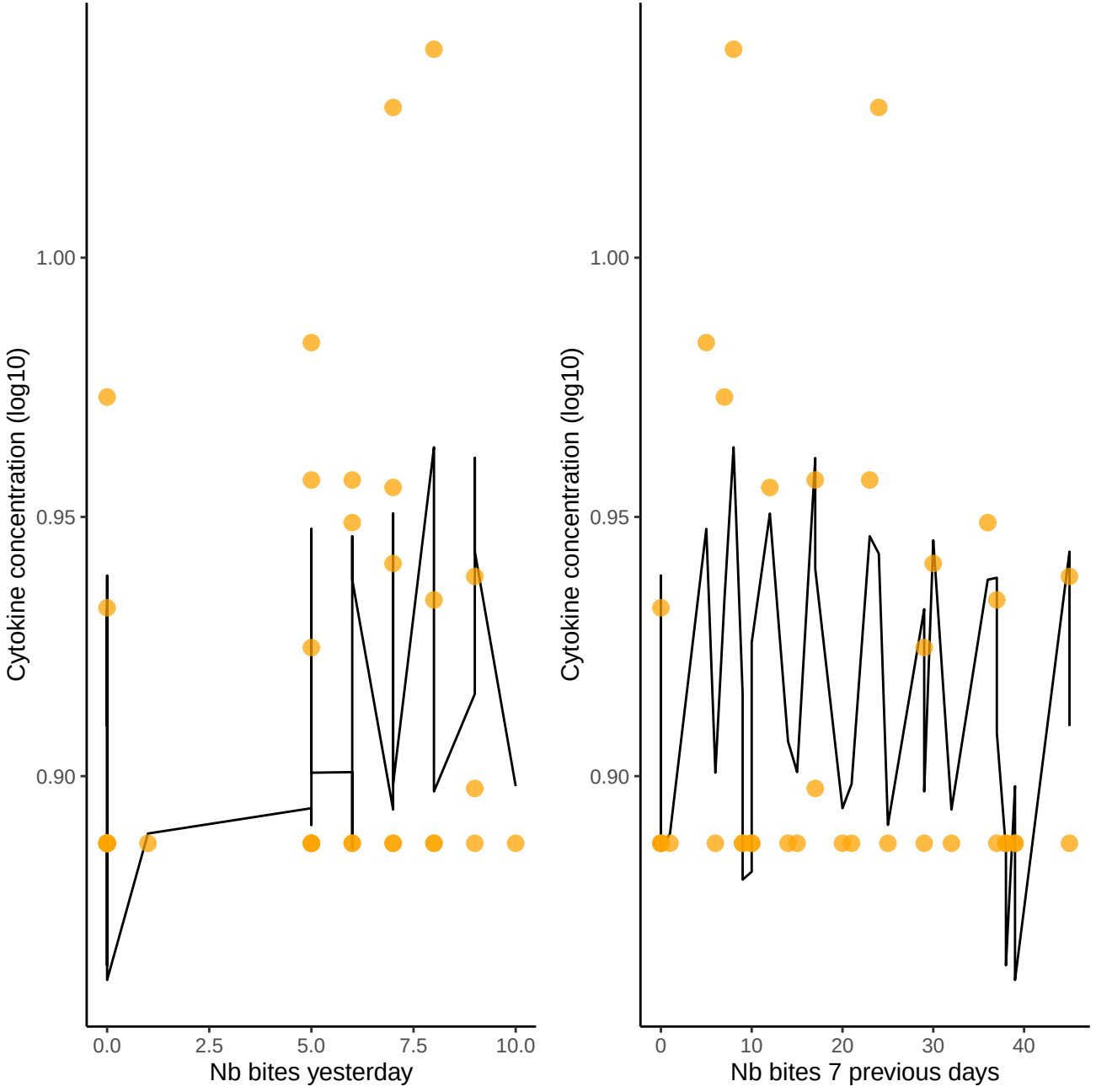
Bites in cyno

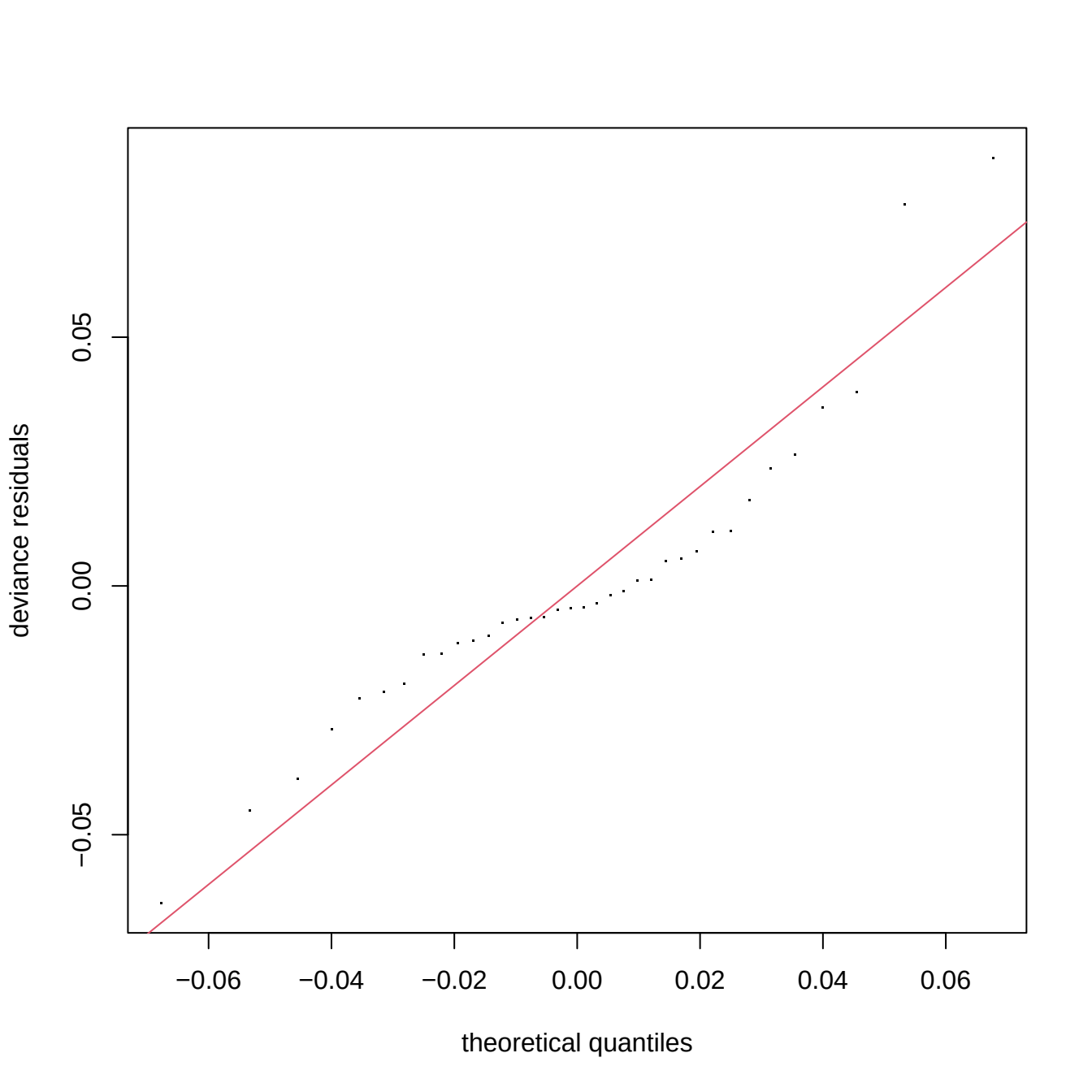
Nb obs: 36

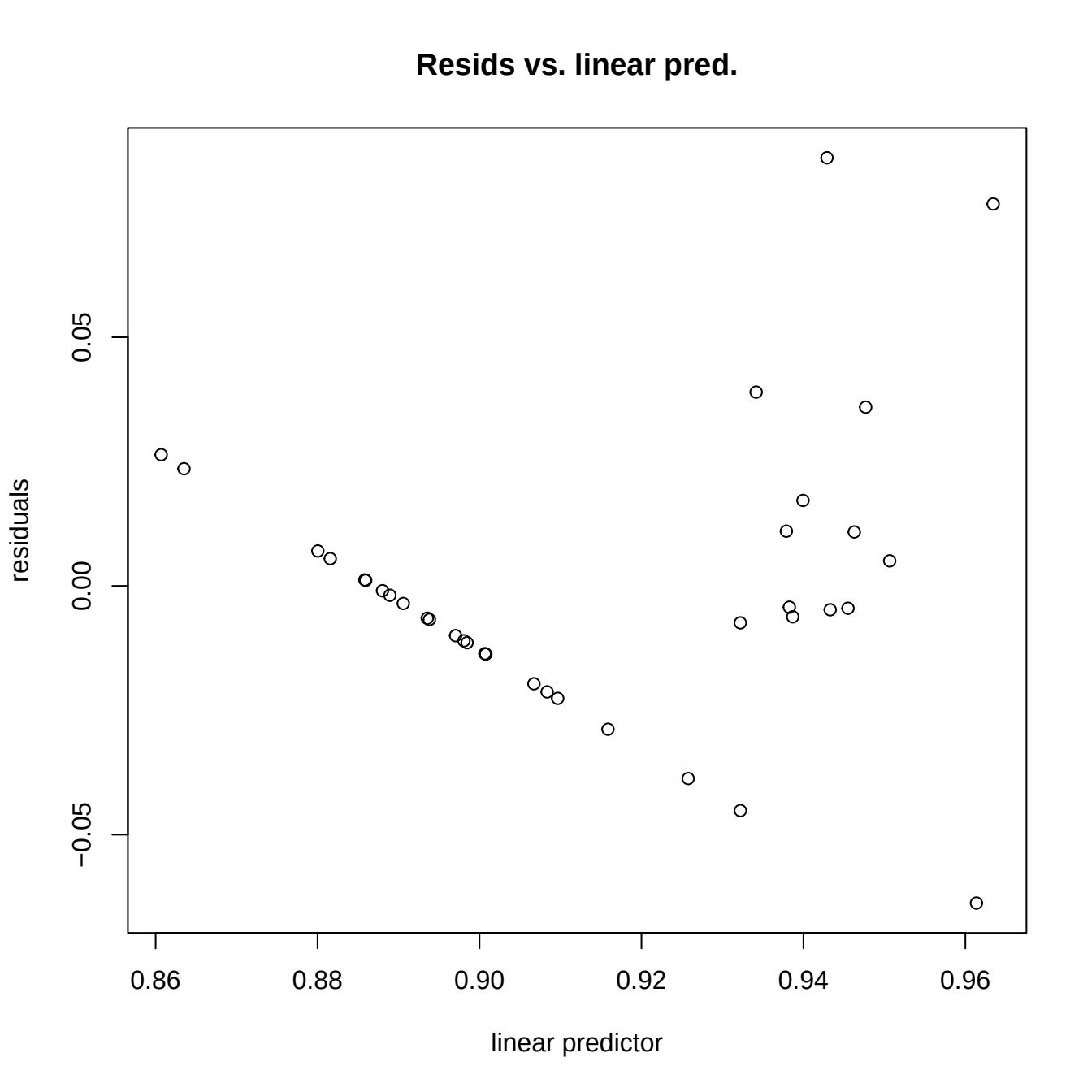

s(bites_of_yesterday,1)
0.10
0.05
0.00
−0.05
0
2
4
6
8
10
bites_of_yesterday

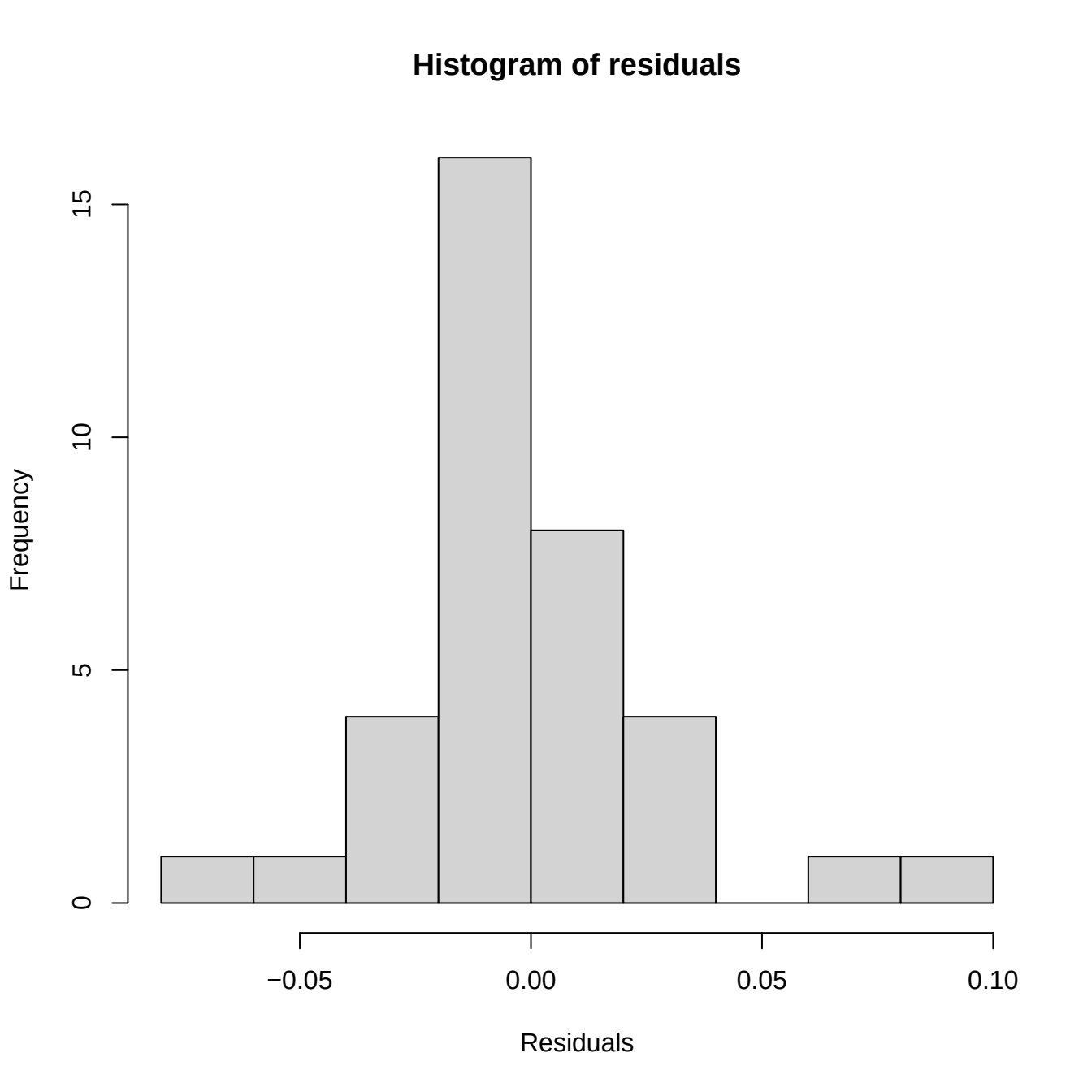

s(cumul_bites_7_previous_days,1)
0.10
0.05
0.00
−0.05
0
10
20
30
40
cumul_bites_7_previous_days

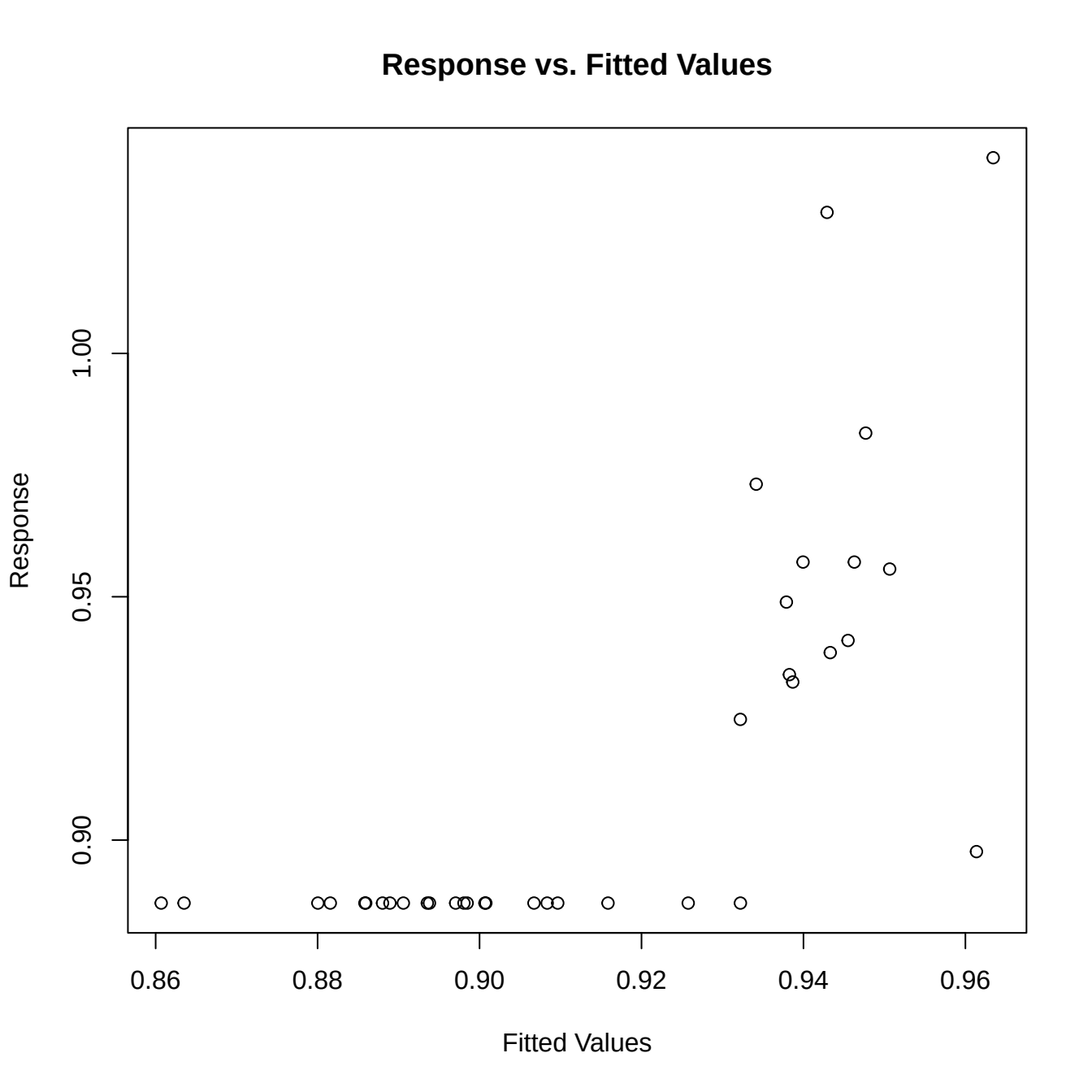

s(ID,2.62)
effects
0.02
0.01
0.00
−0.01
−0.02
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
1.00
0.95
0.90
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
1.00
0.95
0.90
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.05
0.00
−0.05
−0.06
−0.04
−0.02
0.00
0.02
0.04
0.06
theoretical quantiles


Resids vs. linear pred.
residuals
0.05
0.00
−0.05
0.86
0.88
0.90
0.92
0.94
0.96
linear predictor


Histogram of residuals
Frequency
0
5
10
15
−0.05
0.00
0.05
0.10
Residuals


Response vs. Fitted Values
Response
1.00
0.95
0.90
0.86
0.88
0.90
0.92
0.94
0.96
Fitted Values

```
Method: ML   Optimizer: outer newton
full convergence after 12 iterations.
Gradient range [−2.045525e−05,7.823253e−06]
(score −71.31694 & scale 0.0009469296).
Hessian positive definite, eigenvalue range [1.142701e−05,18.18327].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k'  edf k−index p−value
s(bites_of_yesterday)         3.00 1.00    0.87    0.18
s(cumul_bites_7_previous_days) 3.00 1.00    1.04    0.49
s(ID)                         4.00 2.62      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.91468    0.01443   63.38   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df     F  p-value
s(bites_of_yesterday)         1.000      1 5.826 0.022101 *
s(cumul_bites_7_previous_days) 1.000      1 2.818 0.103603
s(ID)                         2.618      3 8.562 0.000115 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =   0.47   Deviance explained =   54%
-ML = -71.317  Scale est. = 0.00094693  n = 36
```

AICc [1] −136.8421

Bites in squirrel

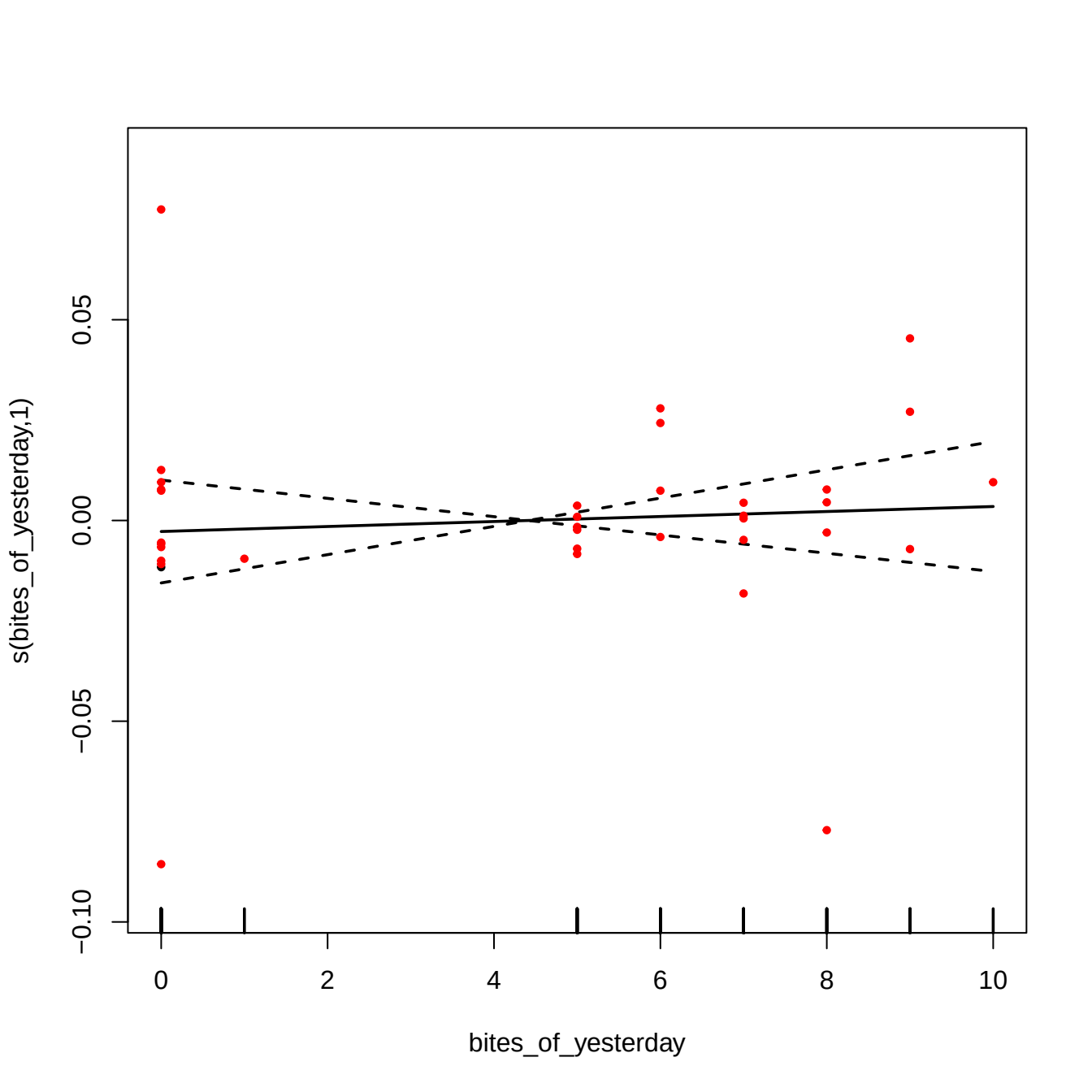
Nb obs: 20

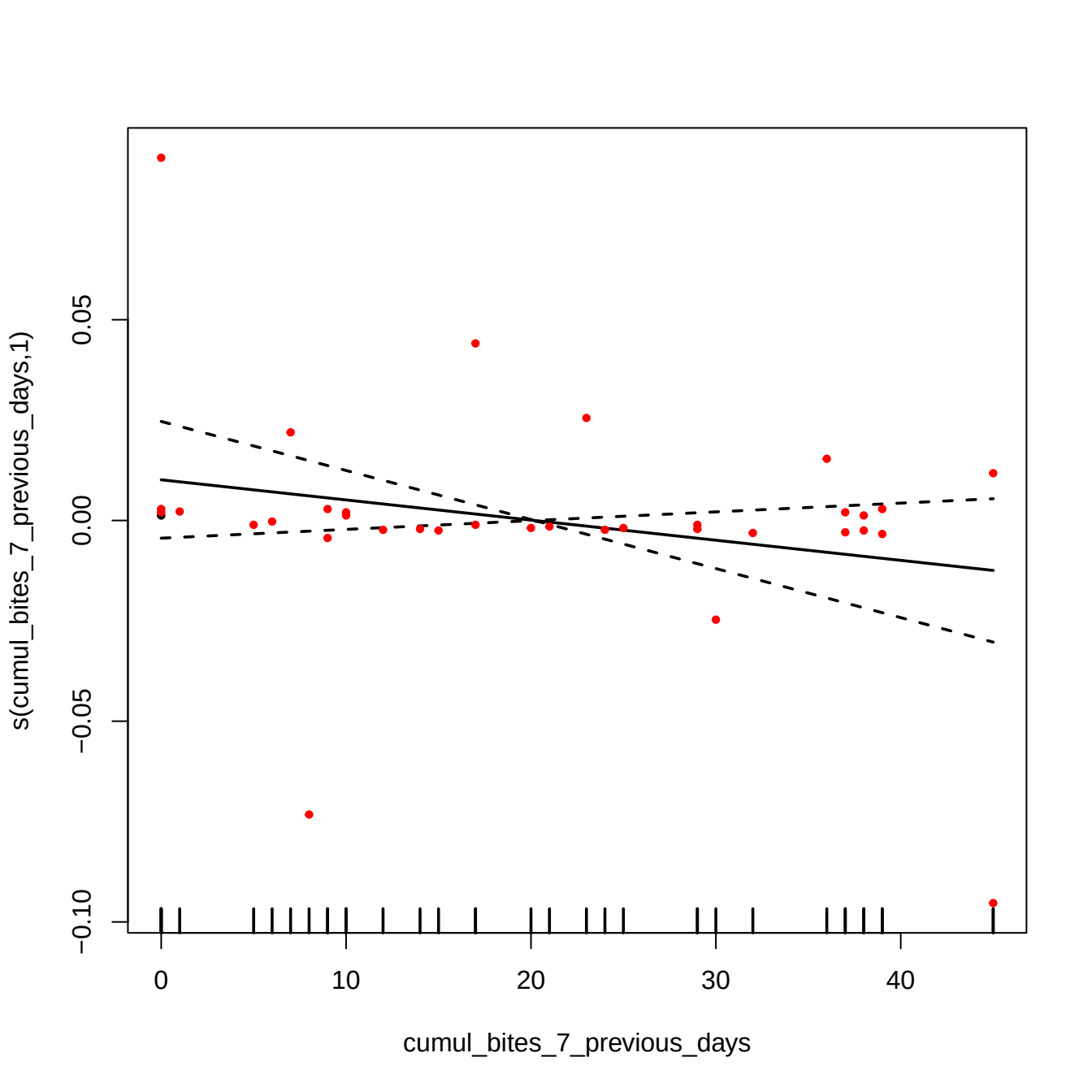
IL.6 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

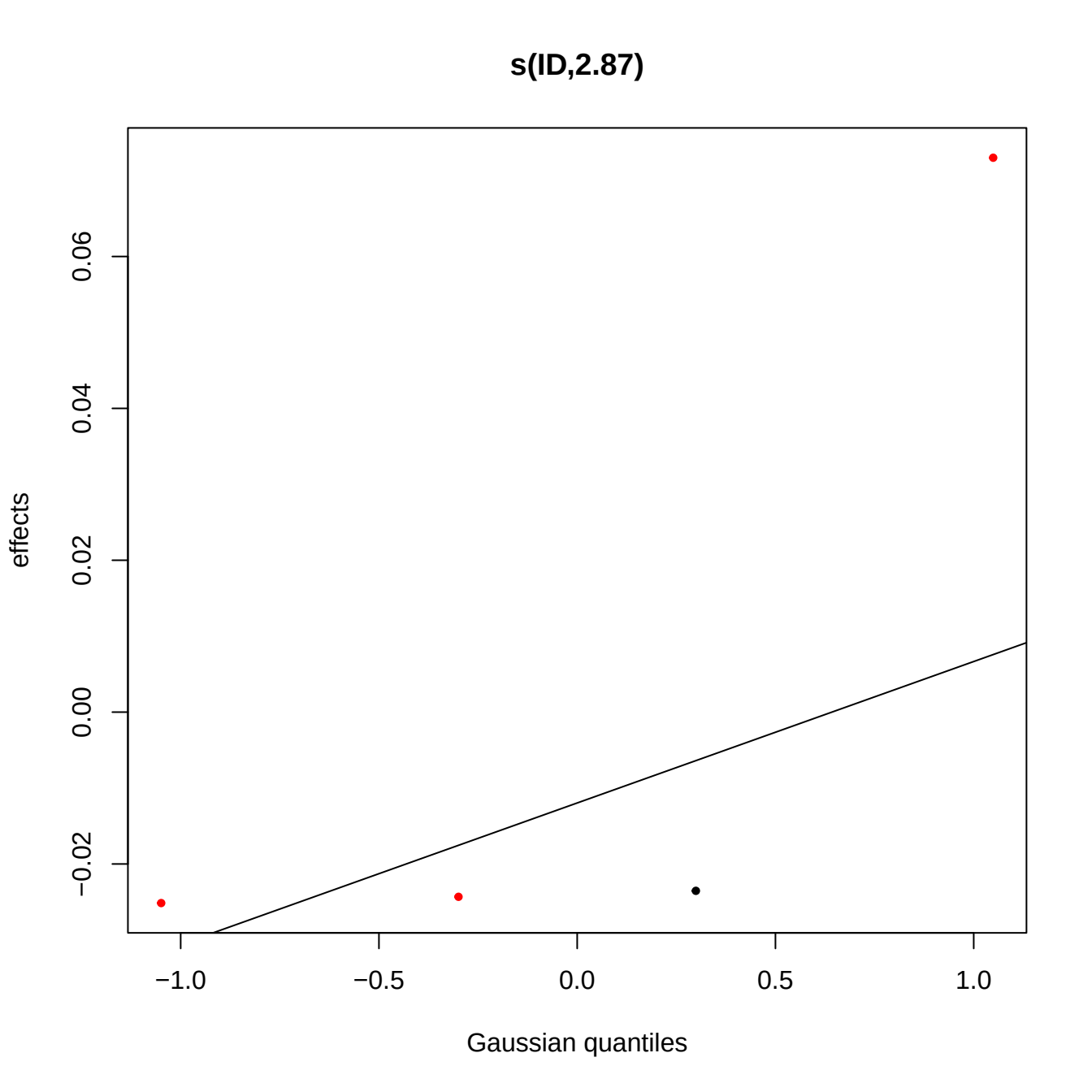
IL.8

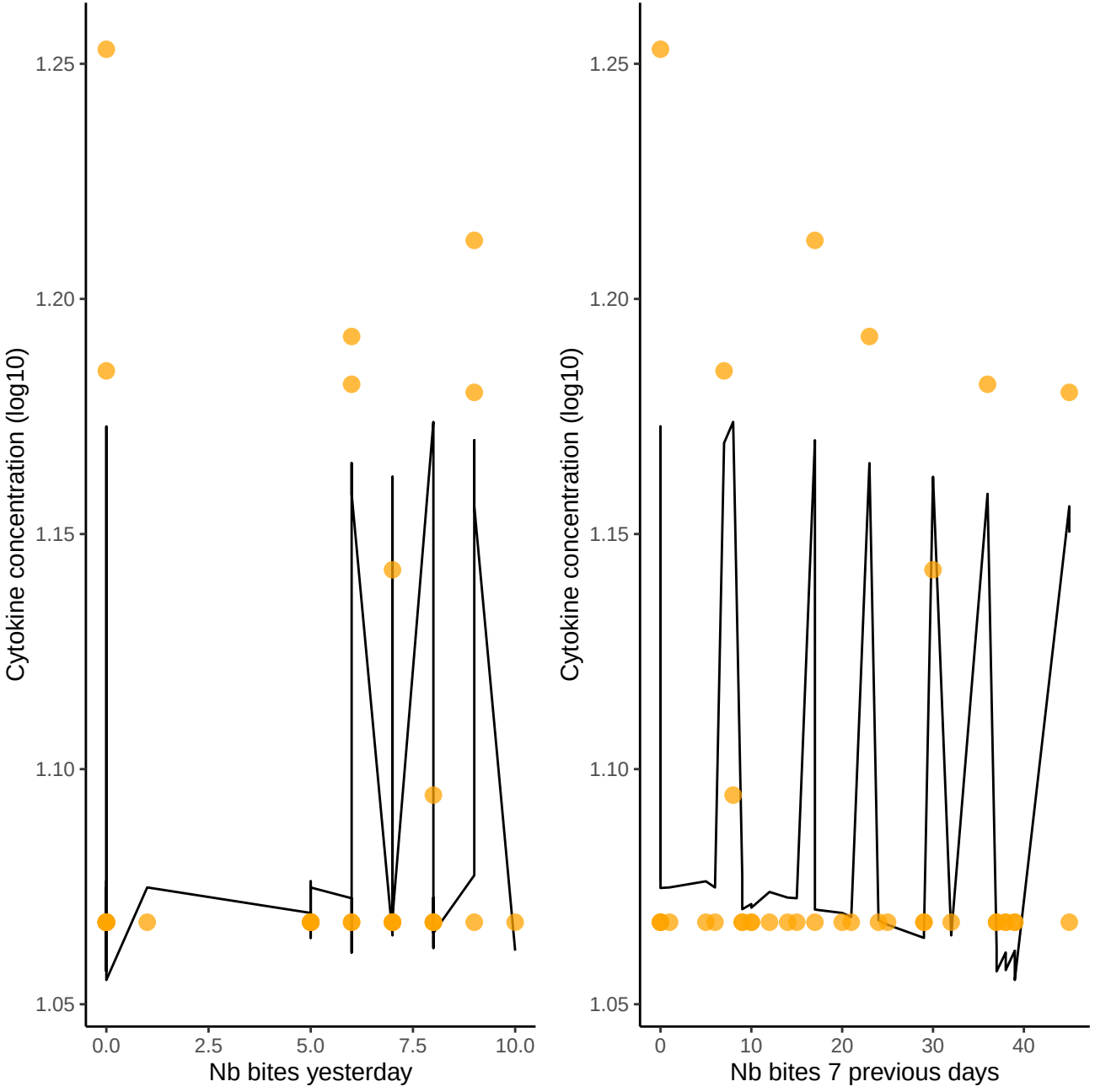
Bites in cyno

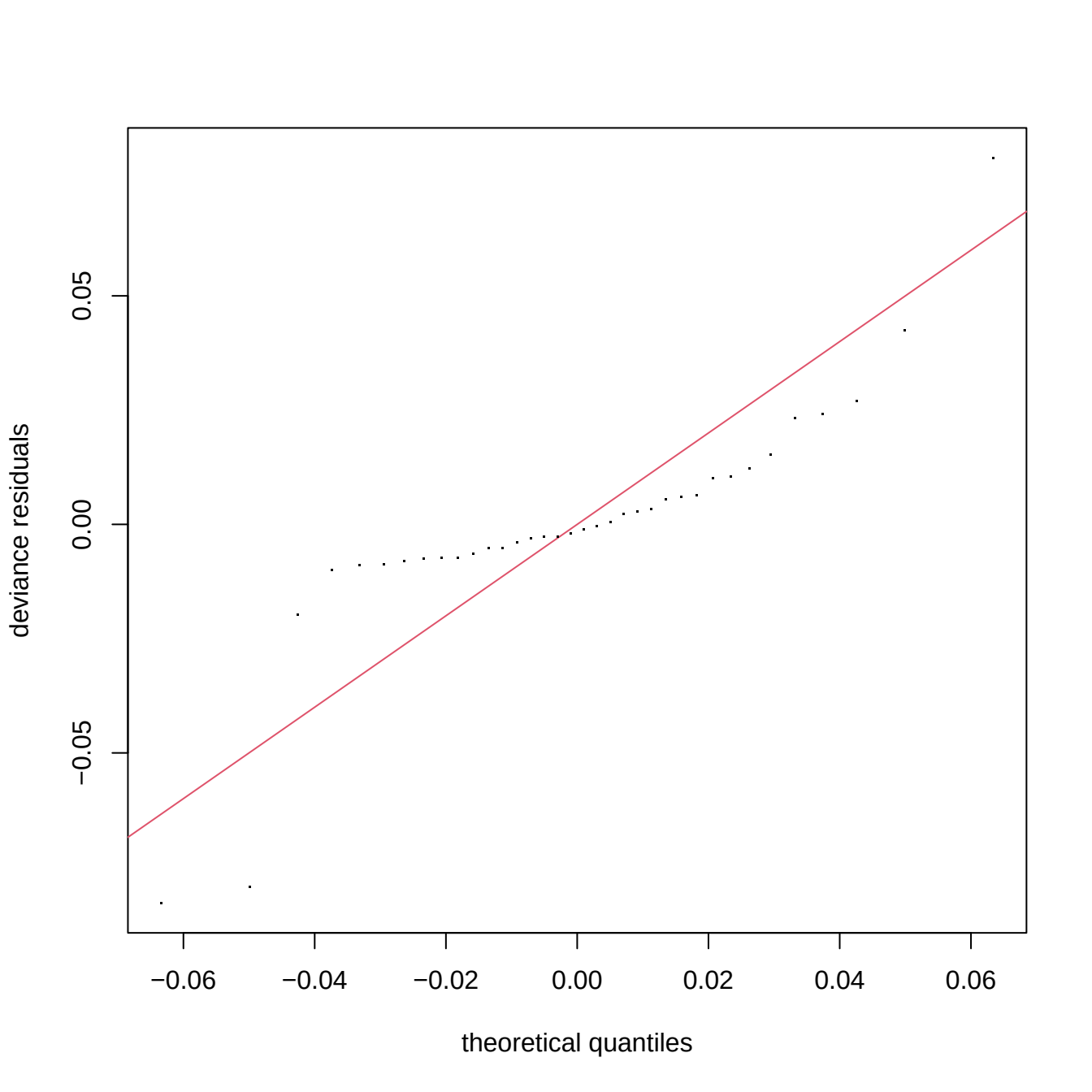
Nb obs: 36

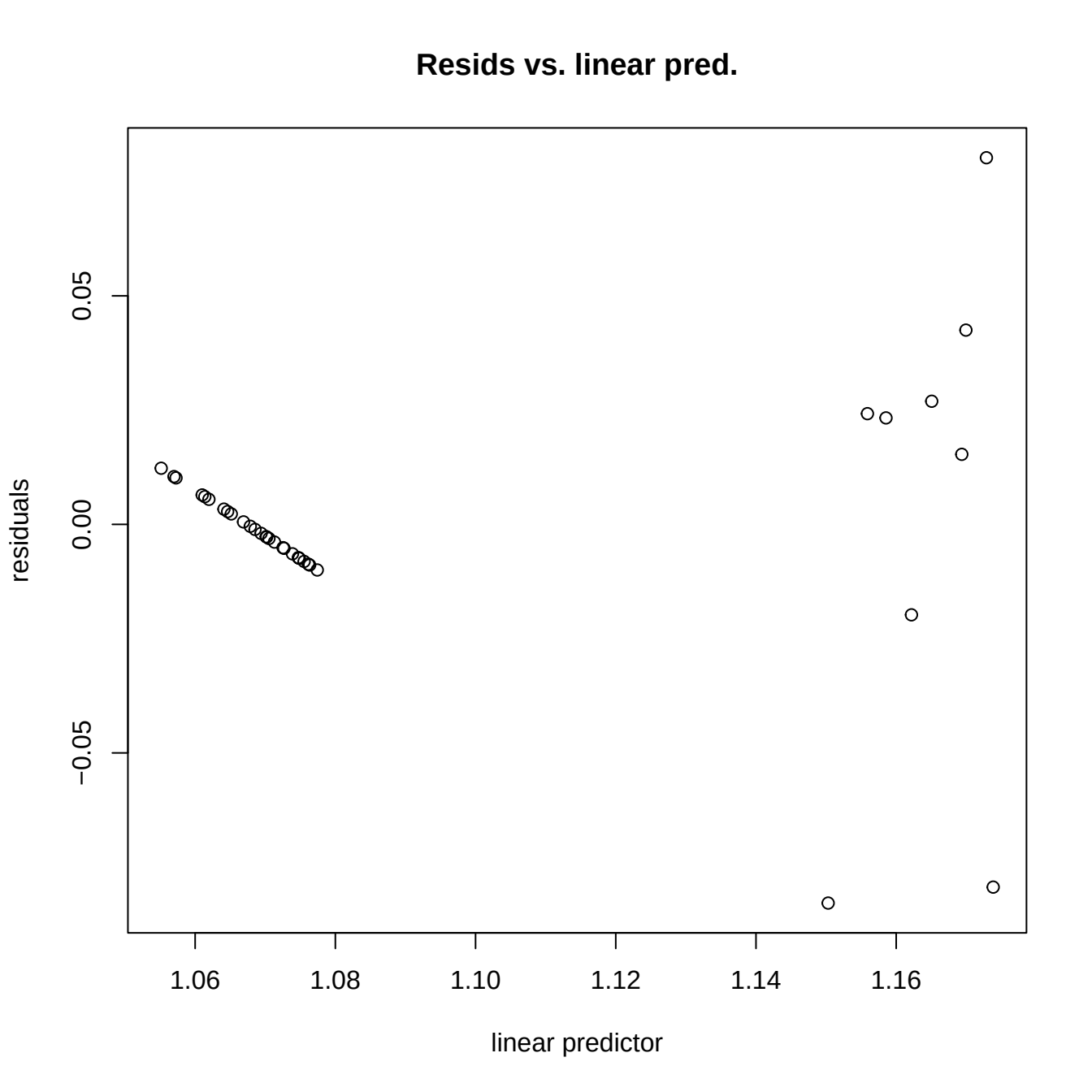

s(bites_of_yesterday,1)
0.05
0.00
−0.05
−0.10
0
2
4
6
8
10
bites_of_yesterday

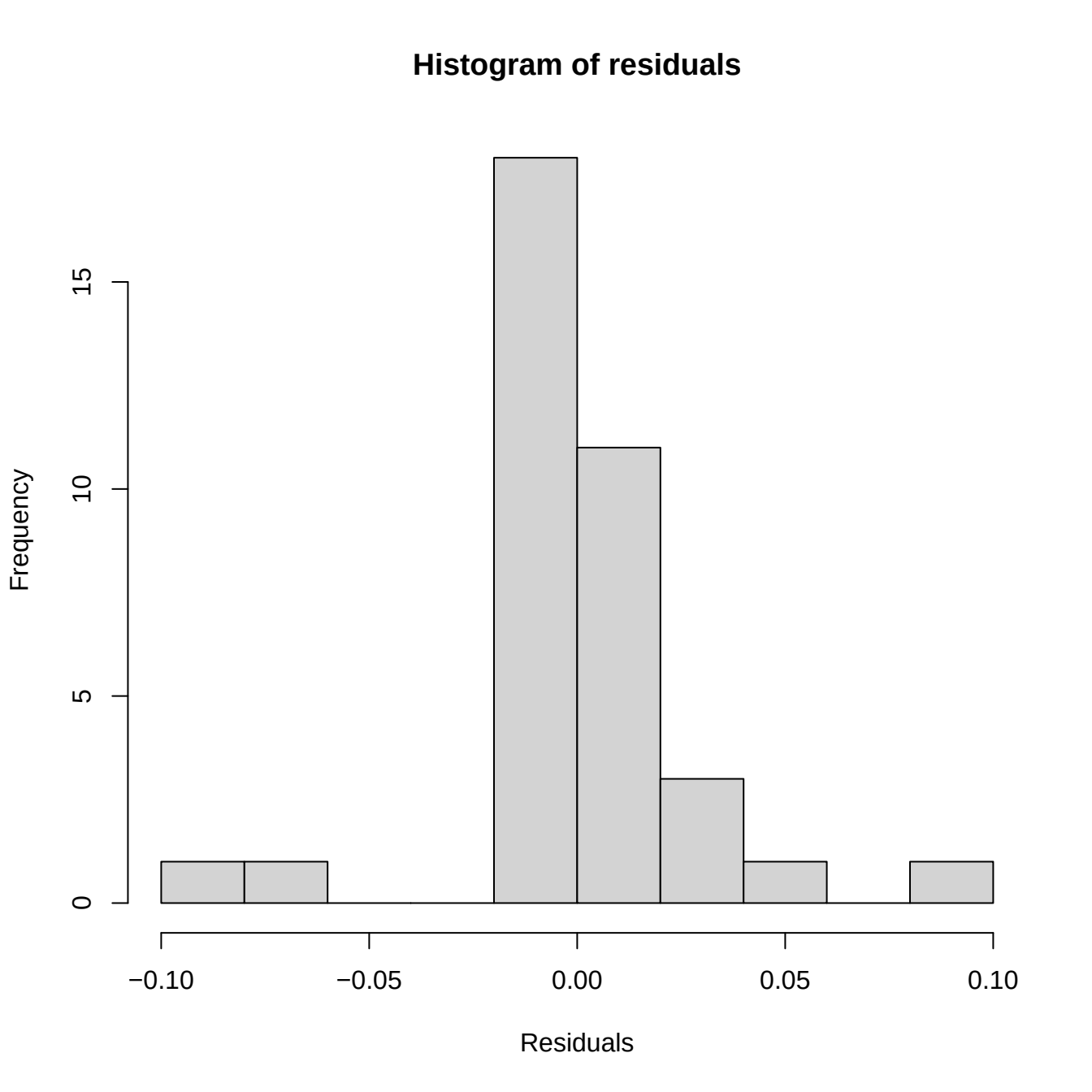

s(cumul_bites_7_previous_days,1)
0.05
0.00
−0.05
−0.10
0
10
20
30
40
cumul_bites_7_previous_days

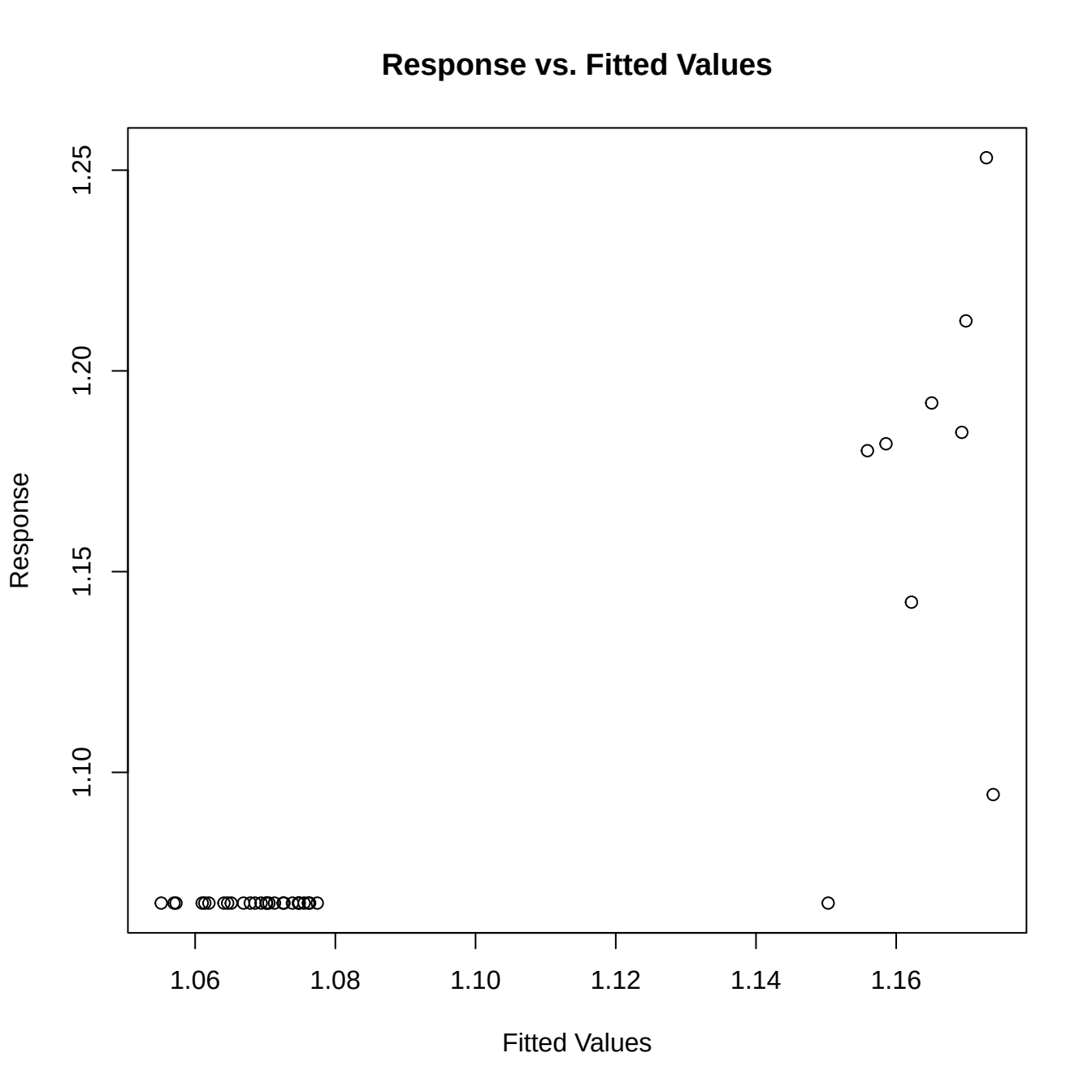

s(ID,2.87)
effects
0.06
0.04
0.02
0.00
−0.02
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
1.25
1.20
1.15
1.10
1.05
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
1.25
1.20
1.15
1.10
1.05
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.05
0.00
−0.05
−0.06
−0.04
−0.02
0.00
0.02
0.04
0.06
theoretical quantiles


Resids vs. linear pred.
residuals
0.05
0.00
−0.05
1.06
1.08
1.10
1.12
1.14
1.16
linear predictor


Histogram of residuals
Frequency
0
5
10
15
−0.10
−0.05
0.00
0.05
0.10
Residuals


Response vs. Fitted Values
Response
1.10
1.15
1.20
1.25
1.06
1.08
1.10
1.12
1.14
1.16
Fitted Values

```
Method: ML   Optimizer: outer newton
full convergence after 10 iterations.
Gradient range [−2.923835e−05,2.827538e−06]
(score −71.56567 & scale 0.000829855).
Hessian positive definite, eigenvalue range [1.471799e−05,18.22273].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                 k'  edf k−index p−value
s(bites_of_yesterday)          3.00 1.00    0.92    0.23
s(cumul_bites_7_previous_days) 3.00 1.00    1.02    0.47
s(ID)                          4.00 2.87      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.09249    0.02279   47.94   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F p-value
s(bites_of_yesterday)         1.000      1  0.184   0.671
s(cumul_bites_7_previous_days) 1.000      1  1.942   0.174
s(ID)                         2.866      3 26.339  <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.692   Deviance explained = 73.5%
-ML = -71.566  Scale est. = 0.00082985  n = 36
```

AICc [1] −141.7083

Bites in squirrel

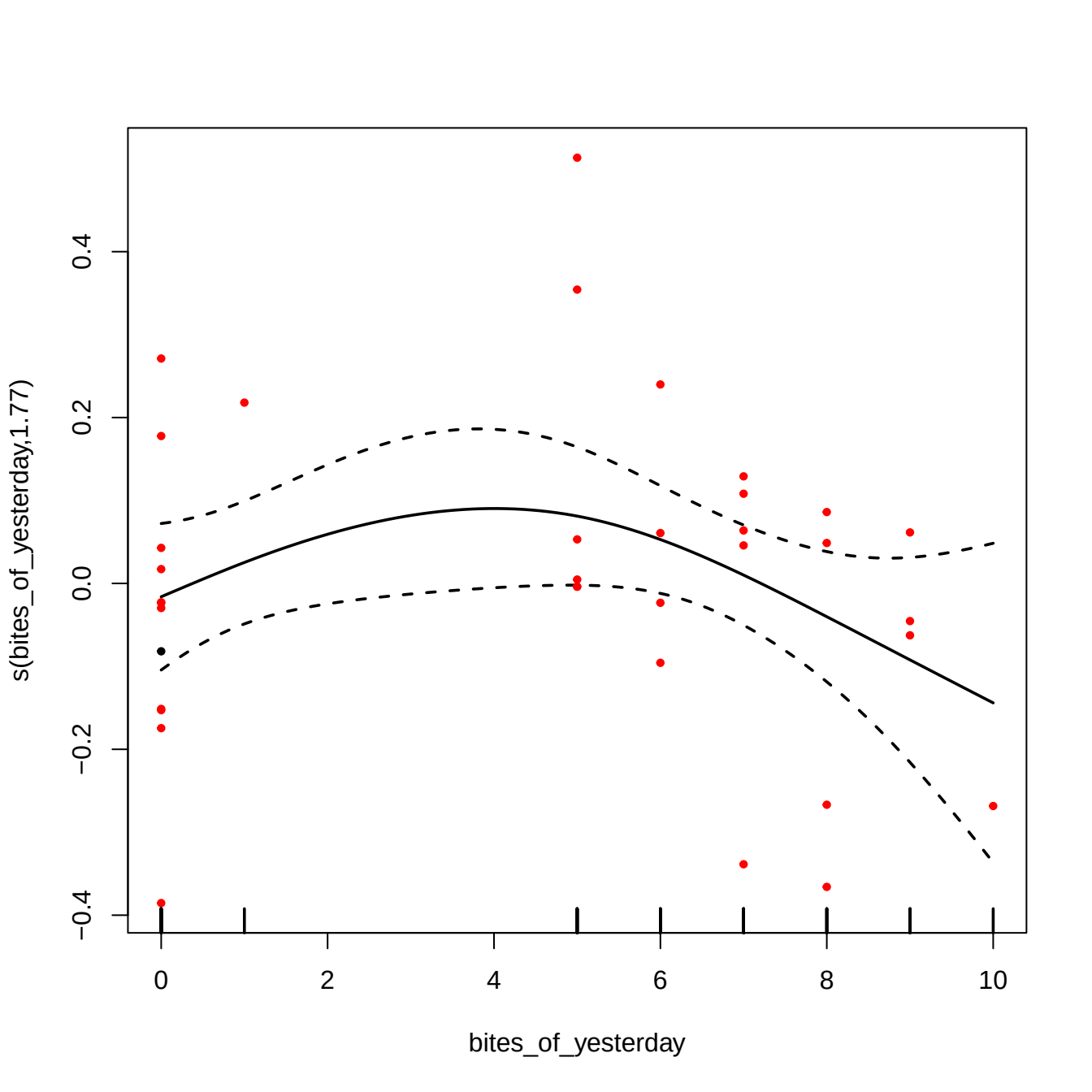
Nb obs: 20

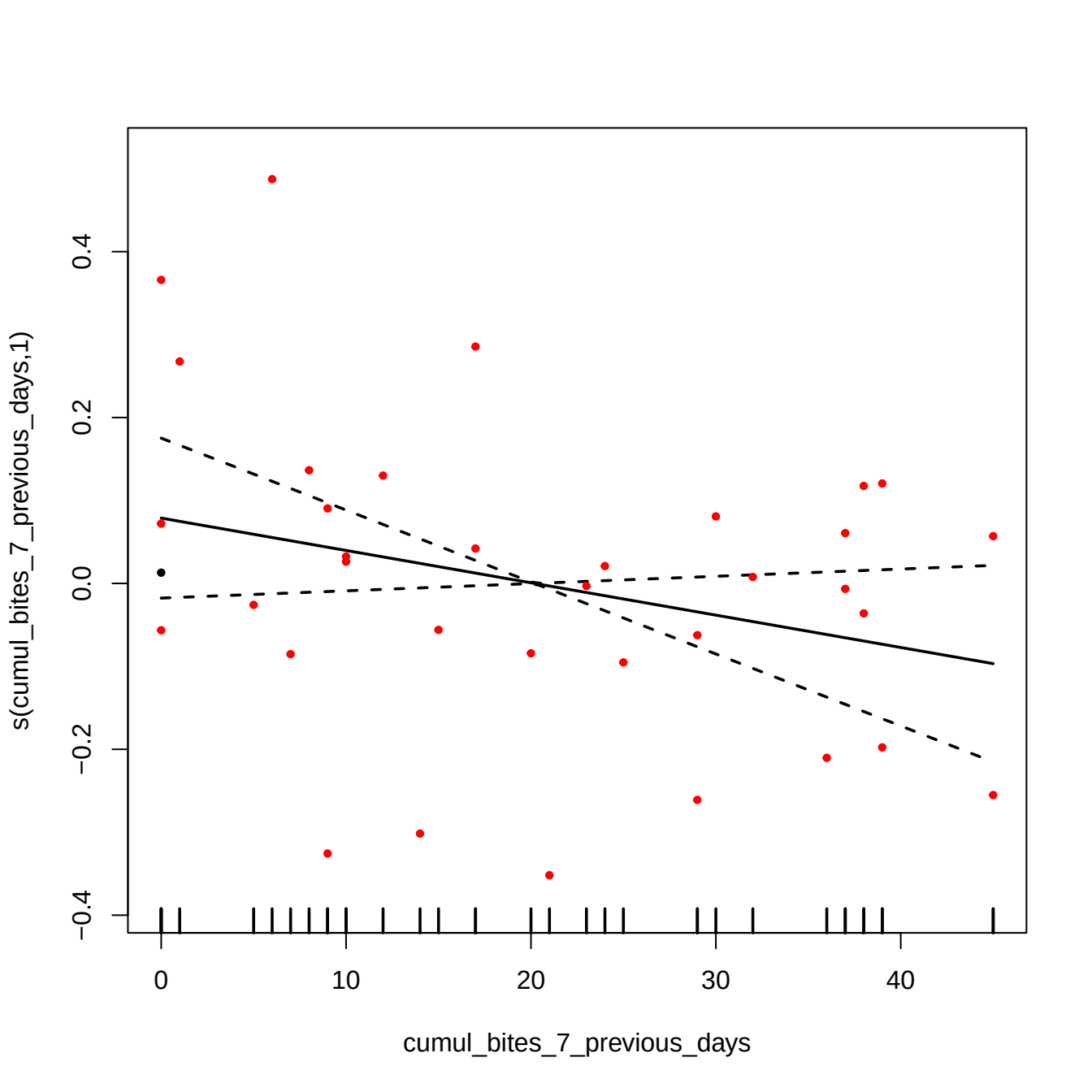
IL.8 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

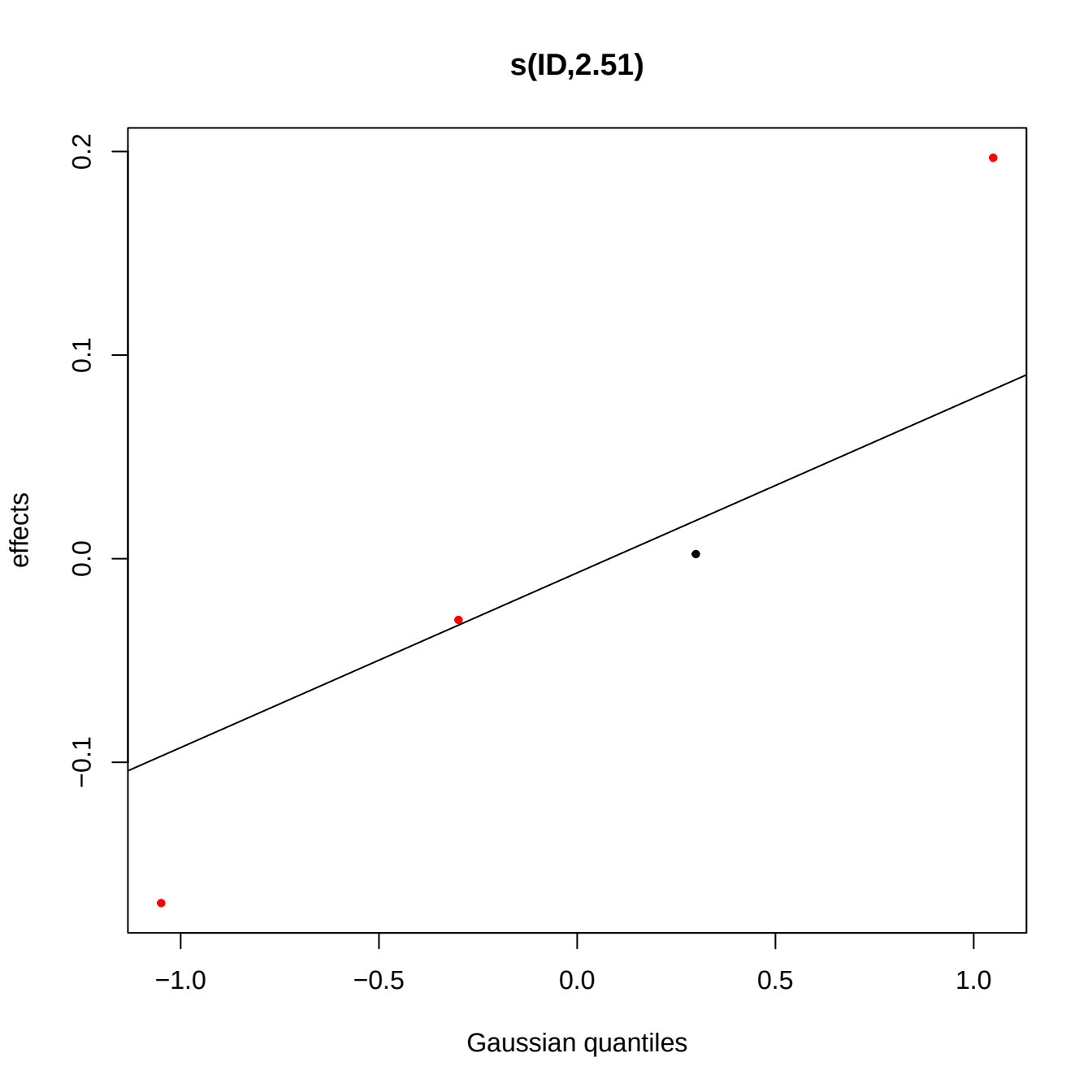
IL.RA

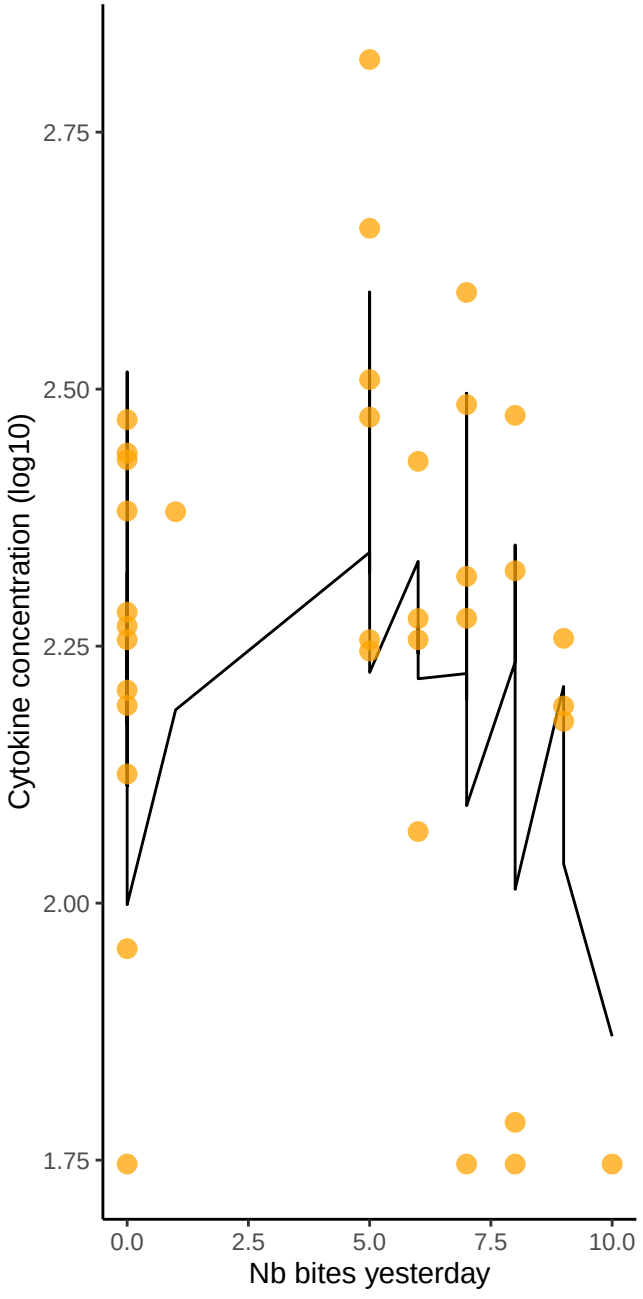
Bites in cyno

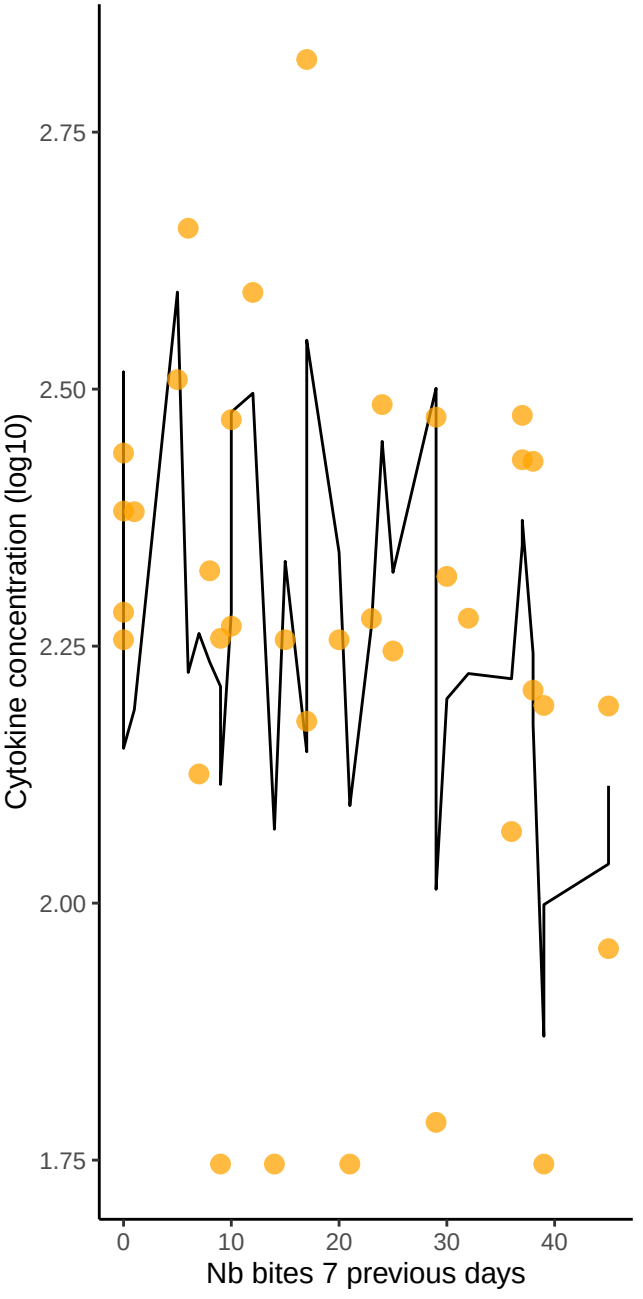
Nb obs: 36

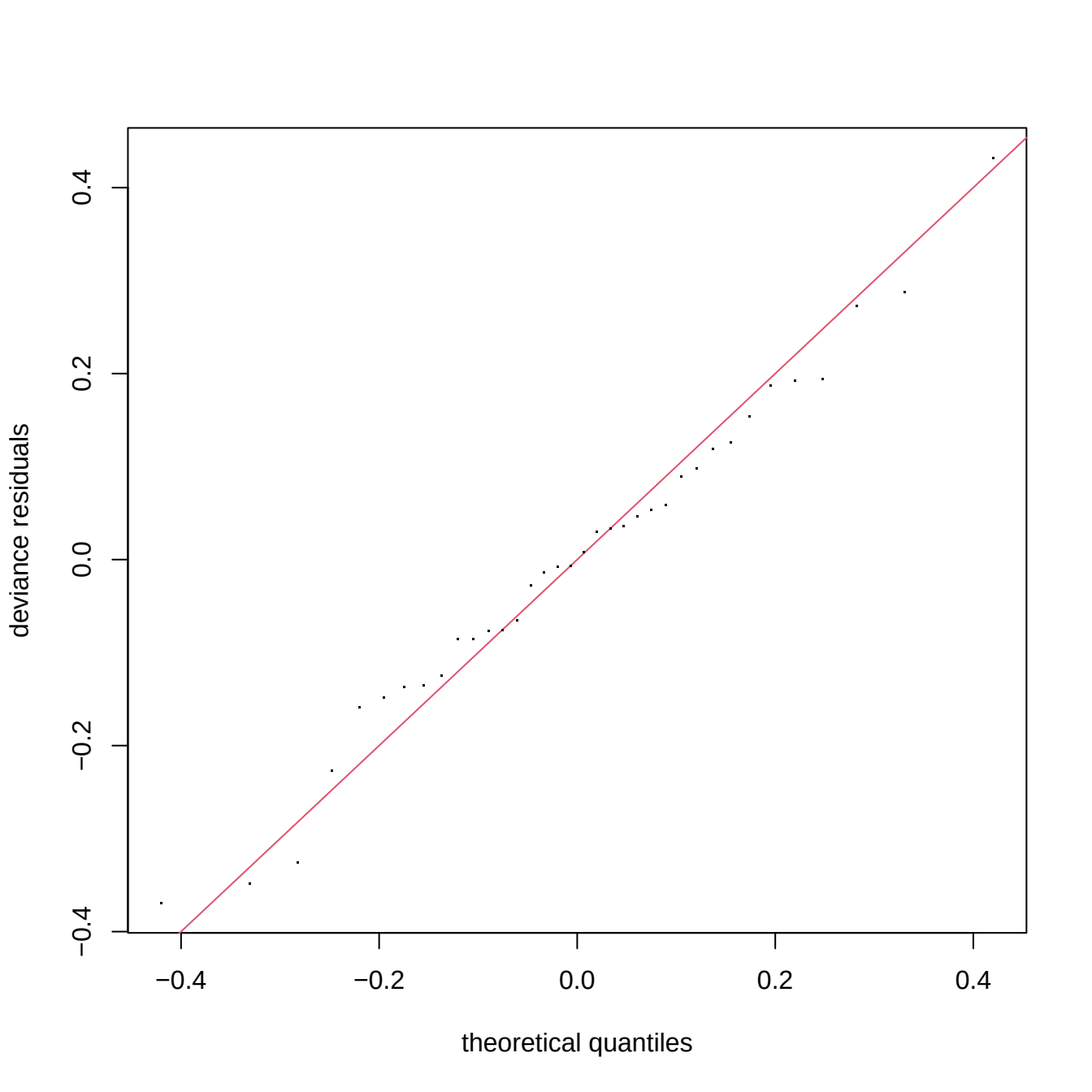

s(bites_of_yesterday,1.77)
0.4
0.2
0.0
−0.2
−0.4
0
2
4
6
8
10
bites_of_yesterday

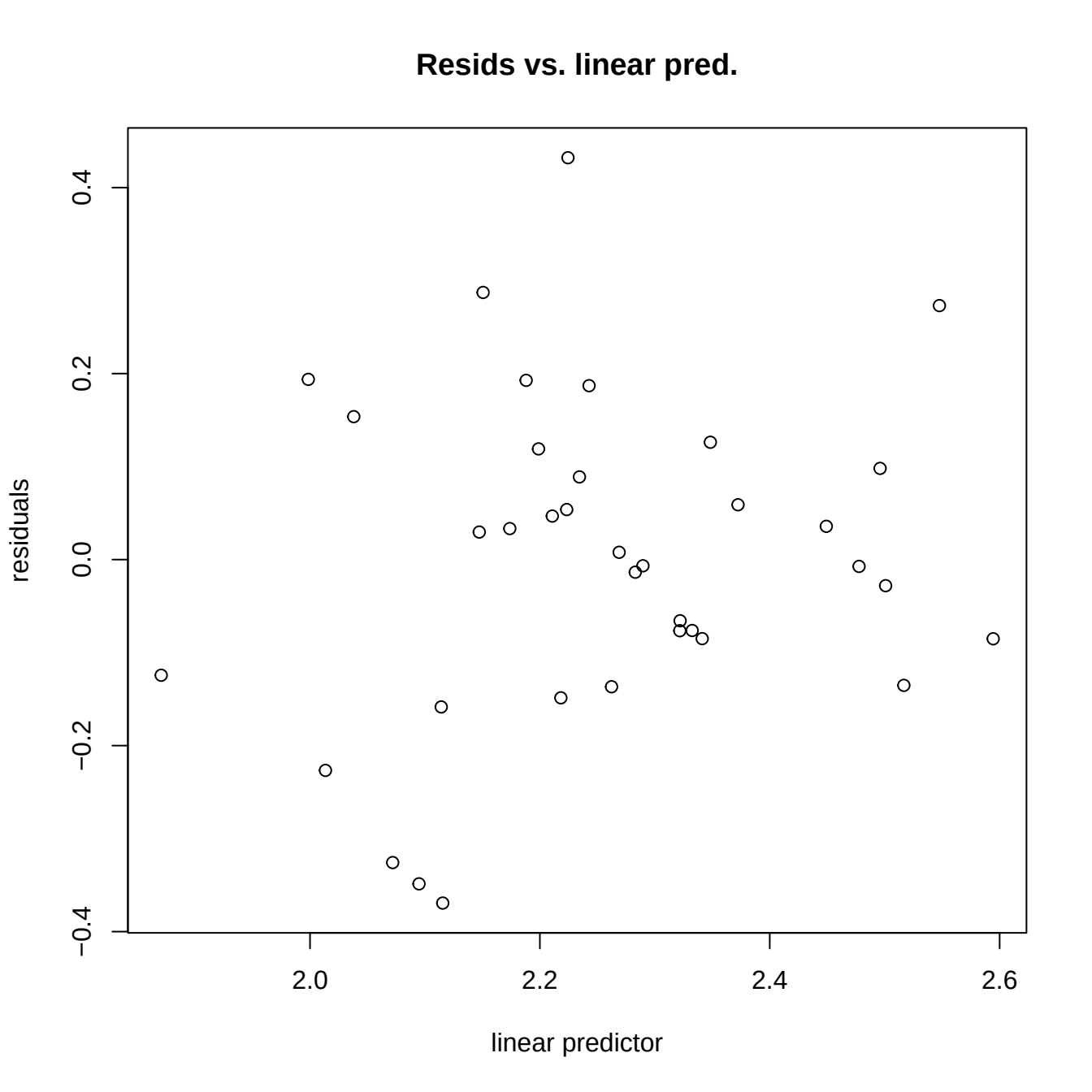

s(cumul_bites_7_previous_days,1)
0.4
0.2
0.0
−0.2
−0.4
0
10
20
30
40
cumul_bites_7_previous_days

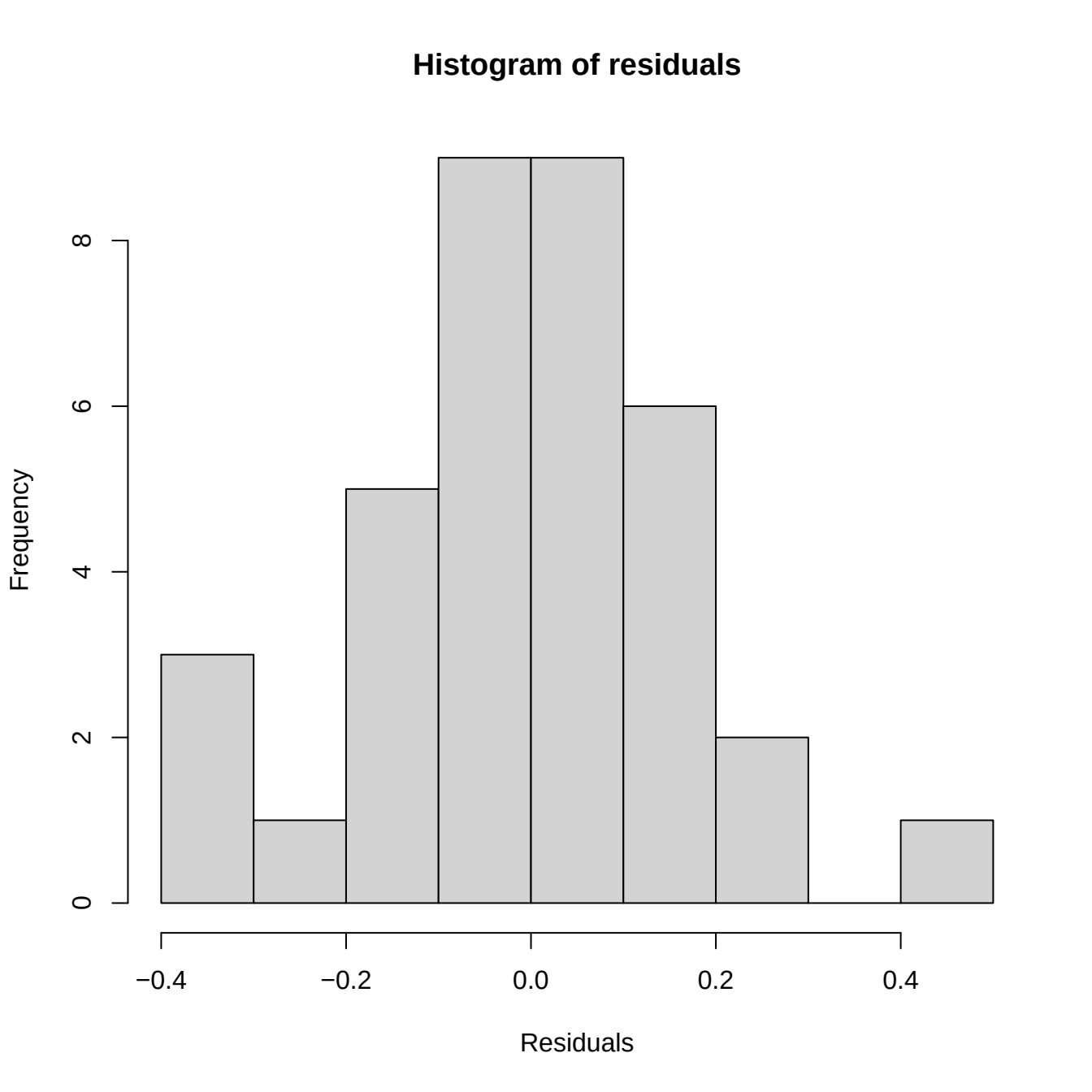

s(ID,2.51)
effects
0.2
0.1
0.0
−0.1
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles

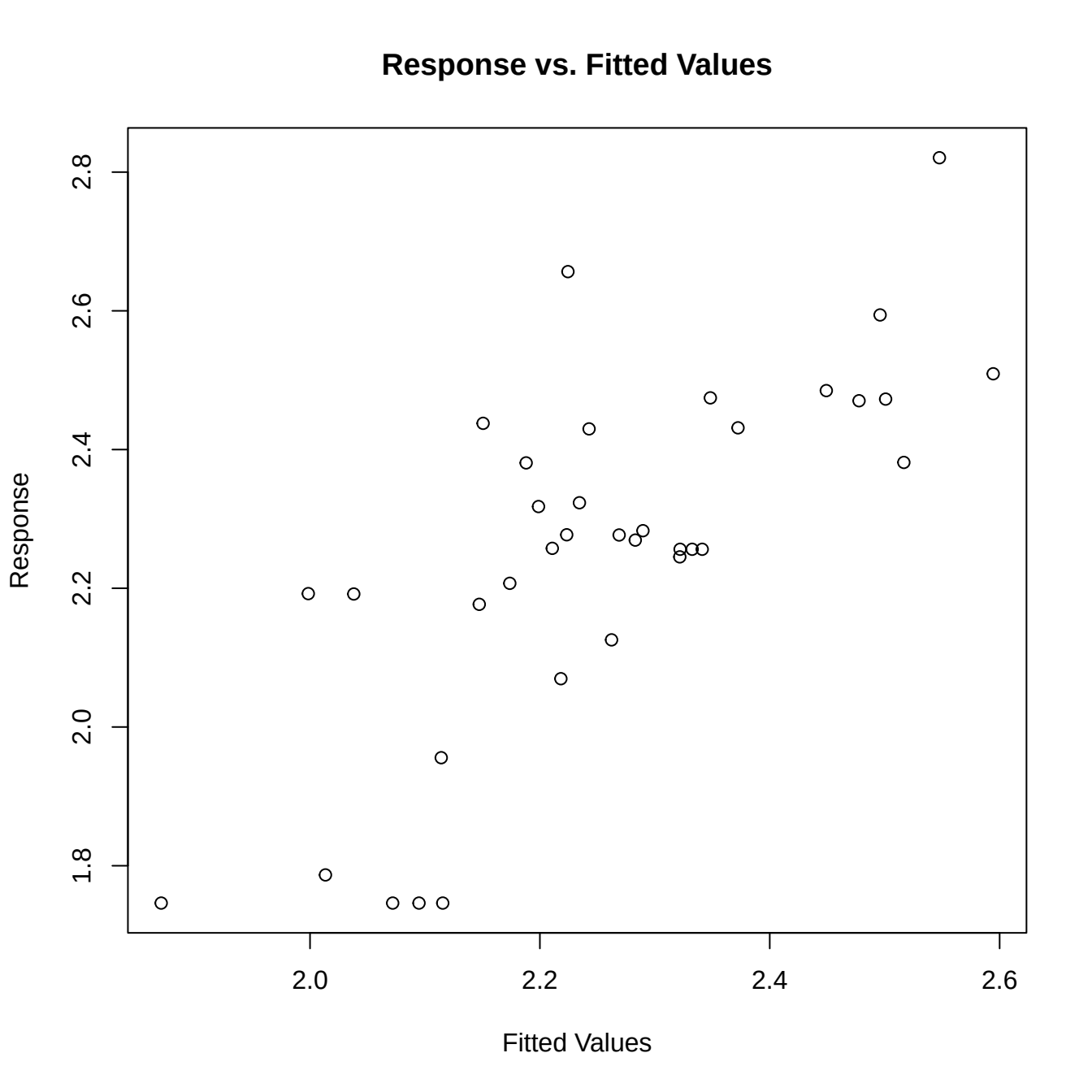

Cytokine concentration (log10)
2.75
2.50
2.25
2.00
1.75
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday


Cytokine concentration (log10)
2.75
2.50
2.25
2.00
1.75
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
theoretical quantiles
−0.4
−0.2
0.0
0.2
0.4
−0.4
−0.2
0.0
0.2
0.4


Resids vs. linear pred.
residuals
0.4
0.2
0.0
−0.2
−0.4
2.0
2.2
2.4
2.6
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
−0.4
−0.2
0.0
0.2
0.4
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.8
2.0
2.2
2.4
2.6
2.8
2.0
2.2
2.4
2.6

```
Method: ML   Optimizer: outer newton
full convergence after 13 iterations.
Gradient range [−3.105111e−06,2.317223e−06]
(score −4.045604 & scale 0.03644245).
Hessian positive definite, eigenvalue range [3.105075e−06,18.20057].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                 k'  edf k−index p−value
s(bites_of_yesterday)          3.00 1.77    1.19    0.86
s(cumul_bites_7_previous_days) 3.00 1.00    1.16    0.74
s(ID)                          4.00 2.51      NA      NA
```

Check for Multicollinearity

Low Correlation

Term	VIF	VIF 95% CI	Increased SE	Tolerance	Tolerance 95% CI
s(cumul_bites_7_previous_days, k = 4)	2.49	[1.72, 4.07]	1.58	0.40	[0.25, 0.58]

Moderate Correlation

Term	VIF	VIF 95% CI	Increased SE	Tolerance	Tolerance 95% CI
s(bites_of_yesterday, k = 4)	7.62	[4.70, 12.84]	2.76	0.13	[0.08, 0.21]

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.25705    0.07967   28.33   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df     F  p-value
s(bites_of_yesterday)         1.769  2.088 1.793 0.162600
s(cumul_bites_7_previous_days) 1.000  1.000 2.667 0.112873
s(ID)                         2.508  3.000 6.414 0.000568 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =   0.47   Deviance explained =   55%
-ML = -4.0456  Scale est. = 0.036442  n = 36
```

AICc [1] −2.620047

Bites in squirrel

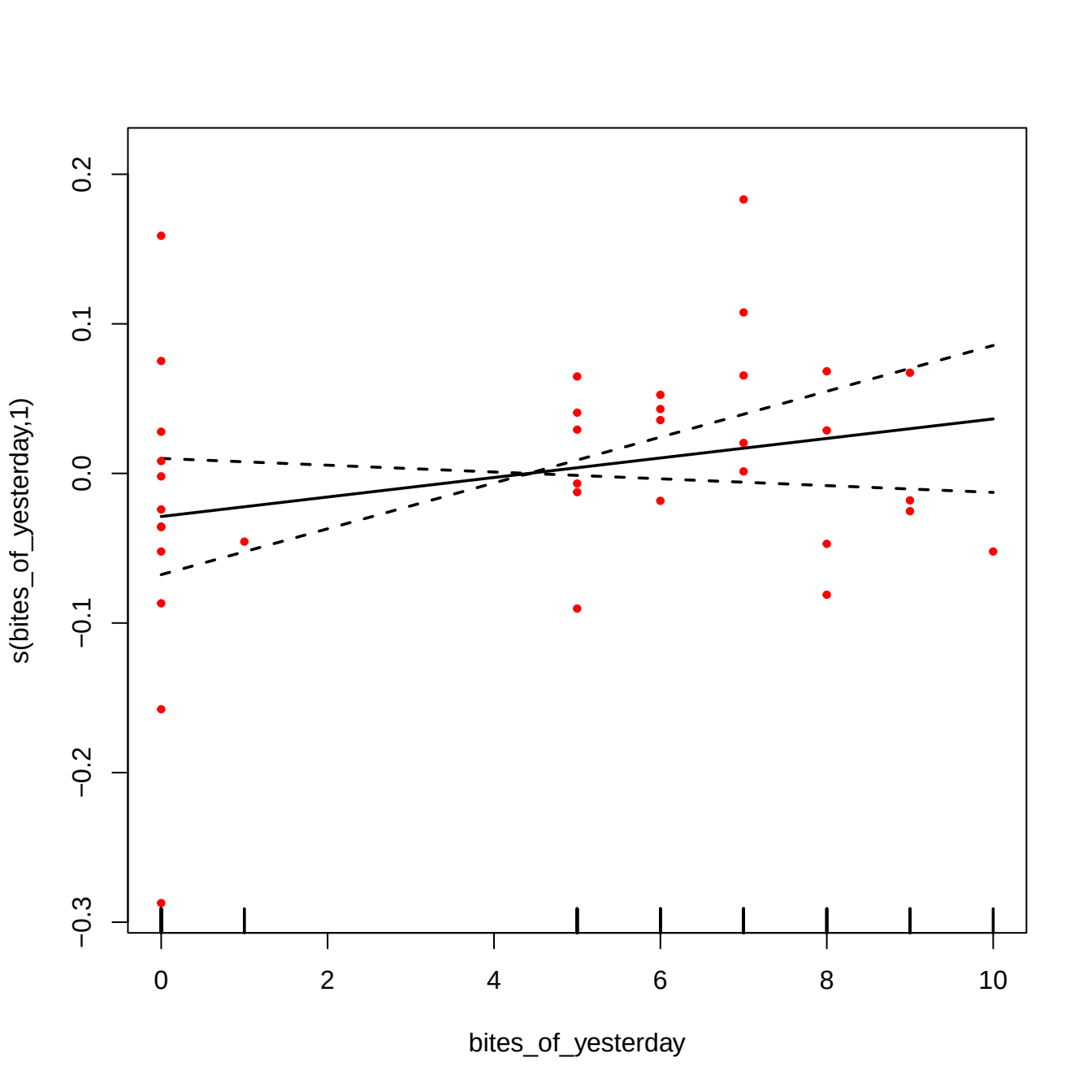
Nb obs: 20

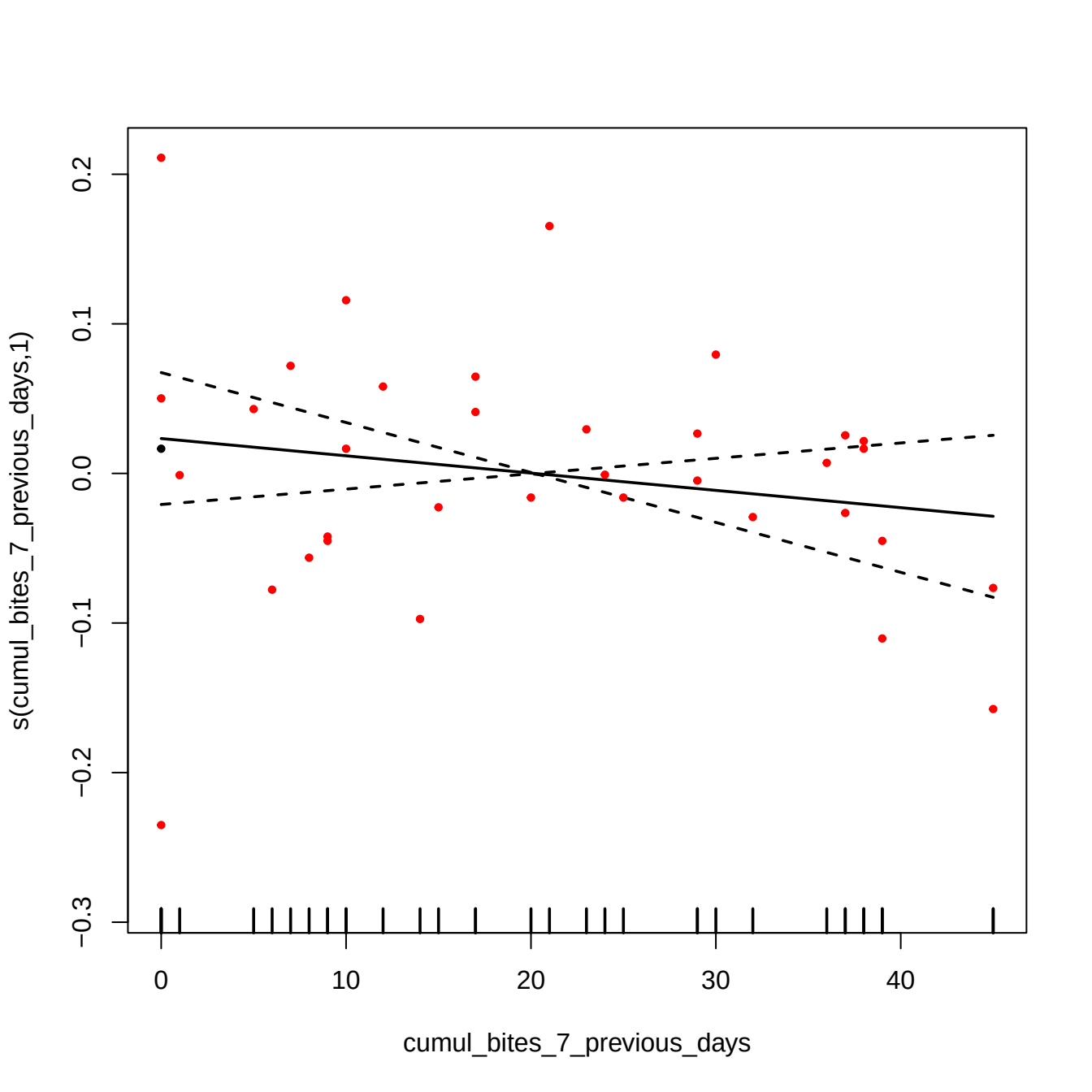
IL.RA ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

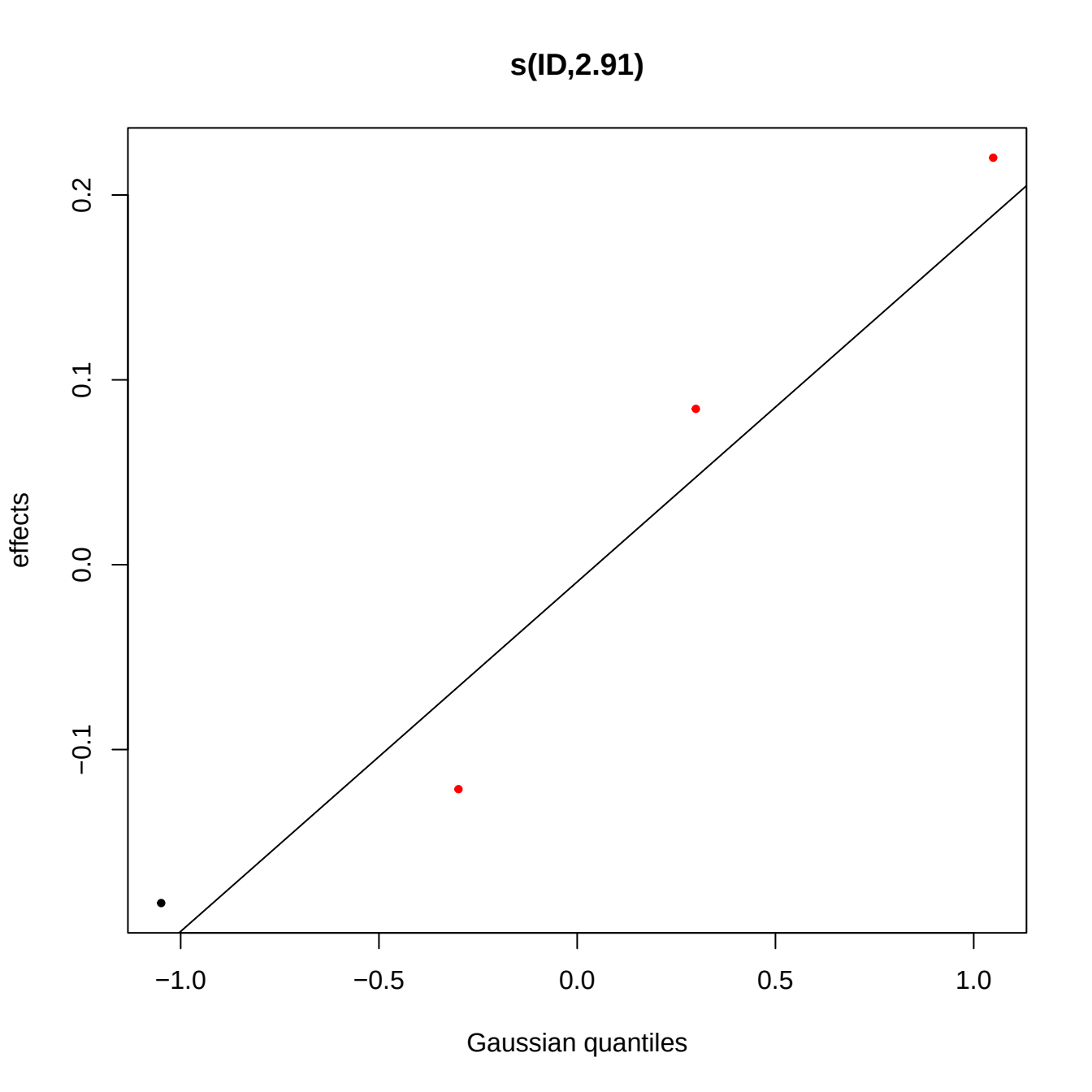
IP.10

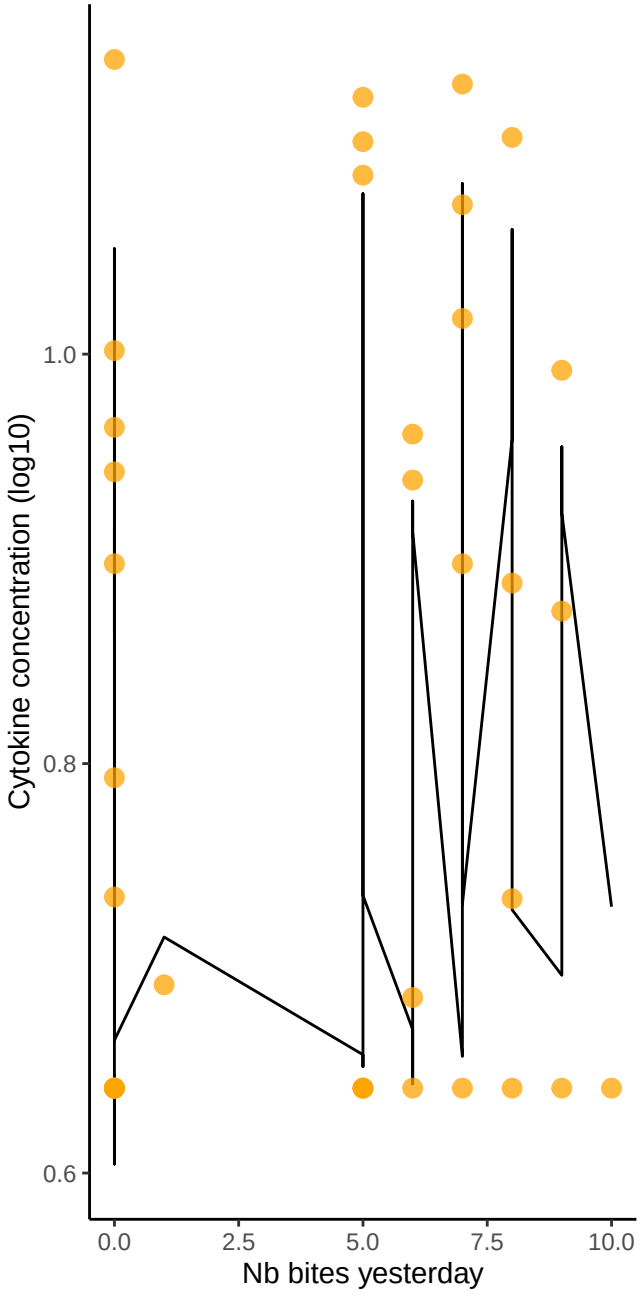
Bites in cyno

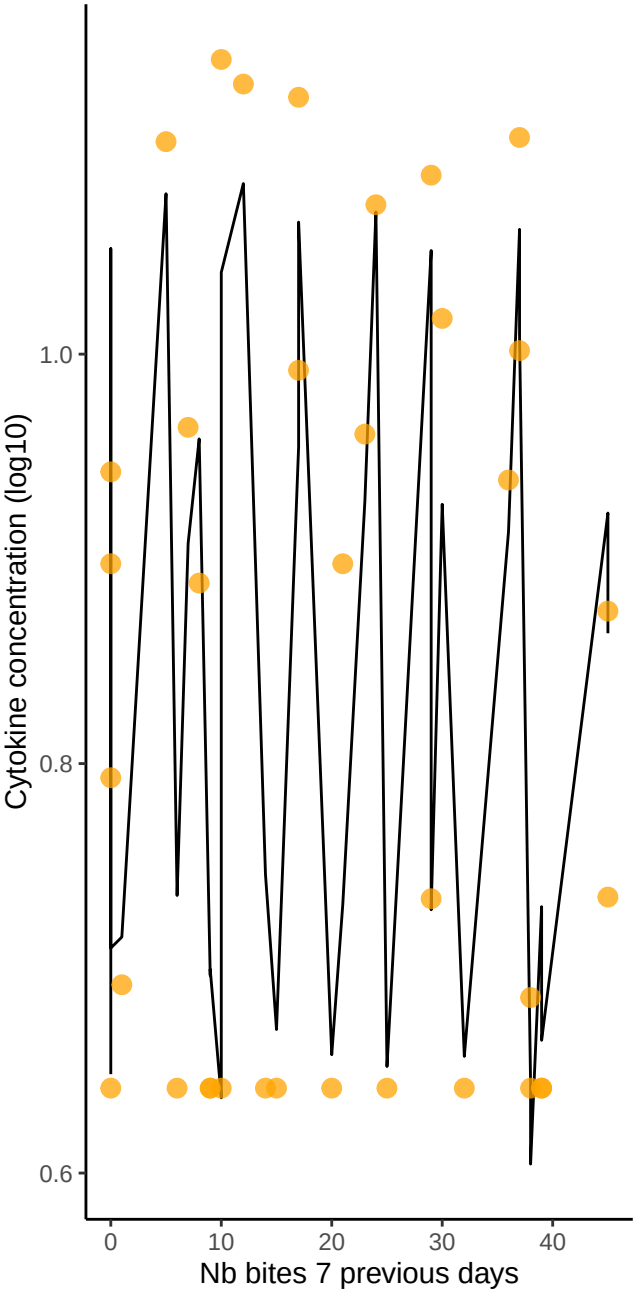
Nb obs: 36

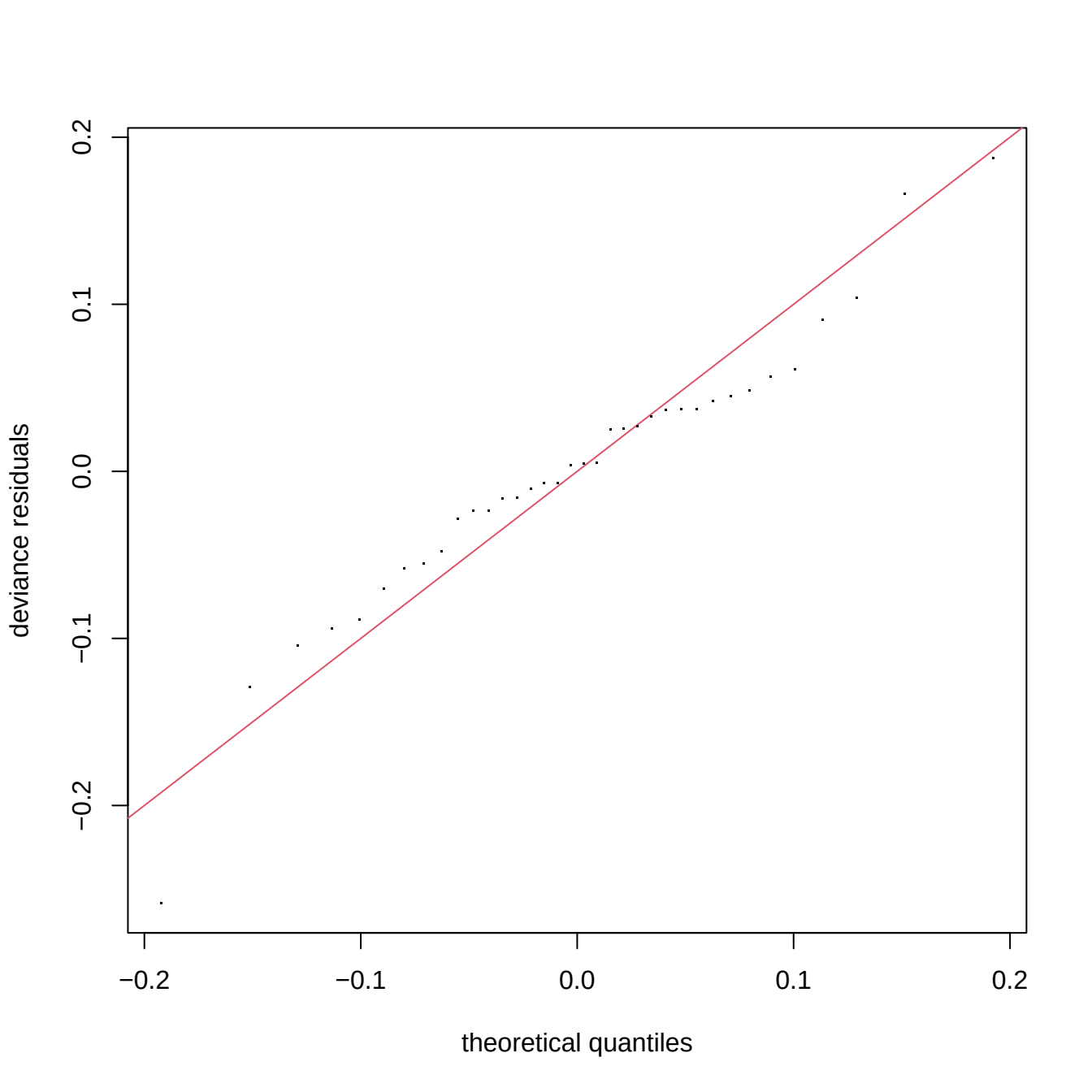

s(bites_of_yesterday,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
2
4
6
8
10
bites_of_yesterday

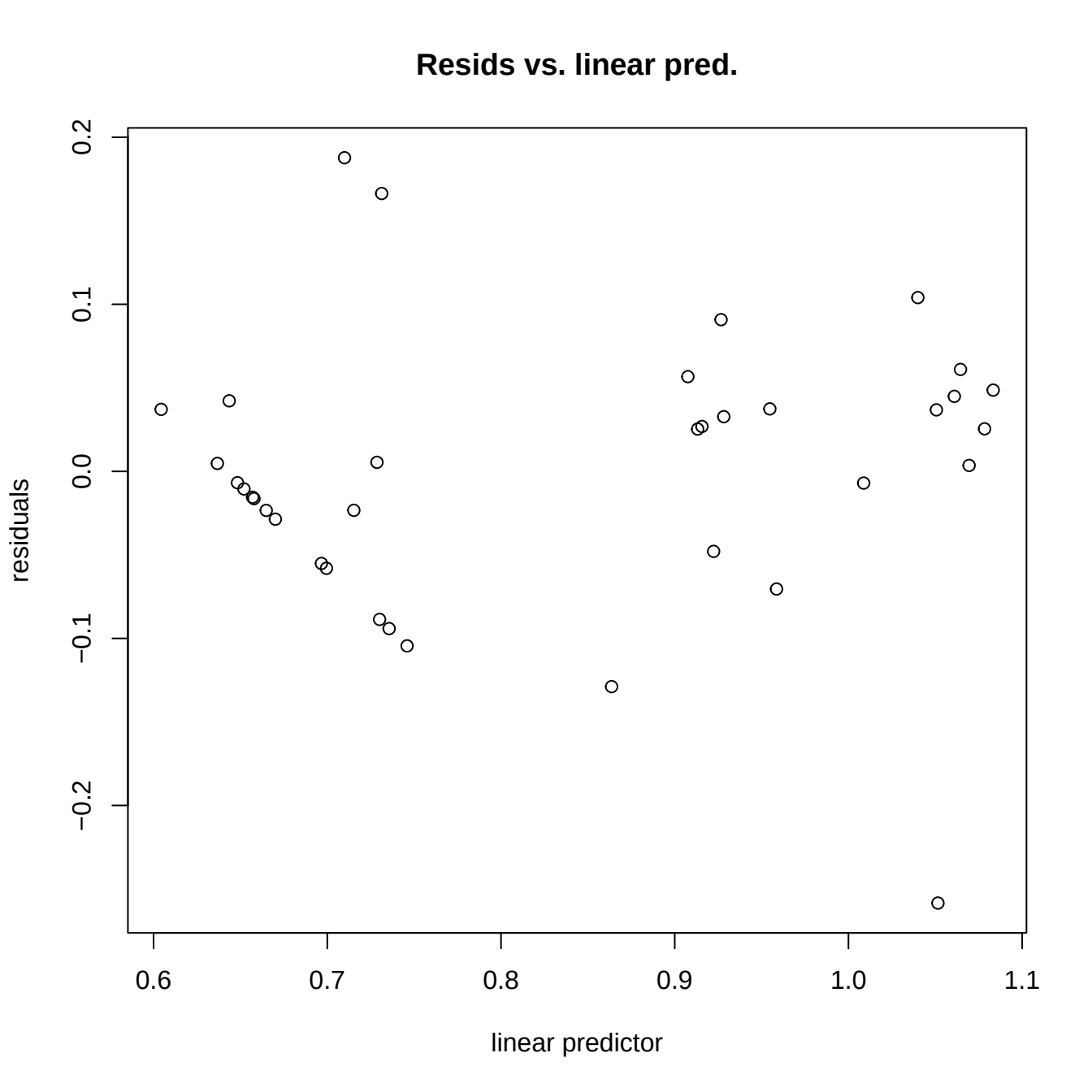

s(cumul_bites_7_previous_days,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
10
20
30
40
cumul_bites_7_previous_days

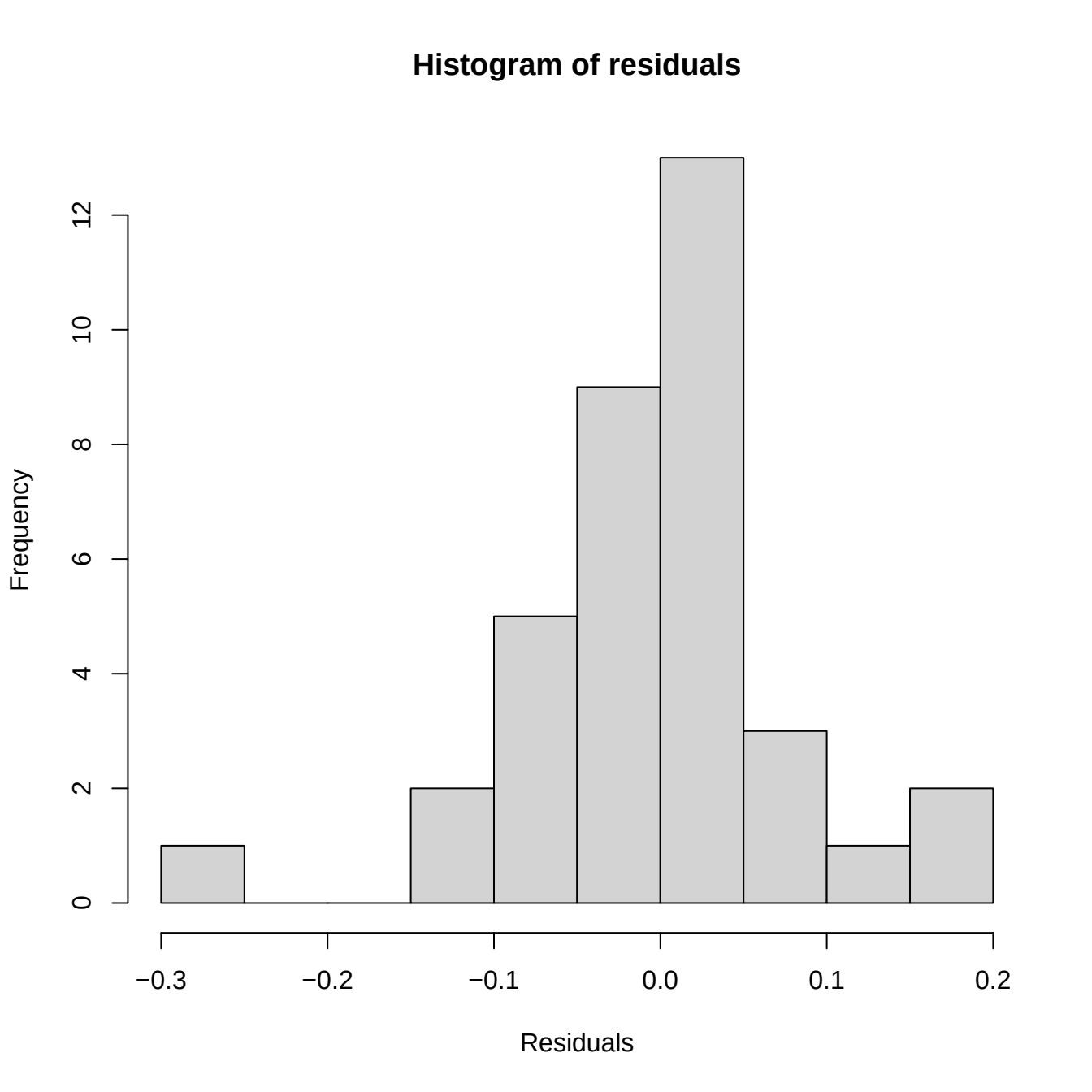

s(ID,2.91)
effects
0.2
0.1
0.0
−0.1
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles

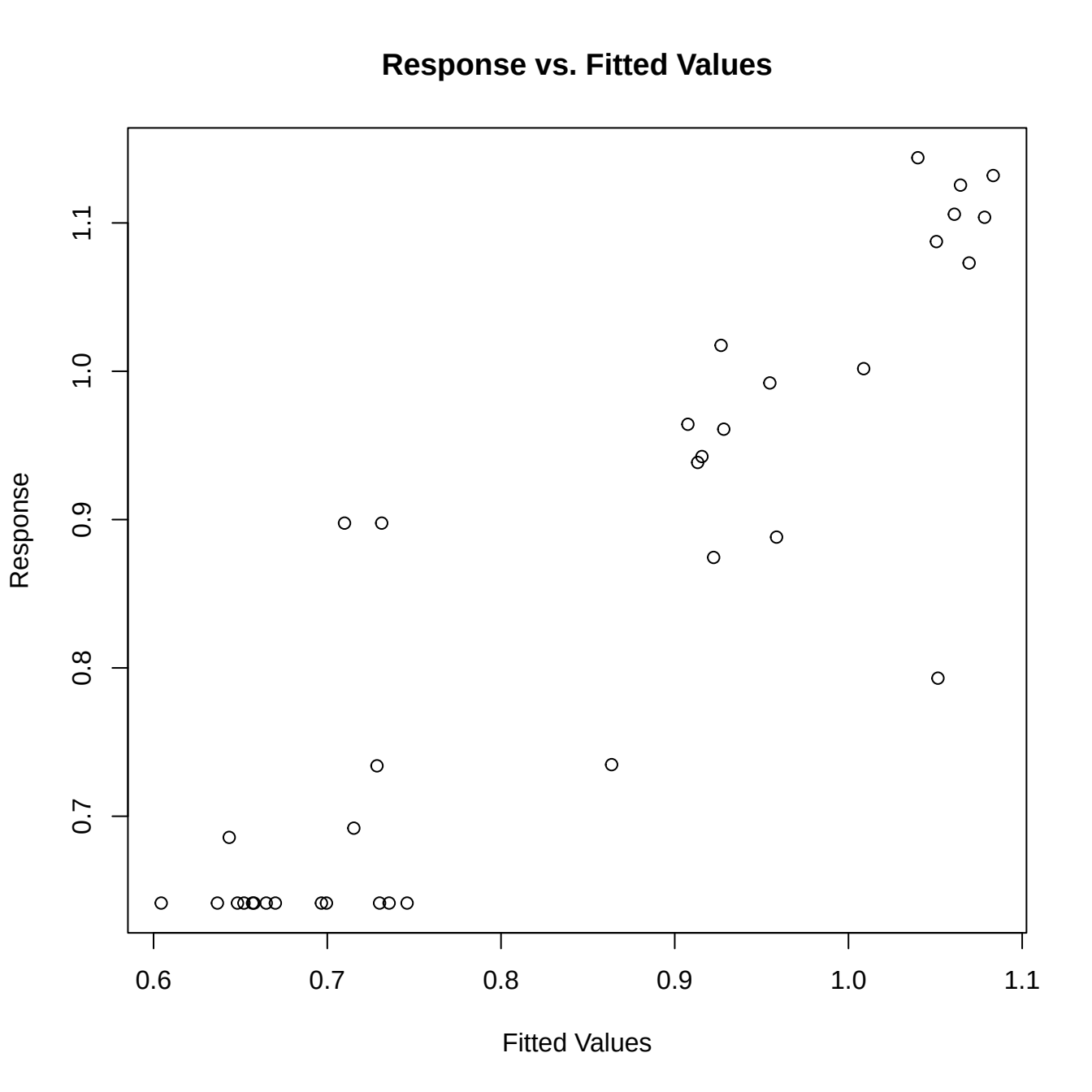

Cytokine concentration (log10)
1.0
0.8
0.6
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday


Cytokine concentration (log10)
1.0
0.8
0.6
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.2
0.1
0.0
−0.1
−0.2
−0.2
−0.1
0.0
0.1
0.2
theoretical quantiles


Resids vs. linear pred.
residuals
linear predictor
0.2
0.1
0.0
−0.1
−0.2
0.6
0.7
0.8
0.9
1.0
1.1


Histogram of residuals
Frequency
0
2
4
6
8
10
12
−0.3
−0.2
−0.1
0.0
0.1
0.2
Residuals


Response vs. Fitted Values
Response
Fitted Values
0.7
0.8
0.9
1.0
1.1
0.6
0.7
0.8
0.9
1.0
1.1

```
Method: ML   Optimizer: outer newton
full convergence after 10 iterations.
Gradient range [−1.096797e−05,5.5344e−06]
(score −30.75996 & scale 0.007631674).
Hessian positive definite, eigenvalue range [2.047699e−07,18.2308].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k'  edf k−index p−value
s(bites_of_yesterday)         3.00 1.00    1.11    0.68
s(cumul_bites_7_previous_days) 3.00 1.00    1.23    0.88
s(ID)                         4.00 2.91      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.8368     0.0857   9.764 7.71e-11 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df     F p-value
s(bites_of_yesterday)         1.000      1  2.20   0.148
s(cumul_bites_7_previous_days) 1.000      1  1.12   0.298
s(ID)                         2.913      3 42.00  <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.784   Deviance explained = 81.5%
-ML = -30.76  Scale est. = 0.0076317  n = 36
```

AICc [1] −61.86329

Bites in squirrel

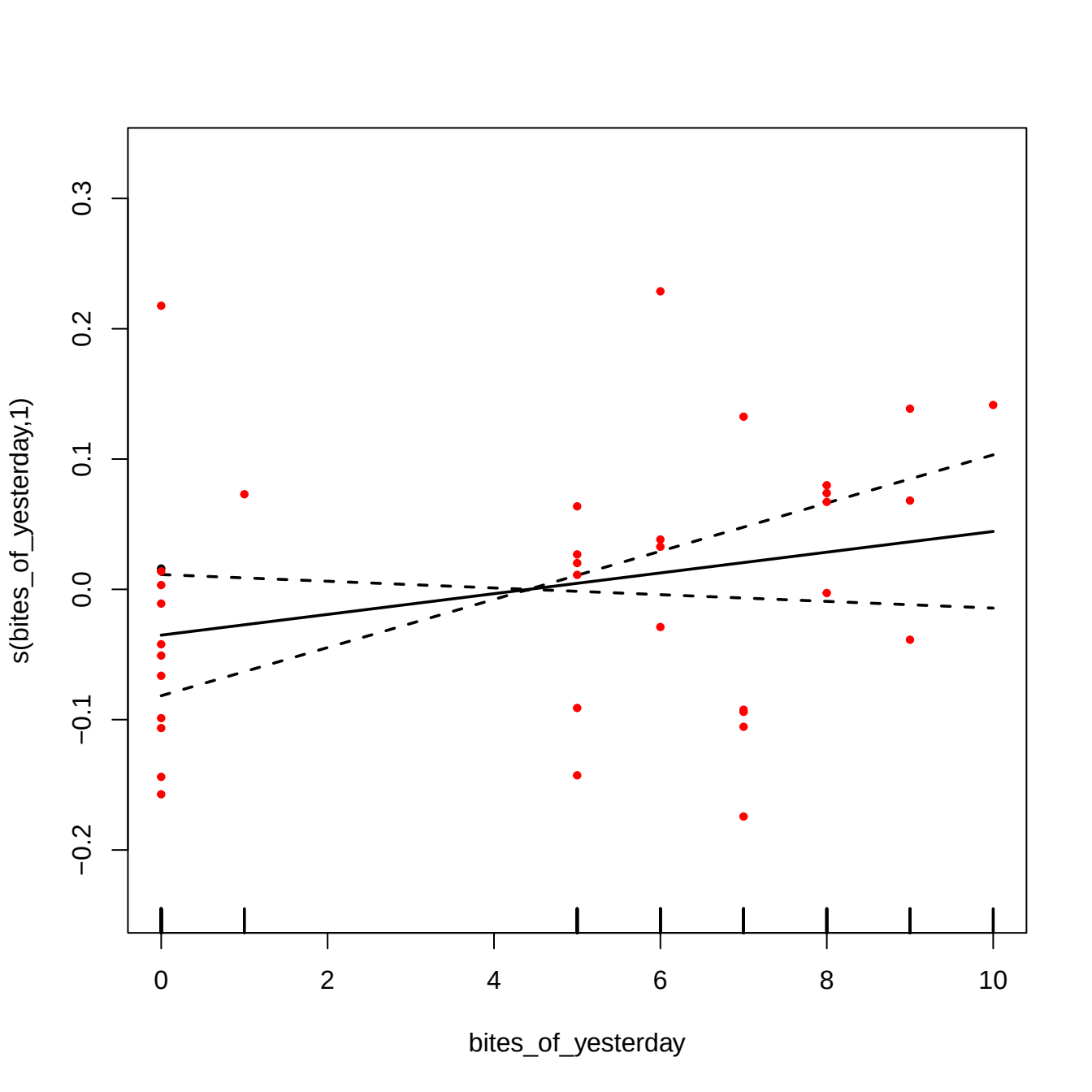
Nb obs: 20

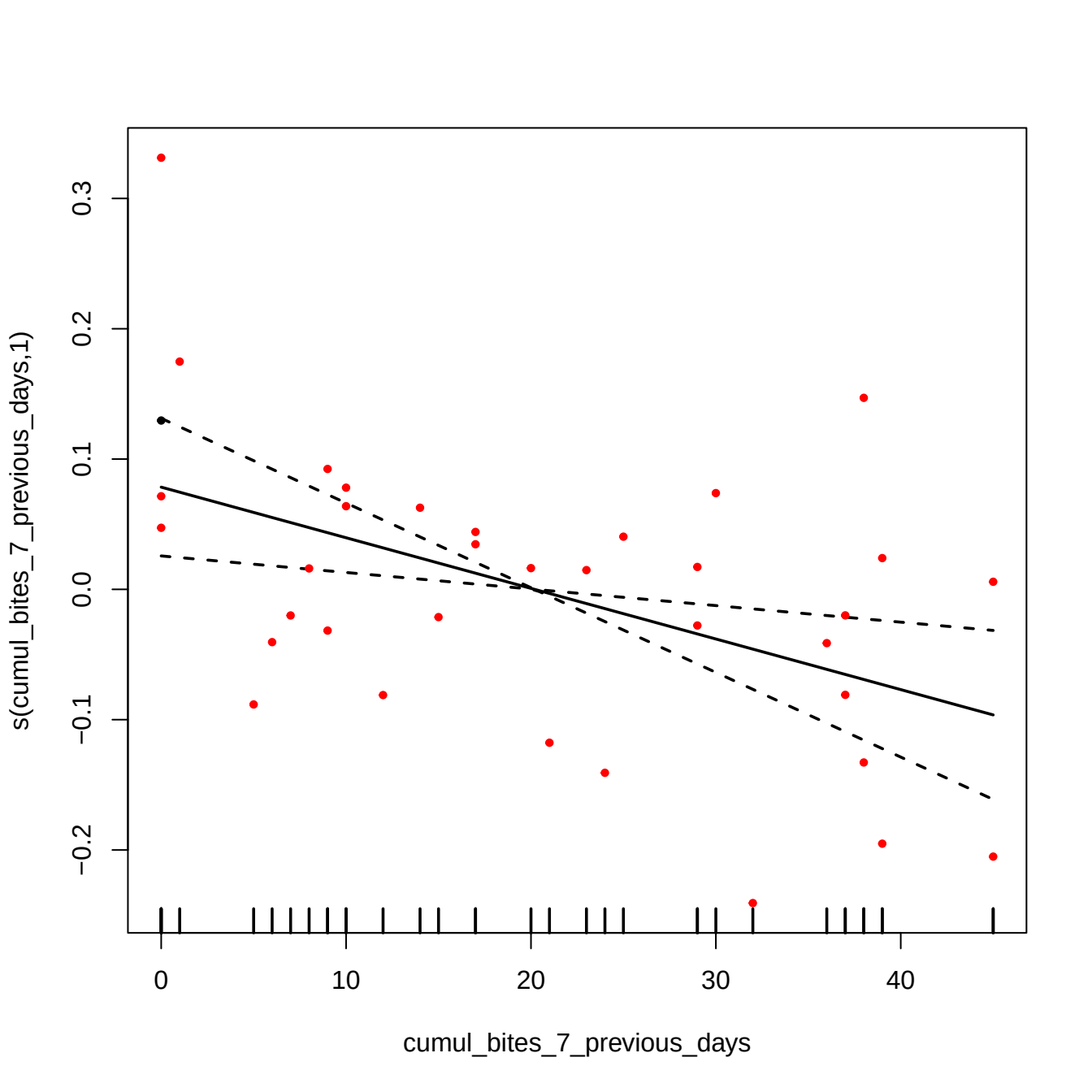
IP.10 ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

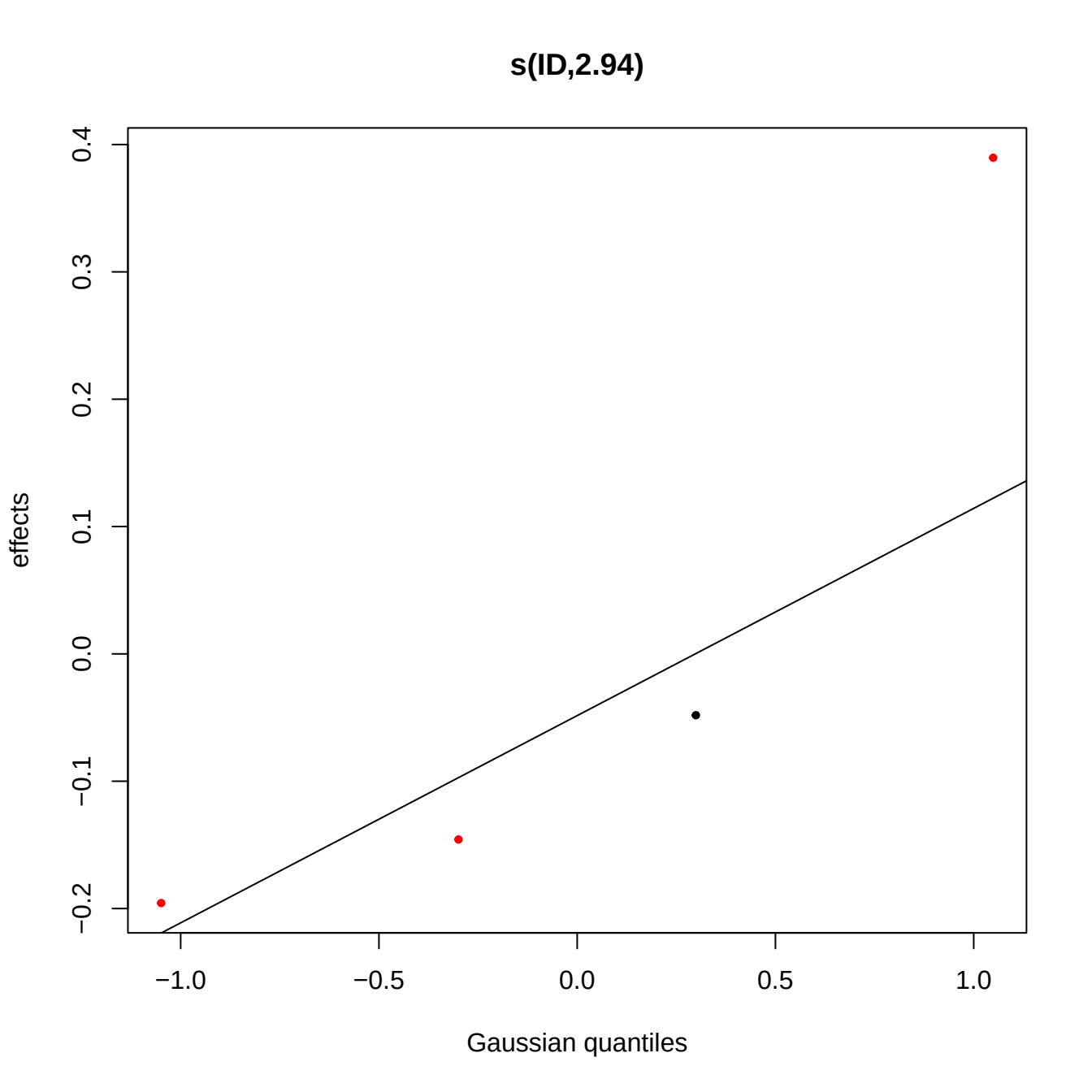
MCP.1

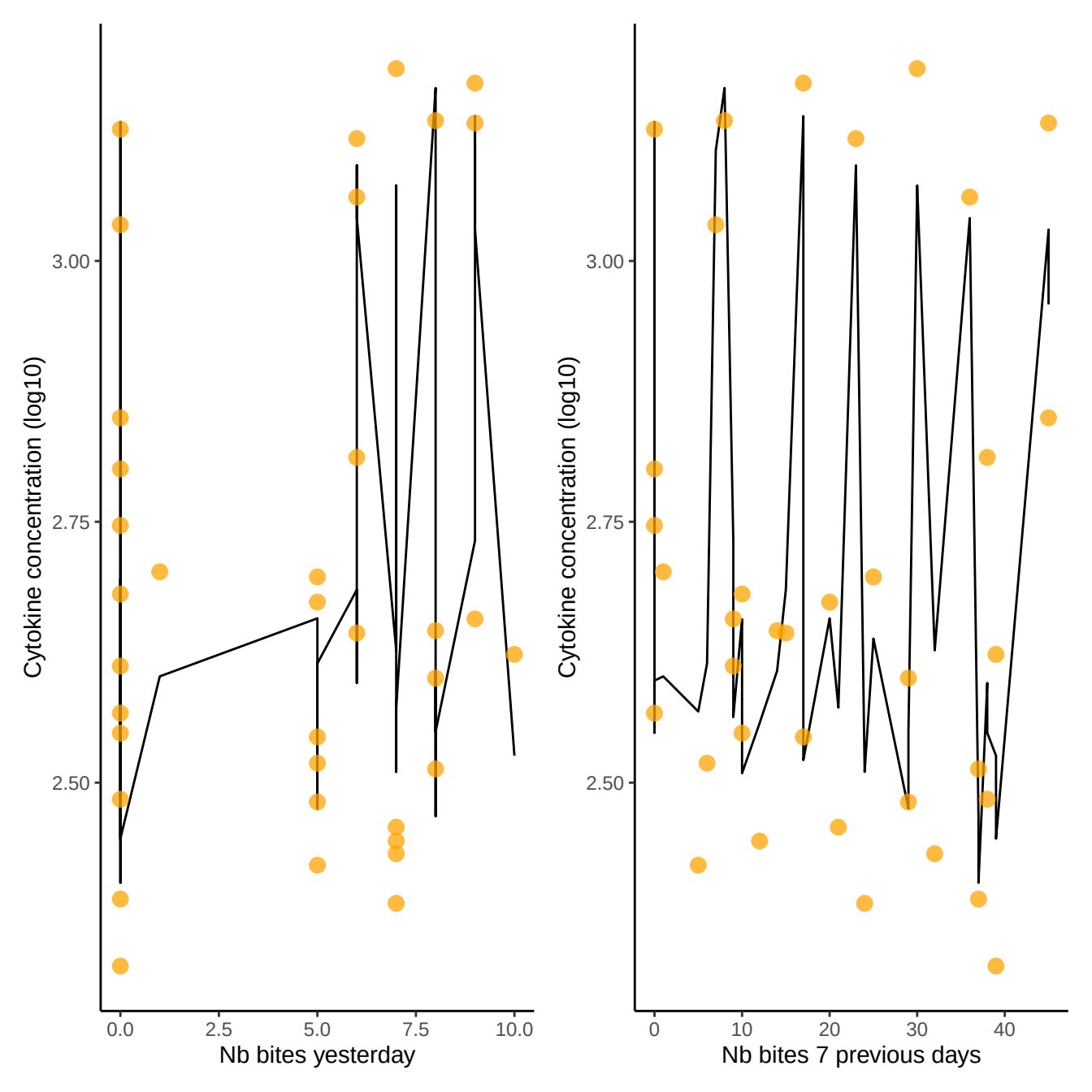
Bites in cyno

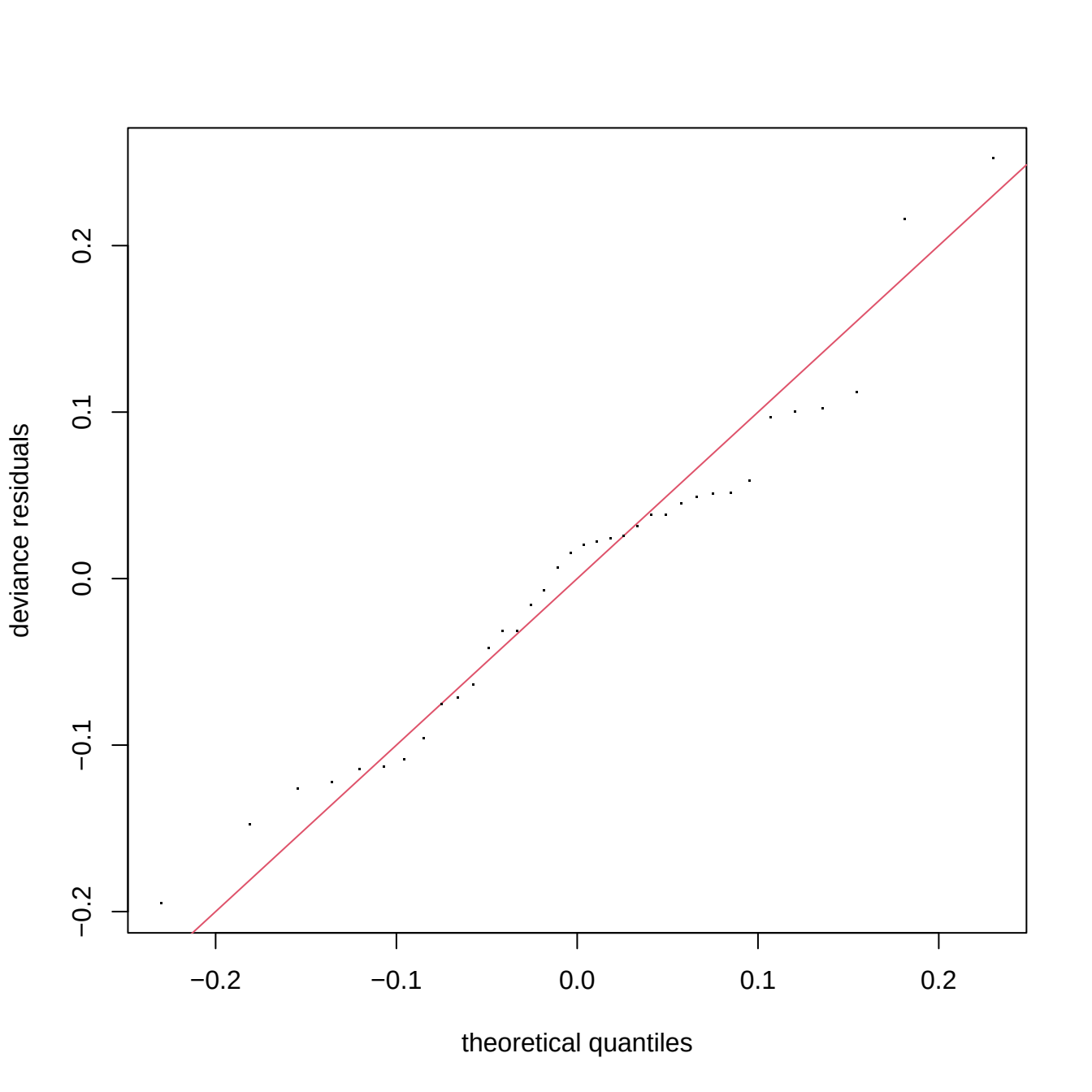
Nb obs: 36

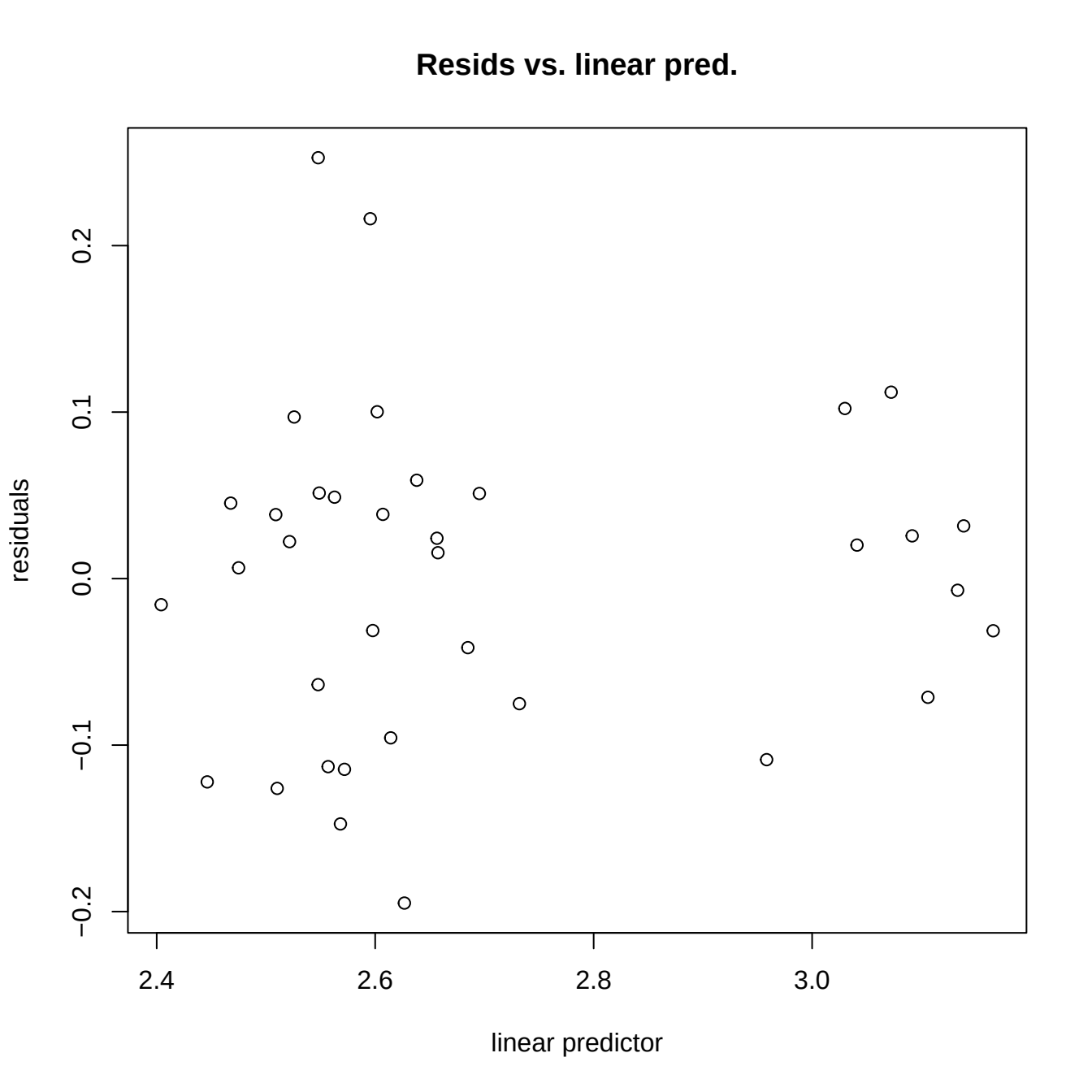

s(bites_of_yesterday,1)
0.3
0.2
0.1
0.0
−0.1
−0.2
0
2
4
6
8
10
bites_of_yesterday

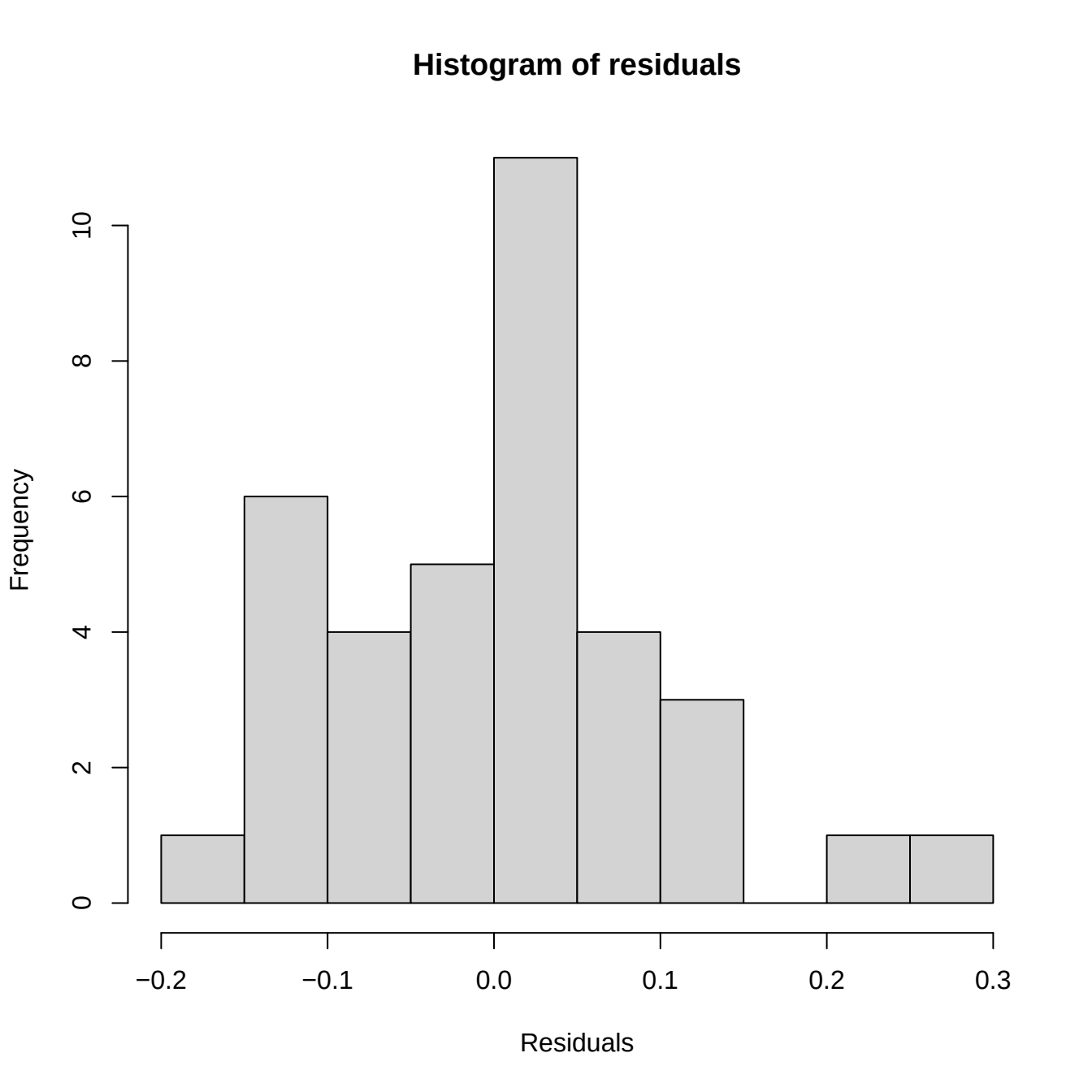

s(cumul_bites_7_previous_days,1)
0.3
0.2
0.1
0.0
−0.1
−0.2
0
10
20
30
40
cumul_bites_7_previous_days

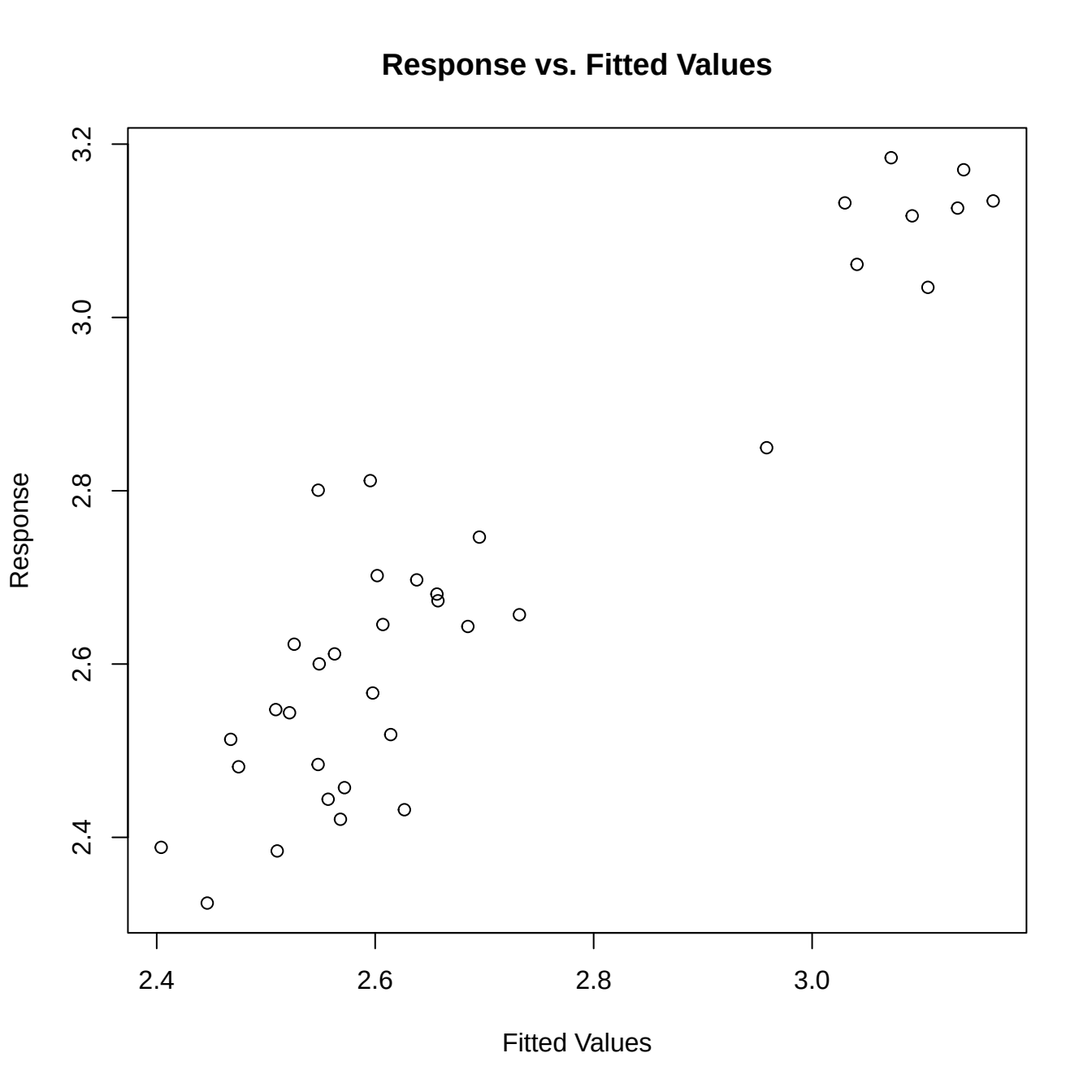

s(ID,2.94)
effects
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
3.00
2.75
2.50
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
3.00
2.75
2.50
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.2
0.1
0.0
−0.1
−0.2
−0.2
−0.1
0.0
0.1
0.2
theoretical quantiles


Resids vs. linear pred.
residuals
0.2
0.1
0.0
−0.1
−0.2
2.4
2.6
2.8
3.0
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
10
−0.2
−0.1
0.0
0.1
0.2
0.3
Residuals


Response vs. Fitted Values
Response
Fitted Values
2.4
2.6
2.8
3.0
3.2

```
Method: ML   Optimizer: outer newton
full convergence after 11 iterations.
Gradient range [−8.925834e−06,4.157709e−06]
(score −23.5931 & scale 0.01093505).
Hessian positive definite, eigenvalue range [5.947848e−06,18.2352].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k'  edf k−index p−value
s(bites_of_yesterday)         3.00 1.00    1.12    0.68
s(cumul_bites_7_previous_days) 3.00 1.00    1.34    0.97
s(ID)                         4.00 2.94      NA      NA
```

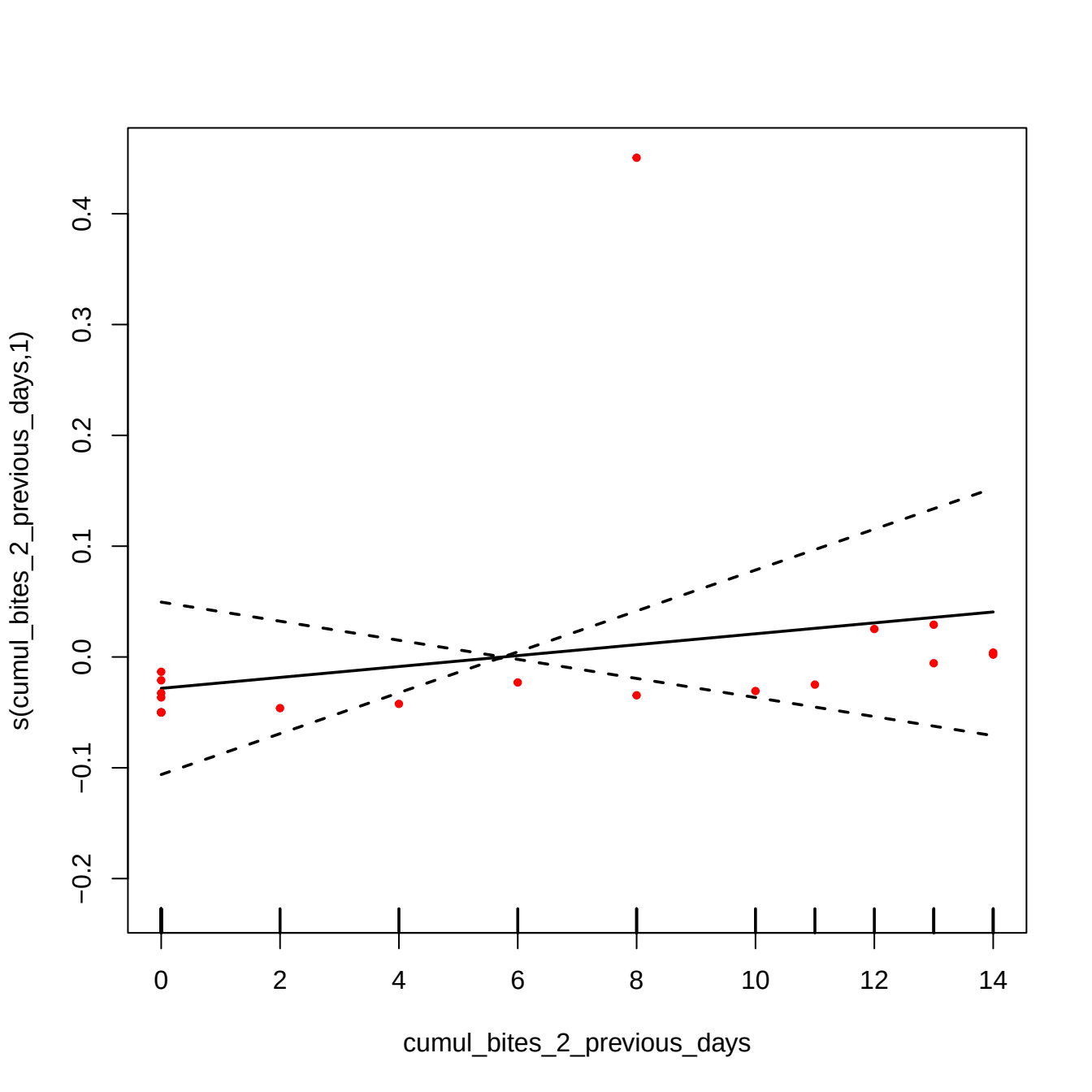
```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

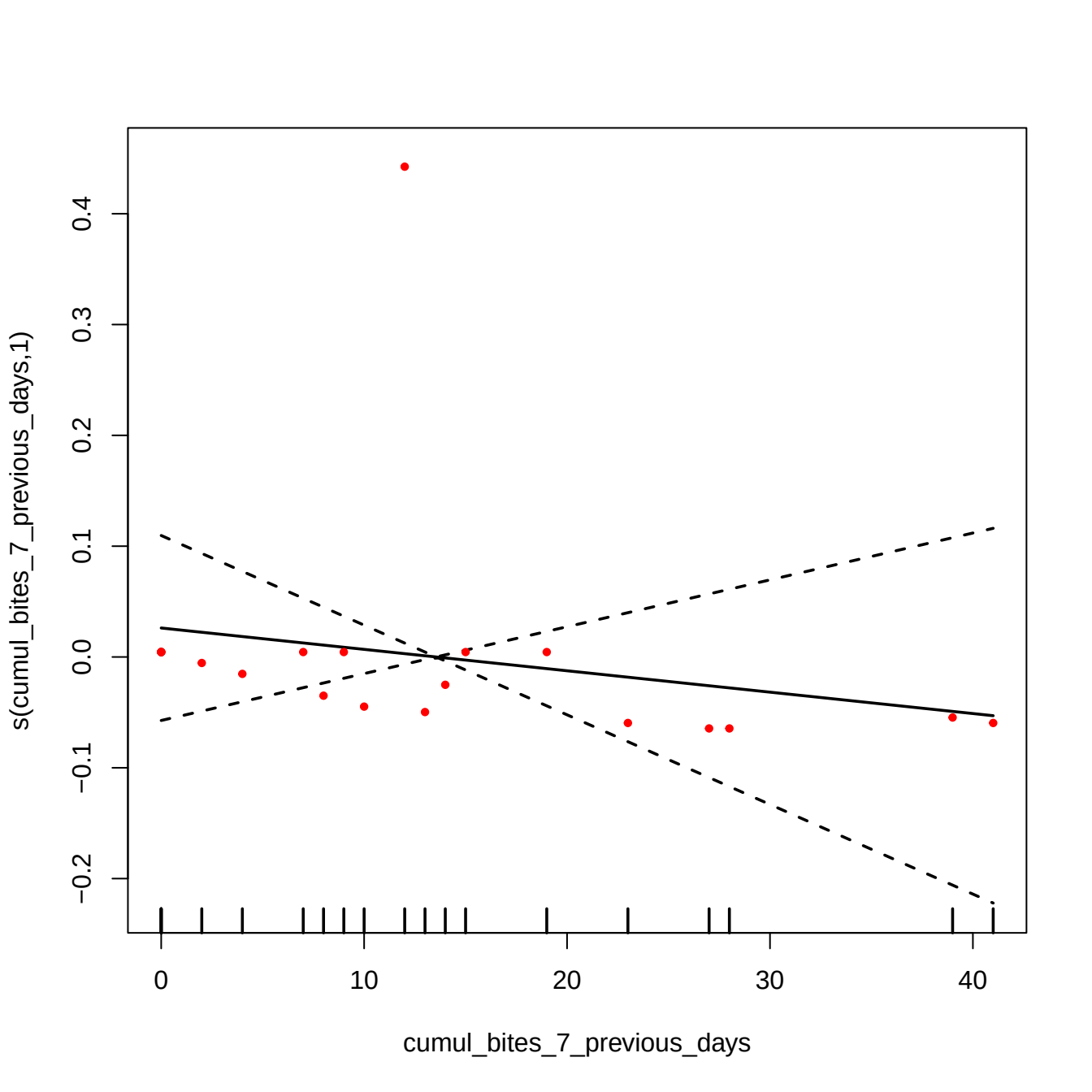
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   2.7002     0.1219   22.16   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F p-value
s(bites_of_yesterday)         1.000      1  2.283 0.14123
s(cumul_bites_7_previous_days) 1.000      1  8.834 0.00578 **
s(ID)                         2.938      3 58.486 < 2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.837   Deviance explained =   86%
-ML = -23.593  Scale est. = 0.010935  n = 36
```

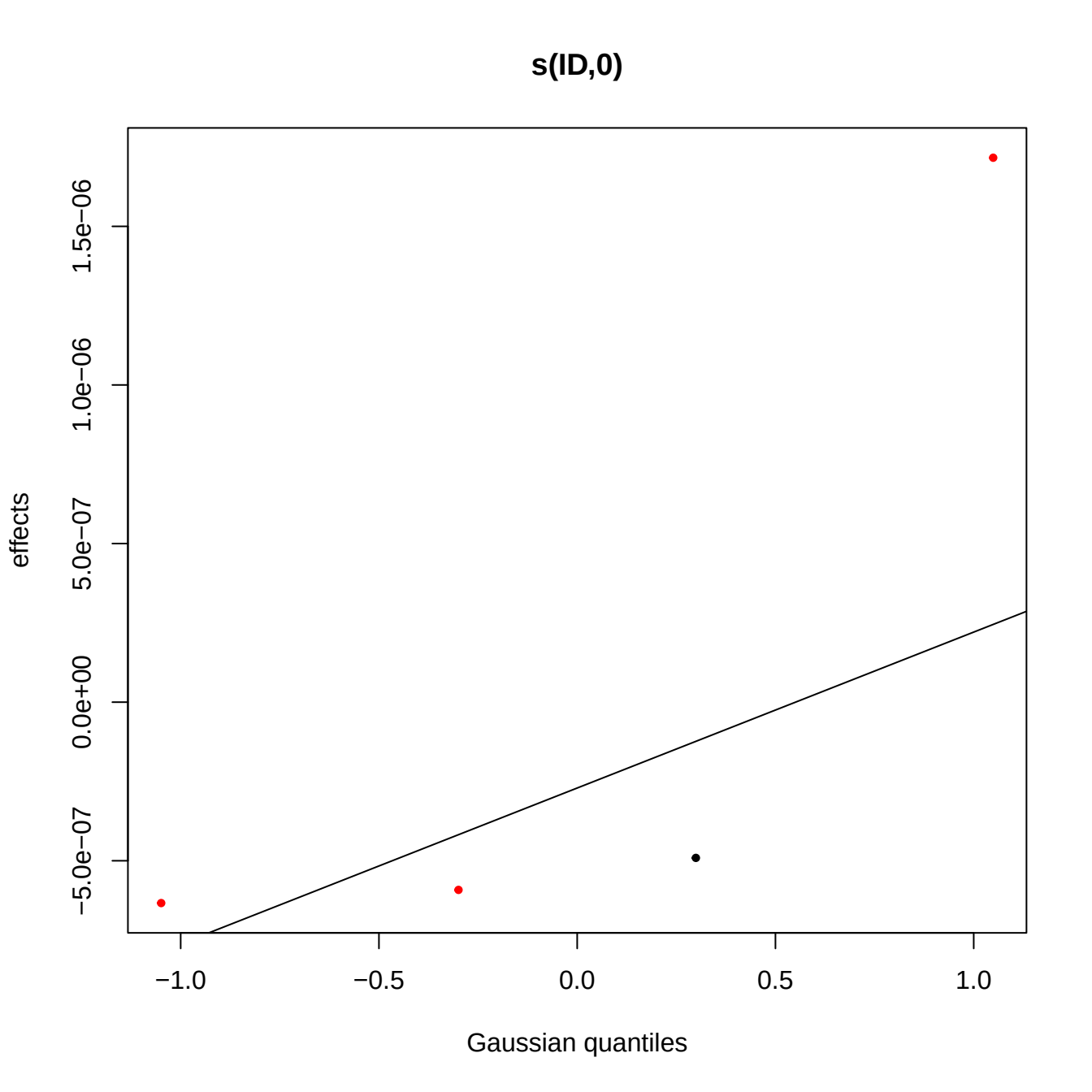
AICc [1] −48.92649

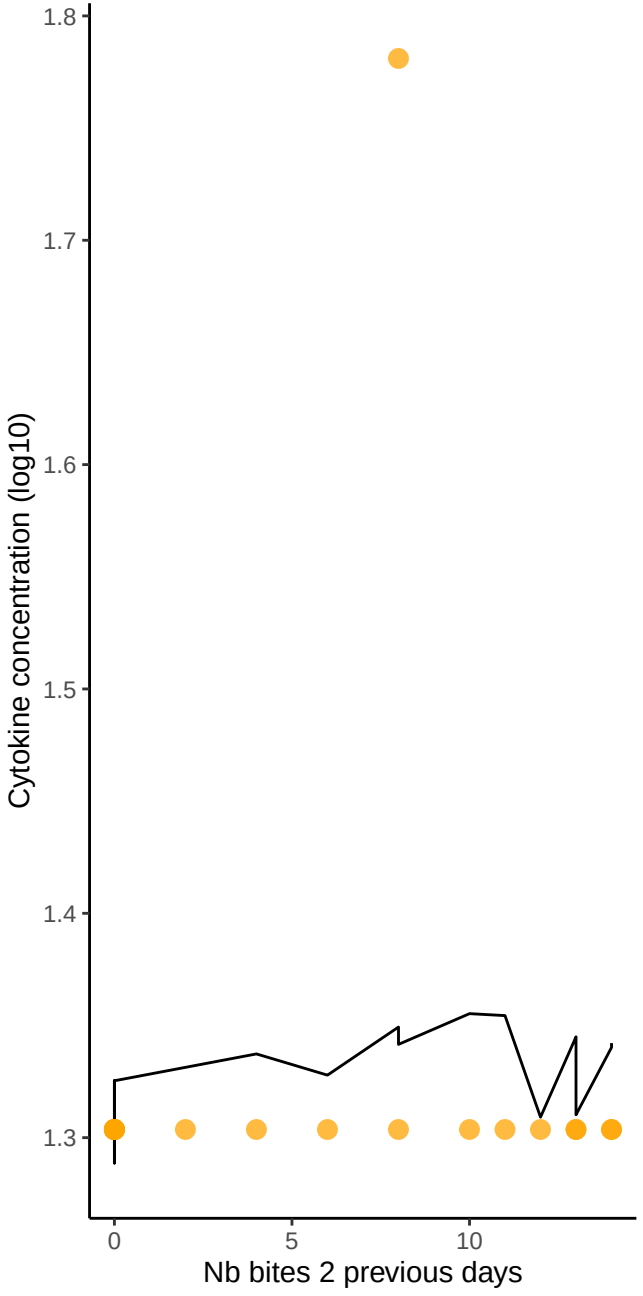
Bites in squirrel

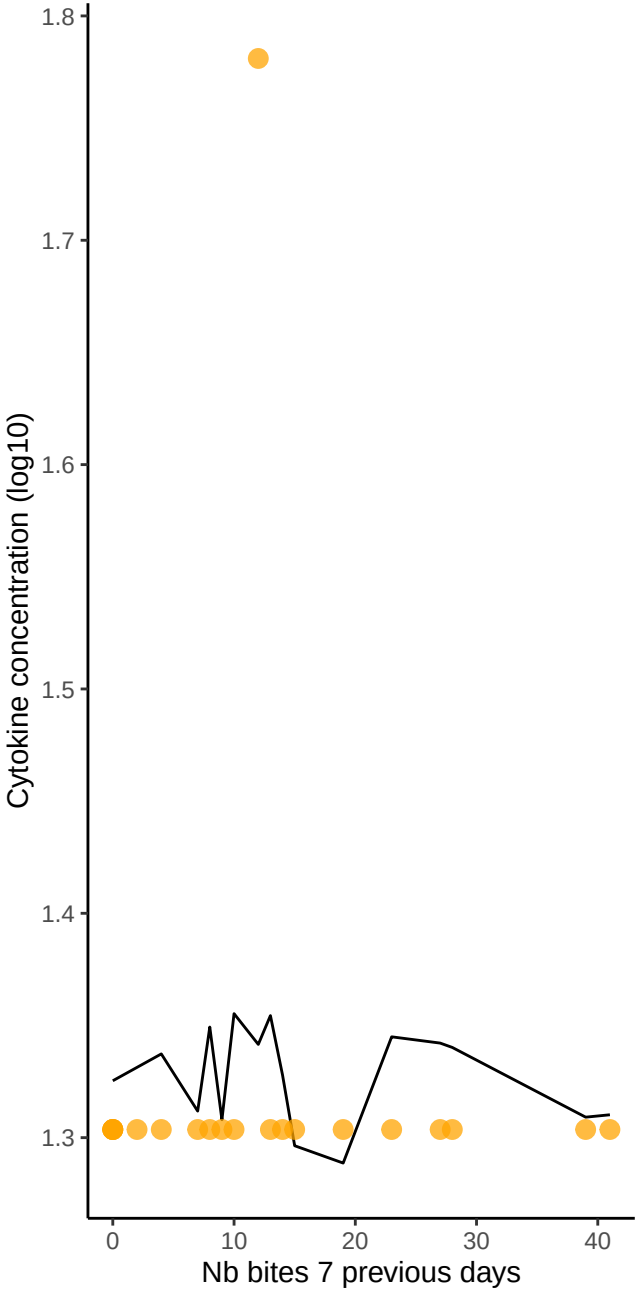
Nb obs: 20

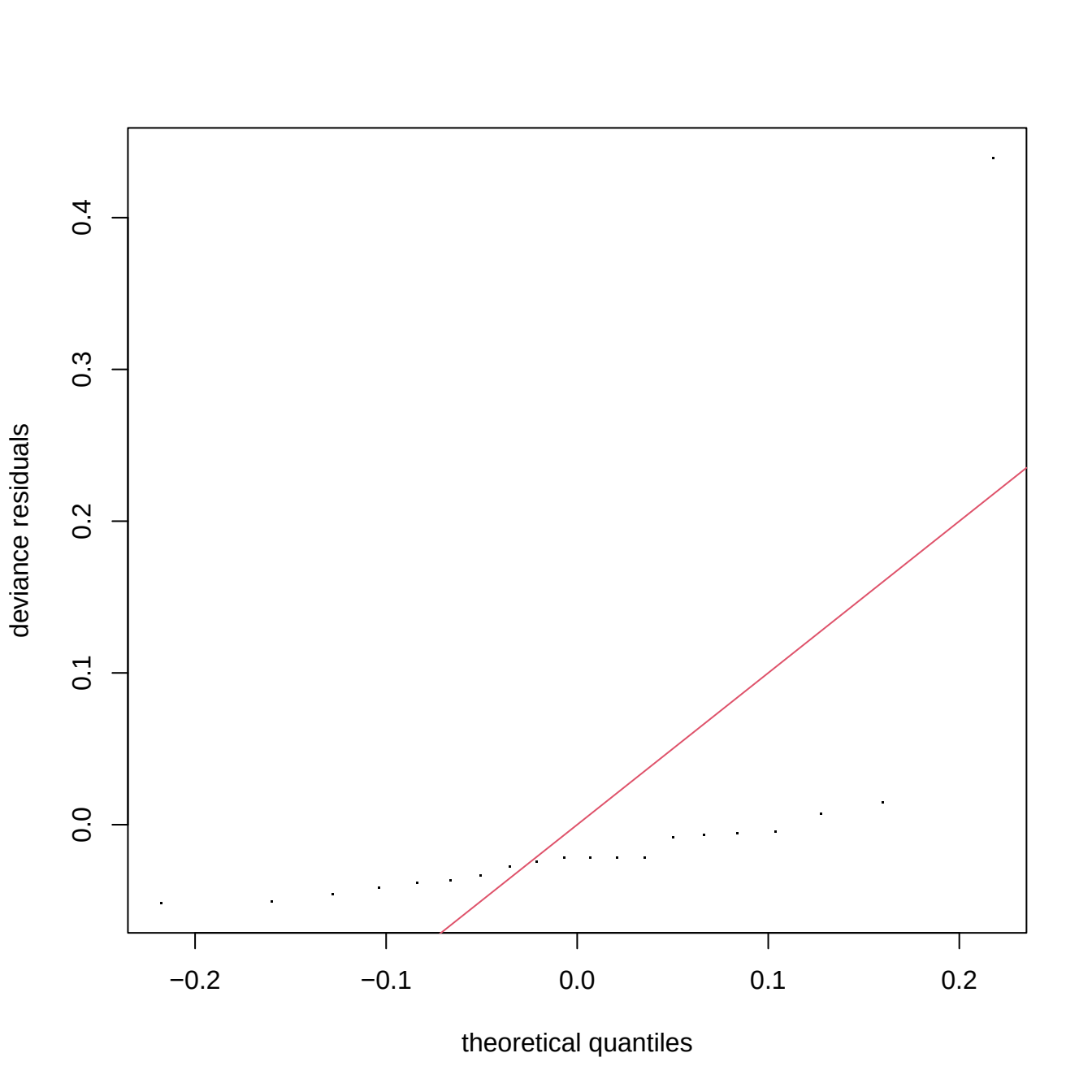

s(cumul_bites_2_previous_days,1)
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
0
2
4
6
8
10
12
14
cumul_bites_2_previous_days

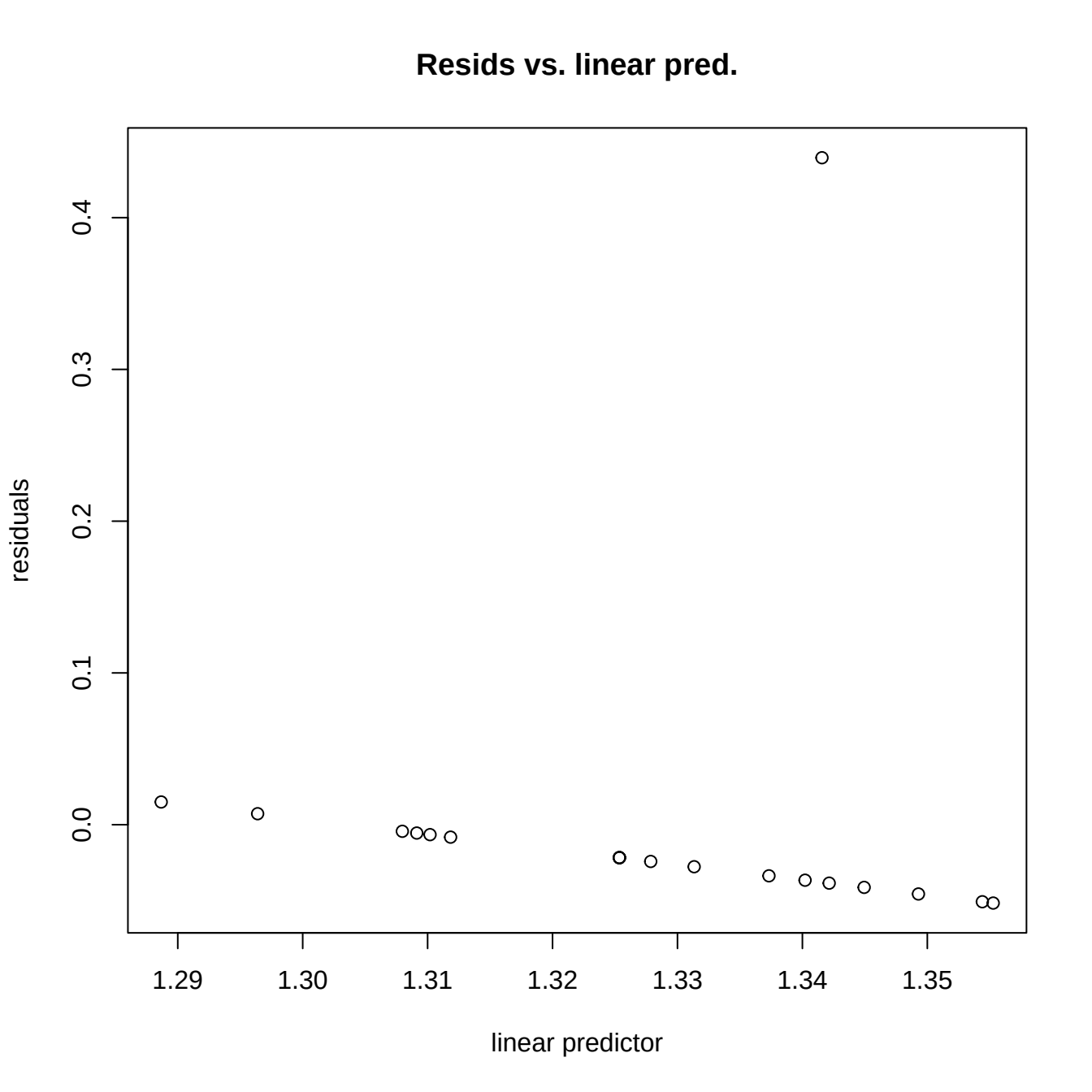

s(cumul_bites_7_previous_days,1)
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
0
10
20
30
40
cumul_bites_7_previous_days

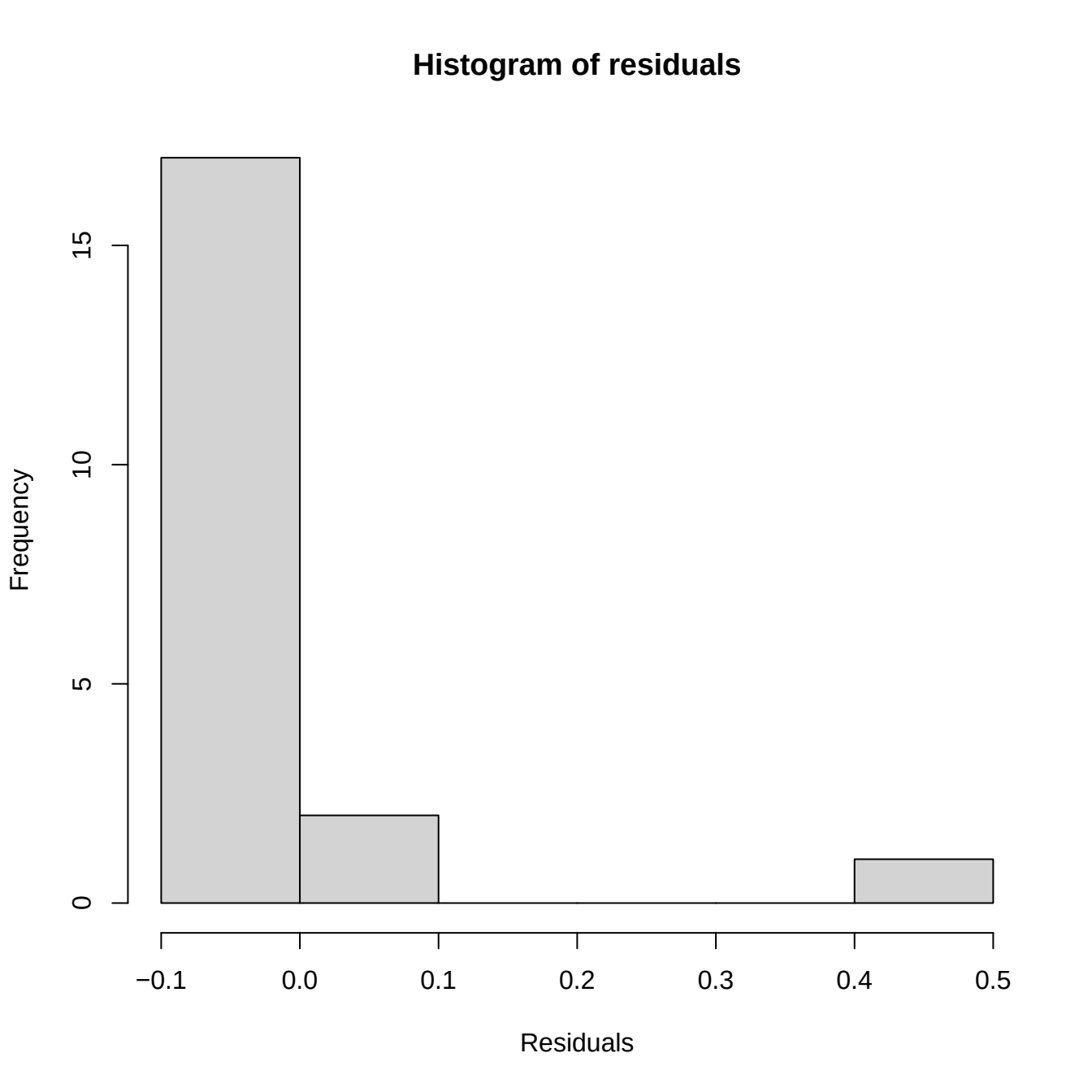

s(ID,0)
effects
1.5e−06
1.0e−06
5.0e−07
0.0e+00
−5.0e−07
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles

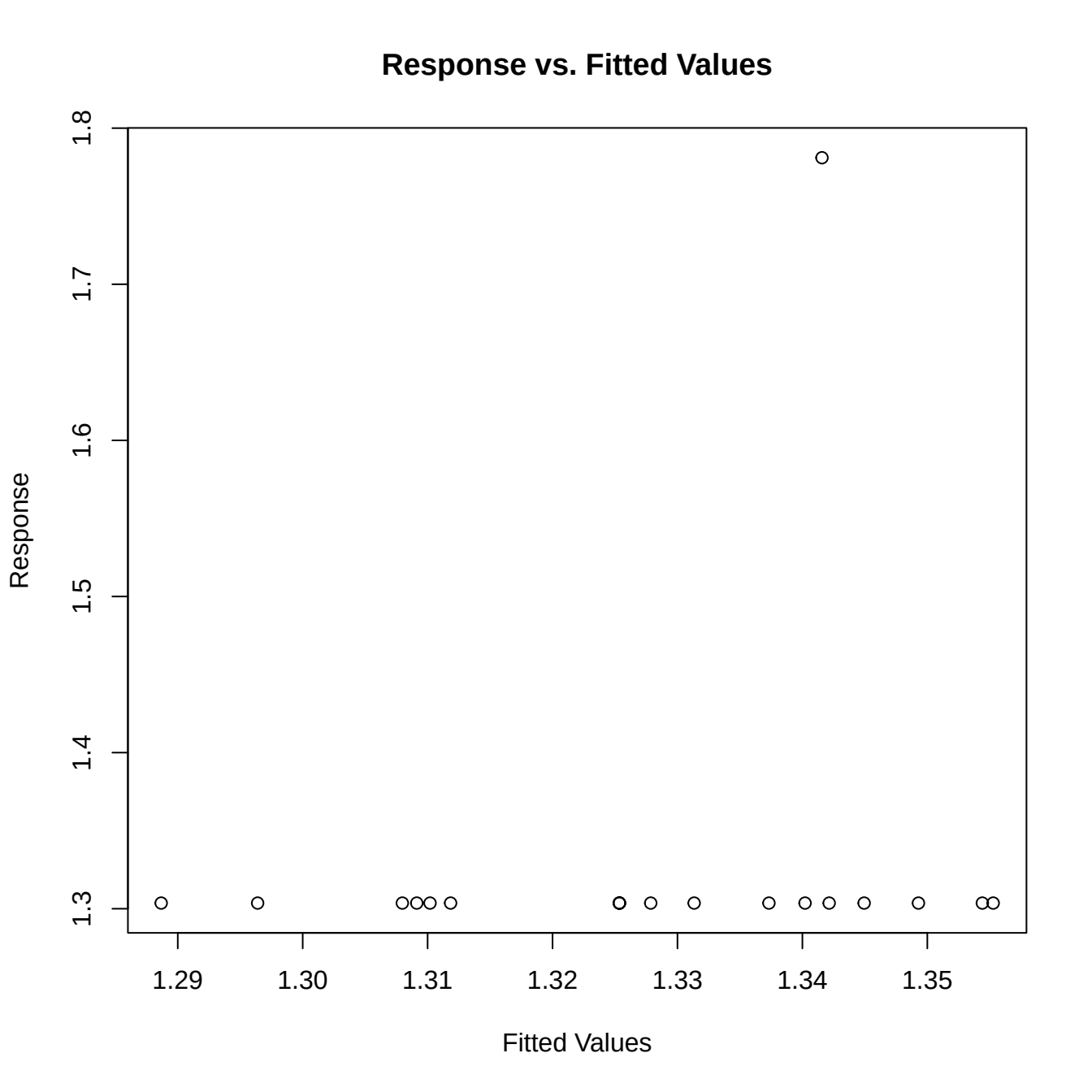

1.8
1.7
1.6
1.5
1.4
1.3
Cytokine concentration (log10)
0
5
10
Nb bites 2 previous days


1.8
1.7
1.6
1.5
1.4
1.3
Cytokine concentration (log10)
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.0
0.1
0.2
0.3
0.4
−0.2
−0.1
0.0
0.1
0.2
theoretical quantiles


Resids vs. linear pred.
residuals
0.0
0.1
0.2
0.3
0.4
1.29
1.30
1.31
1.32
1.33
1.34
1.35
linear predictor


Histogram of residuals
Frequency
0
5
10
15
−0.1
0.0
0.1
0.2
0.3
0.4
0.5
Residuals


Response vs. Fitted Values
Response
1.3
1.4
1.5
1.6
1.7
1.8
1.29
1.30
1.31
1.32
1.33
1.34
1.35
Fitted Values

```
Method: ML   Optimizer: outer newton
full convergence after 15 iterations.
Gradient range [−1.445314e−06,4.255814e−05]
(score −17.19421 & scale 0.01234153).
Hessian positive definite, eigenvalue range [1.177622e−06,9.999957].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                    k'      edf k−index p−value
s(cumul_bites_2_previous_days) 3.00e+00 1.00e+00    1.22    0.98
s(cumul_bites_7_previous_days) 3.00e+00 1.00e+00    1.24    1.00
s(ID)                          4.00e+00 6.17e−05      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                                Term  VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_2_previous_days, k = 4) 1.06 [1.00, 15.02]         1.03      0.94     [0.07, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.06 [1.00, 15.02]         1.03      0.94     [0.07, 1.00]
```

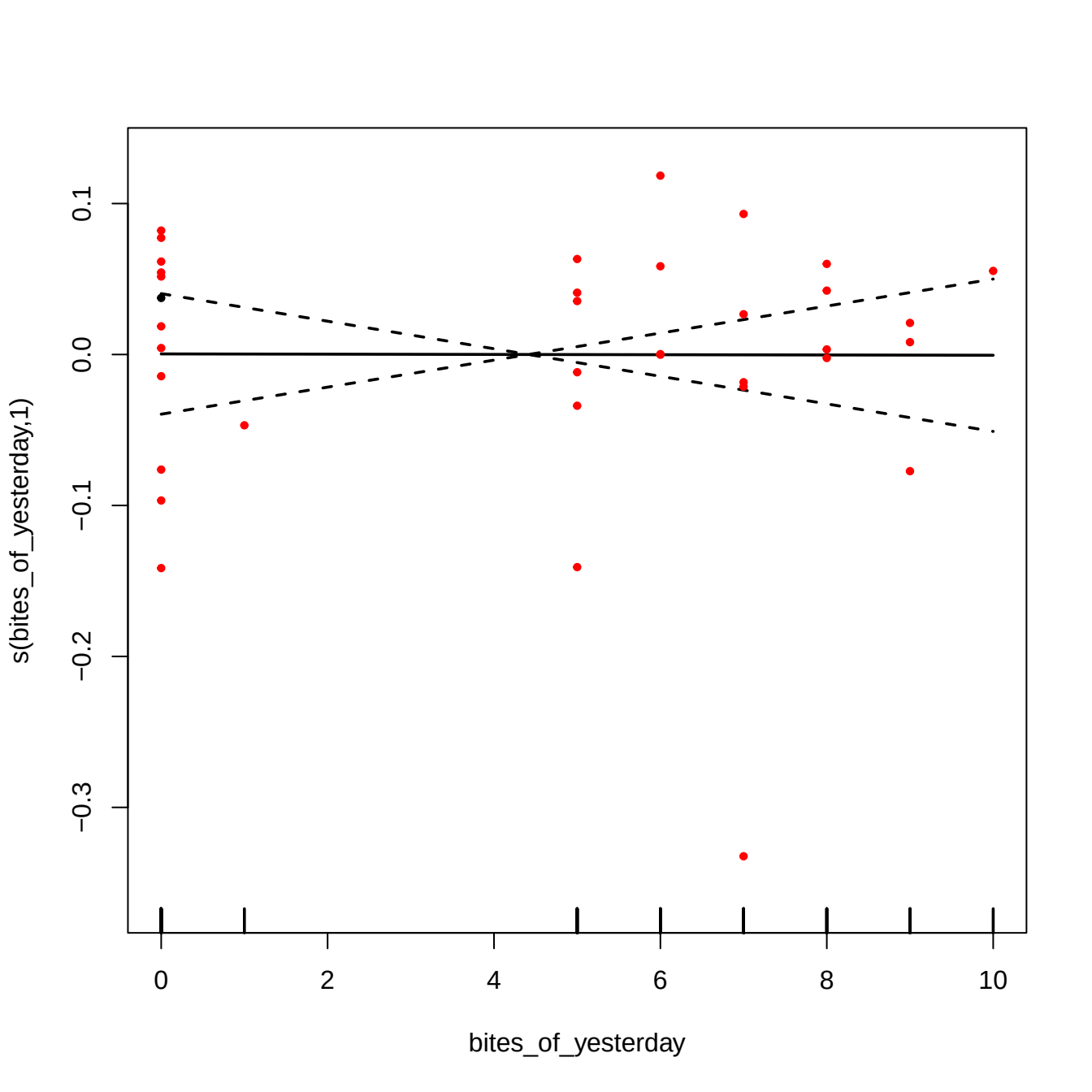
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(cumul_bites_2_previous_days, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.32750    0.02484   53.44   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                    edf Ref.df     F p-value
s(cumul_bites_2_previous_days) 1.000e+00      1 0.529   0.477
s(cumul_bites_7_previous_days) 1.000e+00      1 0.393   0.539
s(ID)                          6.174e-05      3 0.000   0.347

R-sq.(adj) =  -0.083   Deviance explained =  3.1%
-ML = -17.194  Scale est. = 0.012342  n = 20
```

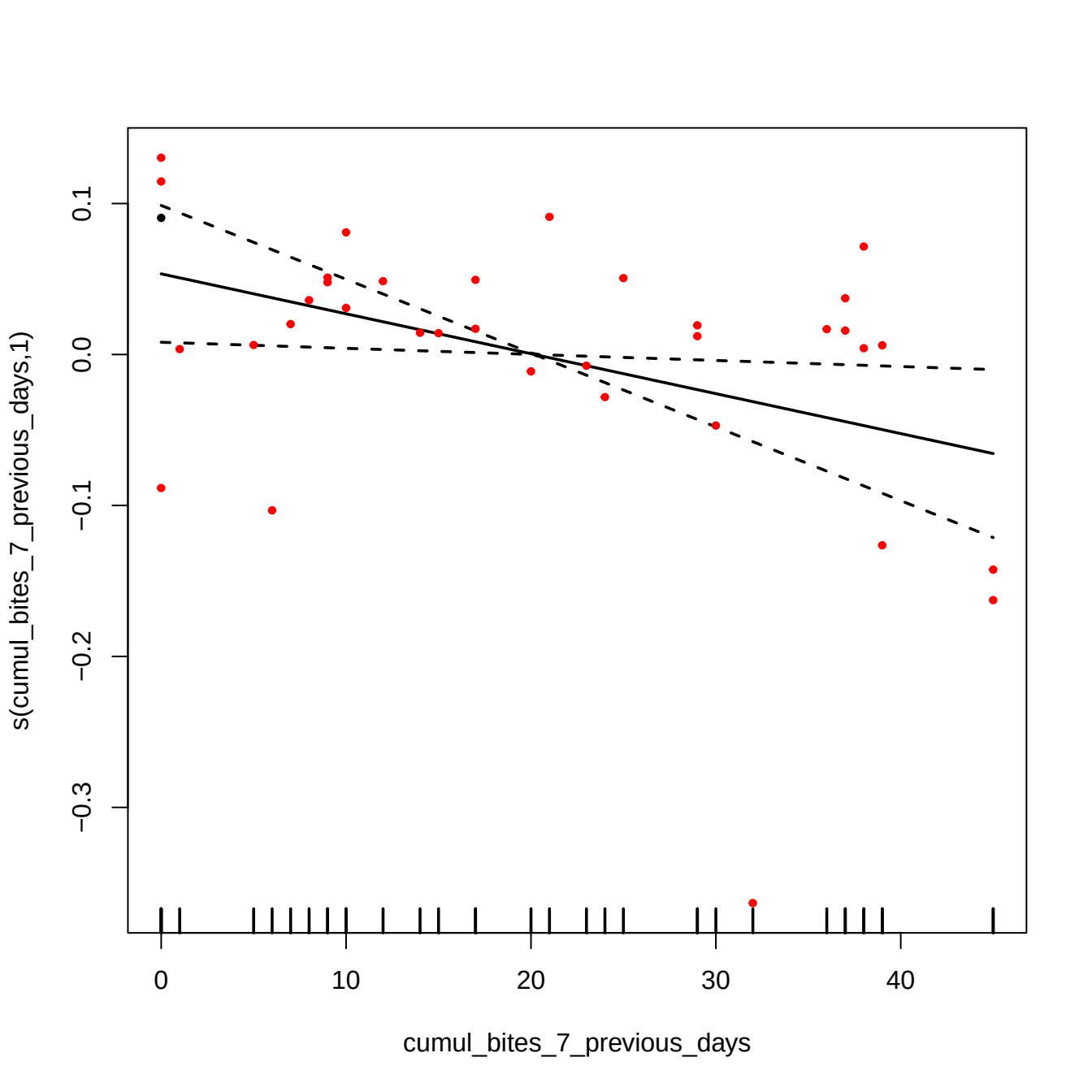
AICc [1] −23.72151

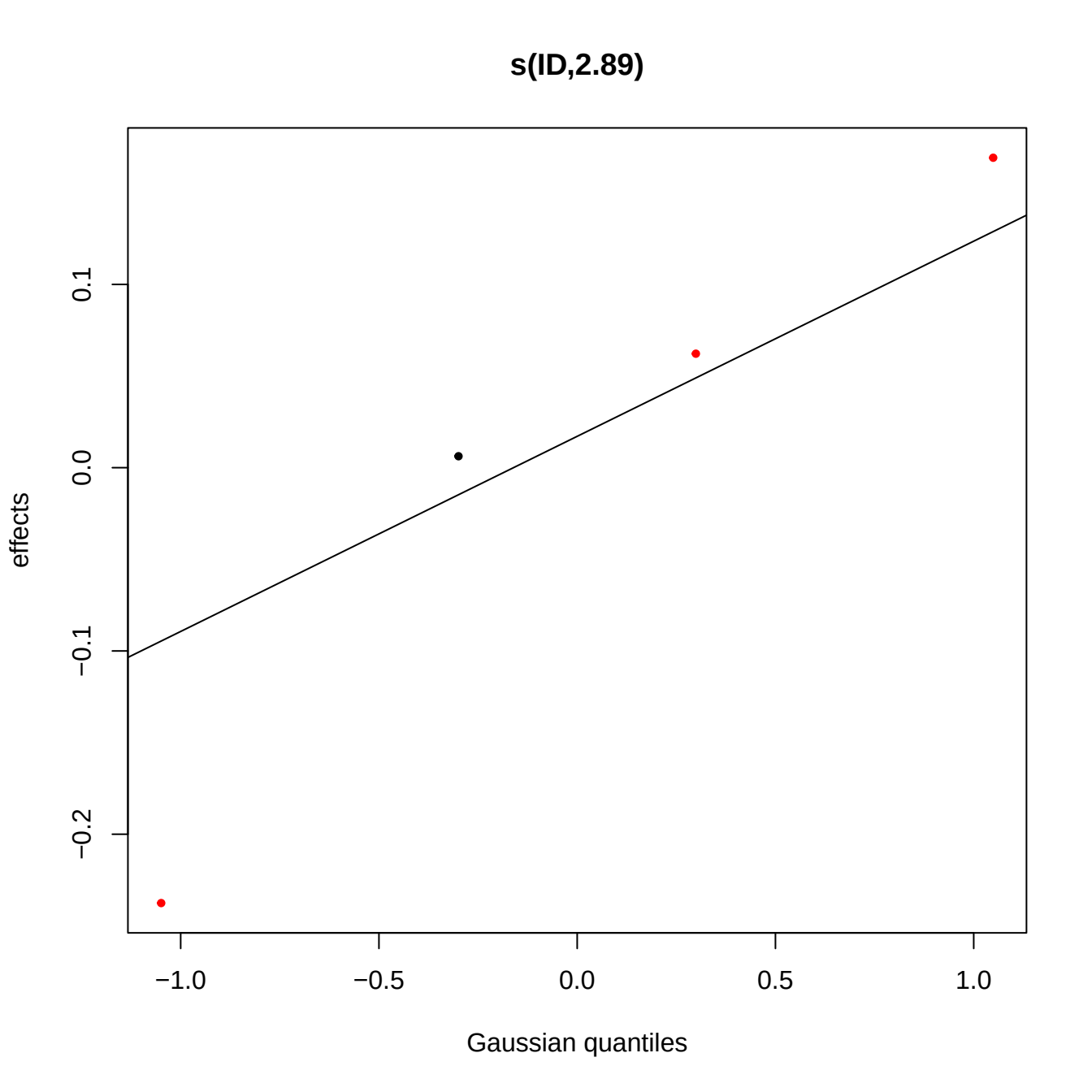
MDC

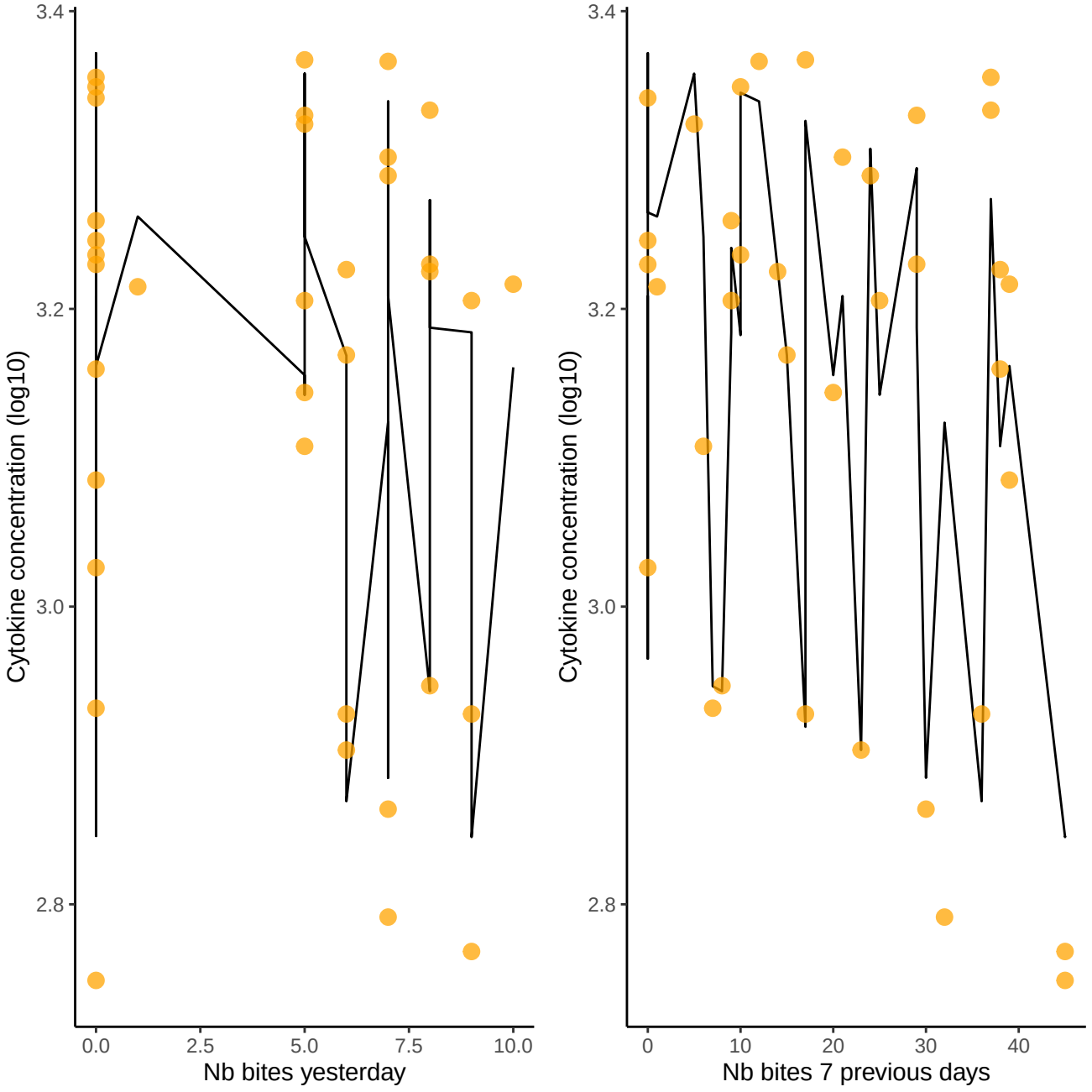
Bites in cyno

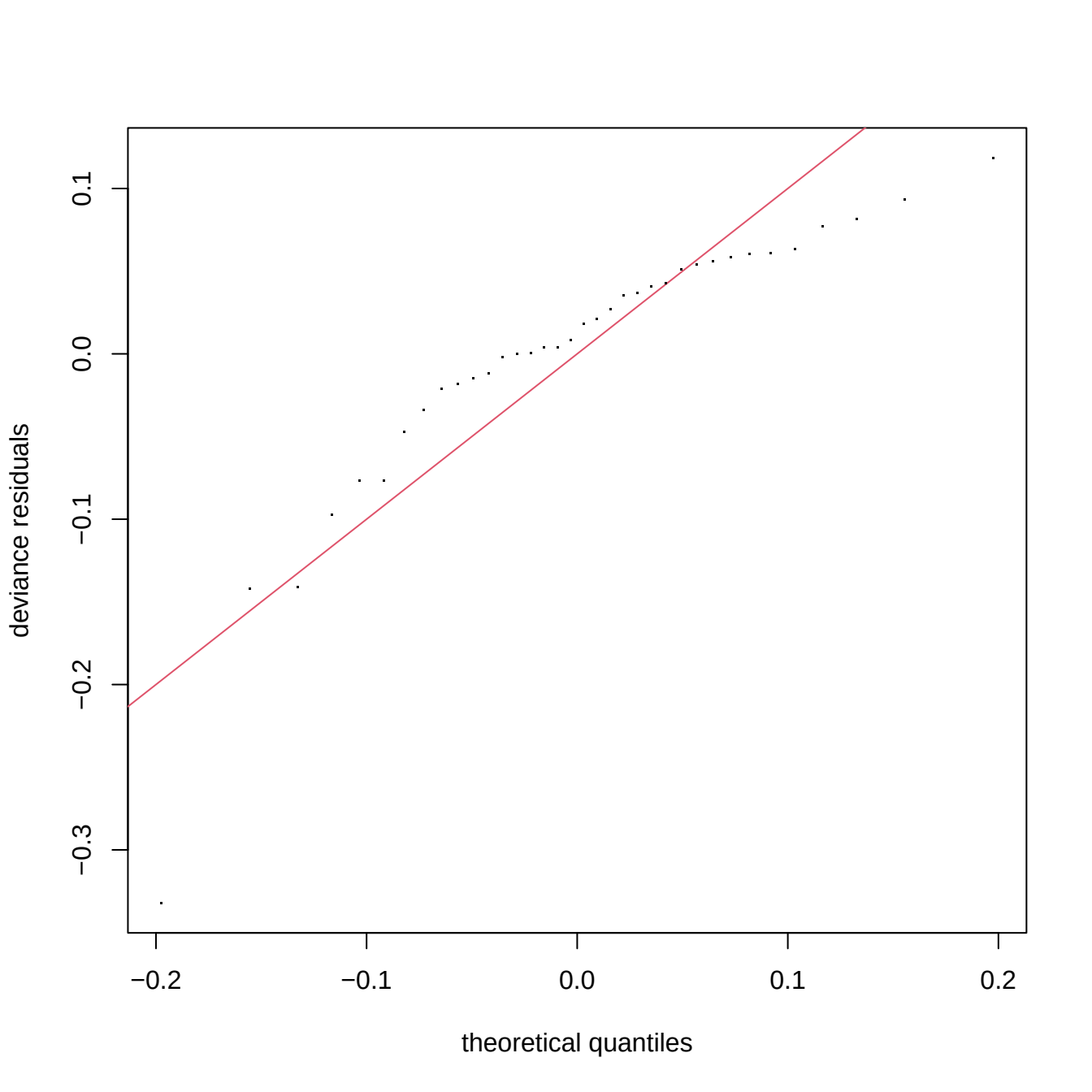
Nb obs: 36

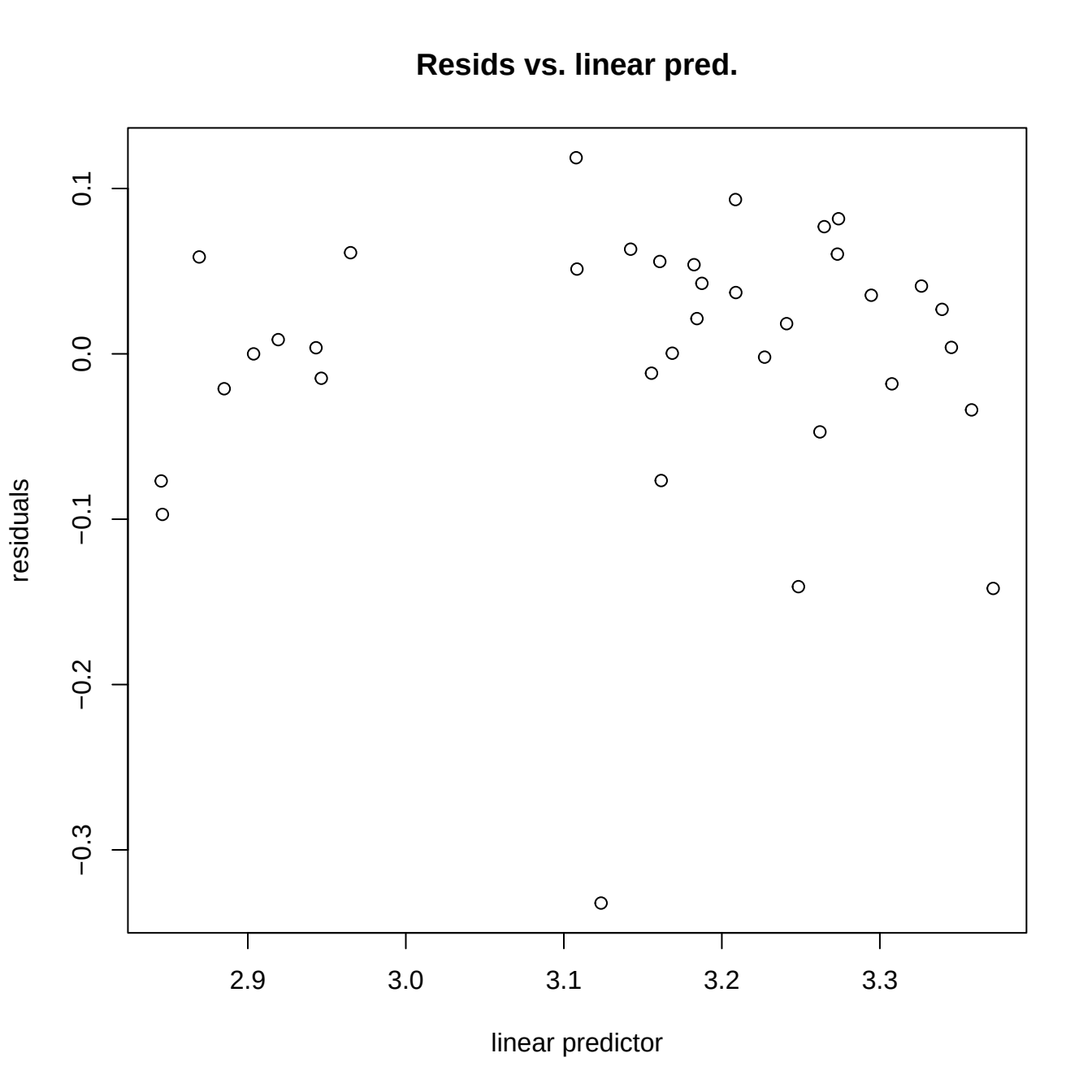

s(bites_of_yesterday,1)
0.1
0.0
−0.1
−0.2
−0.3
0
2
4
6
8
10
bites_of_yesterday

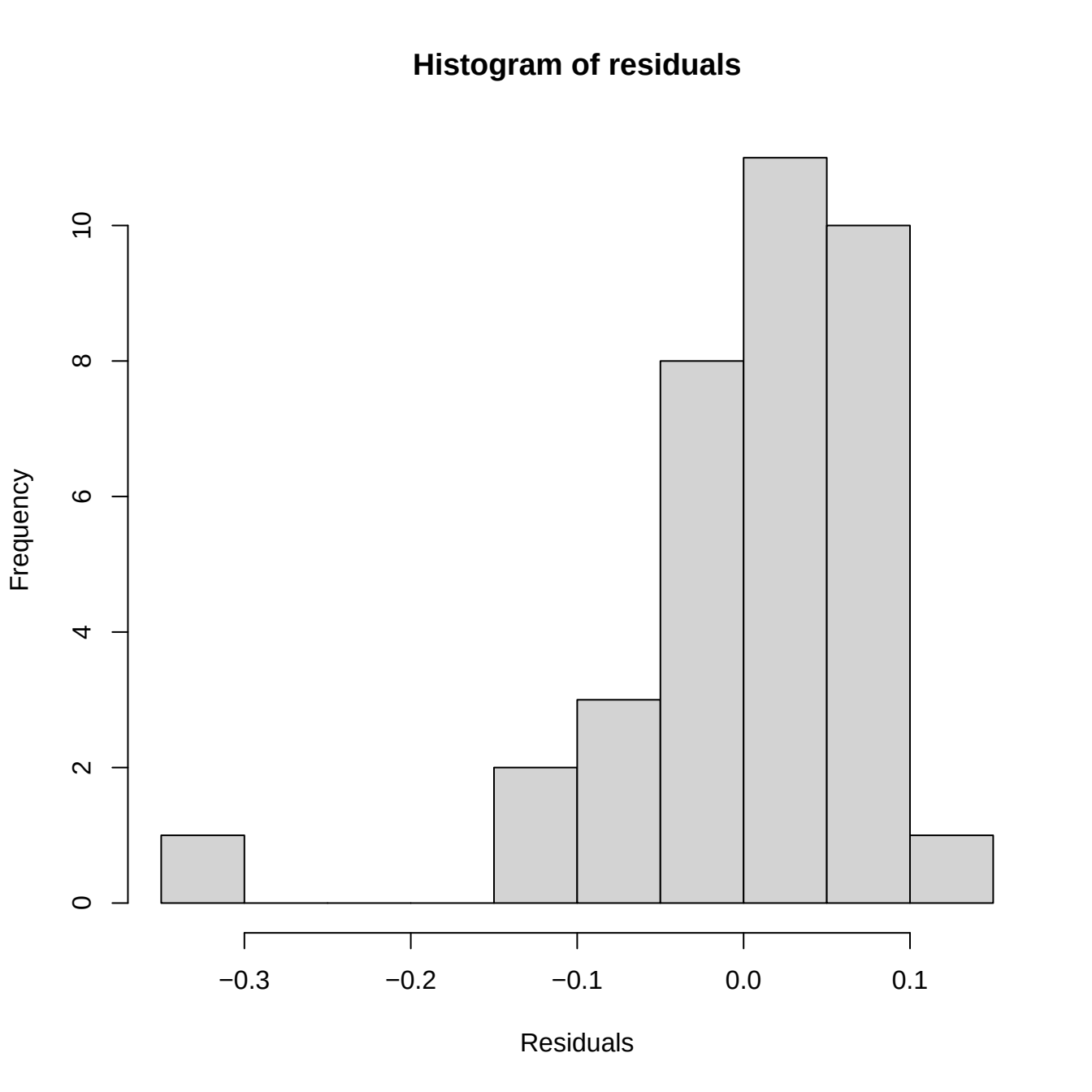

s(cumul_bites_7_previous_days,1)
0.1
0.0
−0.1
−0.2
−0.3
0
10
20
30
40
cumul_bites_7_previous_days

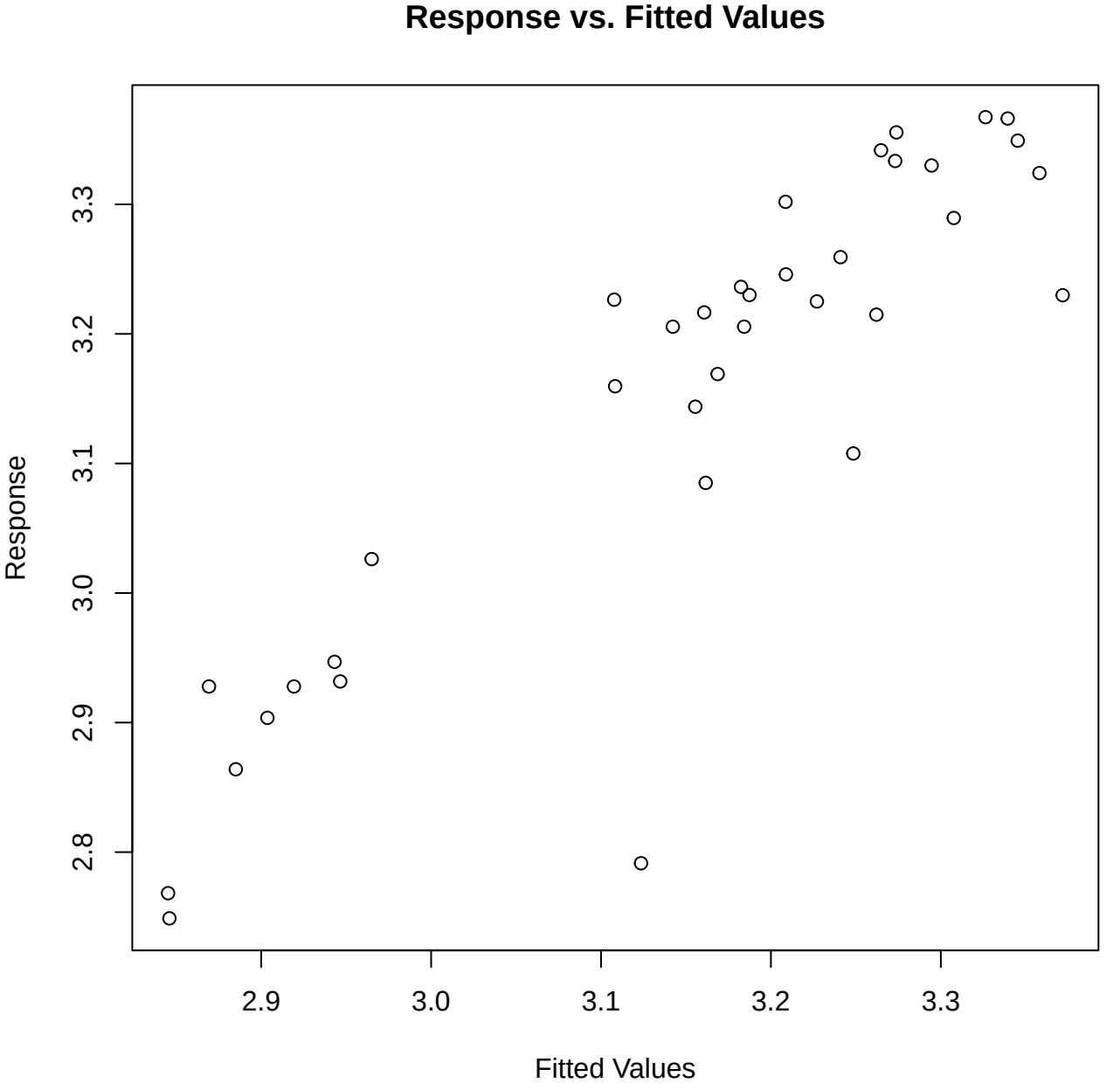

s(ID,2.89)
effects
0.1
0.0
−0.1
−0.2
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
3.4
3.2
3.0
2.8
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
3.4
3.2
3.0
2.8
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.1
0.0
−0.1
−0.2
−0.3
−0.2
−0.1
0.0
0.1
0.2
theoretical quantiles


Resids vs. linear pred.
residuals
0.1
0.0
−0.1
−0.2
−0.3
2.9
3.0
3.1
3.2
3.3
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
10
−0.3
−0.2
−0.1
0.0
0.1
Residuals


Response vs. Fitted Values
Response
Fitted Values
2.8
2.9
3.0
3.1
3.2
3.3
2.9
3.0
3.1
3.2
3.3

```
Method: ML   Optimizer: outer newton
full convergence after 11 iterations.
Gradient range [−1.138384e−05,1.971193e−06]
(score −30.17698 & scale 0.008057609).
Hessian positive definite, eigenvalue range [8.925835e−06,18.22751].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                 k'  edf k−index p−value
s(bites_of_yesterday)          3.00 1.00    0.99    0.47
s(cumul_bites_7_previous_days) 3.00 1.00    0.95    0.23
s(ID)                          4.00 2.89      NA      NA
```

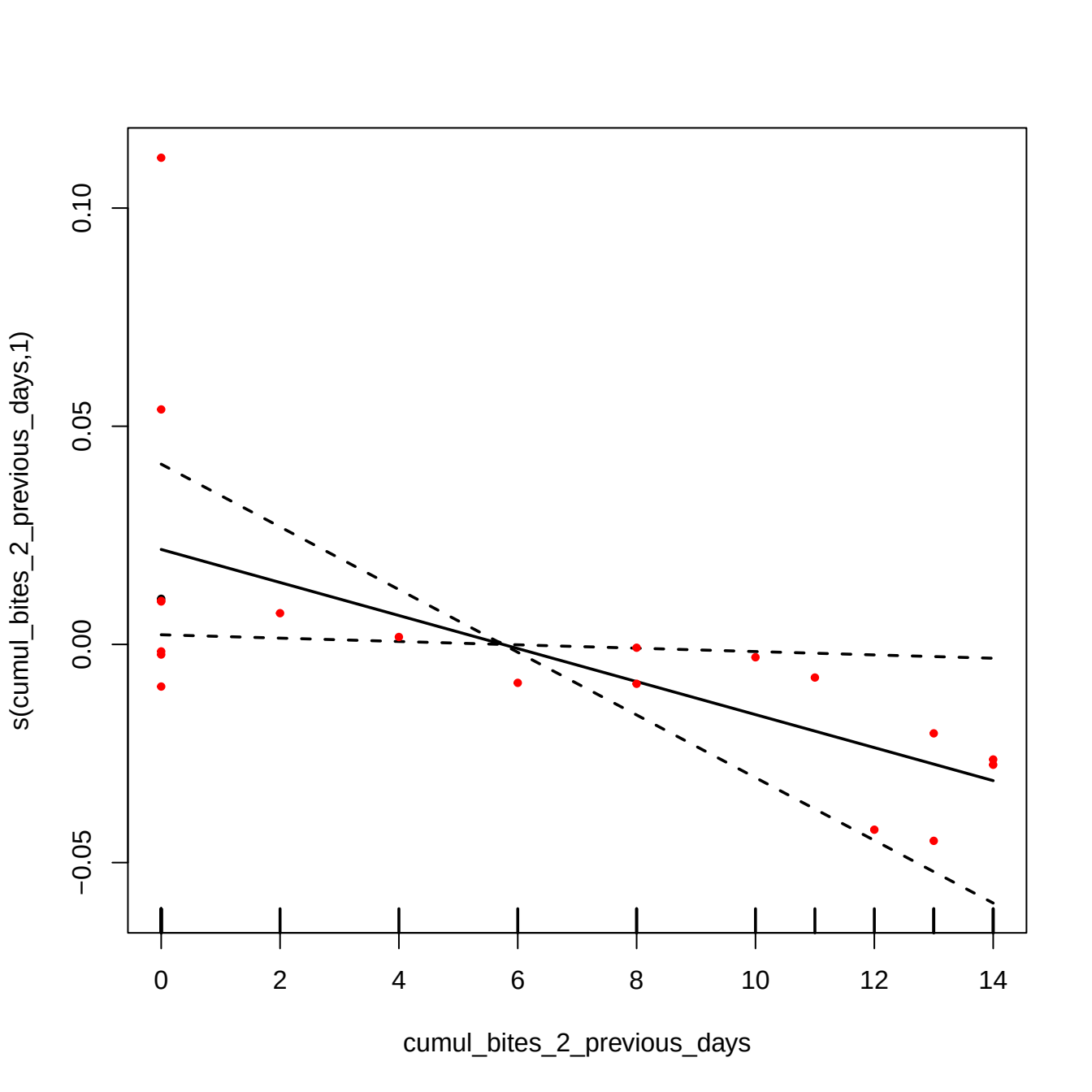
```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

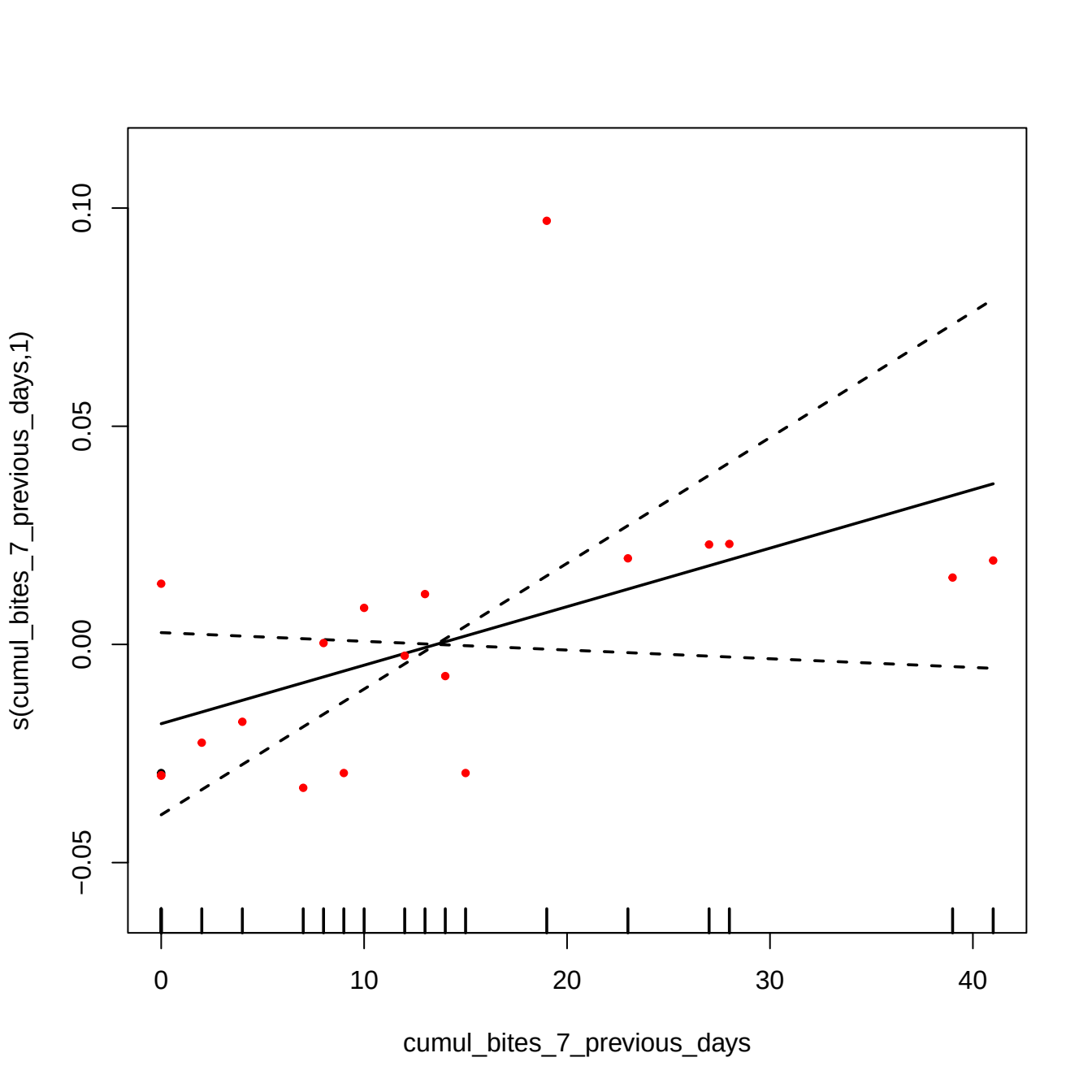
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  3.14878    0.07984   39.44   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F p-value
s(bites_of_yesterday)         1.000      1  0.000  0.9848
s(cumul_bites_7_previous_days) 1.000      1  5.562  0.0251 *
s(ID)                         2.894      3 33.618  <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.766   Deviance explained = 79.9%
-ML = -30.177  Scale est. = 0.0080576  n = 36
```

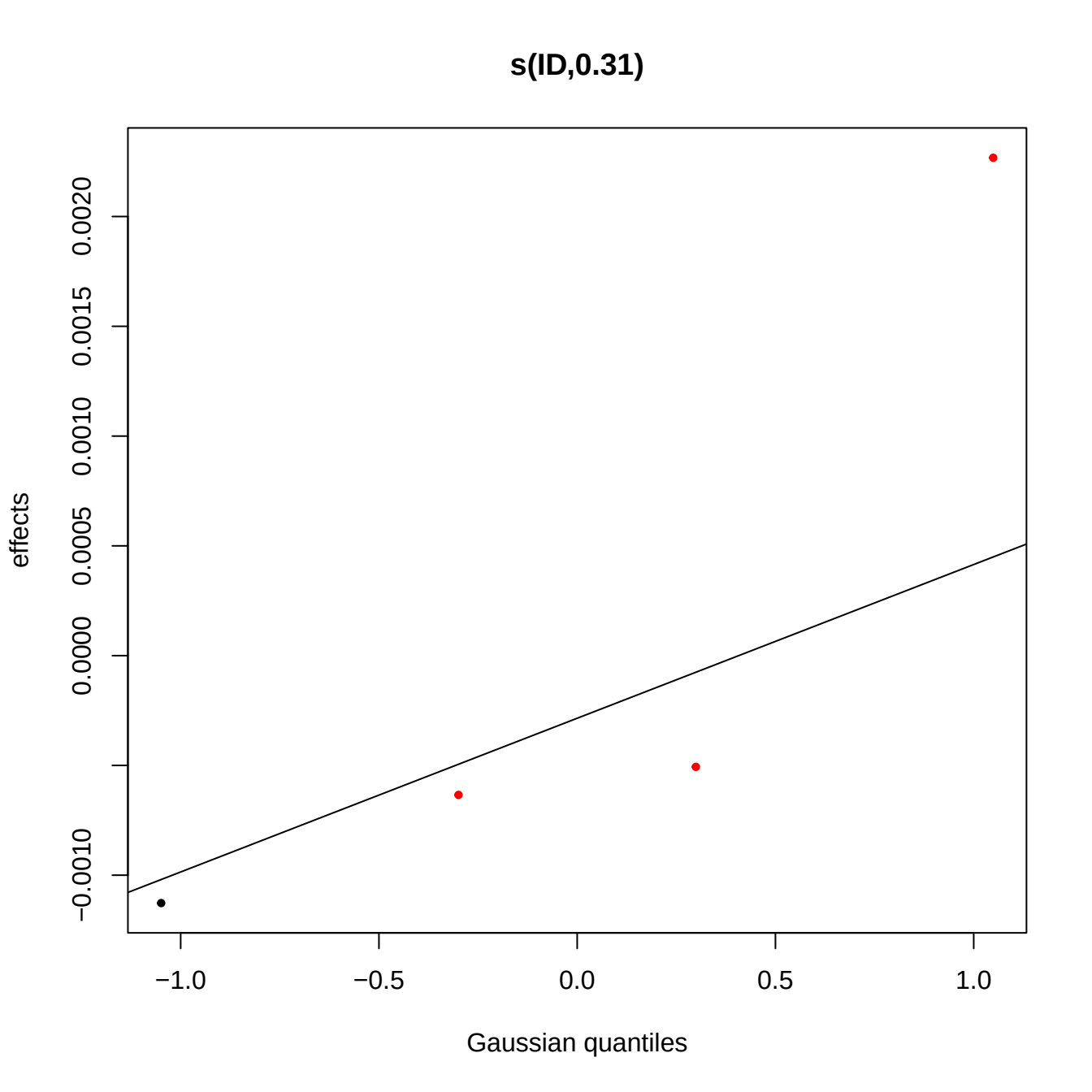
AICc [1] −59.89258

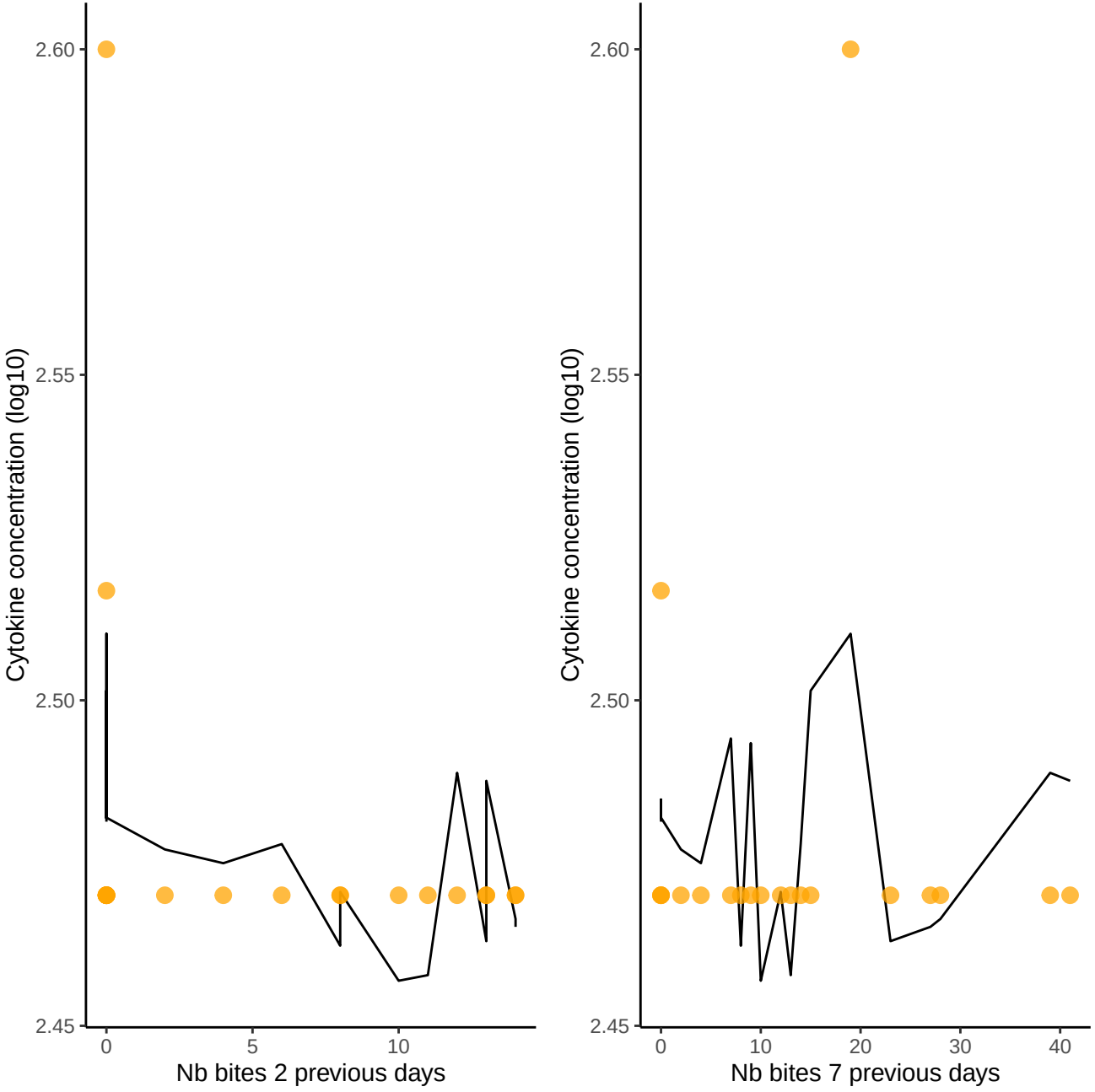
Bites in squirrel

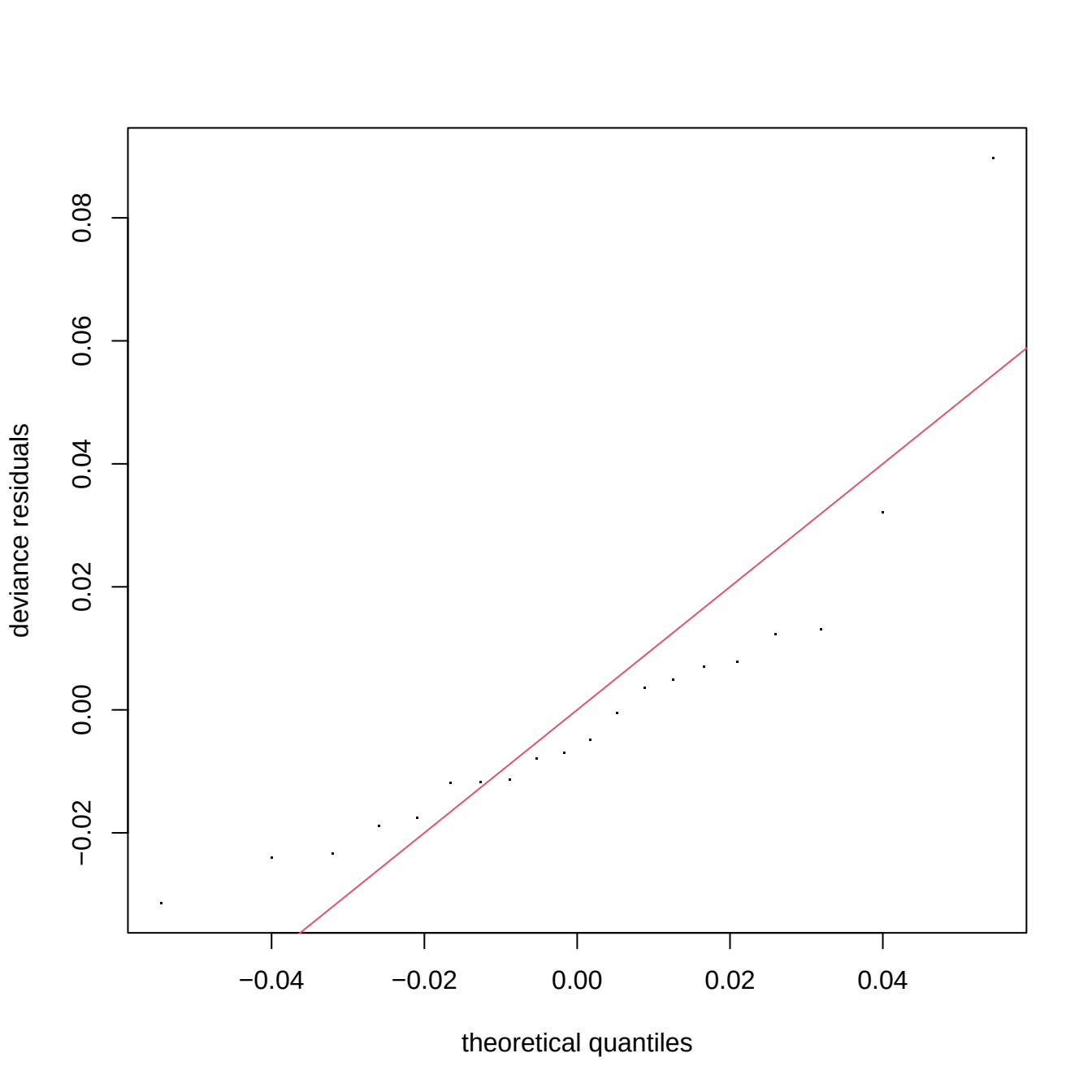
Nb obs: 20

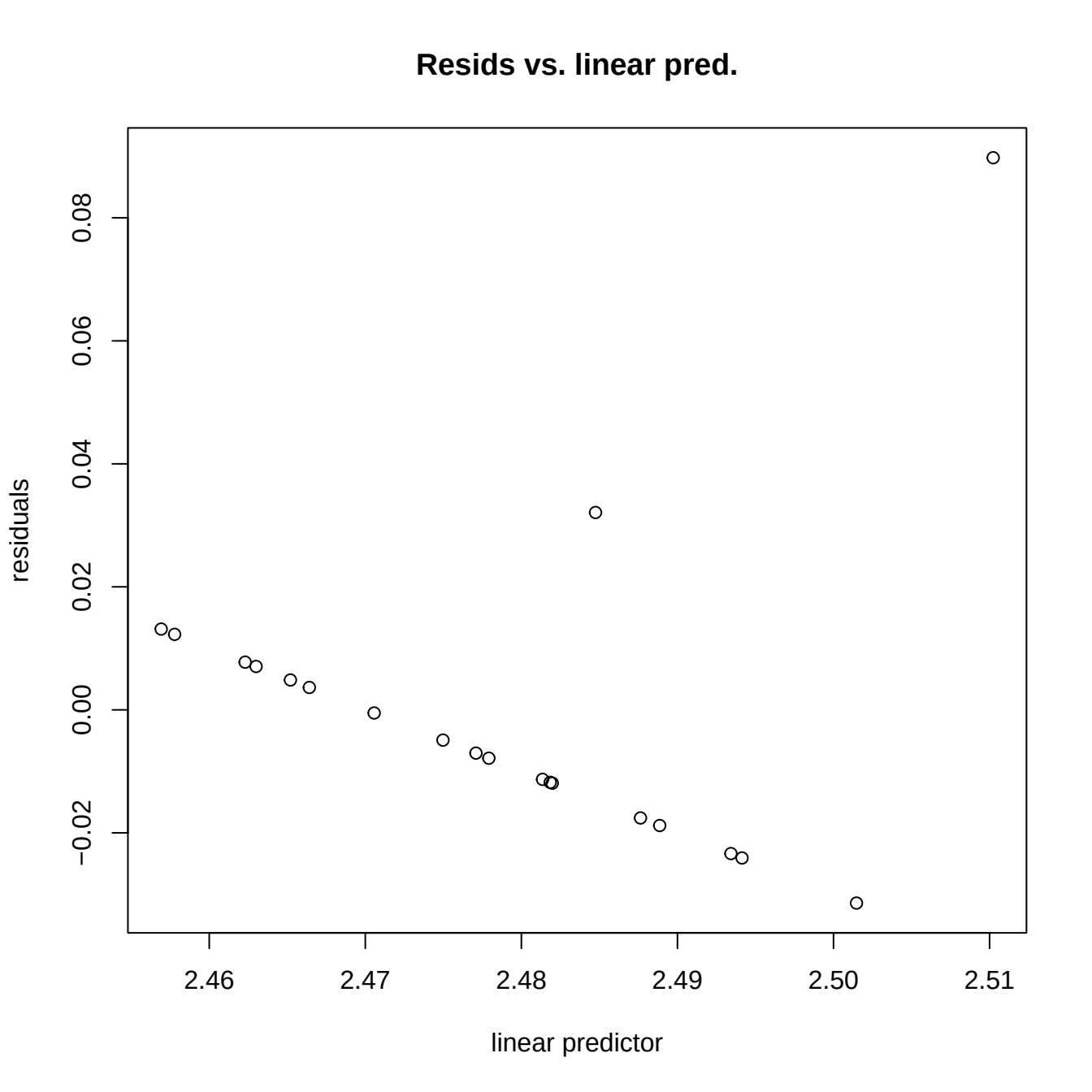

s(cumul_bites_2_previous_days,1)
0.10
0.05
0.00
−0.05
0
2
4
6
8
10
12
14
cumul_bites_2_previous_days

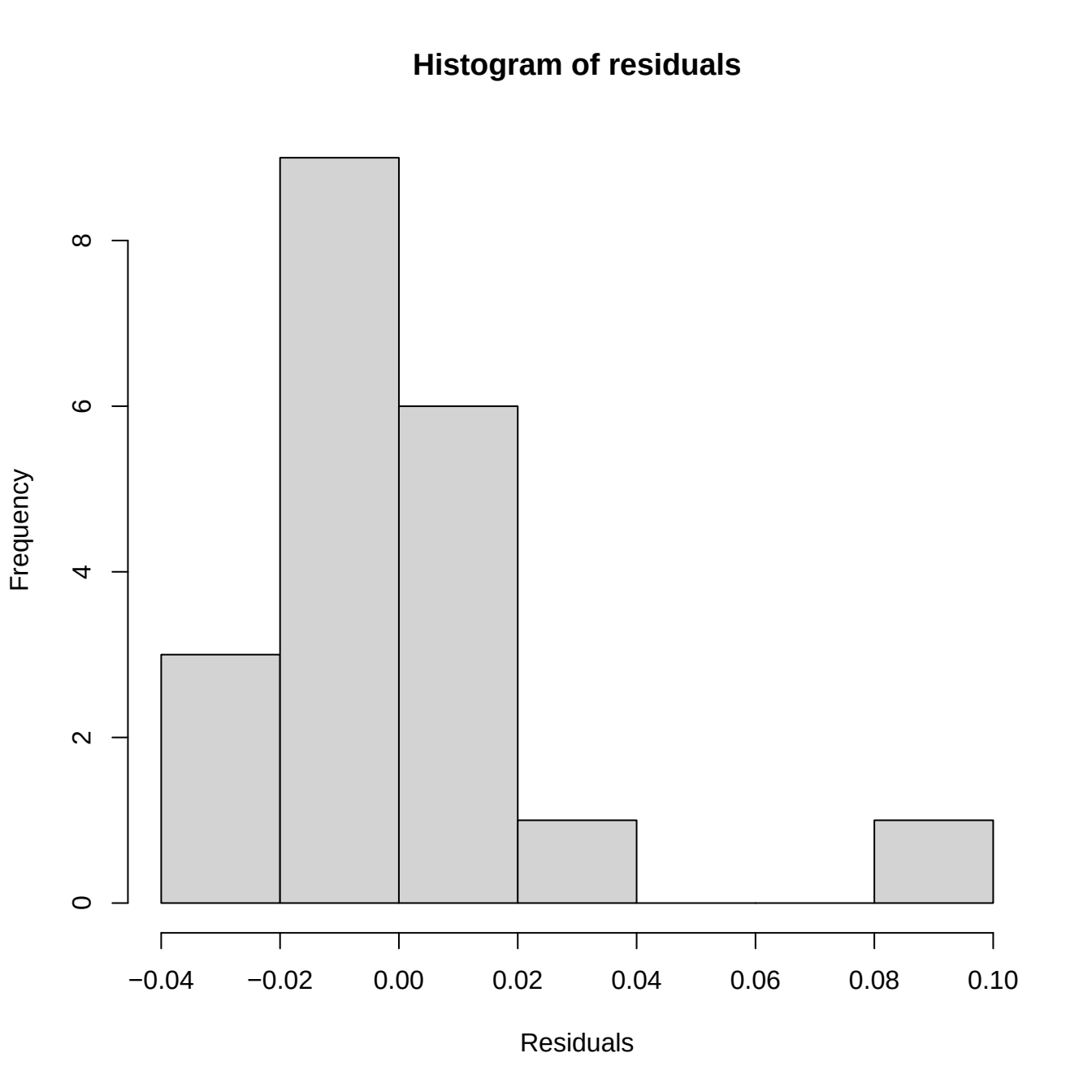

s(cumul_bites_7_previous_days,1)
0.10
0.05
0.00
−0.05
0
10
20
30
40
cumul_bites_7_previous_days

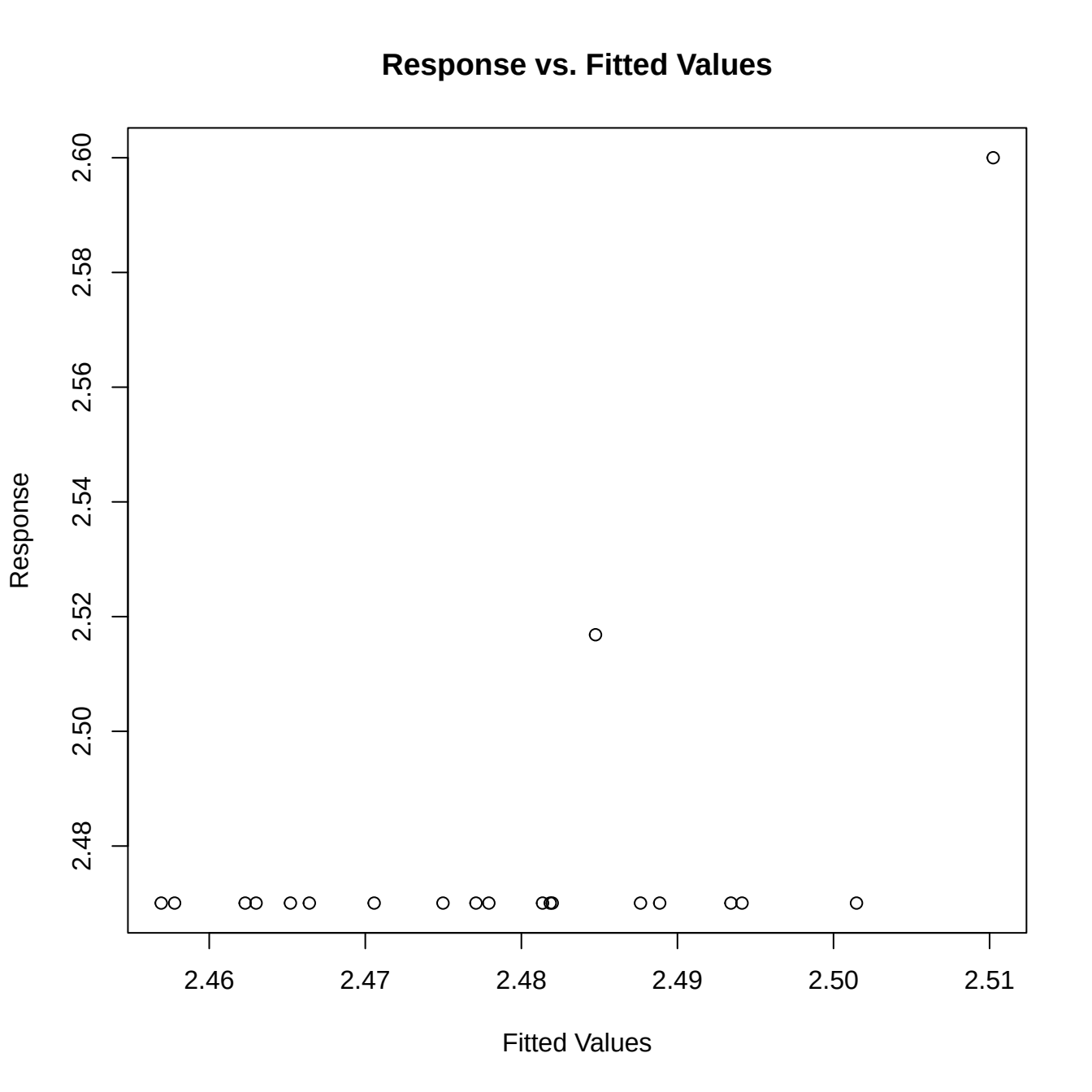

s(ID,0.31)
effects
0.0020
0.0015
0.0010
0.0005
0.0000
−0.0010
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.60
2.55
2.50
2.45
0
5
10
Nb bites 2 previous days
Cytokine concentration (log10)
2.60
2.55
2.50
2.45
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.08
0.06
0.04
0.02
0.00
−0.02
−0.04
−0.02
0.00
0.02
0.04
theoretical quantiles


Resids vs. linear pred.
residuals
0.08
0.06
0.04
0.02
0.00
−0.02
2.46
2.47
2.48
2.49
2.50
2.51
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
−0.04
−0.02
0.00
0.02
0.04
0.06
0.08
0.10
Residuals


Response vs. Fitted Values
Response
2.48
2.50
2.52
2.54
2.56
2.58
2.60
2.46
2.47
2.48
2.49
2.50
2.51
Fitted Values

```
Method: ML   Optimizer: outer newton
full convergence after 10 iterations.
Gradient range [−2.677535e−05,1.873333e−06]
(score −44.64763 & scale 0.0007716068).
Hessian positive definite, eigenvalue range [6.938894e−07,10.00479].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                  k'   edf k−index p−value
s(cumul_bites_2_previous_days) 3.000 1.000    1.32    0.94
s(cumul_bites_7_previous_days) 3.000 1.000    1.26    0.84
s(ID)                          4.000 0.309      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_2_previous_days, k = 4) 1.06 [1.00, 14.99]         1.03      0.94     [0.07, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.06 [1.00, 15.01]         1.03      0.94     [0.07, 1.00]
```

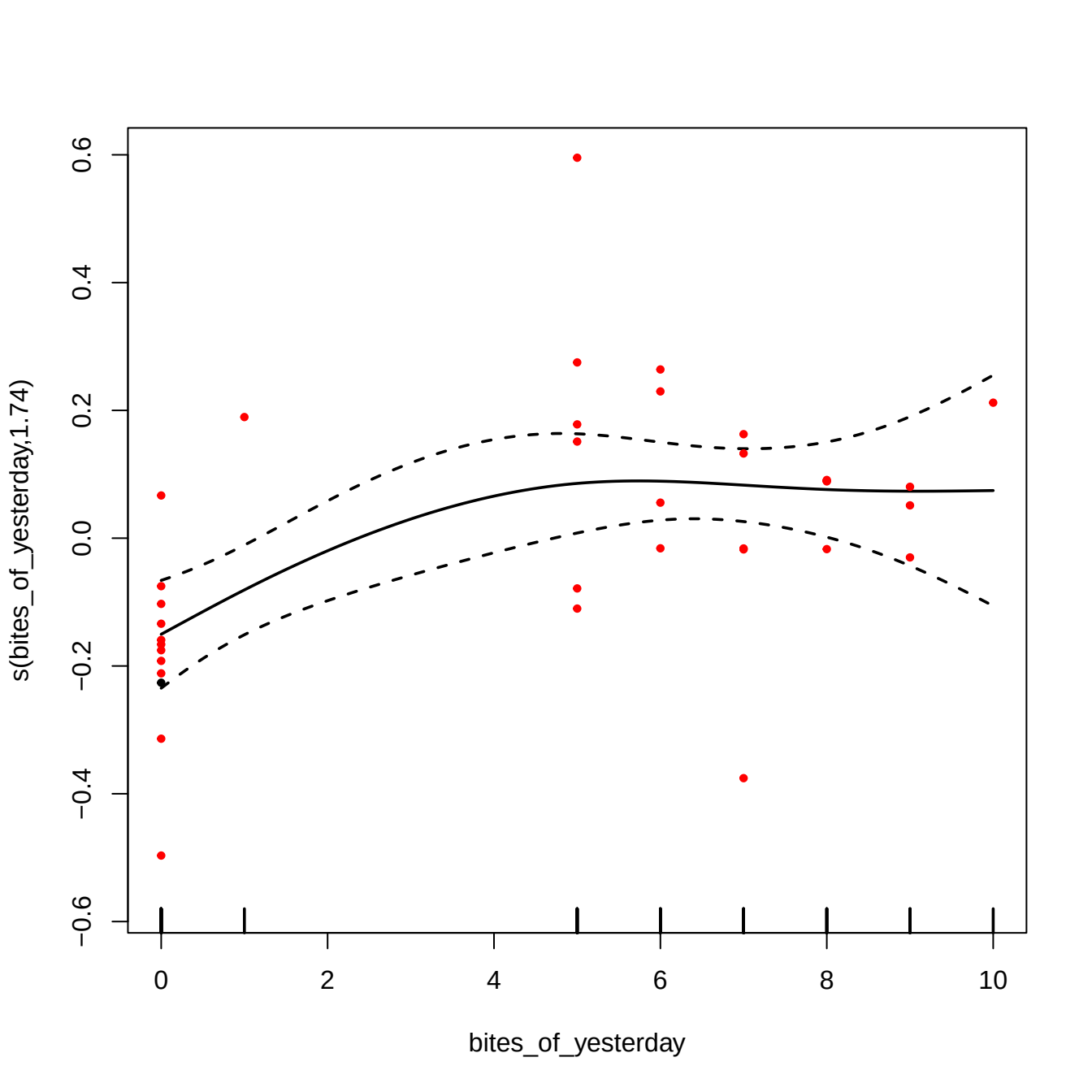
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(cumul_bites_2_previous_days, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 2.478894   0.006582   376.6   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df     F p-value
s(cumul_bites_2_previous_days) 1.0000      1 4.955  0.0398 *
s(cumul_bites_7_previous_days) 1.0000      1 3.030  0.0998 .
s(ID)                          0.3094      3 0.138  0.2939
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.163   Deviance explained = 26.5%
-ML = -44.648  Scale est. = 0.00077161  n = 20
```

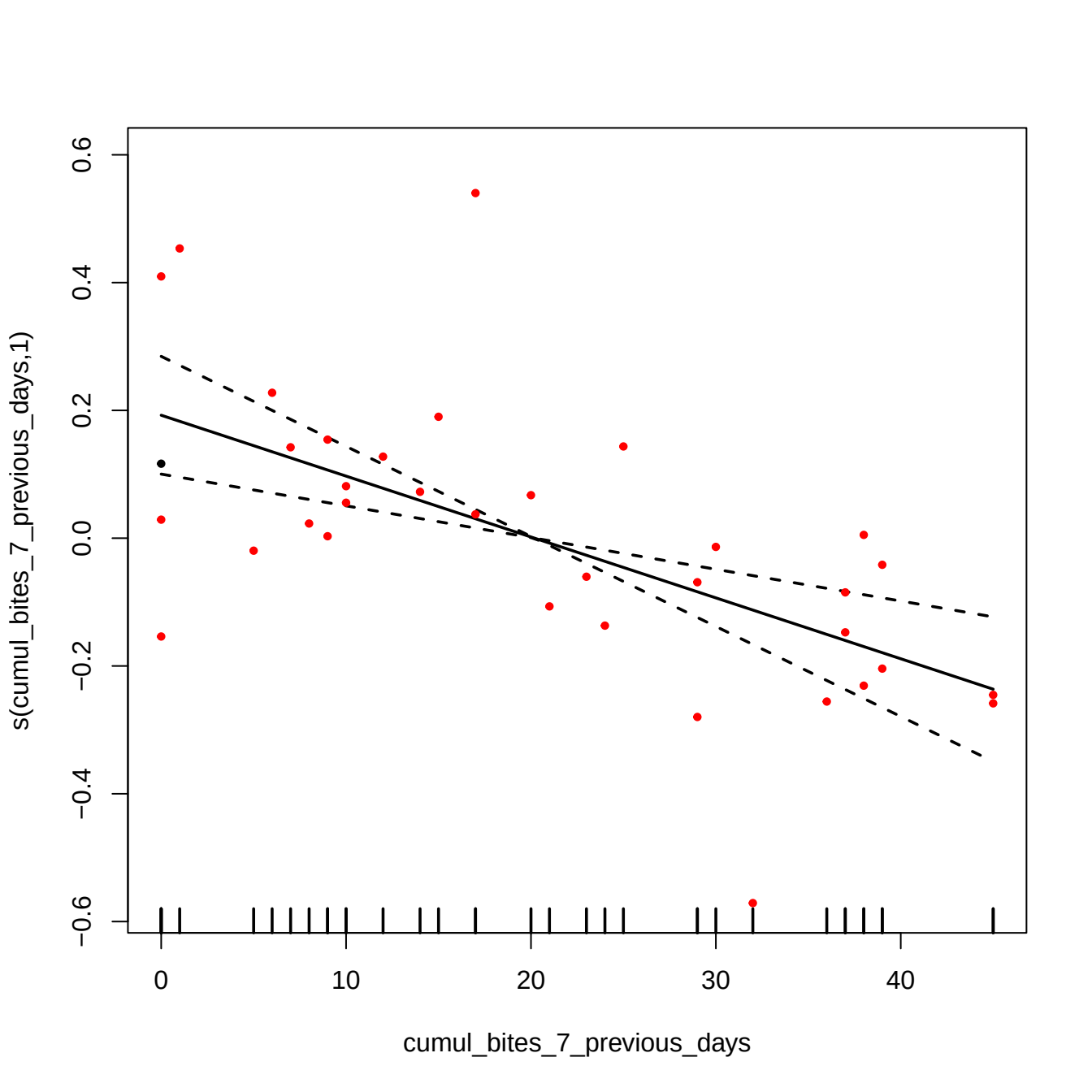
AICc [1] −77.47212

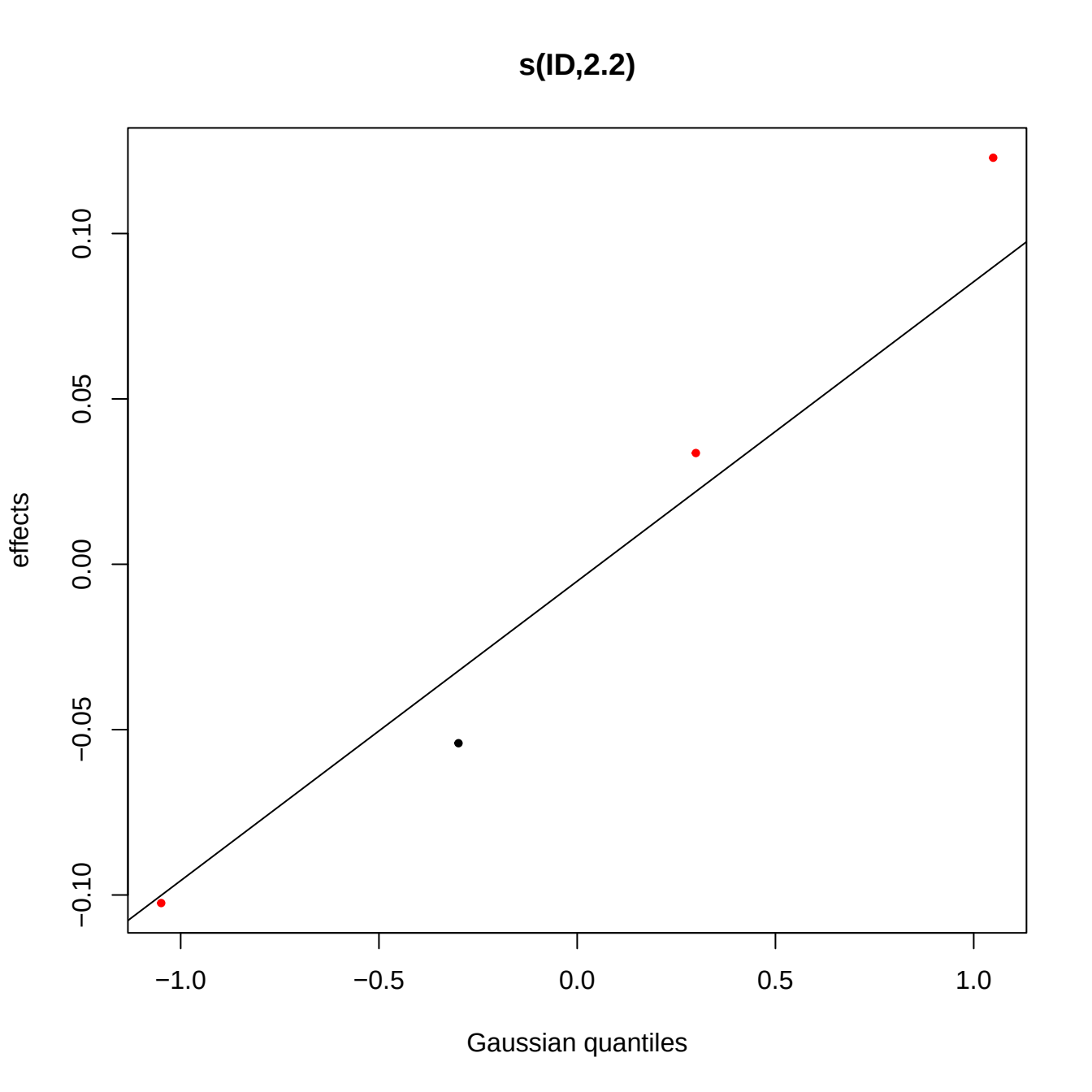
MIF

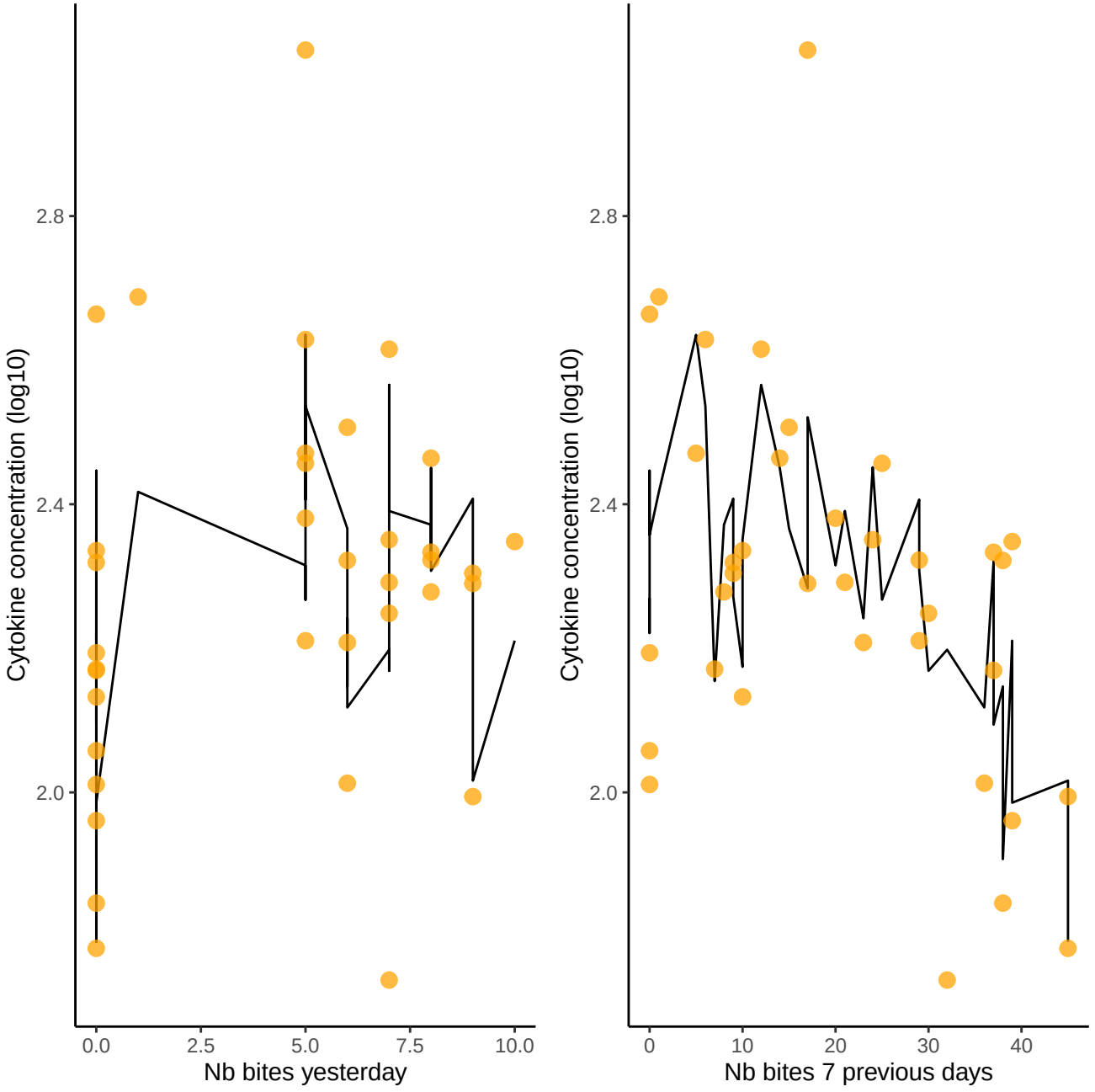
Bites in cyno

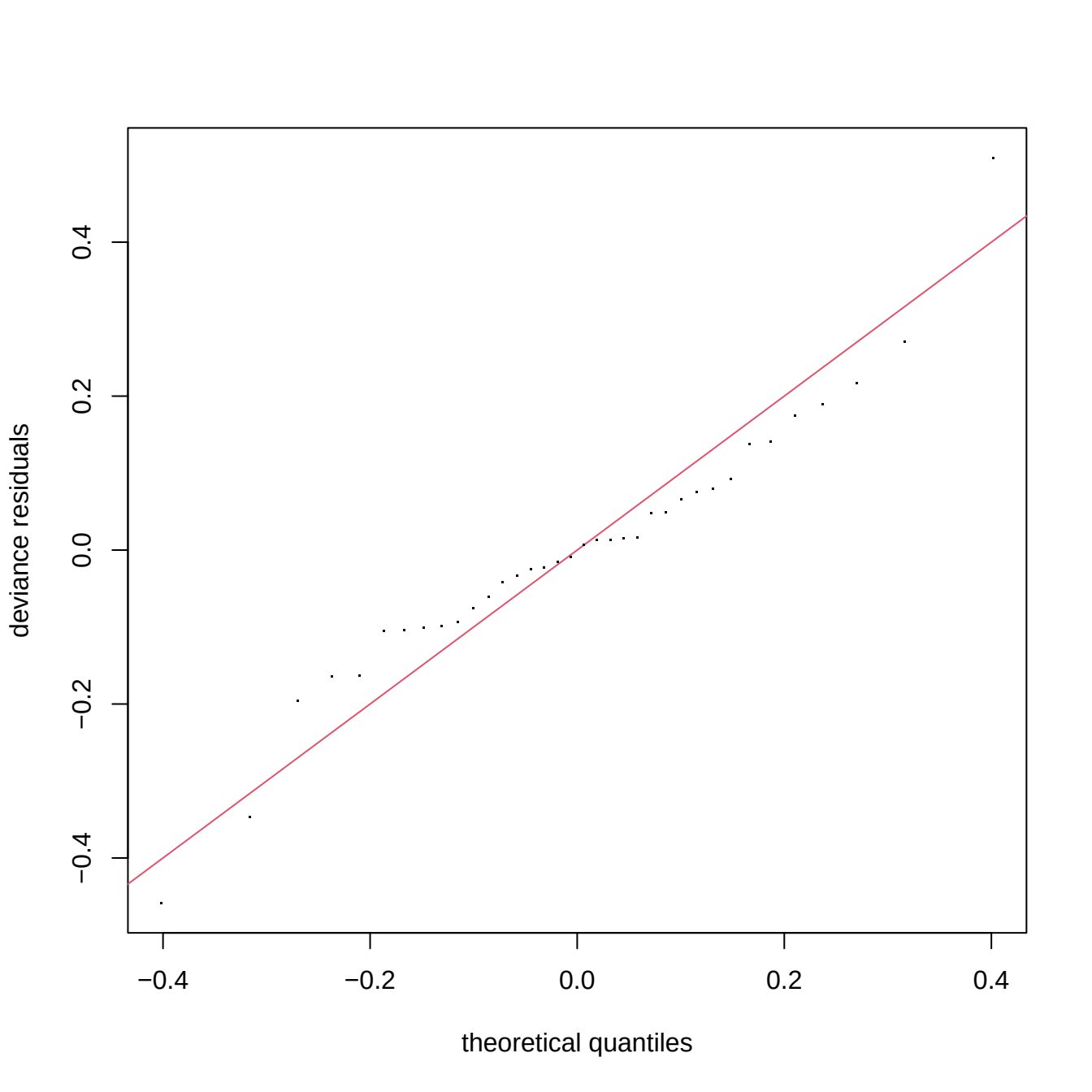
Nb obs: 36

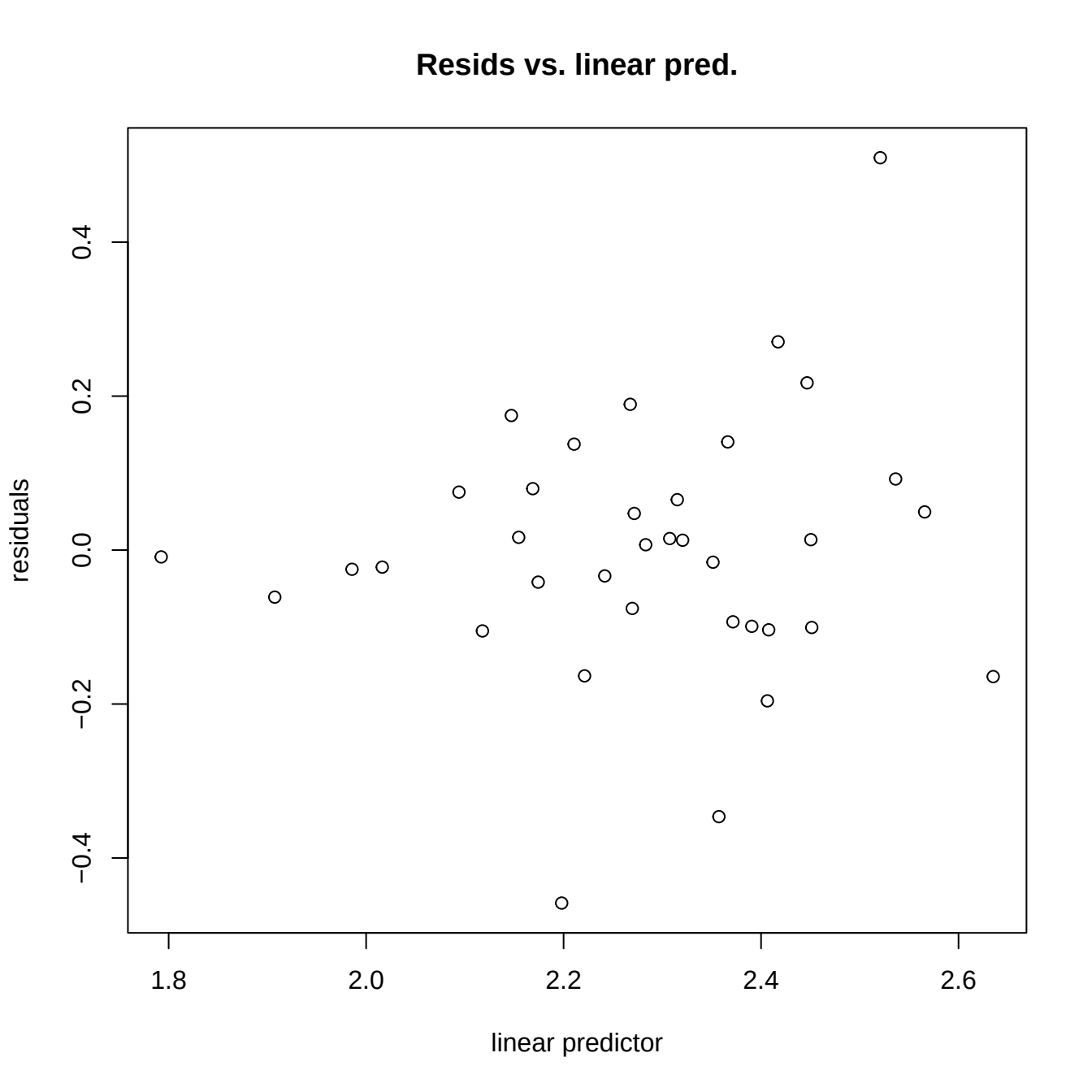

s(bites_of_yesterday,1.74)
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
0
2
4
6
8
10
bites_of_yesterday

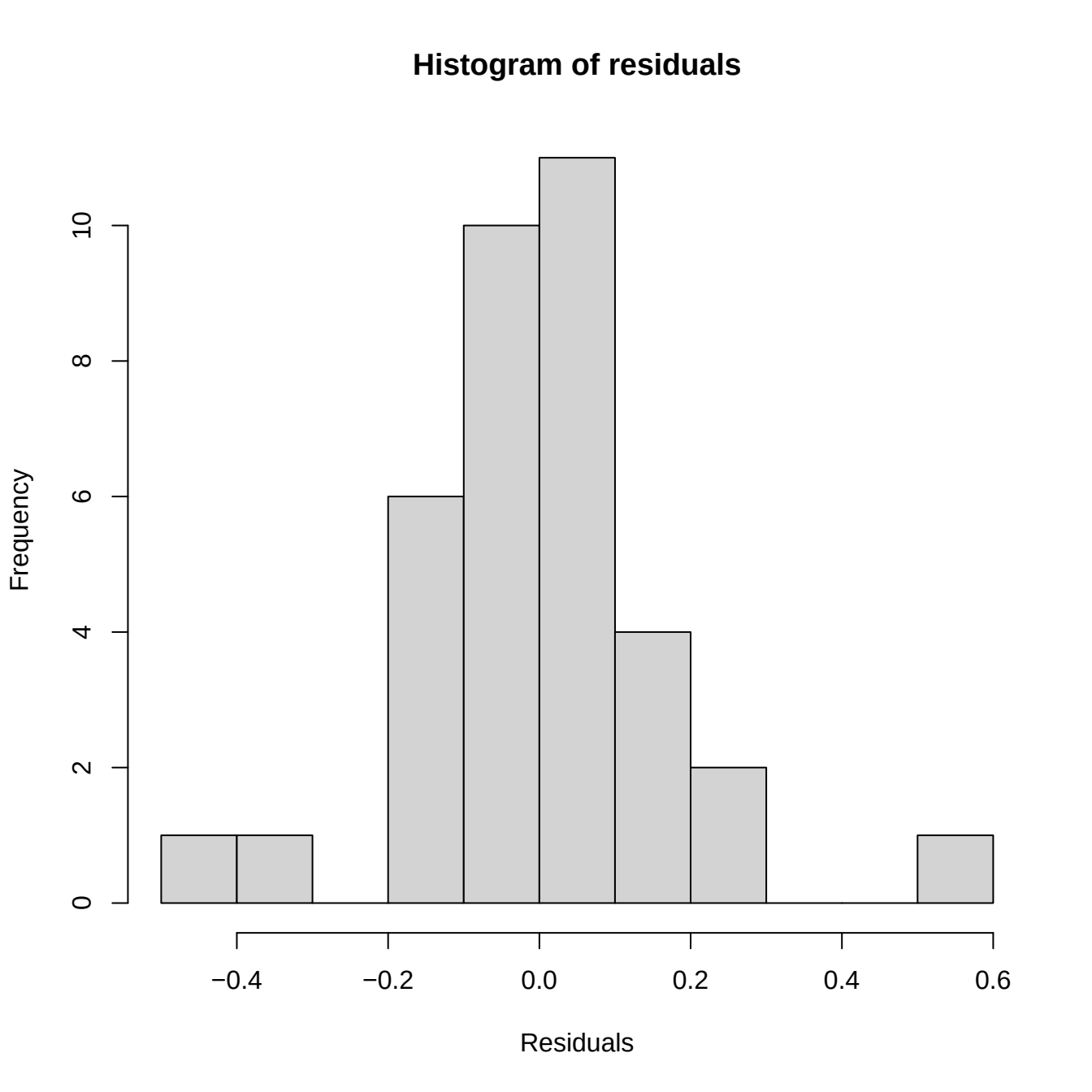

s(cumul_bites_7_previous_days,1)
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
0
10
20
30
40
cumul_bites_7_previous_days

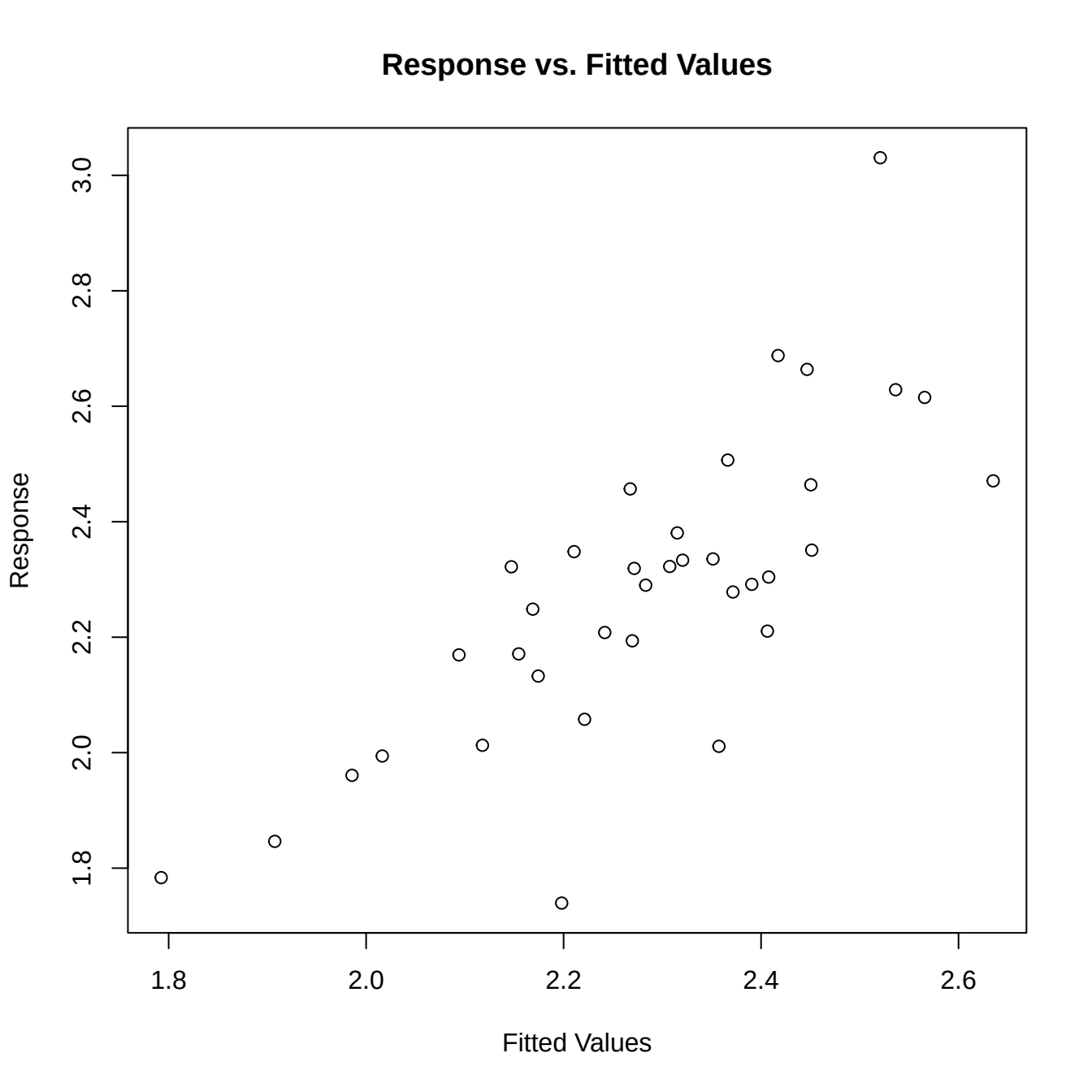

s(ID,2.2)
effects
0.10
0.05
0.00
−0.05
−0.10
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.8
2.4
2.0
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
2.8
2.4
2.0
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.4
0.2
0.0
−0.2
−0.4
−0.4
−0.2
0.0
0.2
0.4
theoretical quantiles


Resids vs. linear pred.
residuals
0.4
0.2
0.0
−0.2
−0.4
1.8
2.0
2.2
2.4
2.6
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
10
−0.4
−0.2
0.0
0.2
0.4
0.6
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.8
2.0
2.2
2.4
2.6
1.8
2.0
2.2
2.4
2.6
2.8
3.0

```
Method: ML   Optimizer: outer newton
full convergence after 13 iterations.
Gradient range [−5.379547e−06,8.8966e−07]
(score −6.750531 & scale 0.03333811).
Hessian positive definite, eigenvalue range [5.379494e−06,18.1585].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k'  edf k−index p−value
s(bites_of_yesterday)         3.00 1.74    1.21    0.90
s(cumul_bites_7_previous_days) 3.00 1.00    1.30    0.95
s(ID)                         4.00 2.20      NA      NA
```

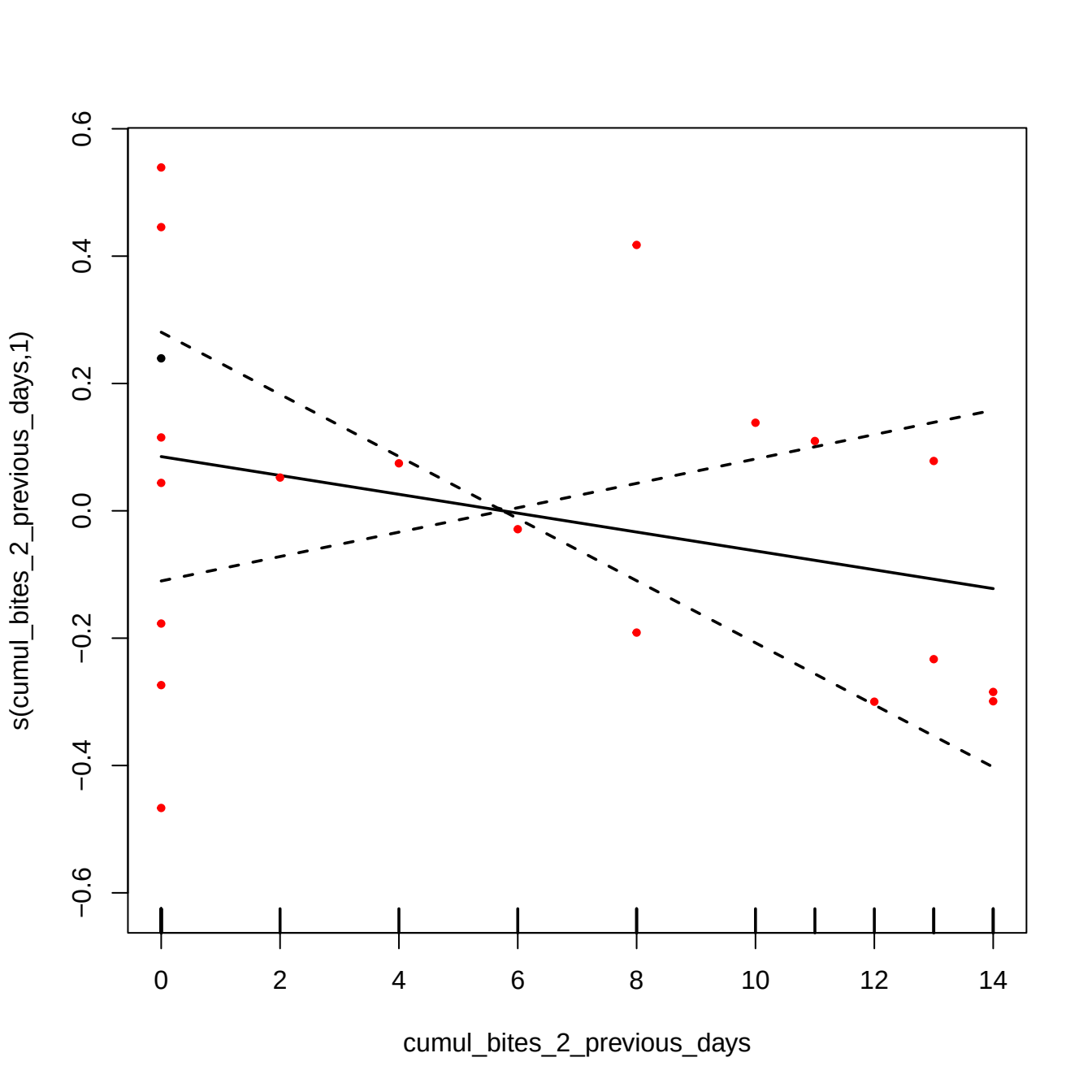
```
# Check for Multicollinearity

Low Correlation

                               Term  VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_7_previous_days, k = 4) 2.42 [1.68,  3.95]         1.56      0.41     [0.25, 0.59]

Moderate Correlation

                         Term  VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(bites_of_yesterday, k = 4) 7.01 [4.35, 11.80]         2.65      0.14     [0.08, 0.23]
```

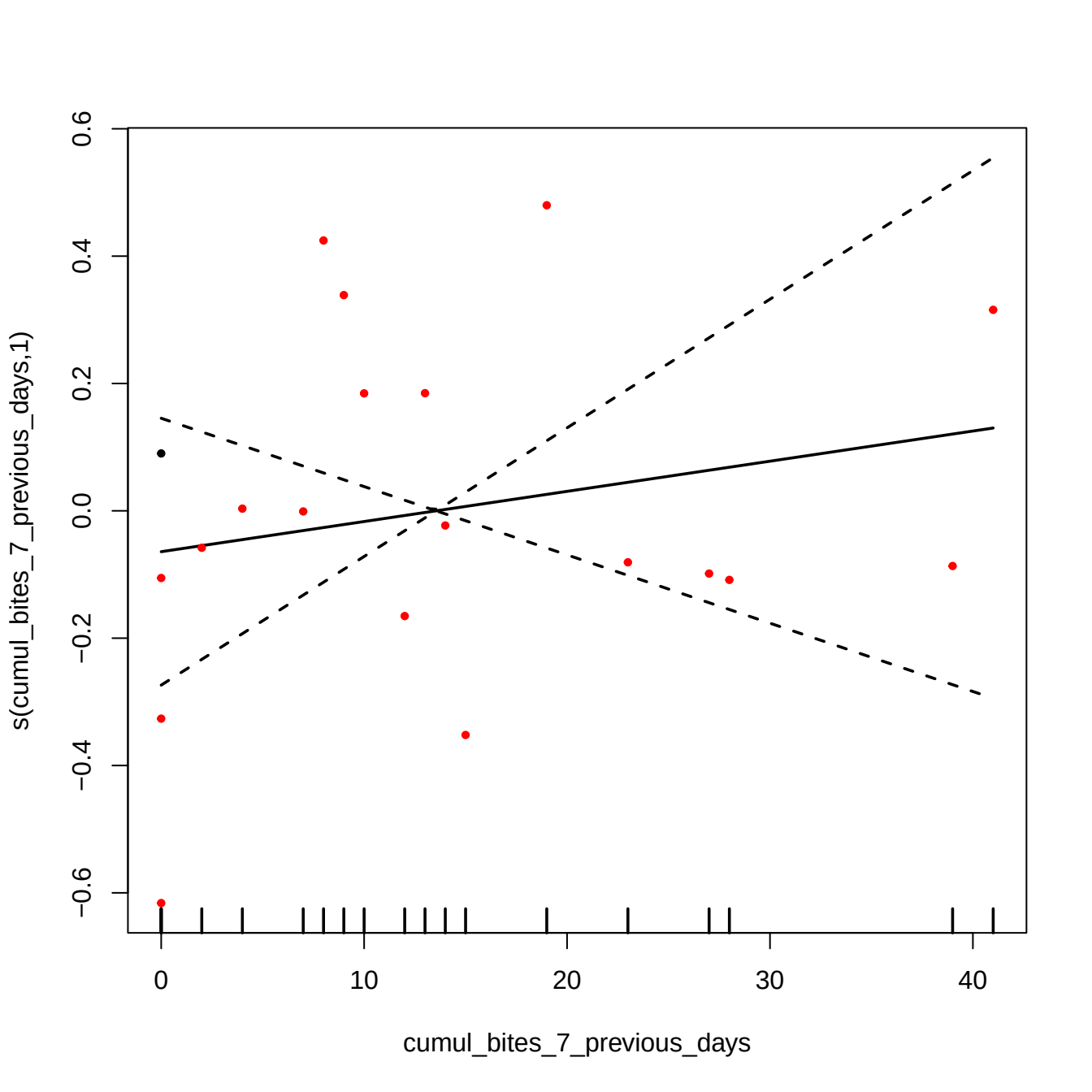
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.28167    0.05973    38.2   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F  p-value
s(bites_of_yesterday)         1.736  2.052  6.168 0.004766 **
s(cumul_bites_7_previous_days) 1.000  1.000 17.447 0.000235 ***
s(ID)                         2.202  3.000  3.533 0.007181 **
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.526   Deviance explained = 59.3%
-ML = -6.7505  Scale est. = 0.033338  n = 36
```

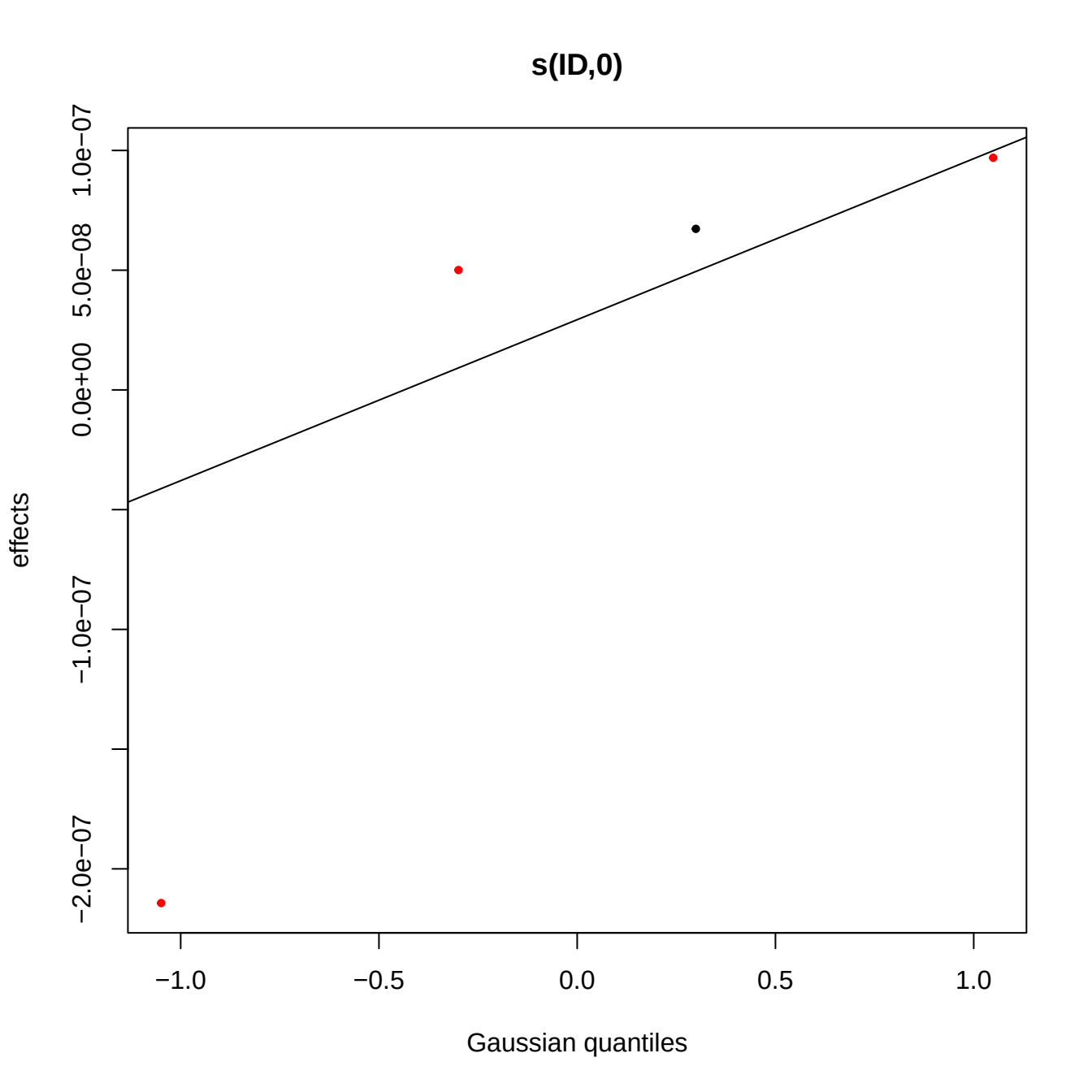
AICc [1] −5.998823

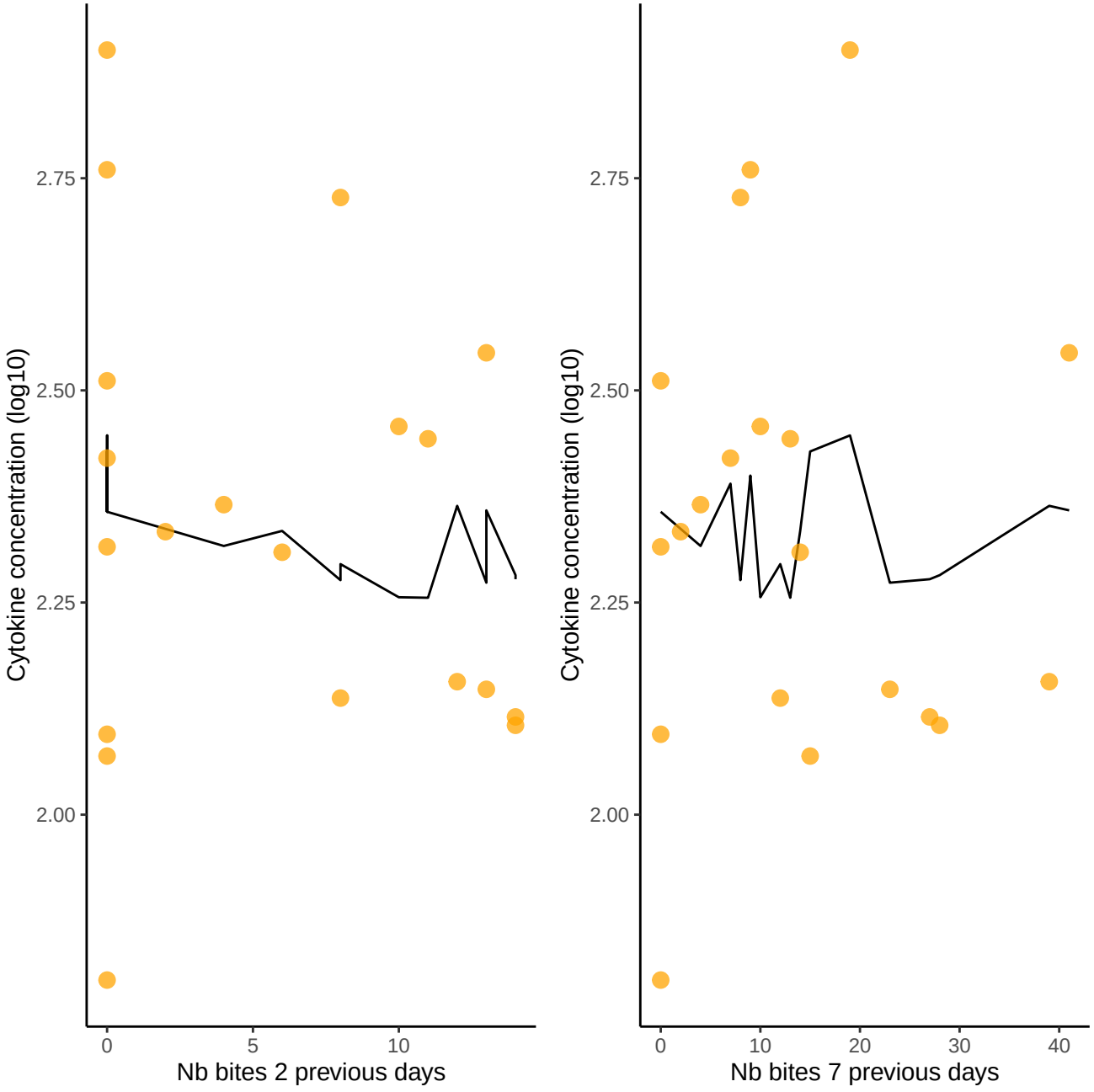
Bites in squirrel

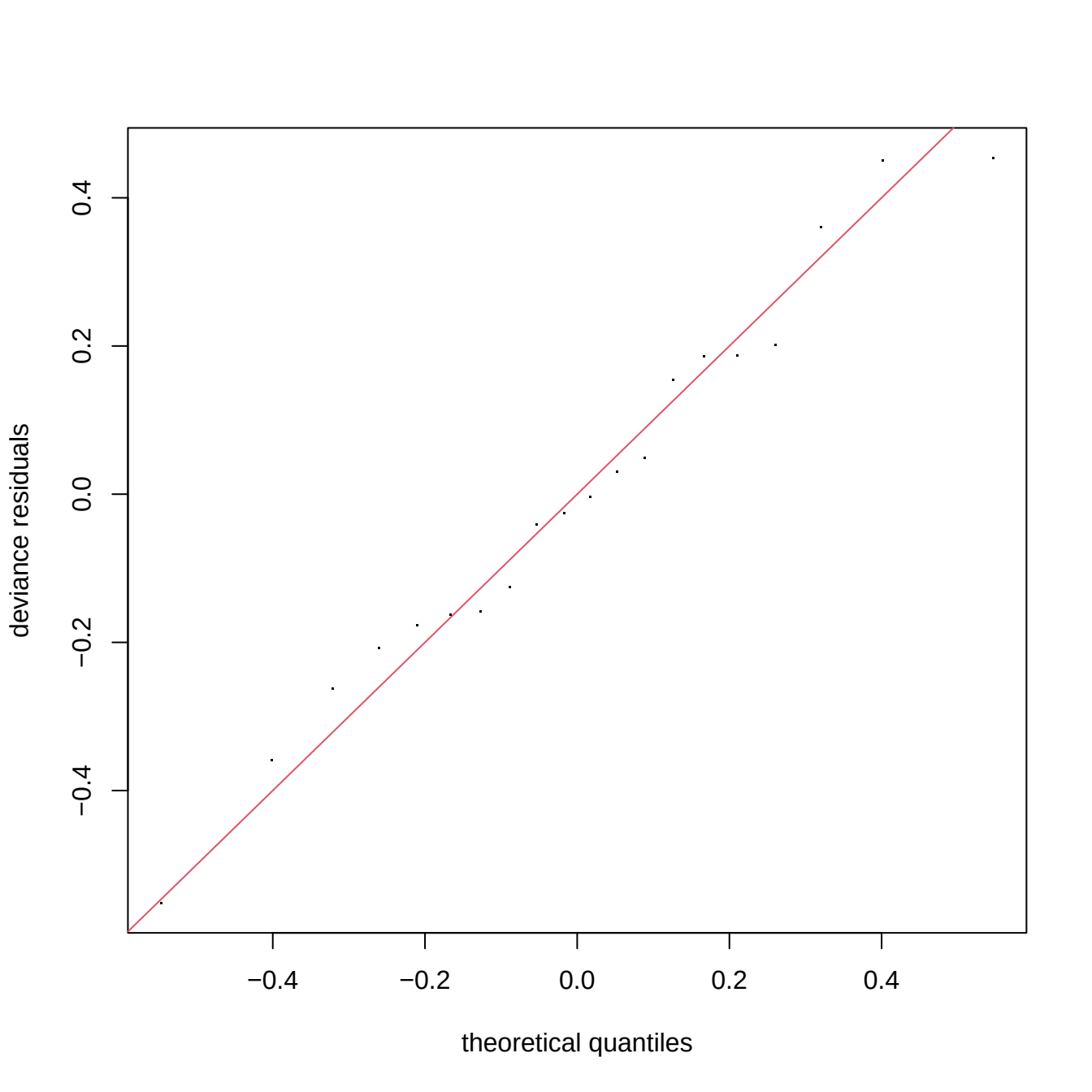
Nb obs: 20

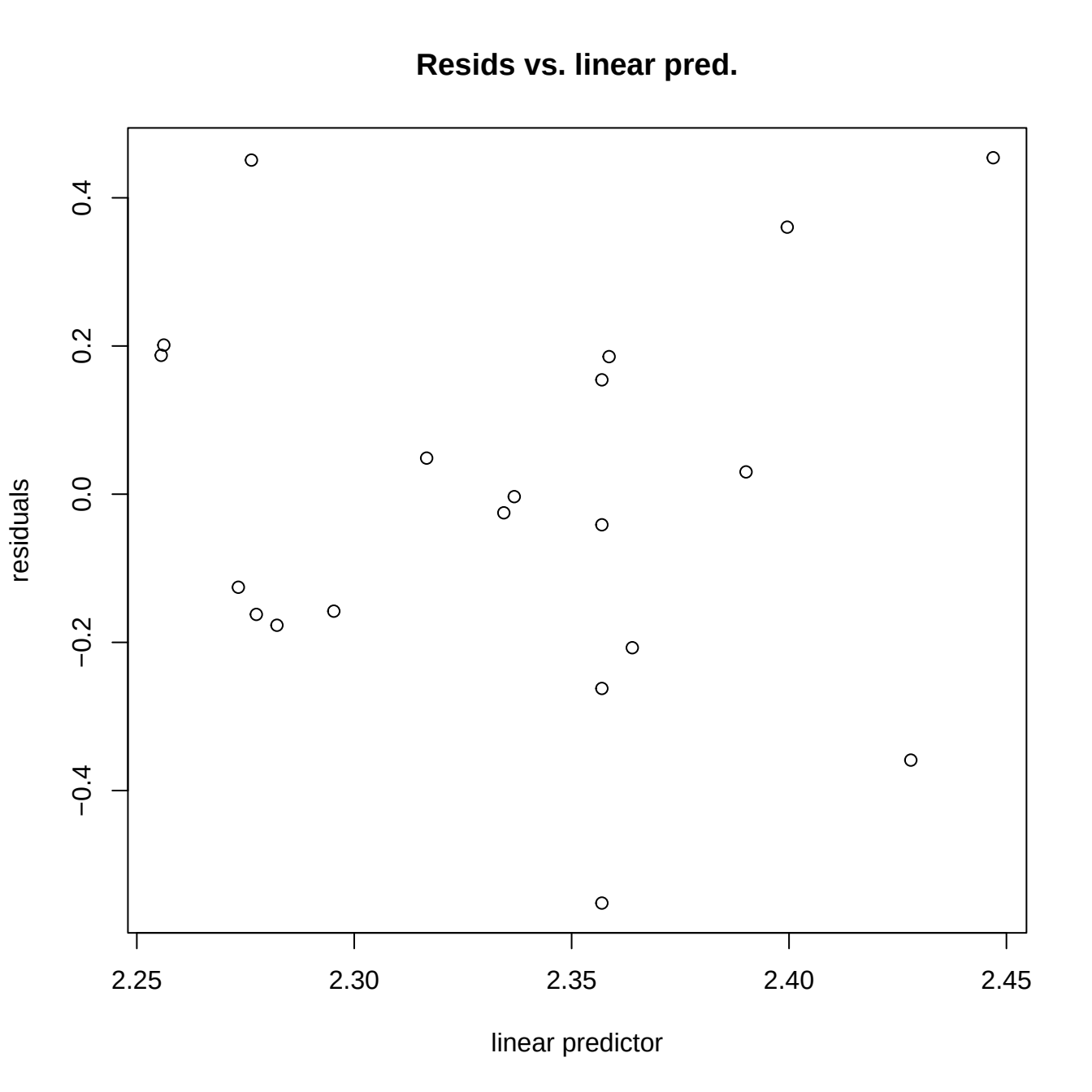

s(cumul_bites_2_previous_days,1)
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
0
2
4
6
8
10
12
14
cumul_bites_2_previous_days

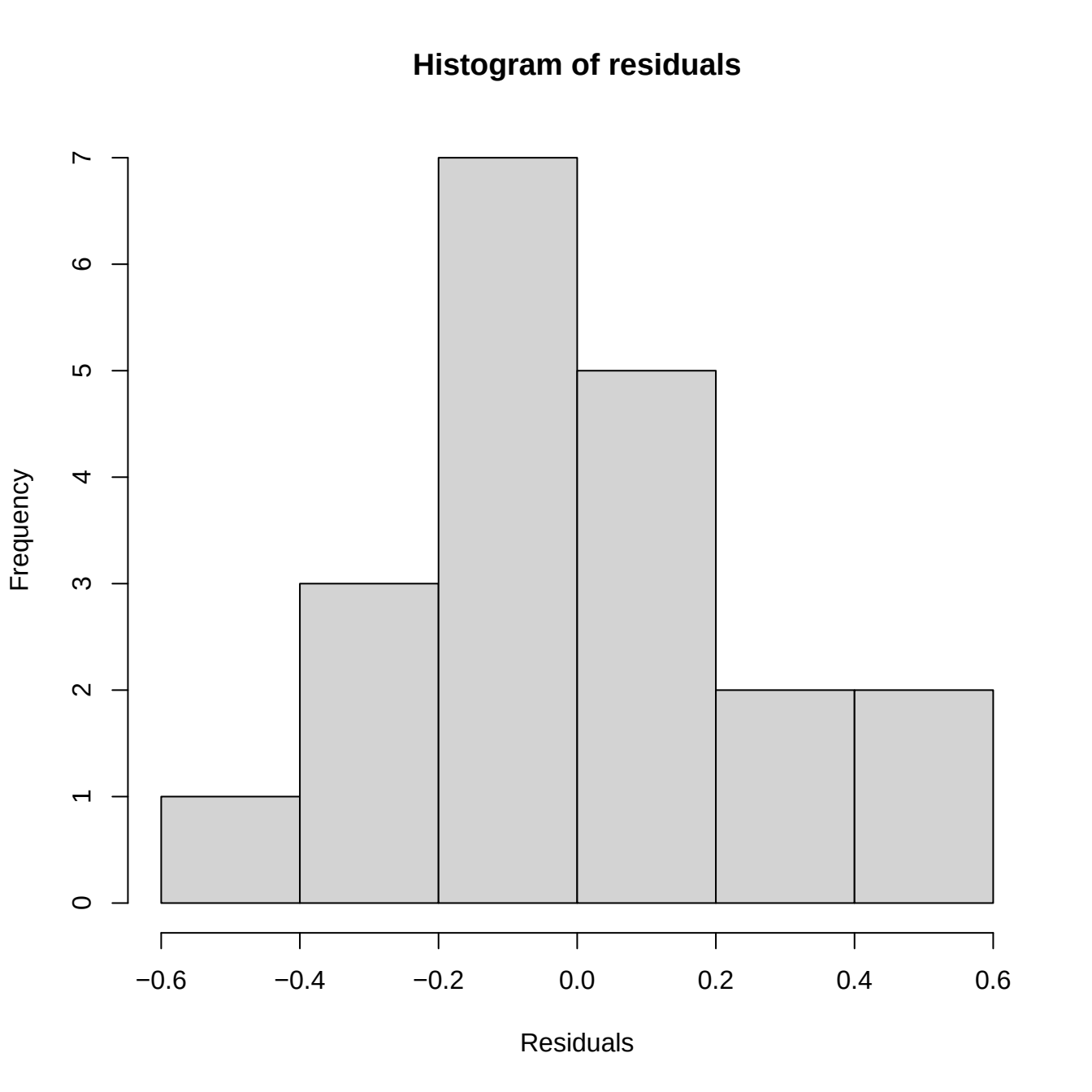

s(cumul_bites_7_previous_days,1)
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
0
10
20
30
40
cumul_bites_7_previous_days

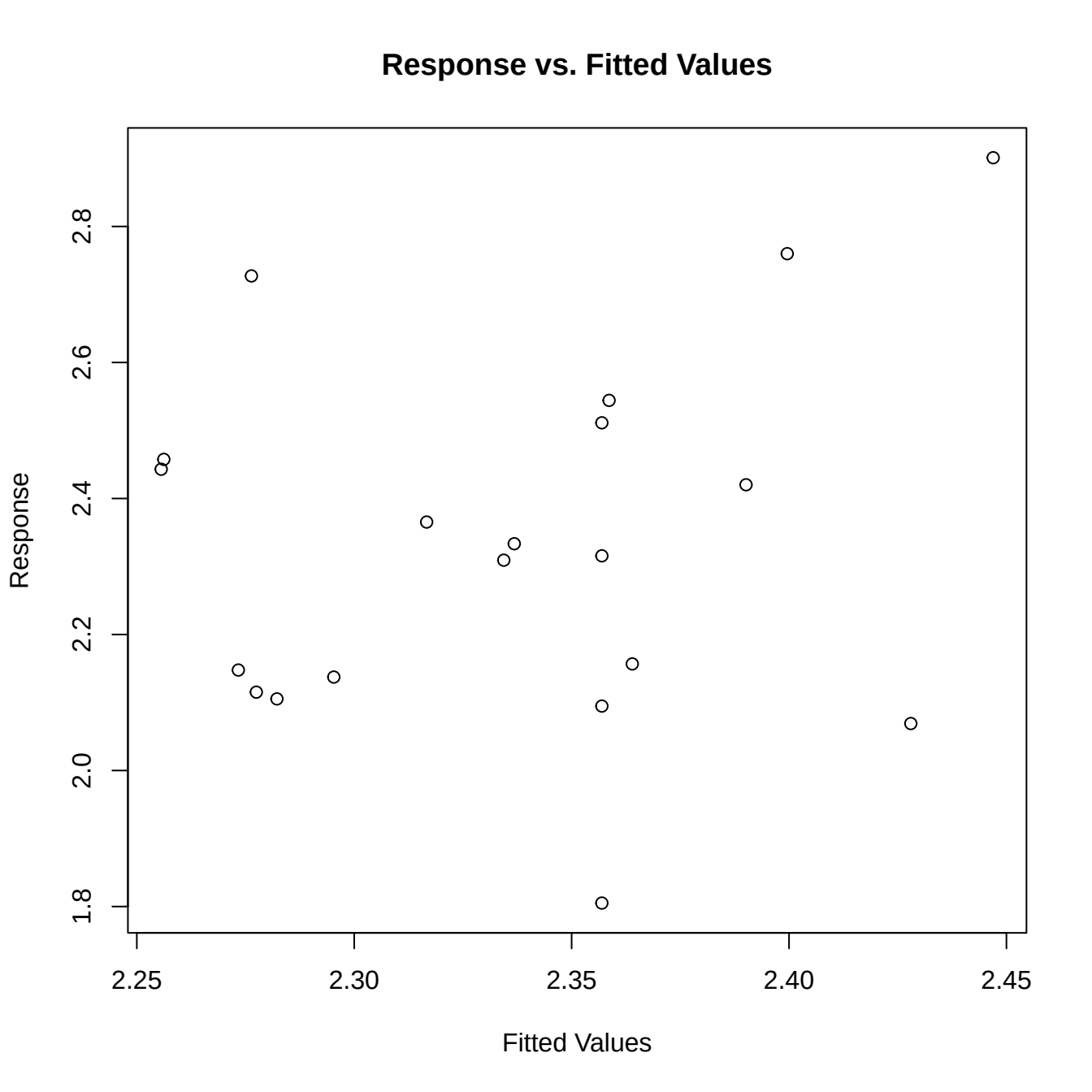

s(ID,0)
effects
1.0e−07
5.0e−08
0.0e+00
−1.0e−07
−2.0e−07
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.75
2.50
2.25
2.00
0
5
10
Nb bites 2 previous days
Cytokine concentration (log10)
2.75
2.50
2.25
2.00
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.4
0.2
0.0
−0.2
−0.4
−0.4
−0.2
0.0
0.2
0.4
theoretical quantiles


Resids vs. linear pred.
residuals
0.4
0.2
0.0
−0.2
−0.4
2.25
2.30
2.35
2.40
2.45
linear predictor


Histogram of residuals
Frequency
0
1
2
3
4
5
6
7
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.8
2.0
2.2
2.4
2.6
2.8
2.25
2.30
2.35
2.40
2.45

```
Method: ML   Optimizer: outer newton
full convergence after 15 iterations.
Gradient range [−1.283981e−06,2.041458e−06]
(score 1.215388 & scale 0.07778399).
Hessian positive definite, eigenvalue range [3.105068e−07,9.999998].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                    k'      edf k−index p−value
s(cumul_bites_2_previous_days) 3.00e+00 1.00e+00    1.29    0.83
s(cumul_bites_7_previous_days) 3.00e+00 1.00e+00    1.02    0.38
s(ID)                          4.00e+00 4.09e−06      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                                Term  VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_2_previous_days, k = 4) 1.06 [1.00, 15.02]         1.03      0.94     [0.07, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.06 [1.00, 15.02]         1.03      0.94     [0.07, 1.00]
```

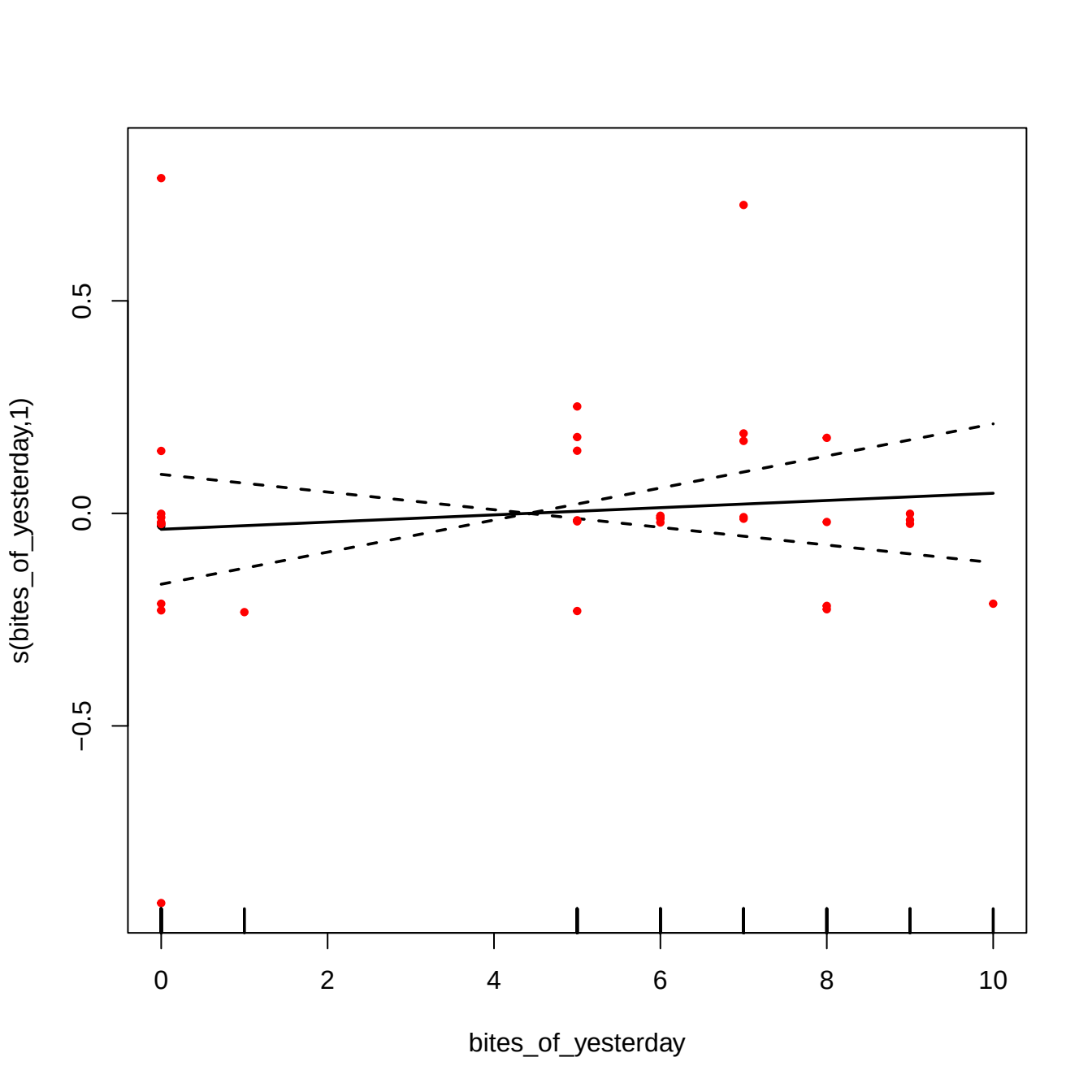
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(cumul_bites_2_previous_days, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.33597    0.06236   37.46   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                   edf Ref.df     F p-value
s(cumul_bites_2_previous_days) 1.000e+00      1 0.760   0.395
s(cumul_bites_7_previous_days) 1.000e+00      1 0.375   0.548
s(ID)                          4.086e-06      3 0.000   0.578

R-sq.(adj) =  -0.0696   Deviance explained =  4.3%
-ML = 1.2154  Scale est. = 0.077784  n = 20
```

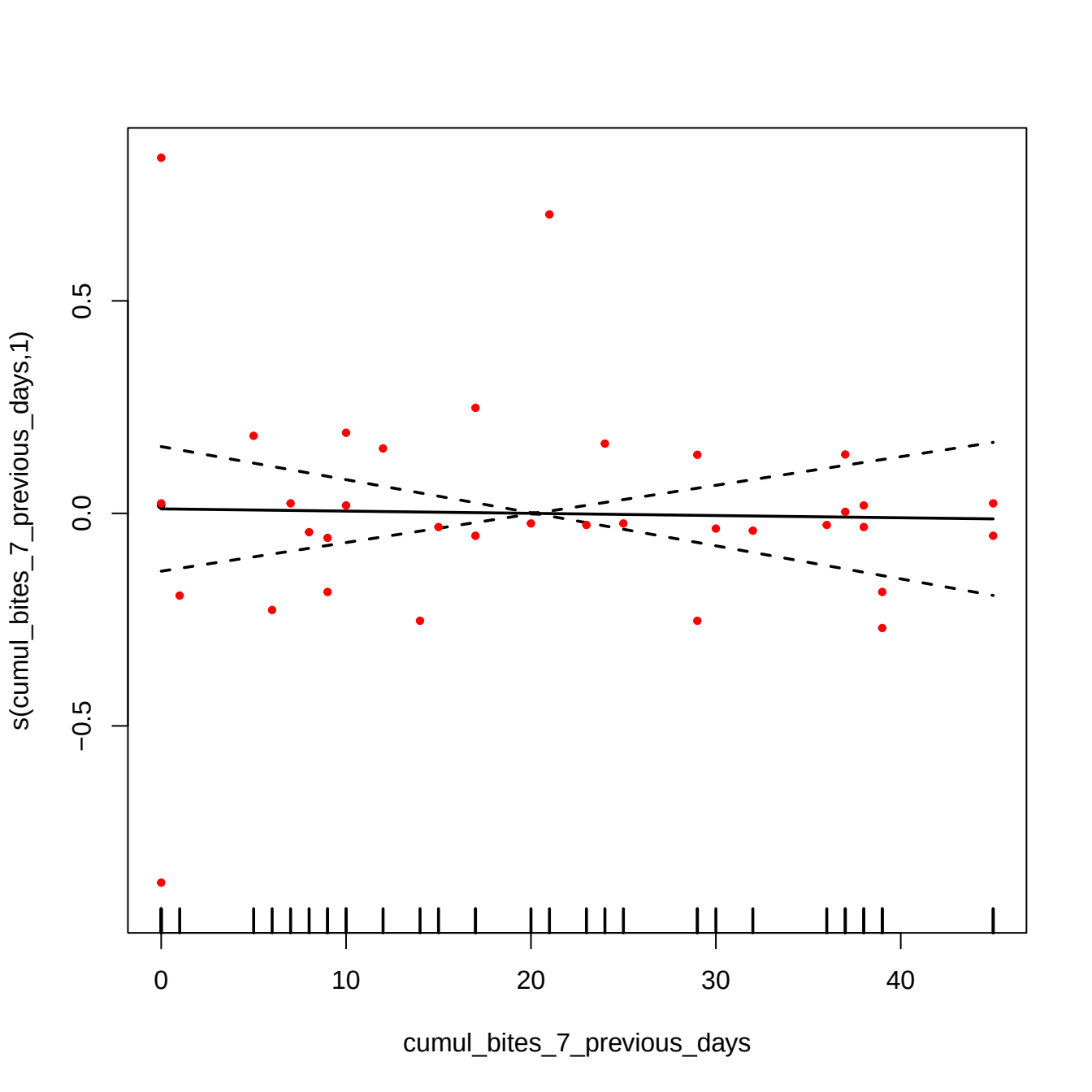
AICc [1] 13.09746

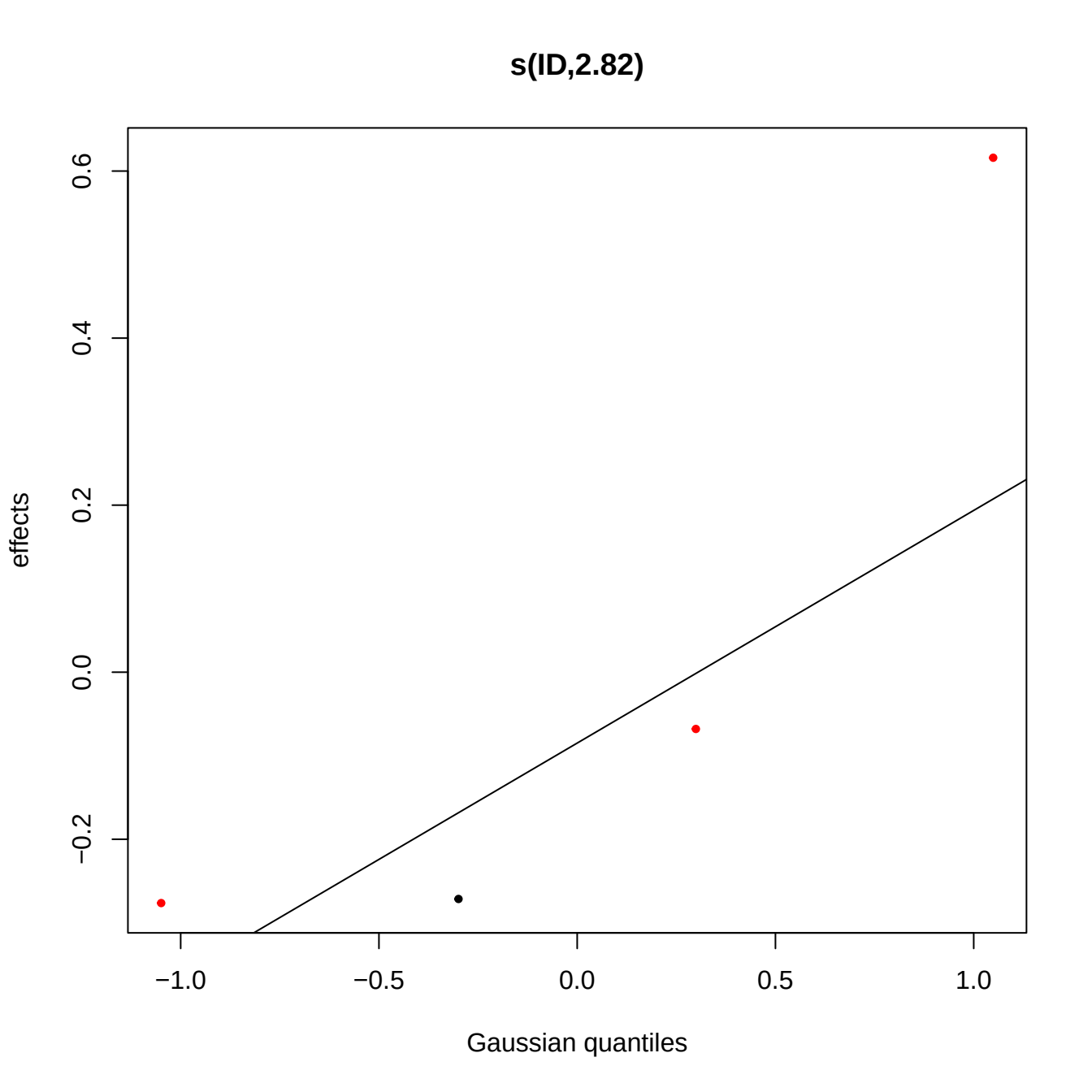
MIG

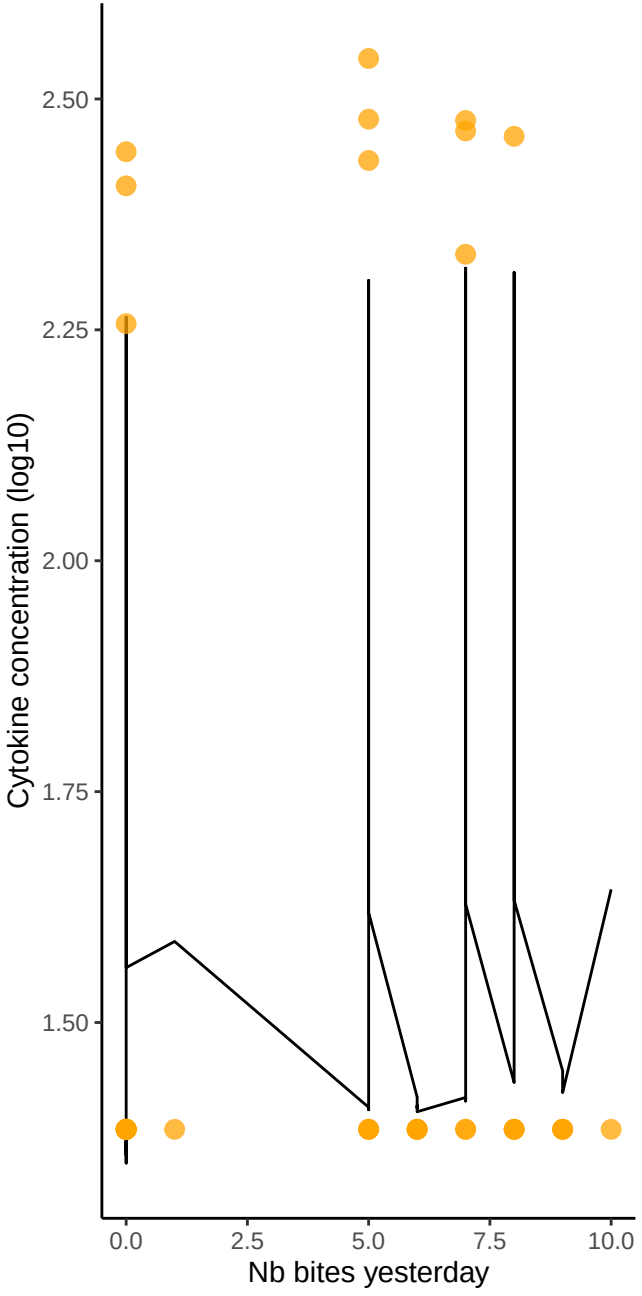
Bites in cyno

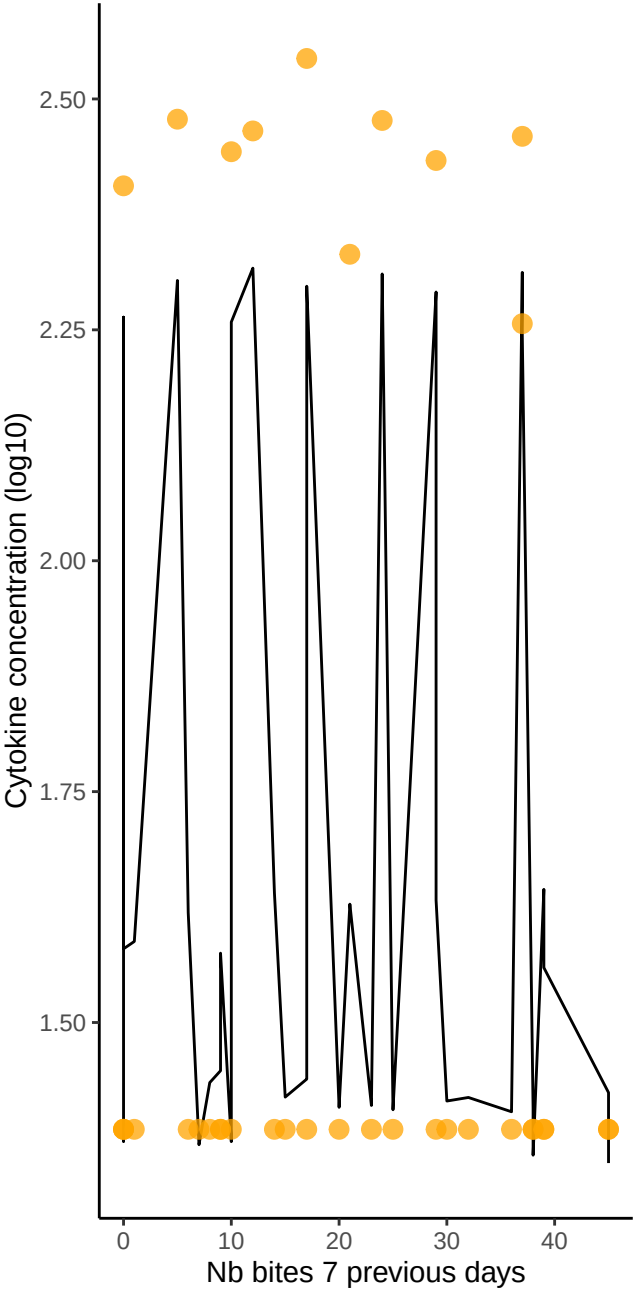
Nb obs: 36

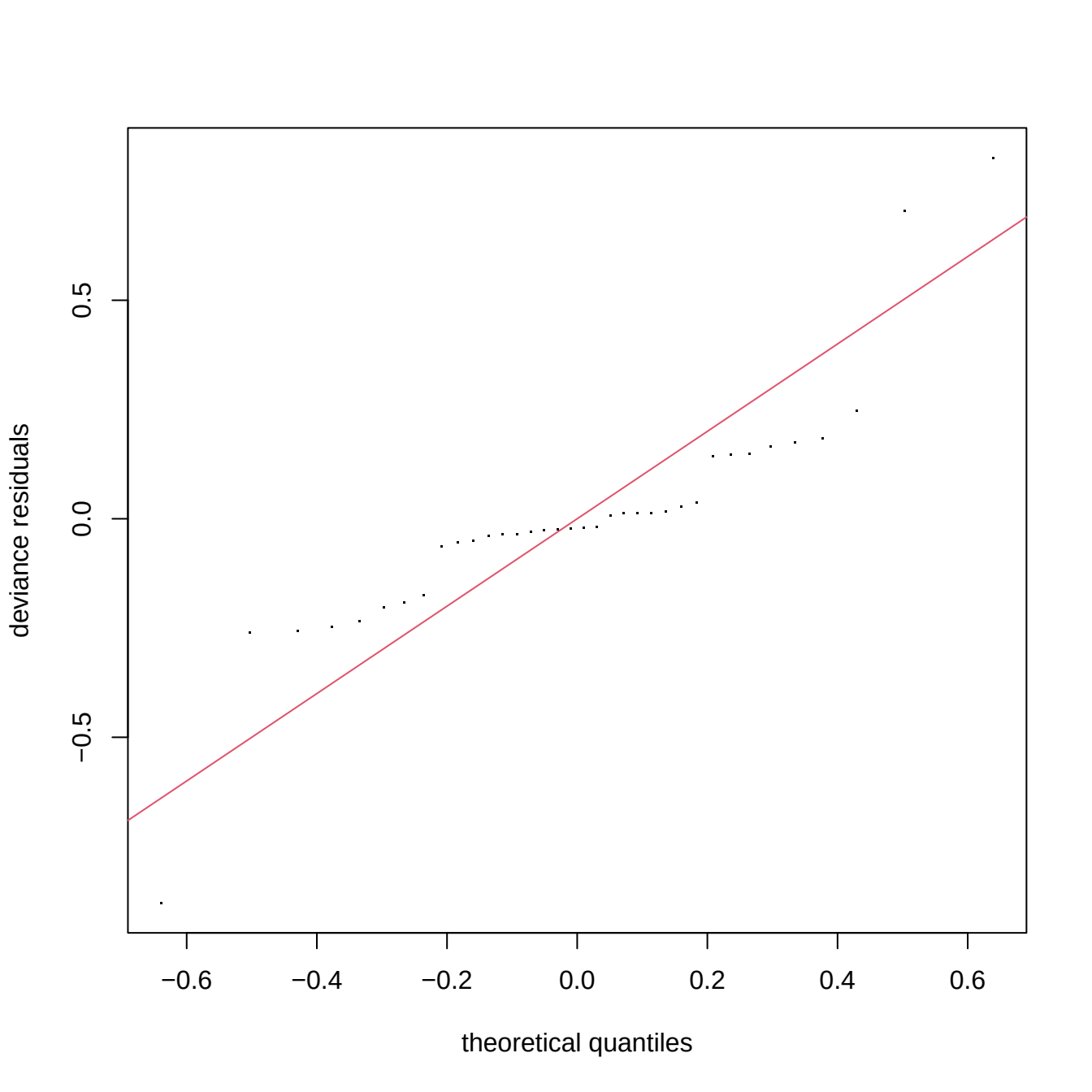

s(bites_of_yesterday,1)
0.5
0.0
−0.5
0
2
4
6
8
10
bites_of_yesterday

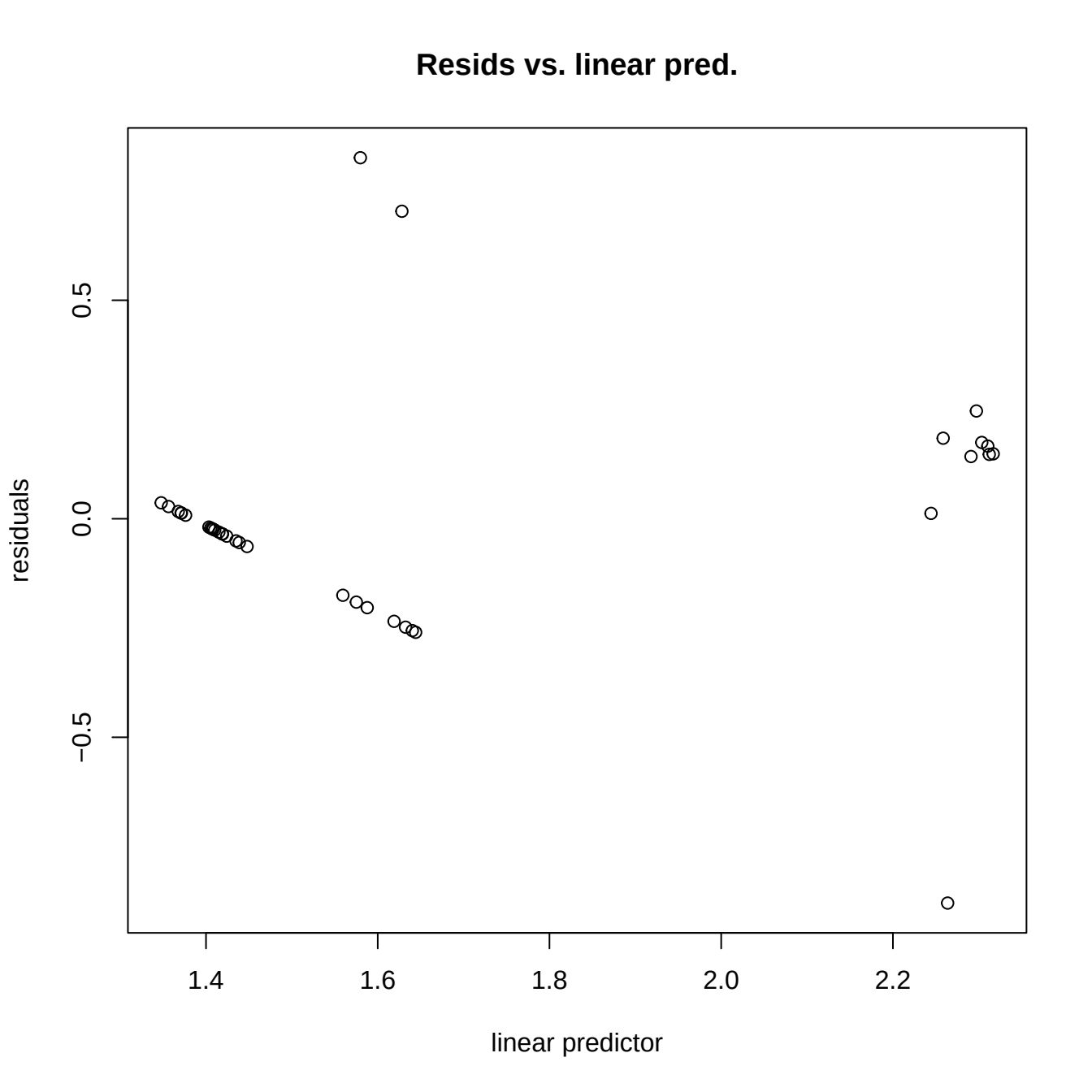

s(cumul_bites_7_previous_days,1)
0.5
0.0
−0.5
0
10
20
30
40
cumul_bites_7_previous_days

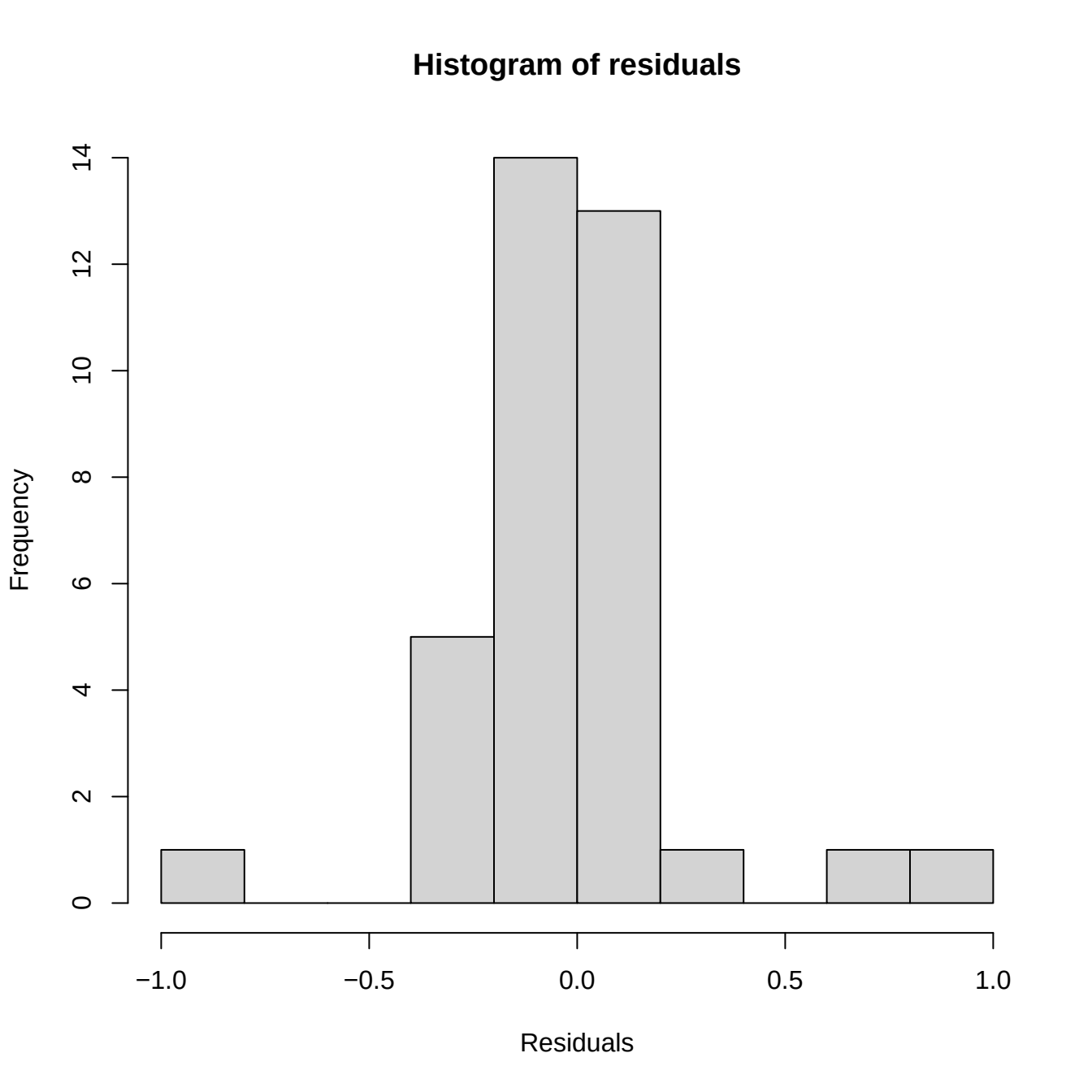

s(ID,2.82)
effects
0.6
0.4
0.2
0.0
−0.2
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles

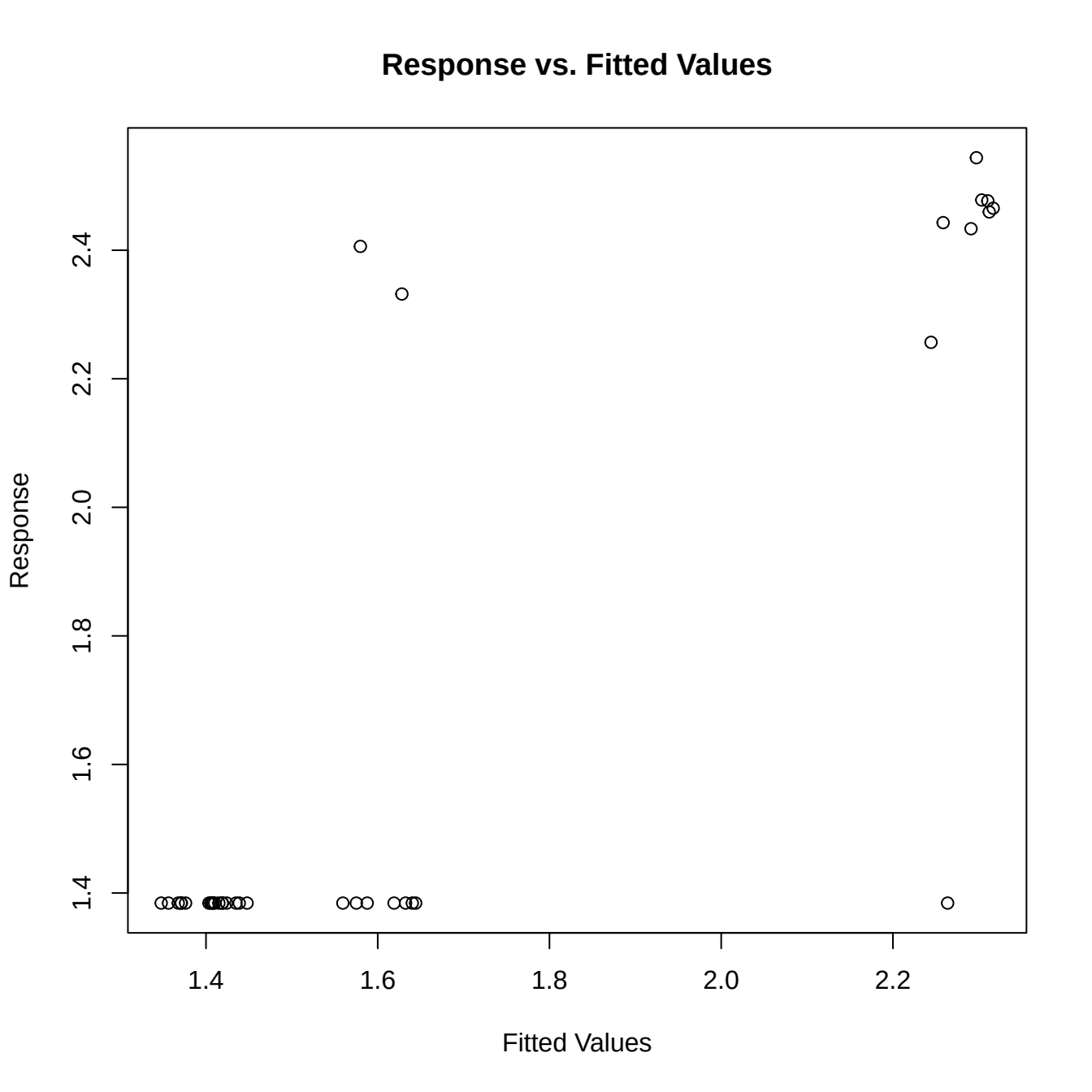

Cytokine concentration (log10)
2.50
2.25
2.00
1.75
1.50
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday


Cytokine concentration (log10)
2.50
2.25
2.00
1.75
1.50
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.5
0.0
−0.5
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6
theoretical quantiles


Resids vs. linear pred.
residuals
0.5
0.0
−0.5
1.4
1.6
1.8
2.0
2.2
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
10
12
14
−1.0
−0.5
0.0
0.5
1.0
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.4
1.6
1.8
2.0
2.2
2.4
1.4
1.6
1.8
2.0
2.2

```
Method: ML   Optimizer: outer newton
full convergence after 14 iterations.
Gradient range [−2.216911e−06,1.165602e−06]
(score 11.07436 & scale 0.0843709).
Hessian positive definite, eigenvalue range [1.868586e−06,18.21573].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                k'  edf k−index p−value
s(bites_of_yesterday)         3.00 1.00    1.04    0.54
s(cumul_bites_7_previous_days) 3.00 1.00    1.44    0.99
s(ID)                         4.00 2.82      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   1.6747     0.2005   8.351 2.43e-09 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df      F p-value
s(bites_of_yesterday)         1.000      1  0.336   0.567
s(cumul_bites_7_previous_days) 1.000      1  0.021   0.886
s(ID)                         2.824      3 20.030  <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.628   Deviance explained =   68%
-ML = 11.074  Scale est. = 0.084371  n = 36
```

AICc [1] 24.6907

Bites in squirrel

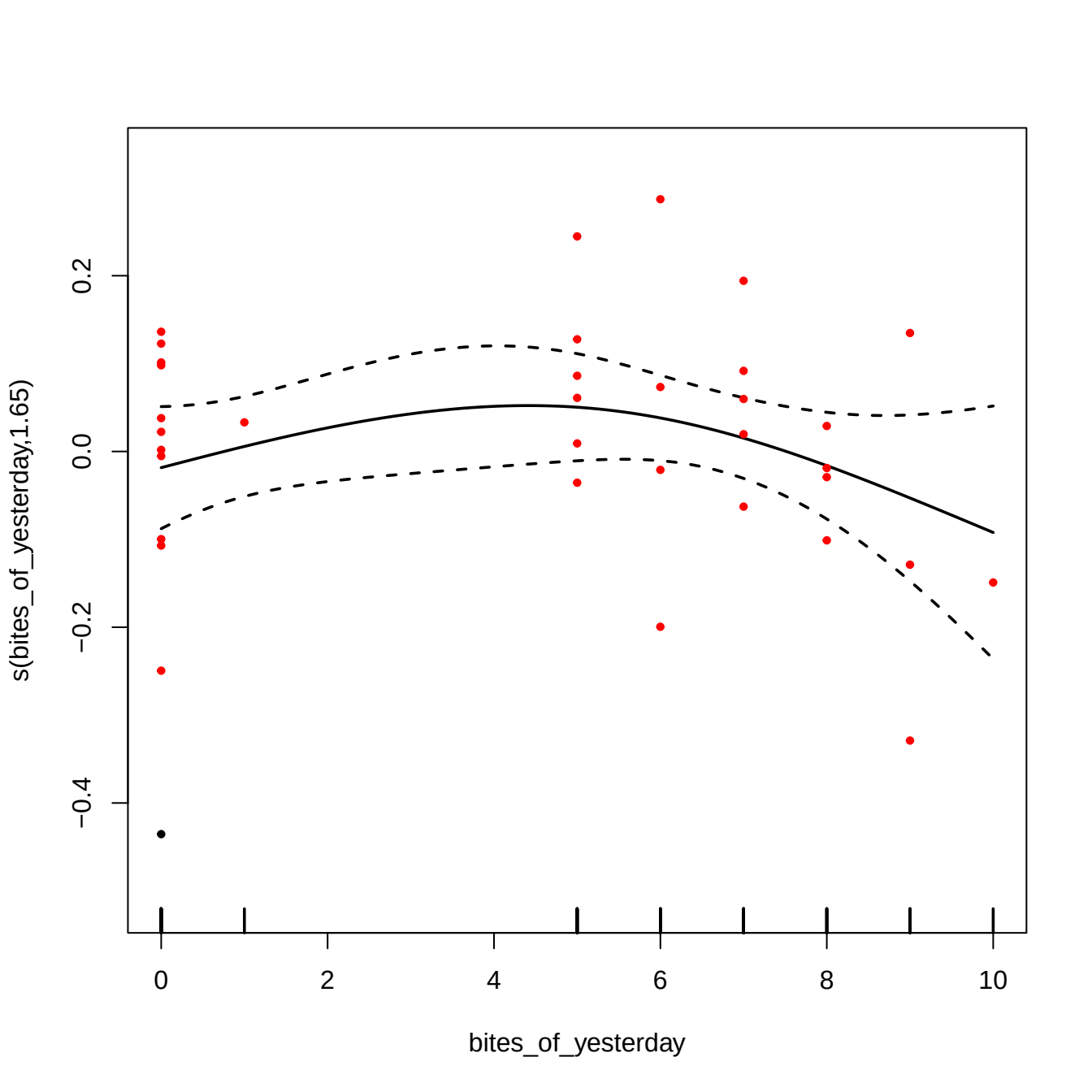
Nb obs: 20

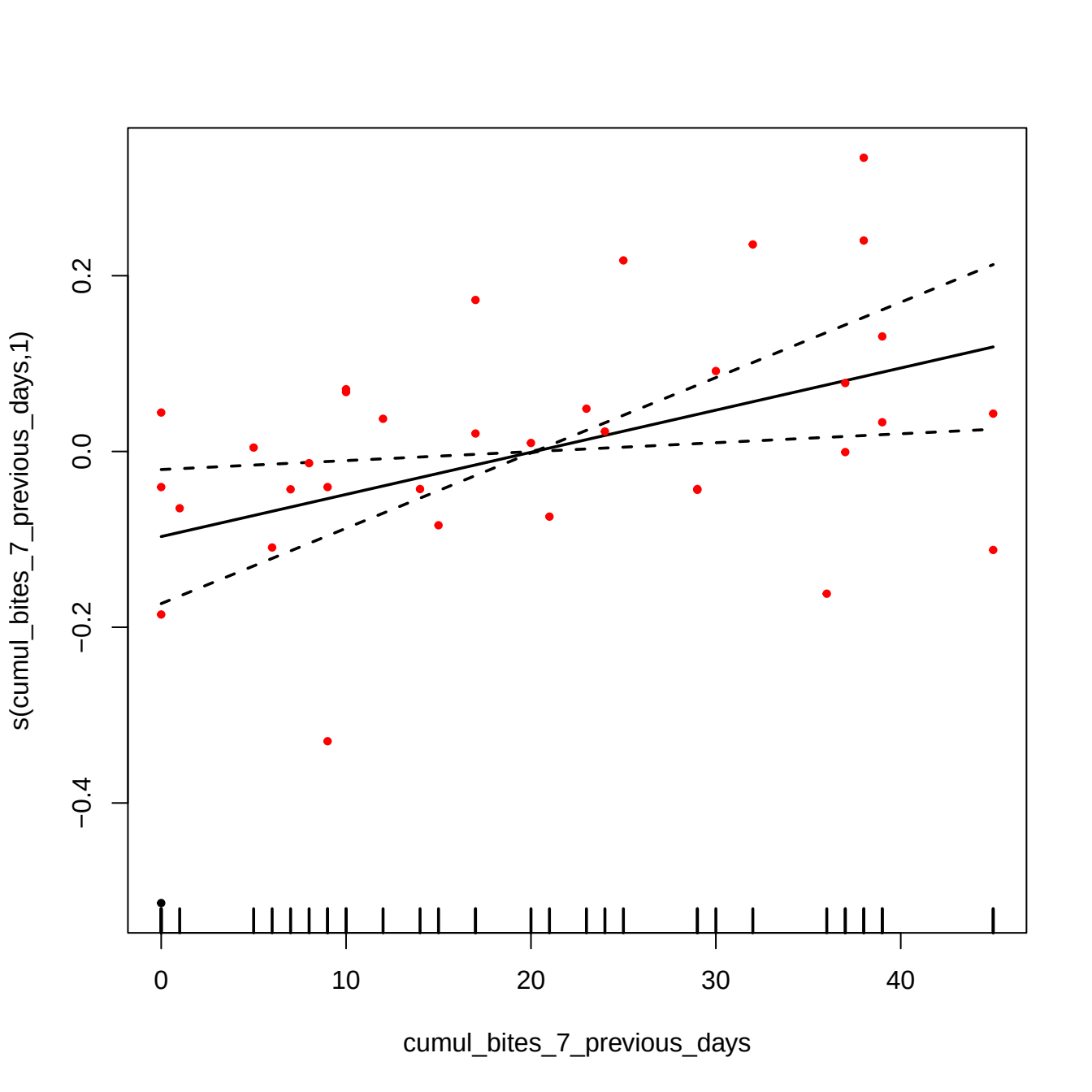
MIG ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

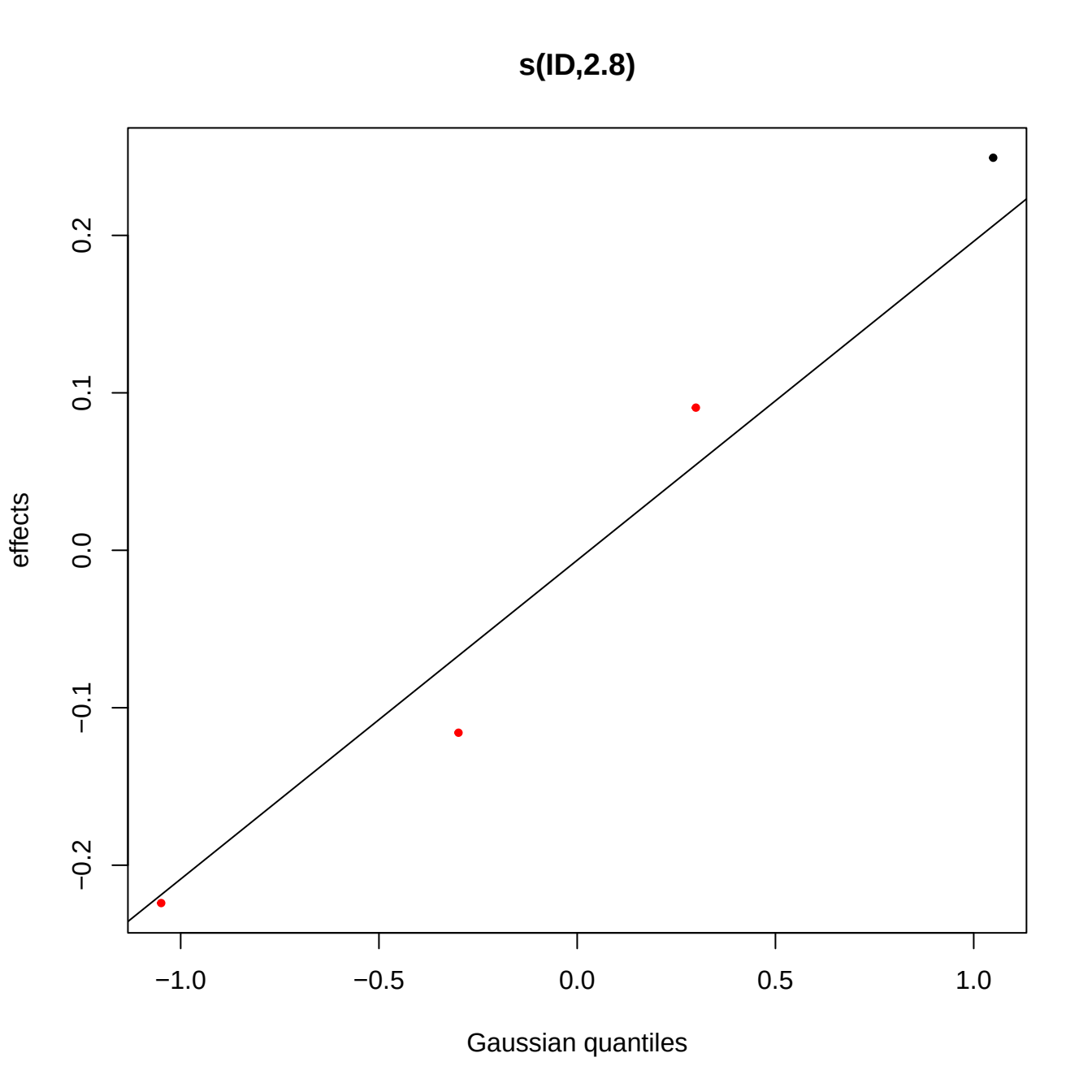
MIP.1a

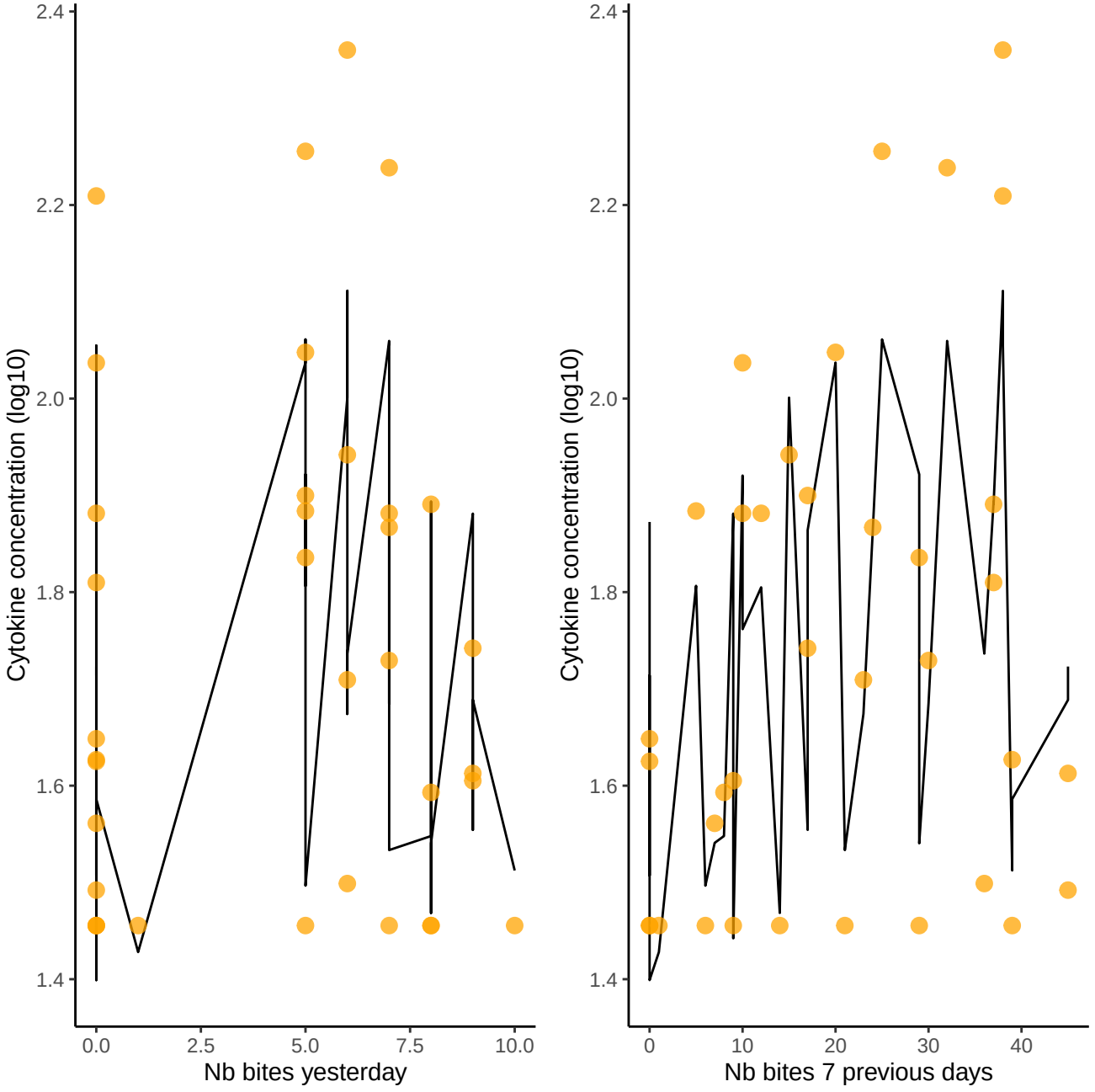
Bites in cyno

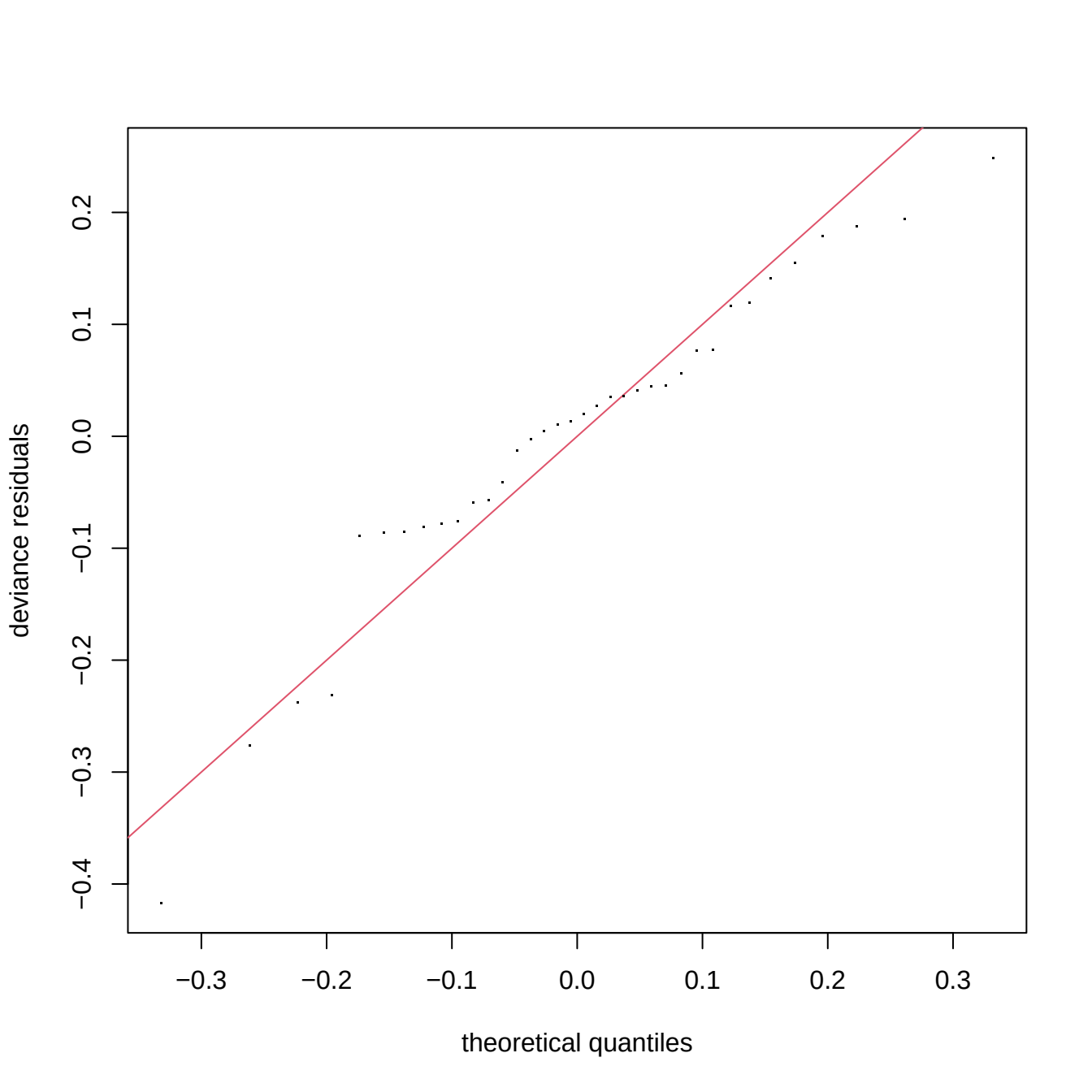
Nb obs: 36

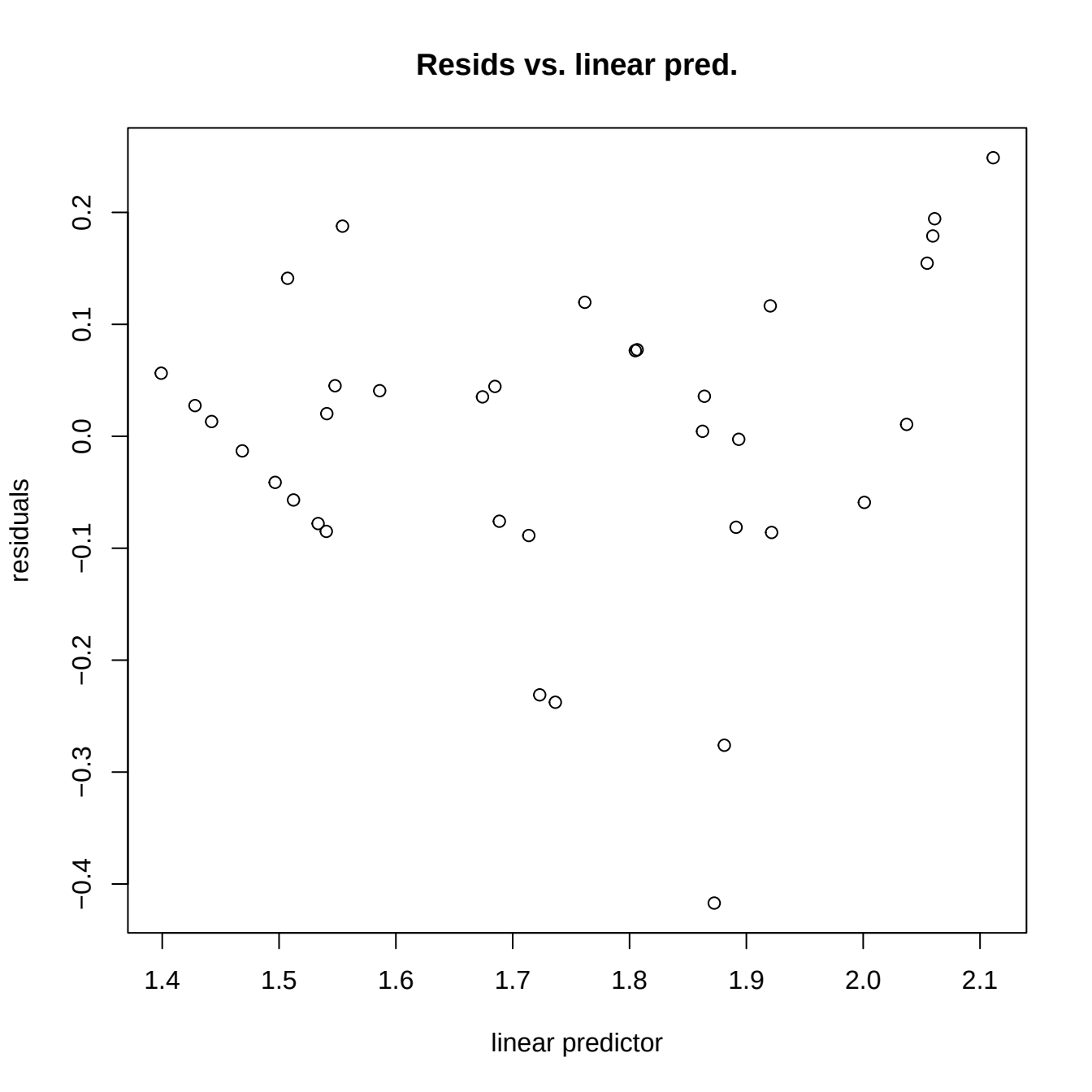

s(bites_of_yesterday,1.65)
0.2
0.0
−0.2
−0.4
0
2
4
6
8
10
bites_of_yesterday

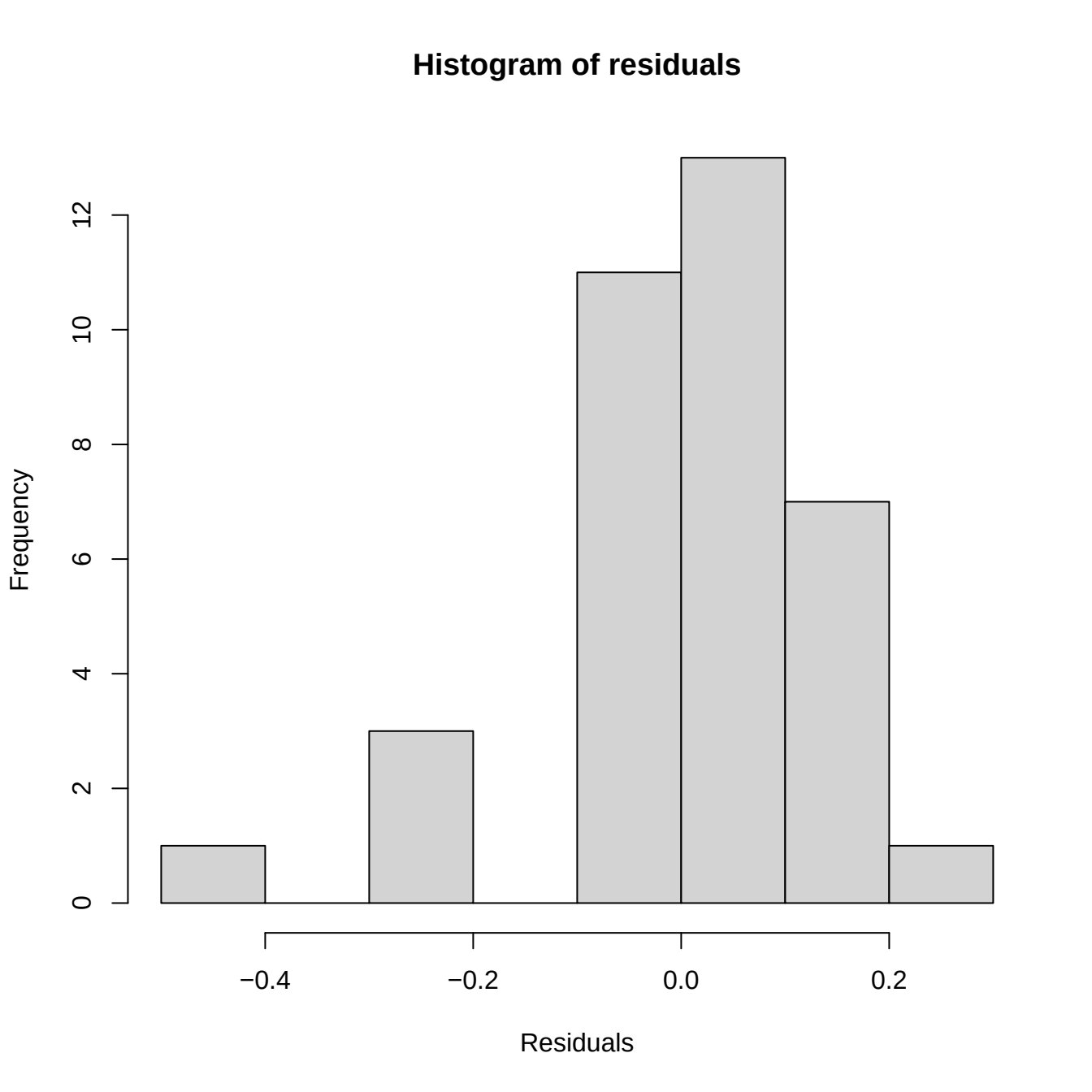

s(cumul_bites_7_previous_days,1)
0.2
0.0
−0.2
−0.4
0
10
20
30
40
cumul_bites_7_previous_days

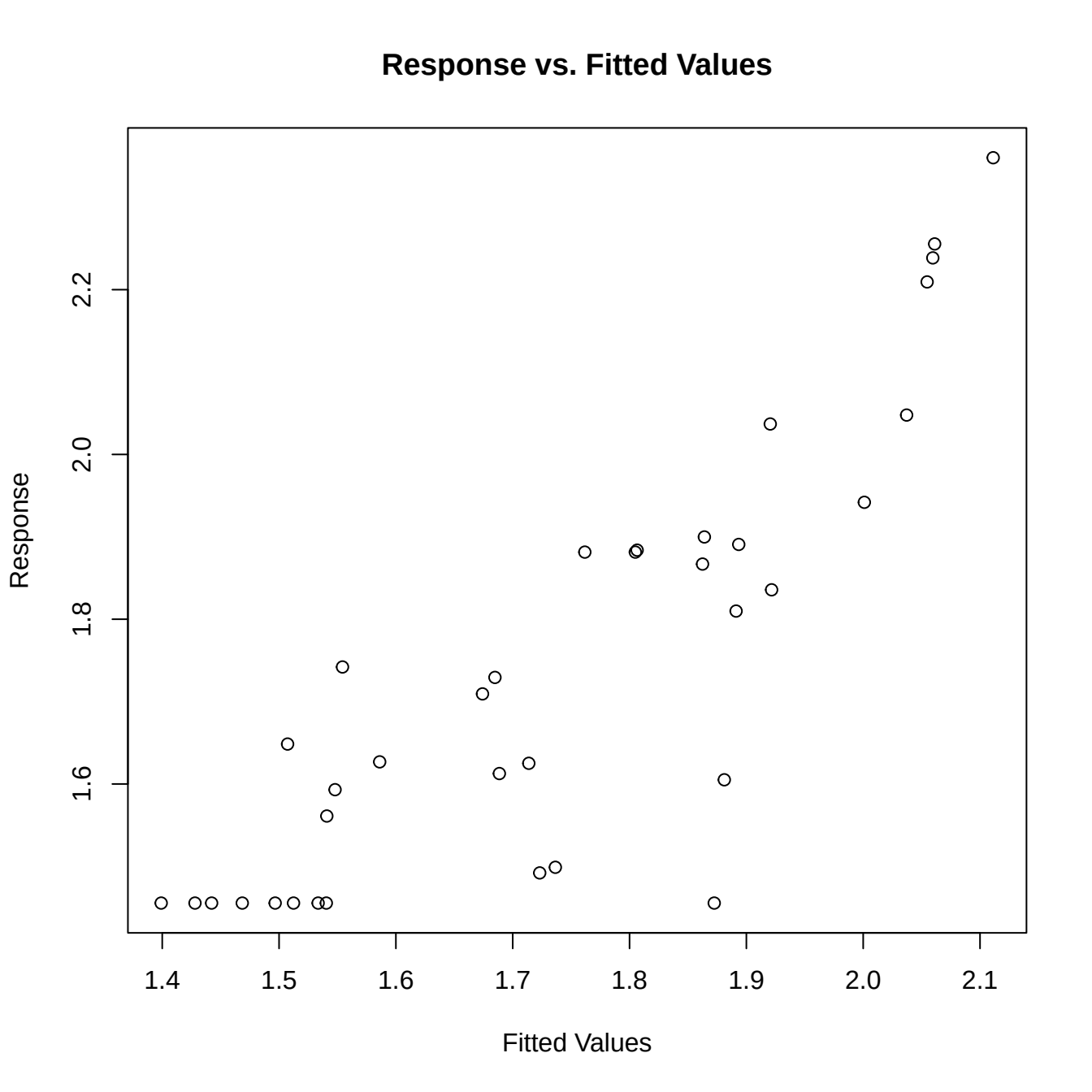

s(ID,2.8)
effects
0.2
0.1
0.0
−0.1
−0.2
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.4
2.2
2.0
1.8
1.6
1.4
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
2.4
2.2
2.0
1.8
1.6
1.4
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.4
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3
theoretical quantiles


Resids vs. linear pred.
residuals
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.4
1.4
1.5
1.6
1.7
1.8
1.9
2.0
2.1
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
10
12
−0.4
−0.2
0.0
0.2
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.6
1.8
2.0
2.2
1.4
1.5
1.6
1.7
1.8
1.9
2.0
2.1

```
Method: ML   Optimizer: outer newton
full convergence after 13 iterations.
Gradient range [−6.020544e−06,8.576643e−06]
(score −10.89495 & scale 0.02277159).
Hessian positive definite, eigenvalue range [6.020313e−06,18.24009].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                 k'  edf k−index p−value
s(bites_of_yesterday)          3.00 1.65    1.01    0.44
s(cumul_bites_7_previous_days) 3.00 1.00    1.01    0.41
s(ID)                          4.00 2.80      NA      NA
```

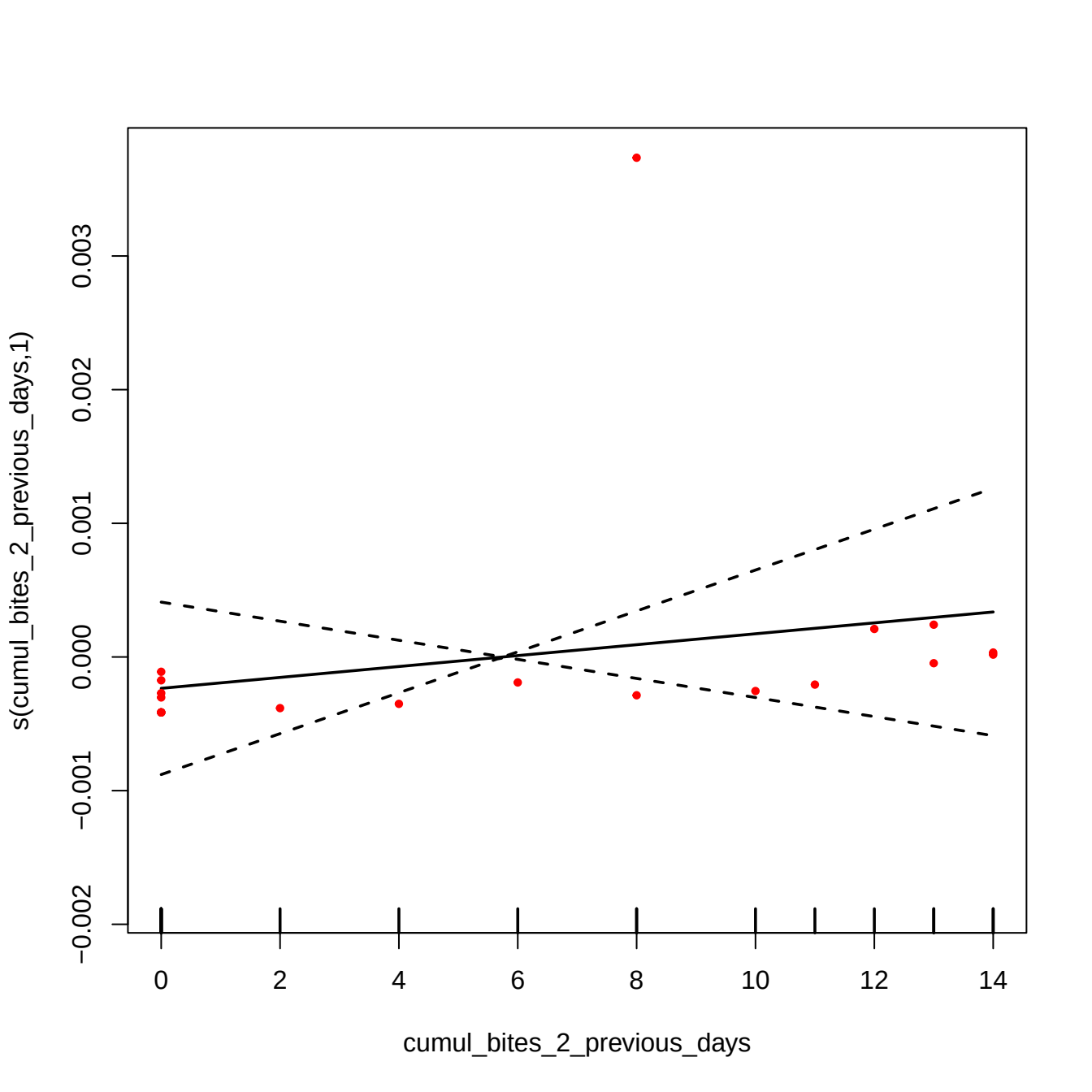
```
# Check for Multicollinearity

Low Correlation

                                Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_7_previous_days, k = 4) 2.32 [1.62, 3.78]         1.52      0.43     [0.26, 0.62]

Moderate Correlation

                         Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(bites_of_yesterday, k = 4) 5.80 [3.64, 9.72]         2.41      0.17     [0.10, 0.27]
```

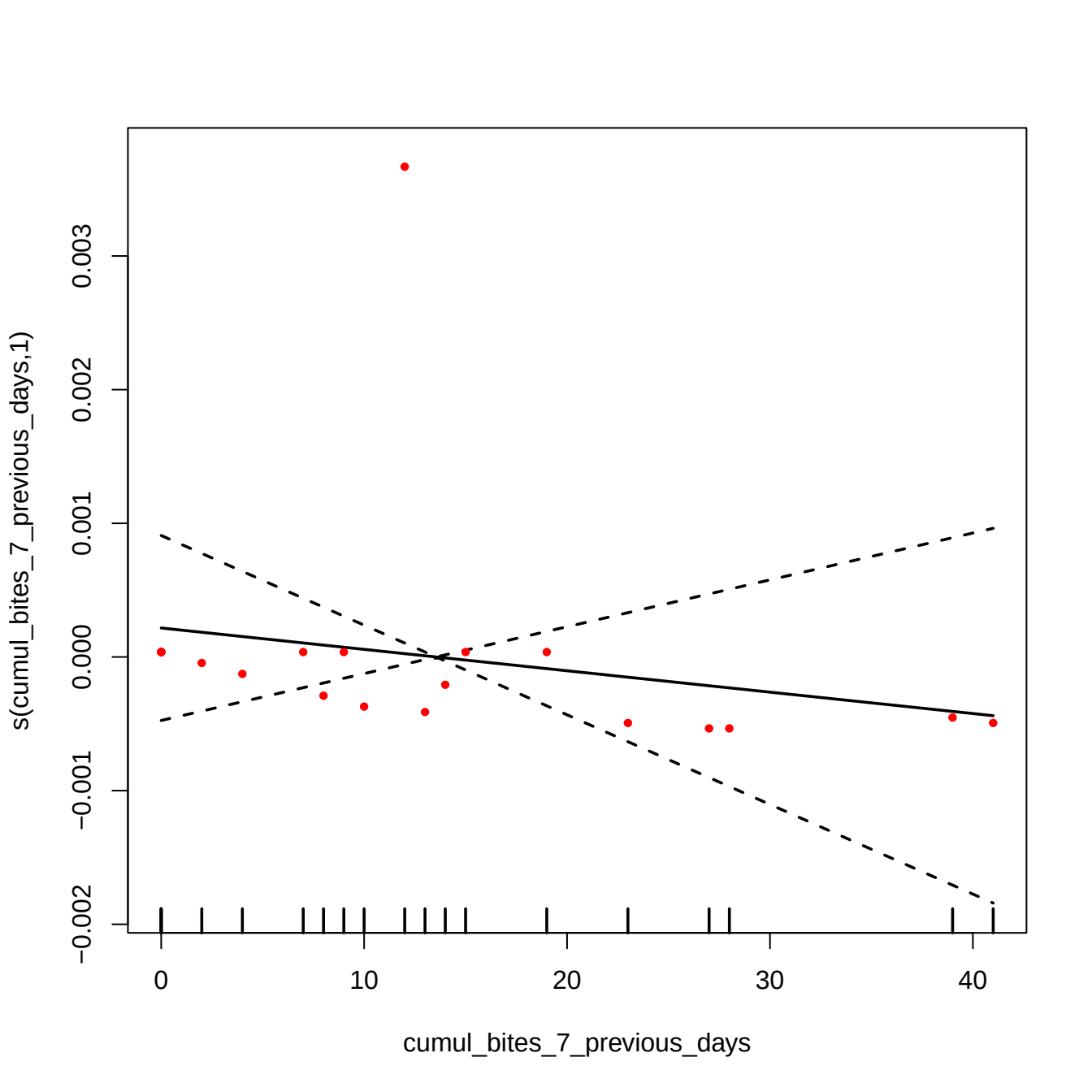
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.73842    0.09991    17.4   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                               edf Ref.df      F  p-value
s(bites_of_yesterday)        1.647  1.963  1.506   0.2350
s(cumul_bites_7_previous_days) 1.000  1.000  6.446   0.0165 *
s(ID)                        2.804  3.000 17.914 7.71e-07 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.675   Deviance explained = 72.6%
-ML = -10.895  Scale est. = 0.022772  n = 36
```

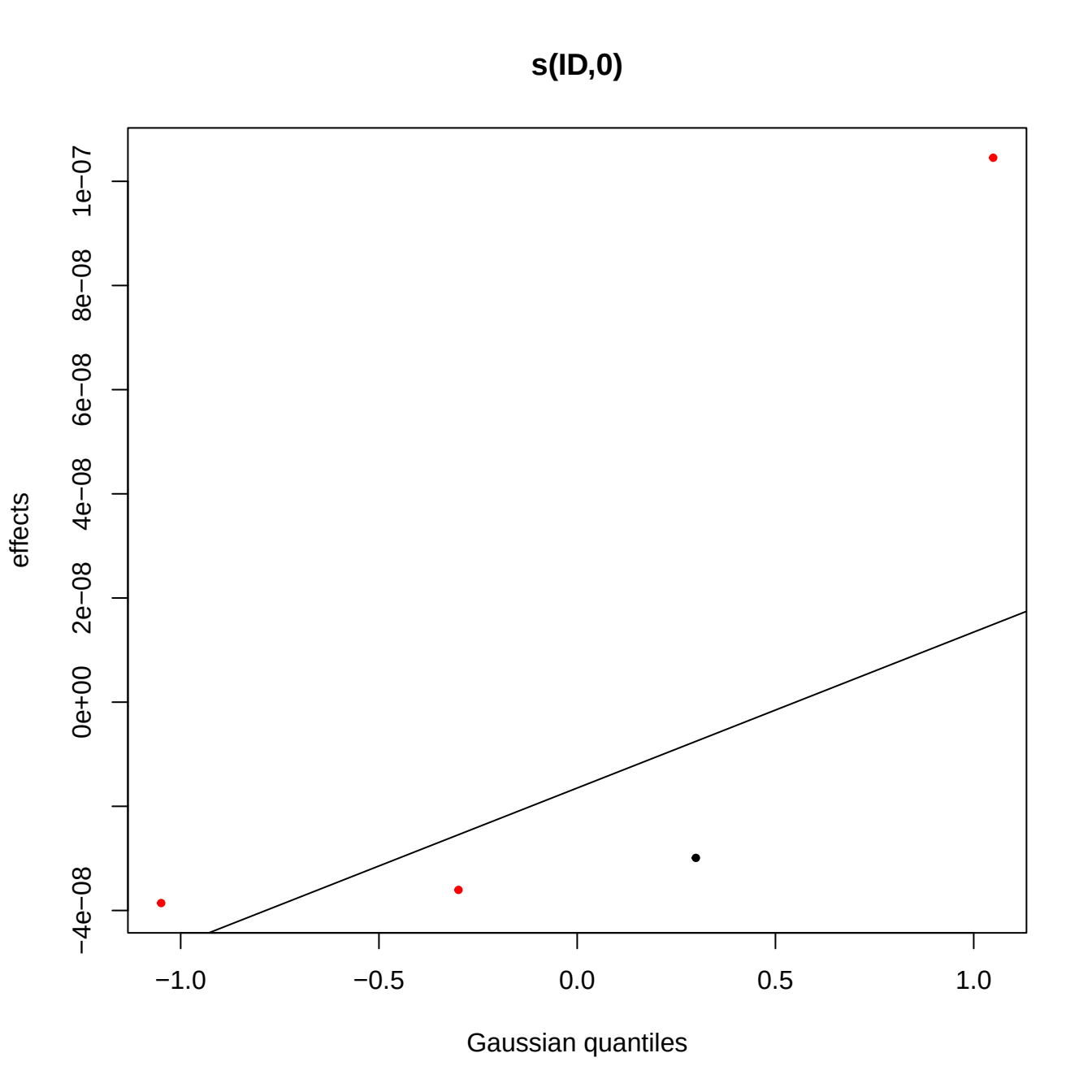
AICc [1] −19.95167

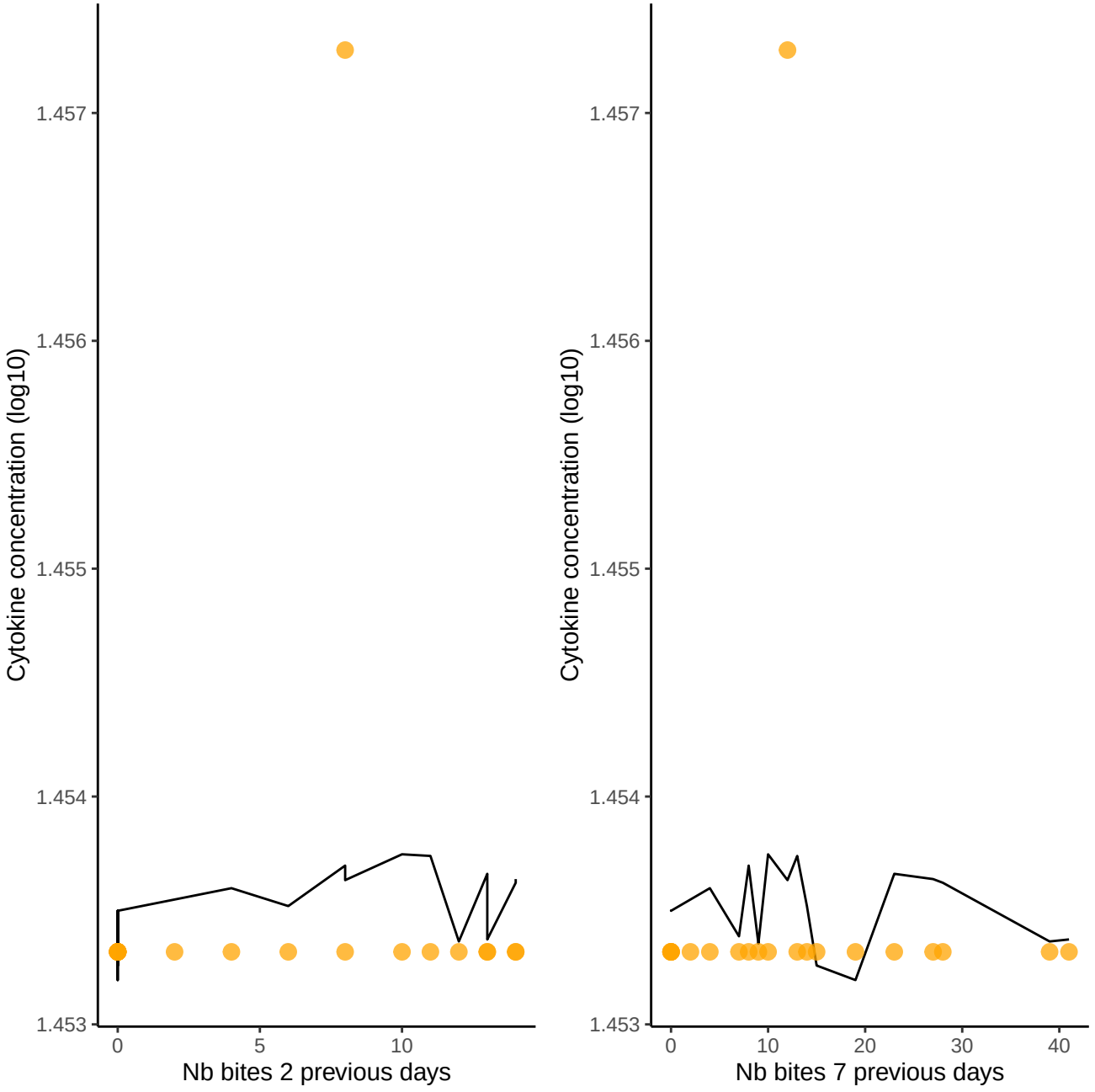
Bites in squirrel

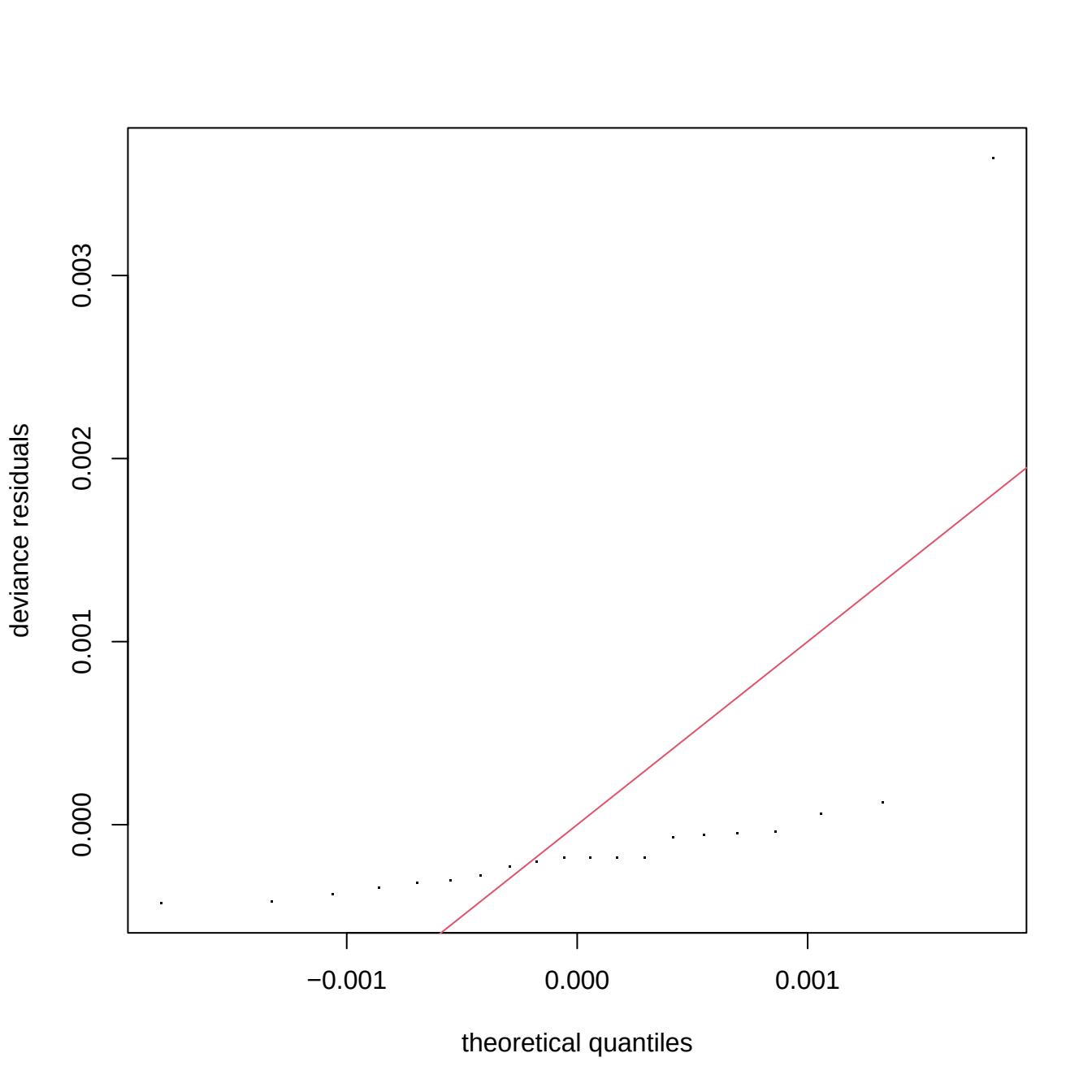
Nb obs: 20

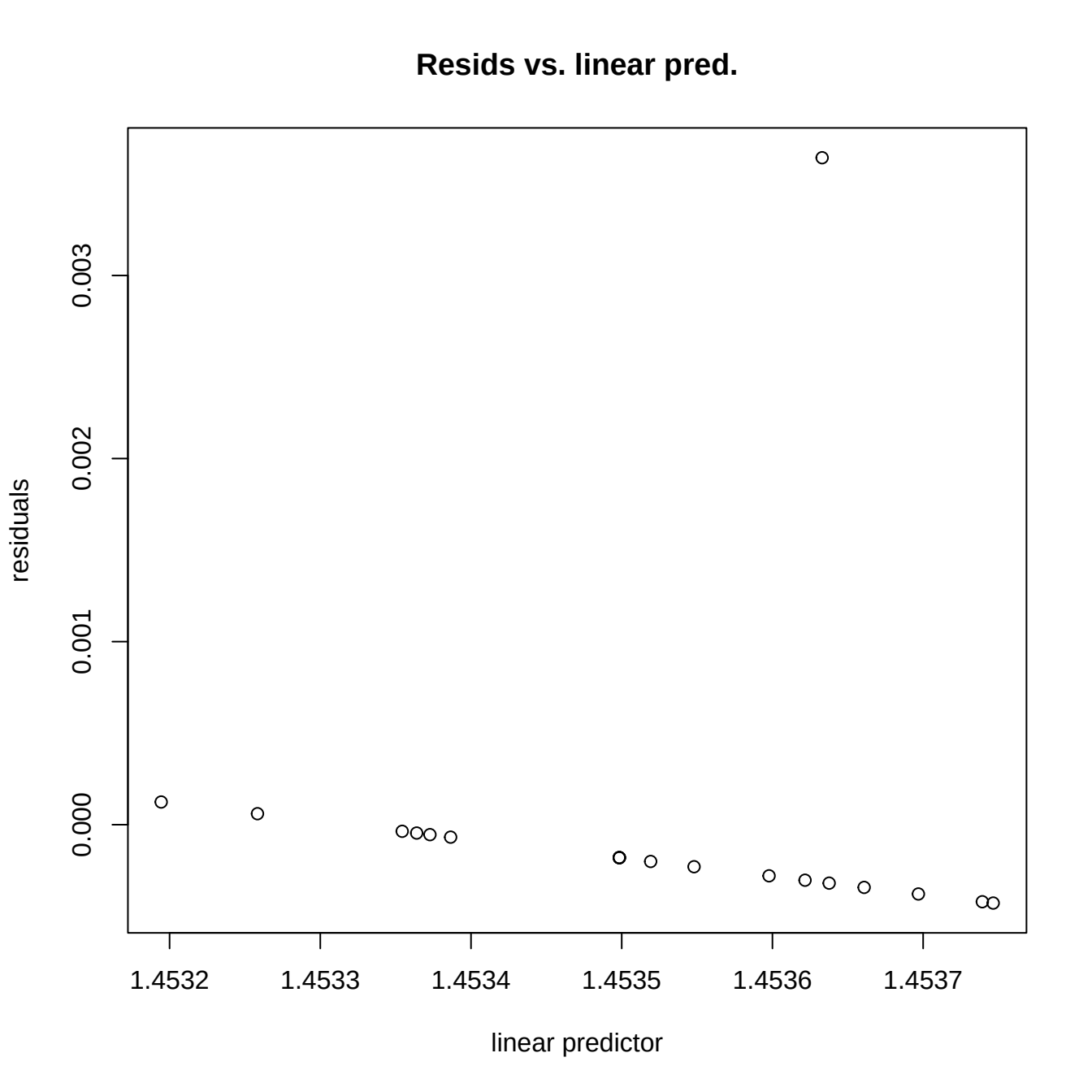

s(cumul_bites_2_previous_days,1)
0.003
0.002
0.001
0.000
−0.001
−0.002
0
2
4
6
8
10
12
14
cumul_bites_2_previous_days

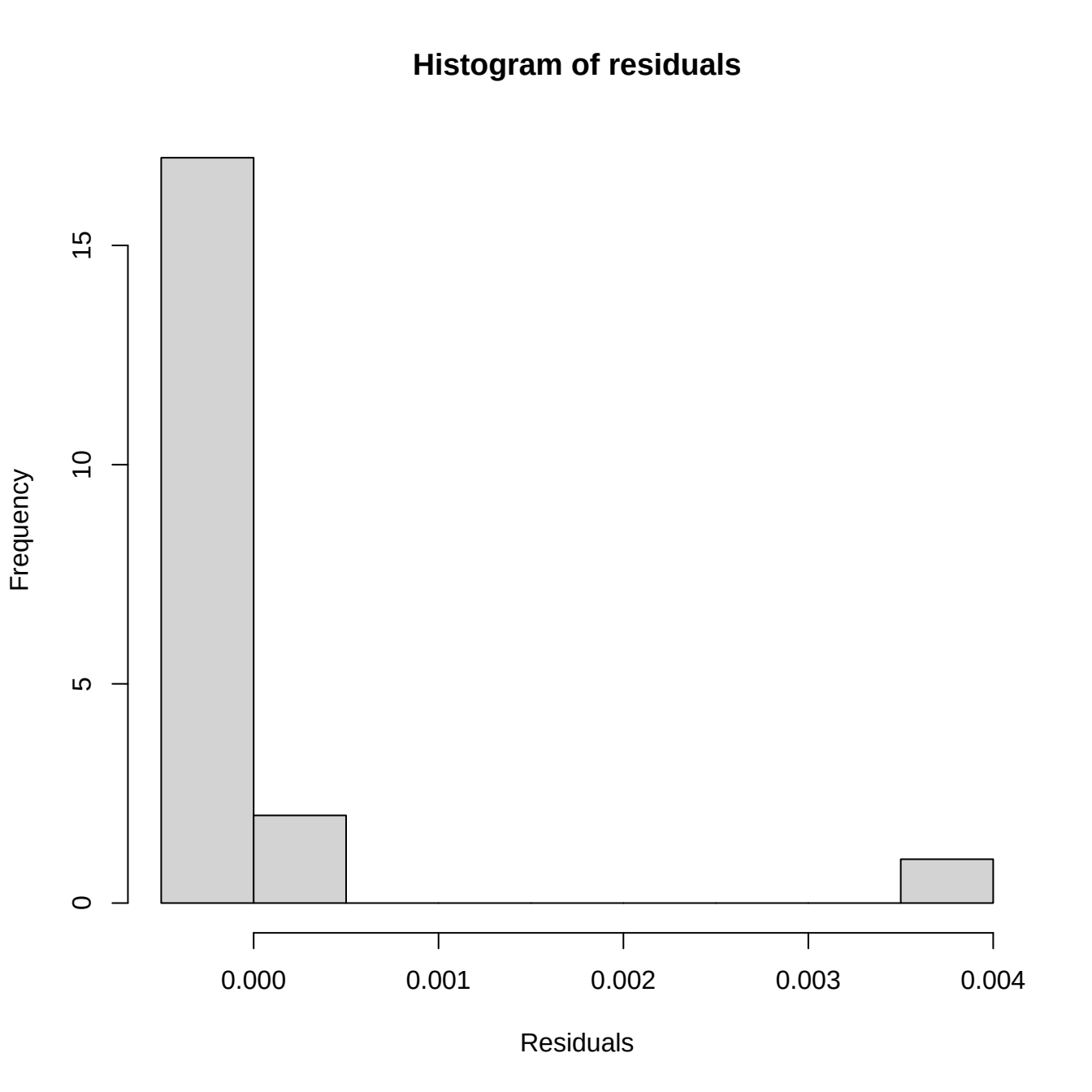

s(cumul_bites_7_previous_days,1)
0.003
0.002
0.001
0.000
−0.001
−0.002
0
10
20
30
40
cumul_bites_7_previous_days

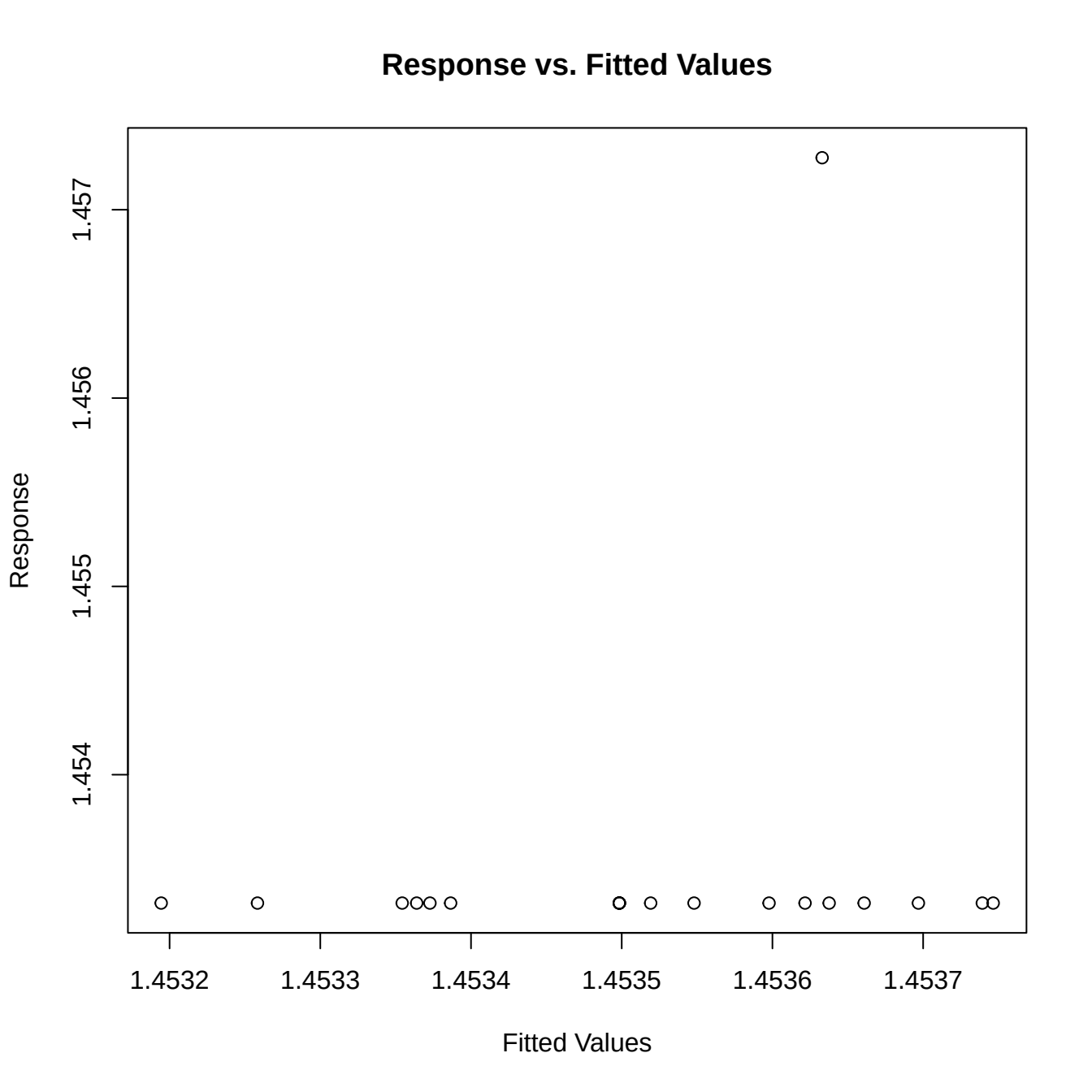

s(ID,0)
effects
1e−07
8e−08
6e−08
4e−08
2e−08
0e+00
−4e−08
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
1.457
1.456
1.455
1.454
1.453
0
5
10
Nb bites 2 previous days
Cytokine concentration (log10)
1.457
1.456
1.455
1.454
1.453
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.000
0.001
0.002
0.003
−0.001
0.000
0.001
theoretical quantiles


Resids vs. linear pred.
residuals
0.000
0.001
0.002
0.003
1.4532
1.4533
1.4534
1.4535
1.4536
1.4537
linear predictor


Histogram of residuals
Frequency
0
5
10
15
0.000
0.001
0.002
0.003
0.004
Residuals


Response vs. Fitted Values
Response
1.454
1.455
1.456
1.457
1.4532
1.4533
1.4534
1.4535
1.4536
1.4537
Fitted Values

```
Method: ML   Optimizer: outer newton
full convergence after 13 iterations.
Gradient range [−1.067915e−05,0.0003045789]
(score −113.0477 & scale 8.481872e−07).
Hessian positive definite, eigenvalue range [8.705866e−06,9.999695].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                    k'      edf k−index p−value
s(cumul_bites_2_previous_days) 3.000000 1.000007    1.22    0.98
s(cumul_bites_7_previous_days) 3.000000 1.000011    1.24    1.00
s(ID)                          4.000000 0.000454      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                                Term  VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_2_previous_days, k = 4) 1.06 [1.00, 15.00]         1.03      0.94     [0.07, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.06 [1.00, 15.01]         1.03      0.94     [0.07, 1.00]
```

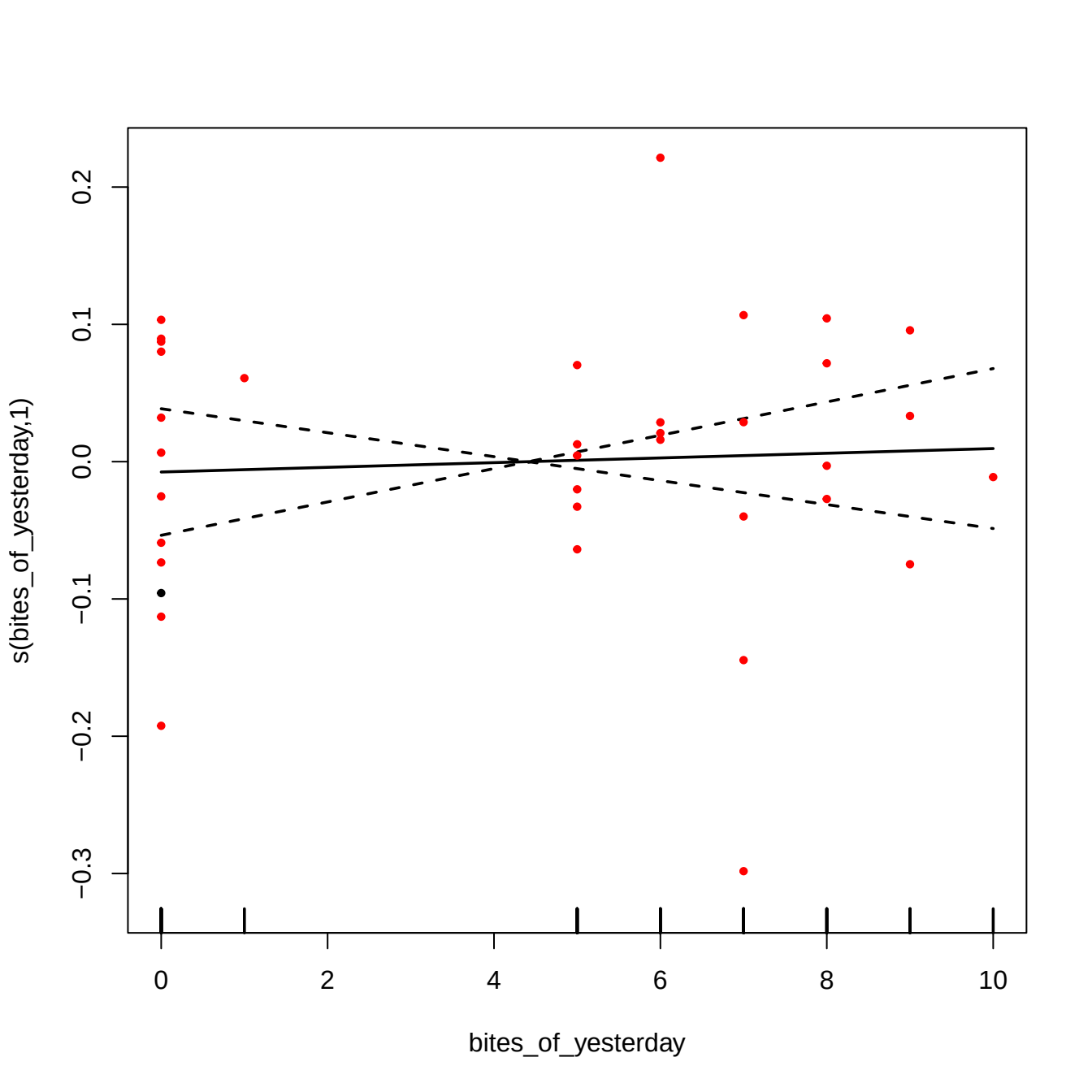
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(cumul_bites_2_previous_days, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 1.453516   0.000206    7058   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                    edf Ref.df     F p-value
s(cumul_bites_2_previous_days) 1.0000071      1 0.529   0.477
s(cumul_bites_7_previous_days) 1.0000108      1 0.393   0.539
s(ID)                          0.0004536      3 0.000   0.347

R-sq.(adj) =  -0.0829   Deviance explained = 3.11%
-ML = -113.05  Scale est. = 8.4819e-07  n = 20
```

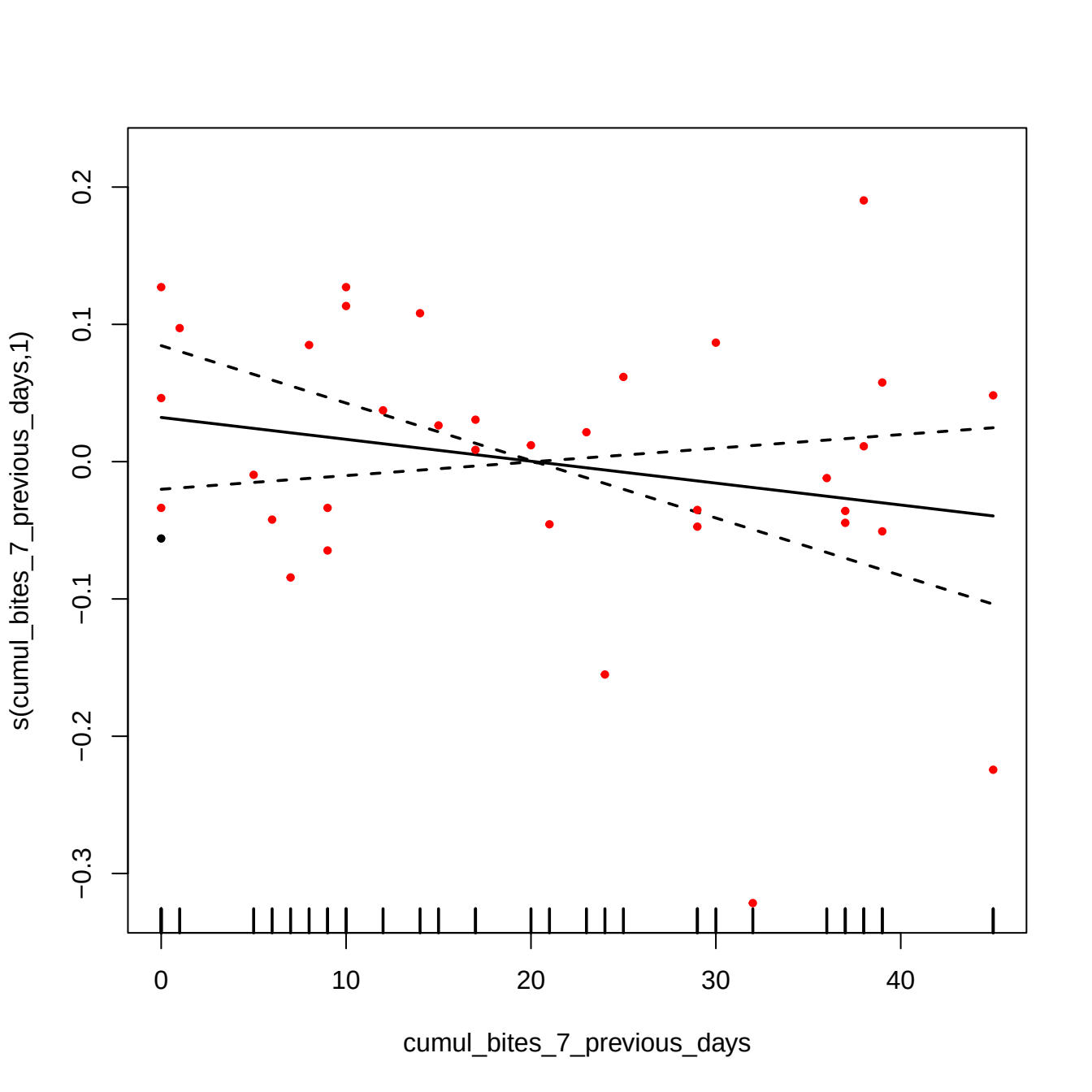
AICc [1] −215.4268

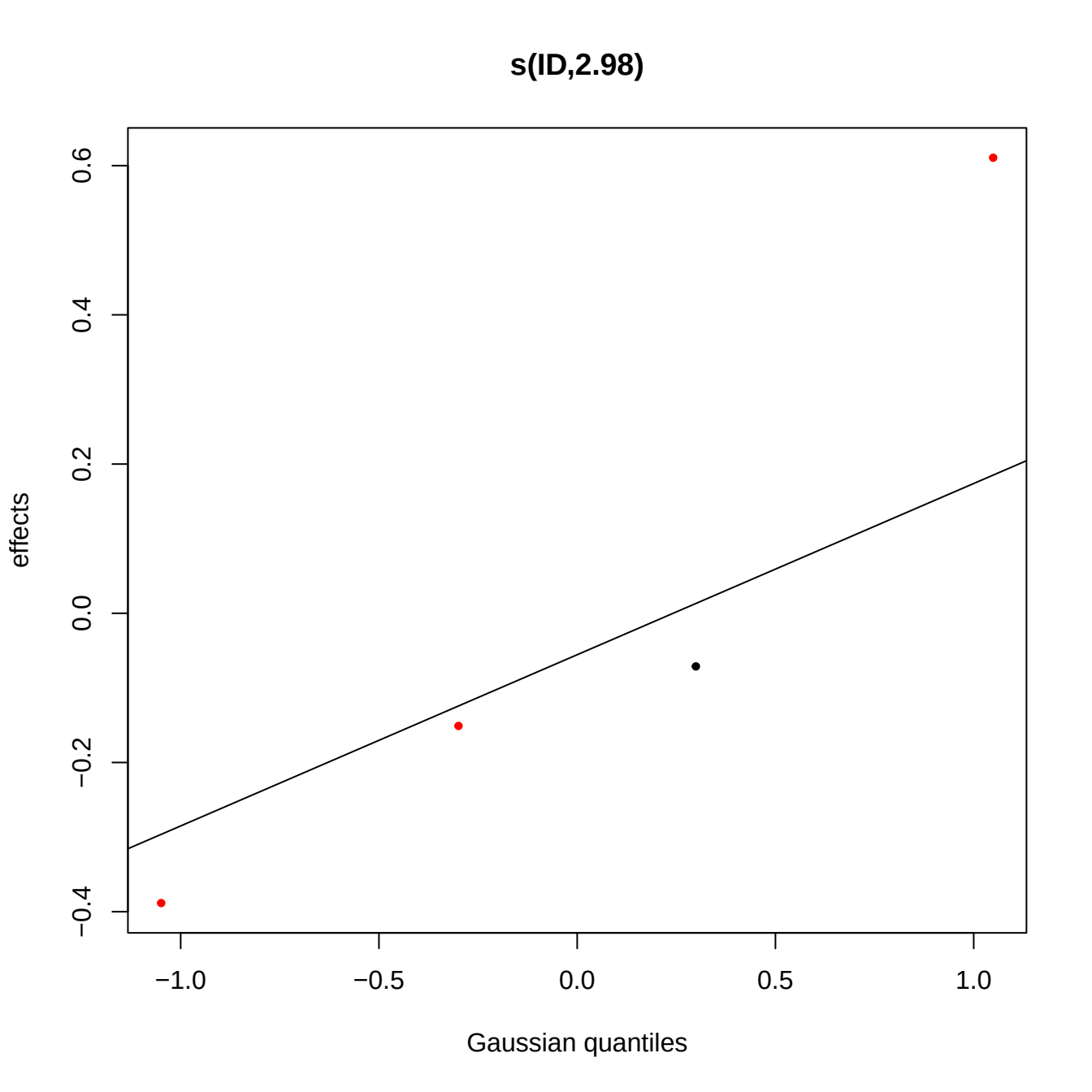
MIP.1B

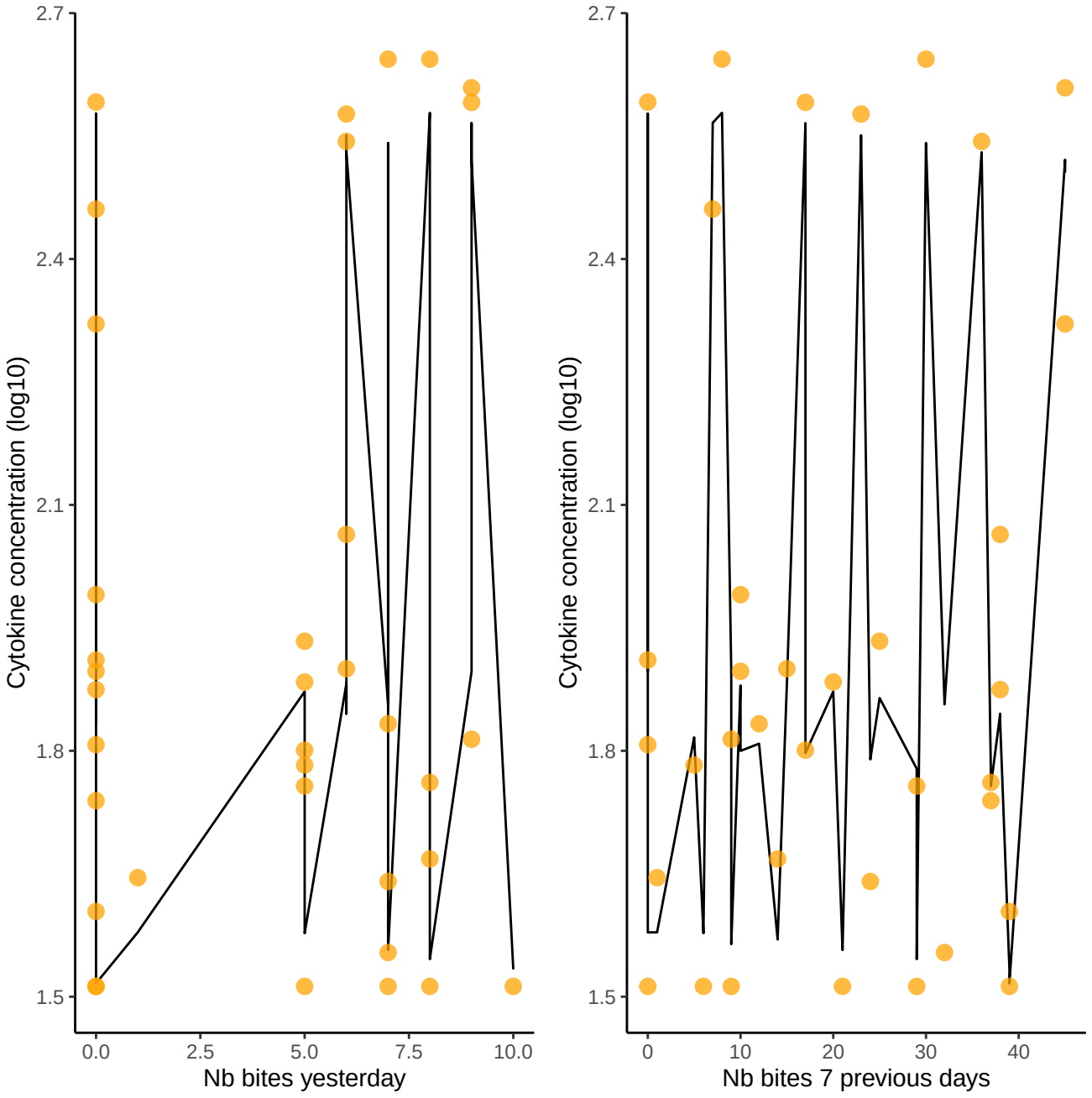
Bites in cyno

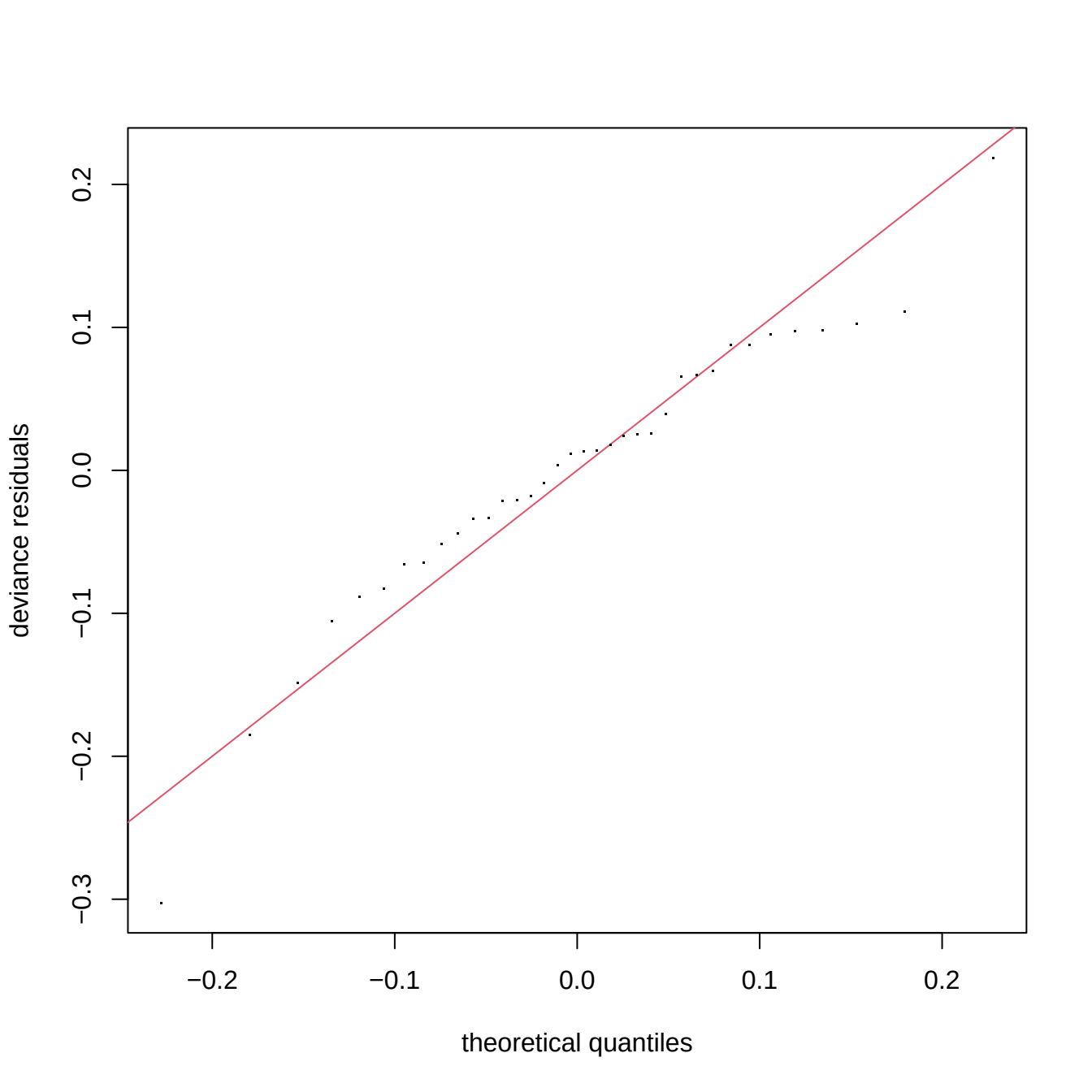
Nb obs: 36

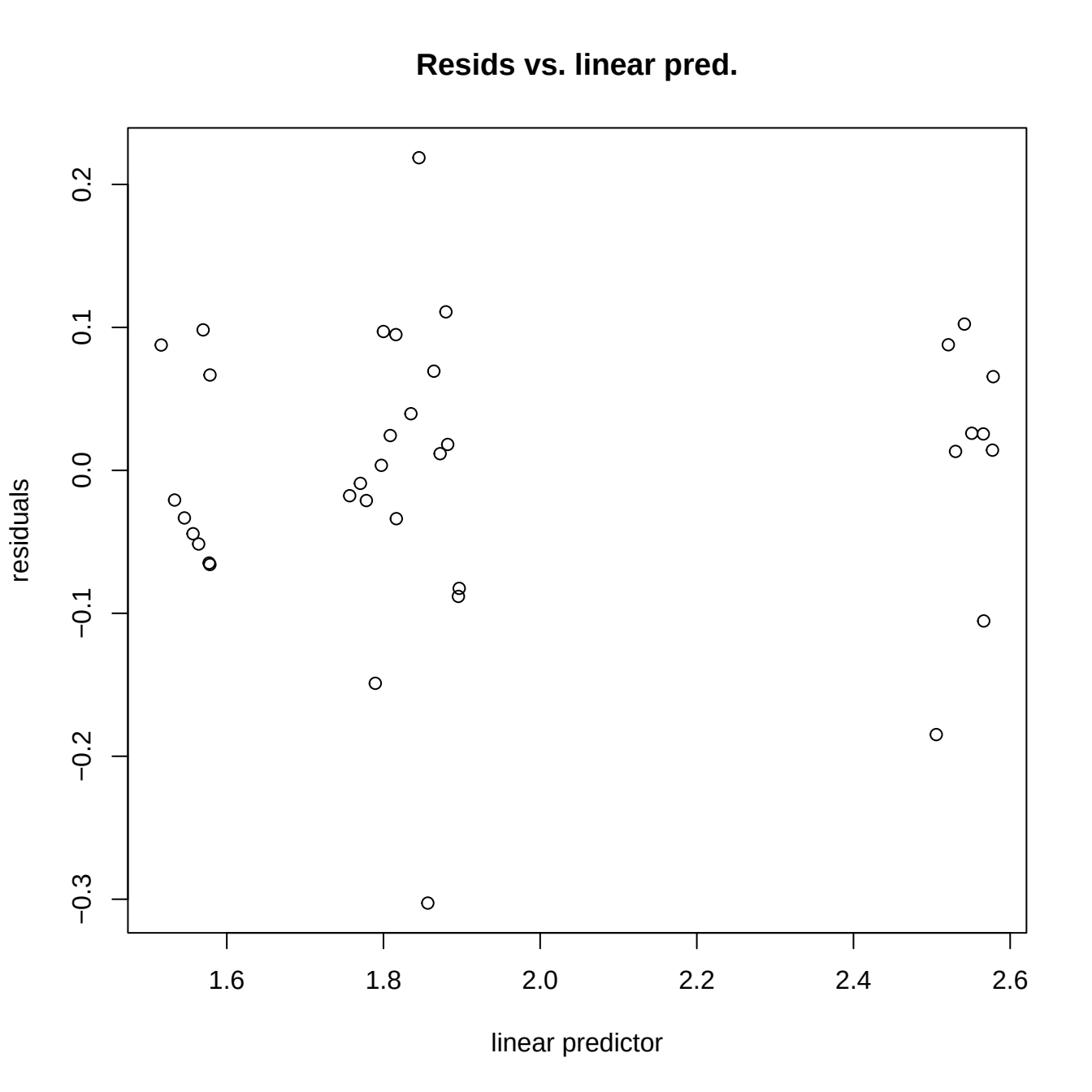

s(bites_of_yesterday,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
2
4
6
8
10
bites_of_yesterday

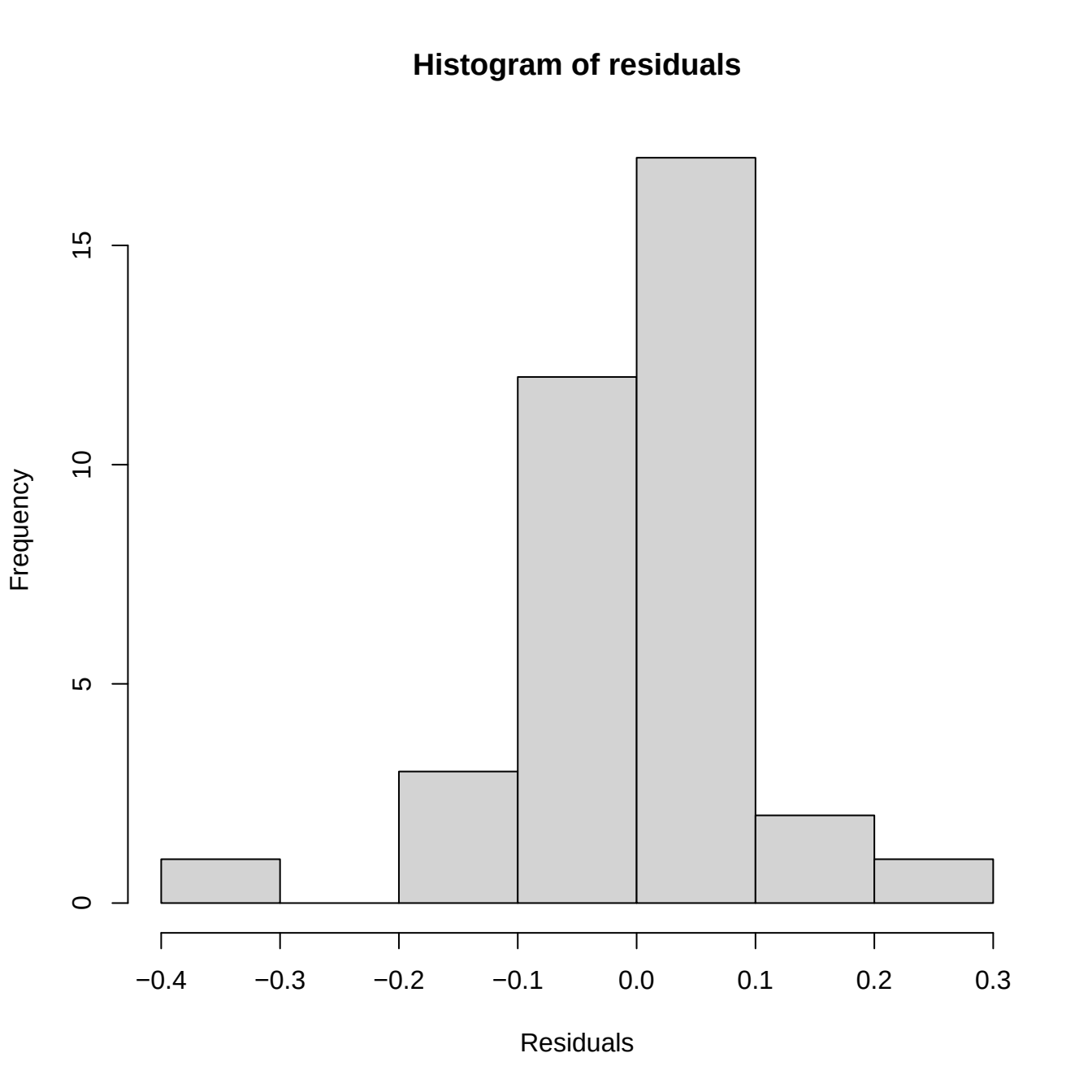

s(cumul_bites_7_previous_days,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
10
20
30
40
cumul_bites_7_previous_days

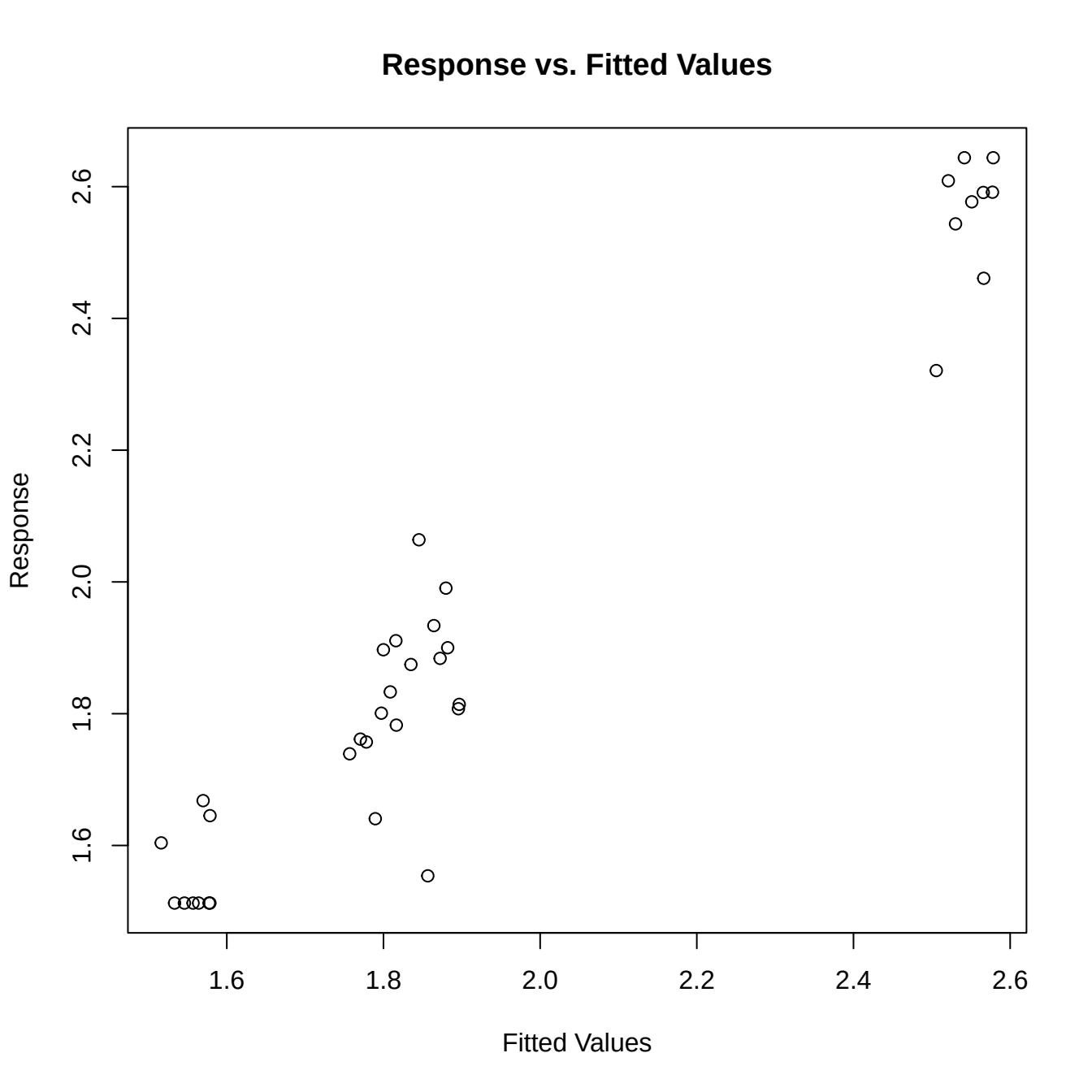

s(ID,2.98)
effects
0.6
0.4
0.2
0.0
−0.2
−0.4
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.7
2.4
2.1
1.8
1.5
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
2.7
2.4
2.1
1.8
1.5
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.2
−0.1
0.0
0.1
0.2
theoretical quantiles


Resids vs. linear pred.
residuals
0.2
0.1
0.0
−0.1
−0.2
−0.3
1.6
1.8
2.0
2.2
2.4
2.6
linear predictor


Histogram of residuals
Frequency
0
5
10
15
−0.4
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.6
1.8
2.0
2.2
2.4
2.6

```
Method: ML   Optimizer: outer newton
full convergence after 10 iterations.
Gradient range [−9.868043e−06,8.447574e−08]
(score −22.03727 & scale 0.01073548).
Hessian positive definite, eigenvalue range [7.793722e−07,18.24188].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                 k'  edf k−index p−value
s(bites_of_yesterday)          3.00 1.00    1.07    0.56
s(cumul_bites_7_previous_days) 3.00 1.00    1.16    0.79
s(ID)                          4.00 2.98      NA      NA
```

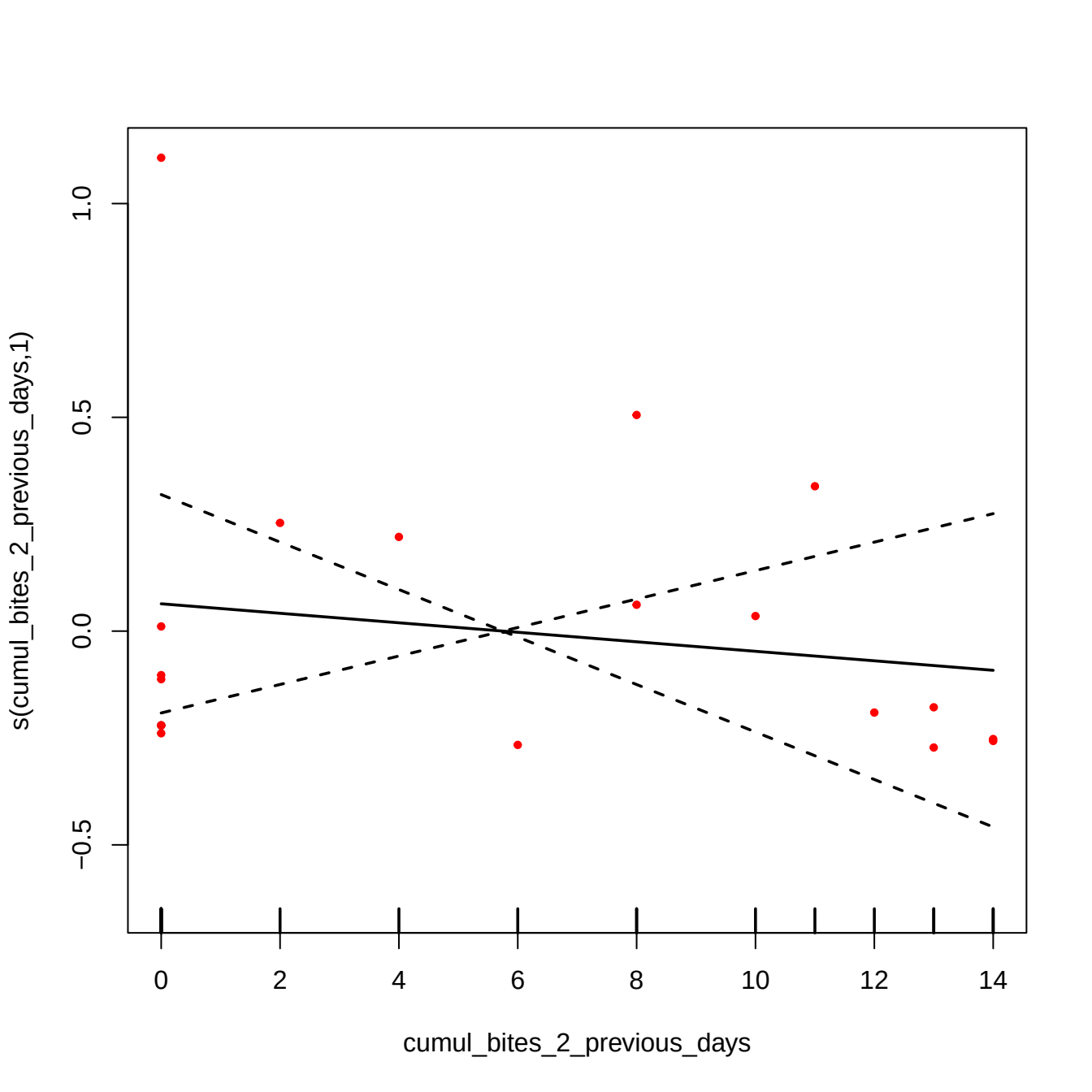
```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

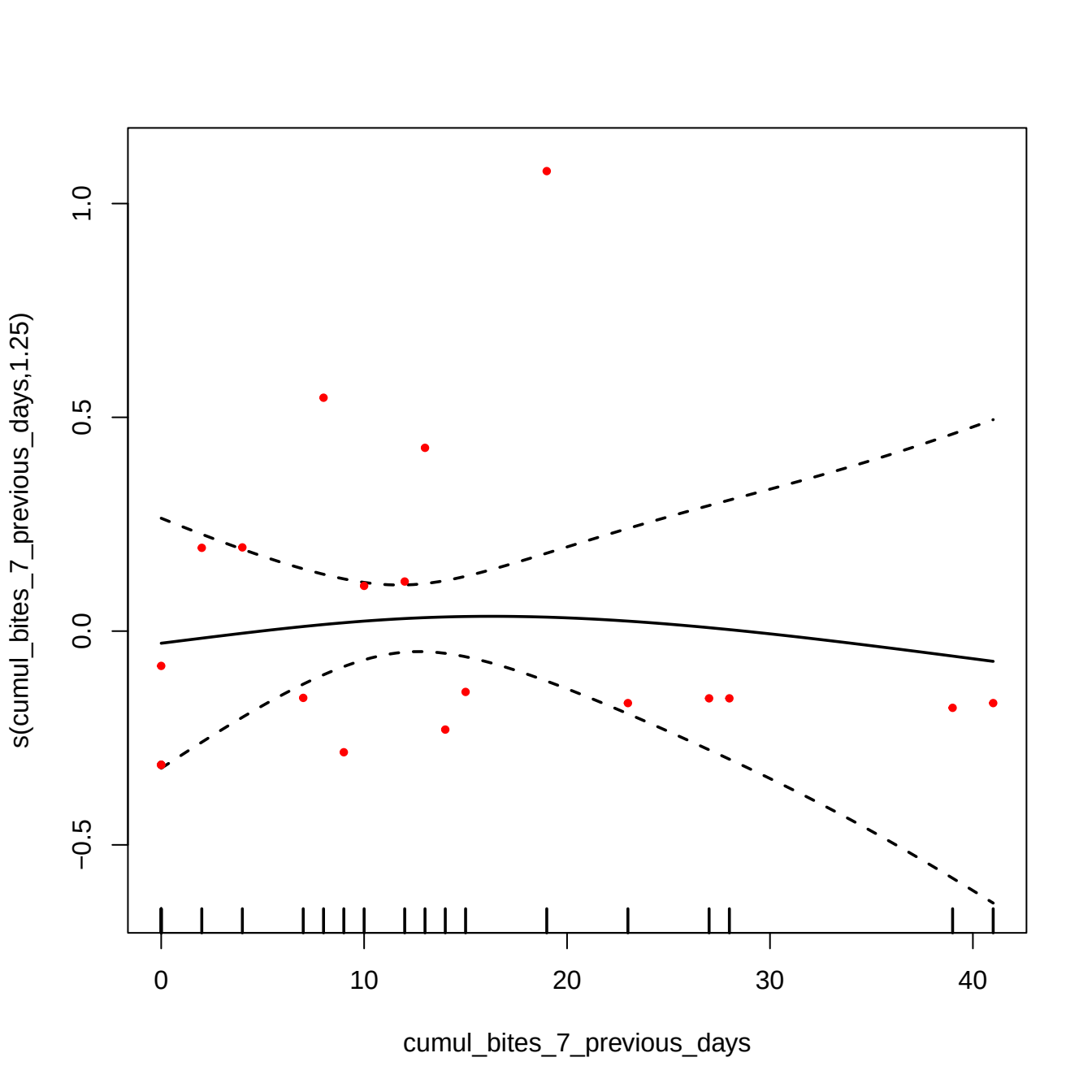
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   1.9422     0.1933   10.05 4.07e-11 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df       F p-value
s(bites_of_yesterday)         1.000      1   0.107   0.746
s(cumul_bites_7_previous_days) 1.000      1   1.516   0.228
s(ID)                         2.976      3 151.612  <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.929   Deviance explained = 93.9%
-ML = -22.037  Scale est. = 0.010735  n = 36
```

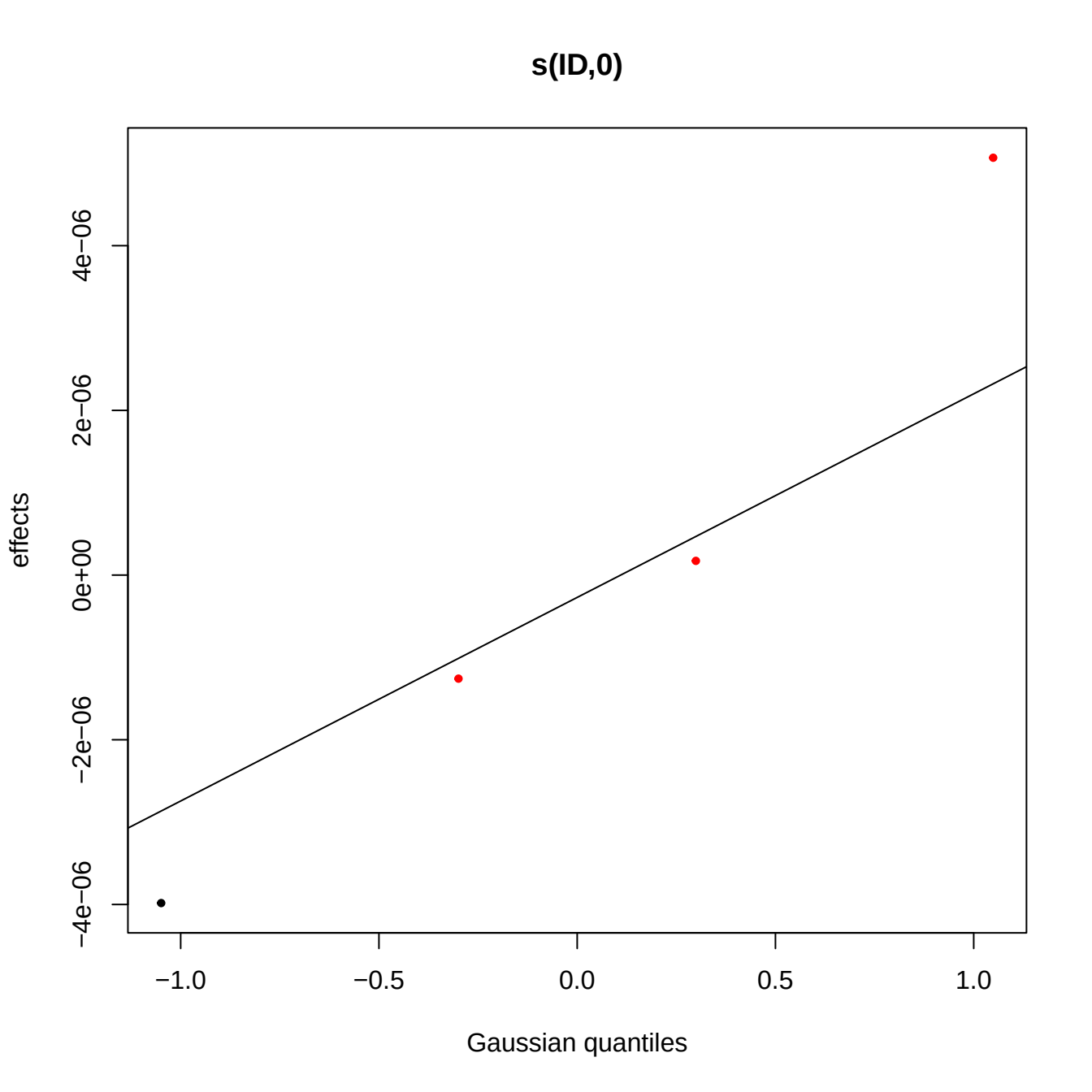
AICc [1] −49.61434

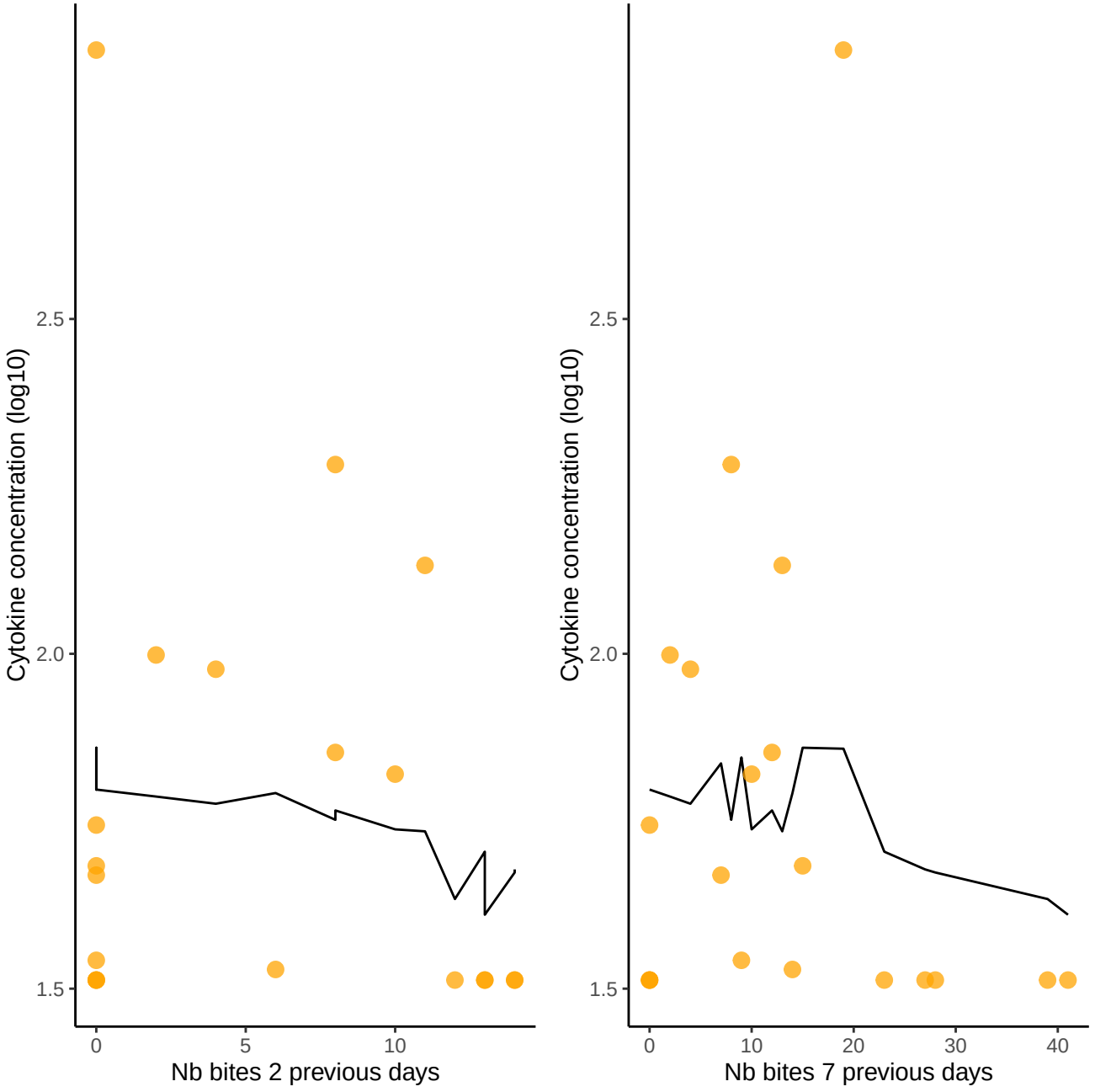
Bites in squirrel

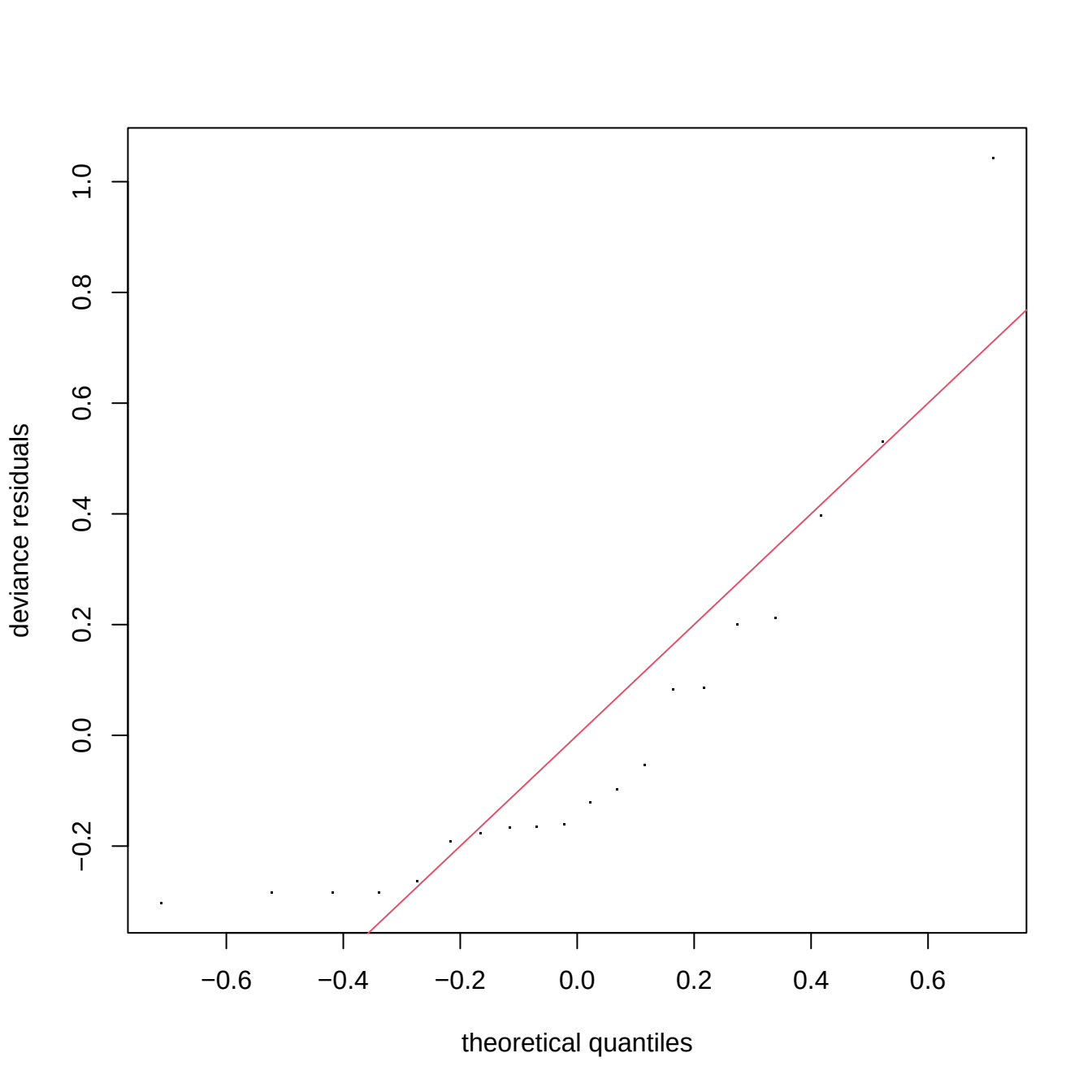
Nb obs: 20

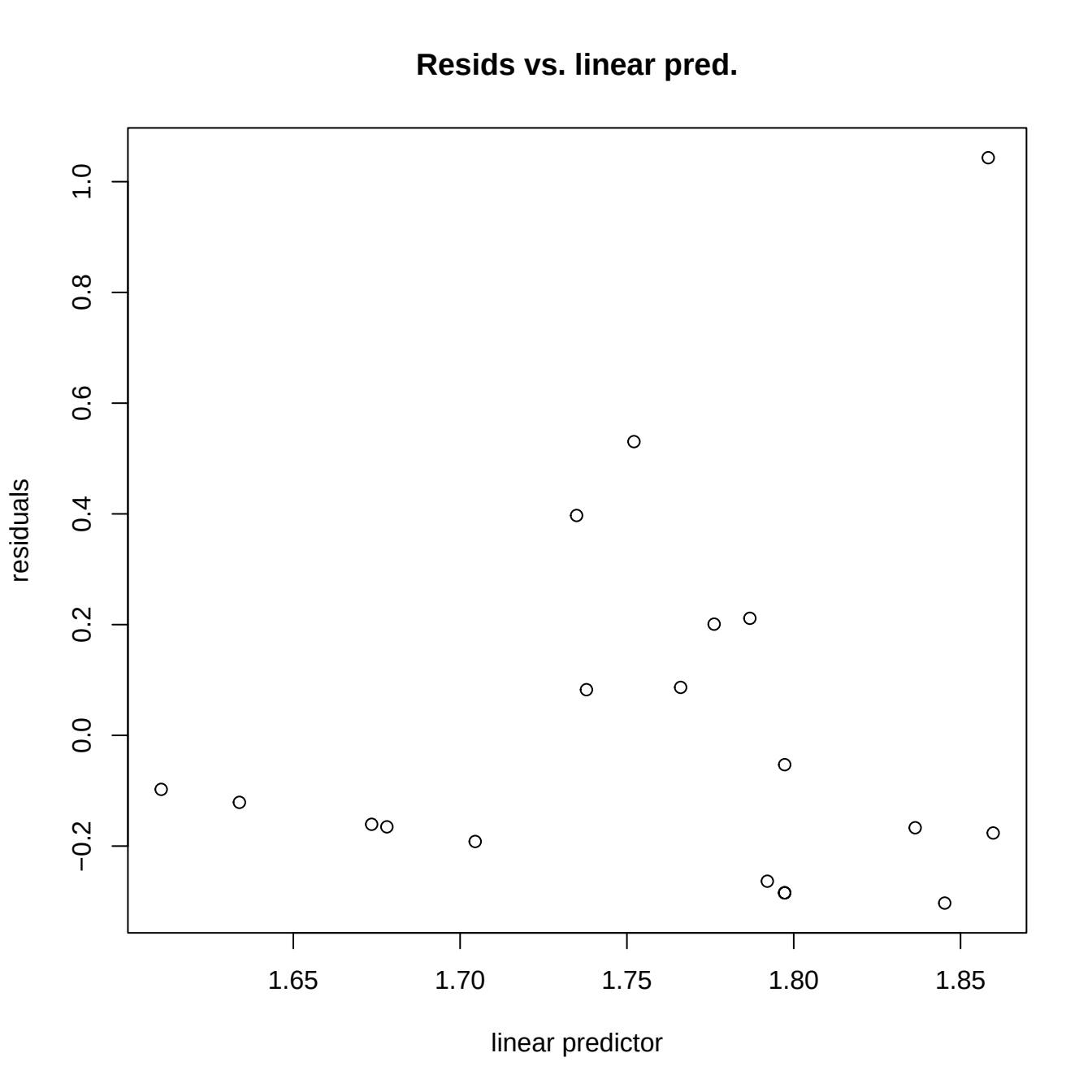

s(cumul_bites_2_previous_days,1)
1.0
0.5
0.0
−0.5
0
2
4
6
8
10
12
14
cumul_bites_2_previous_days

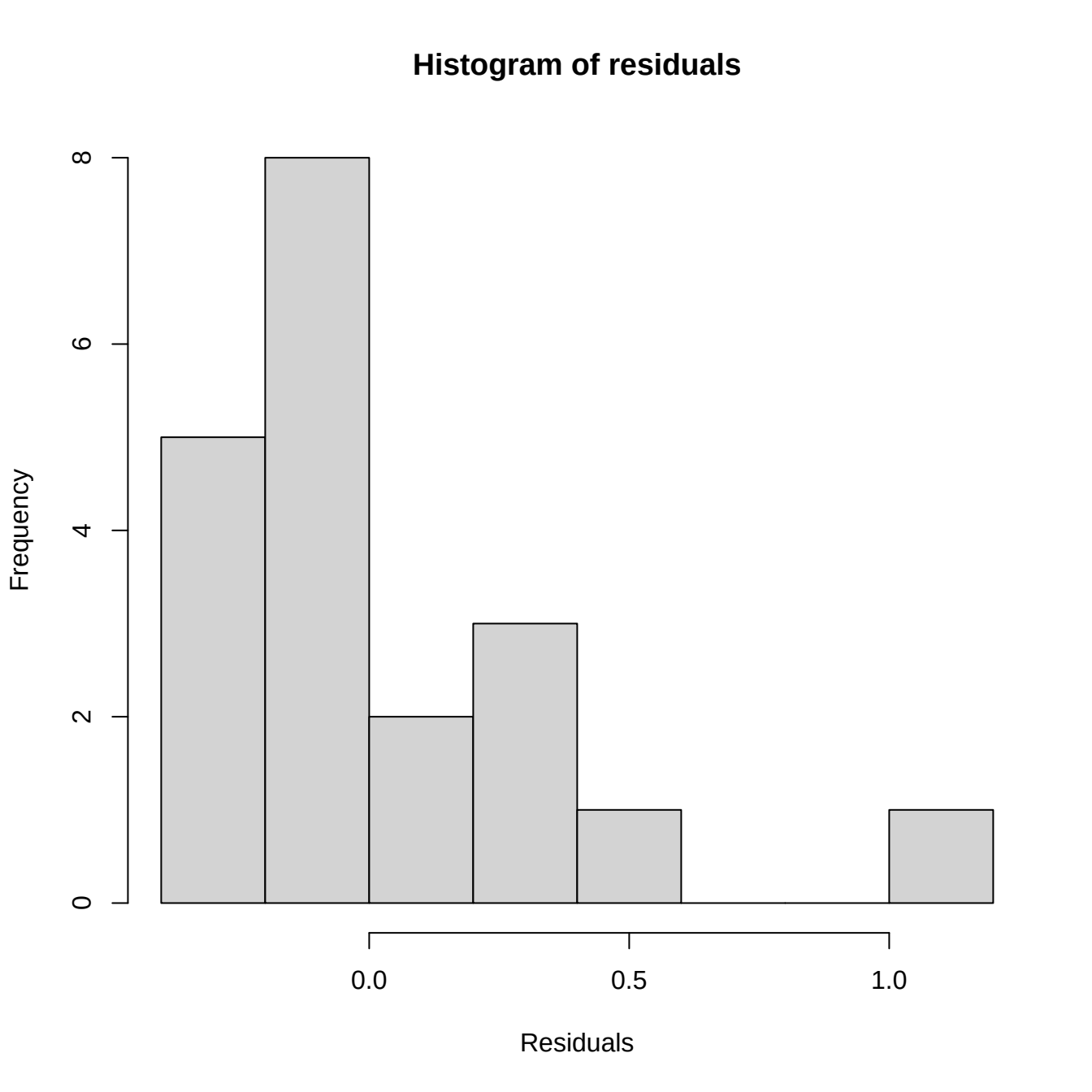

s(cumul_bites_7_previous_days,1.25)
1.0
0.5
0.0
−0.5
0
10
20
30
40
cumul_bites_7_previous_days

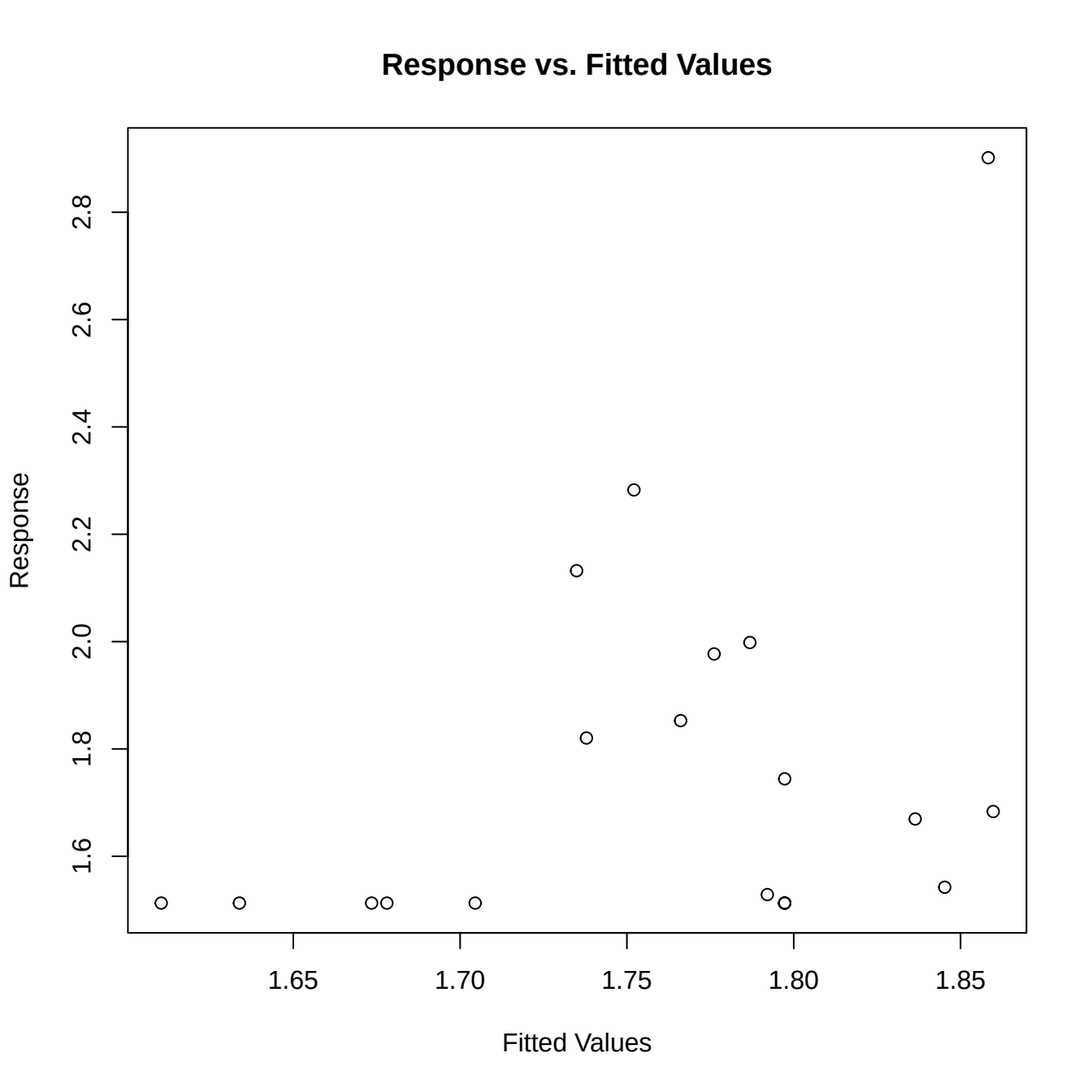

s(ID,0)
effects
4e−06
2e−06
0e+00
−2e−06
−4e−06
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.5
2.0
1.5
0
5
10
Nb bites 2 previous days
Cytokine concentration (log10)
2.5
2.0
1.5
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6
theoretical quantiles


Resids vs. linear pred.
residuals
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
1.65
1.70
1.75
1.80
1.85
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
0.0
0.5
1.0
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.6
1.8
2.0
2.2
2.4
2.6
2.8
1.65
1.70
1.75
1.80
1.85

```
Method: ML   Optimizer: outer newton
full convergence after 14 iterations.
Gradient range [−3.310148e−06,4.22303e−05]
(score 6.973644 & scale 0.1317552).
Hessian positive definite, eigenvalue range [5.617811e−07,10.0083].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                    k'      edf k−index p−value
s(cumul_bites_2_previous_days) 3.00e+00 1.00e+00    1.19    0.72
s(cumul_bites_7_previous_days) 3.00e+00 1.25e+00    1.28    0.90
s(ID)                          4.00e+00 6.34e−05      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                                Term  VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_2_previous_days, k = 4) 1.06 [1.00, 15.02]         1.03      0.94     [0.07, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.06 [1.00, 15.02]         1.03      0.94     [0.07, 1.00]
```

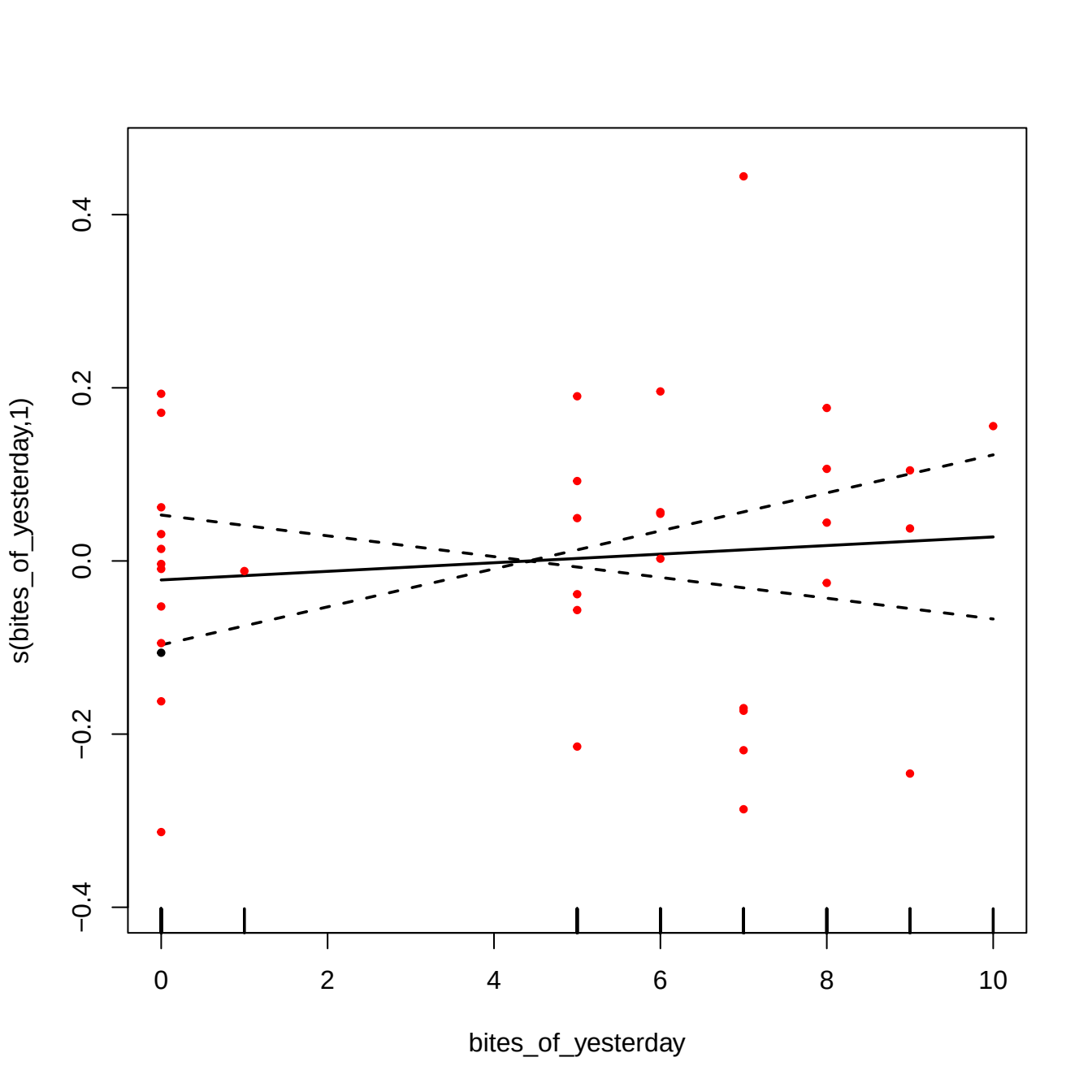
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(cumul_bites_2_previous_days, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.76176    0.08117   21.71 1.07e-13 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                    edf Ref.df     F p-value
s(cumul_bites_2_previous_days) 1.000e+00  1.000 0.251   0.623
s(cumul_bites_7_previous_days) 1.252e+00  1.455 0.212   0.790
s(ID)                          6.343e-05  3.000 0.000   0.360

R-sq.(adj) =  -0.0282   Deviance explained = 9.37%
-ML = 6.9736  Scale est. = 0.13176   n = 20
```

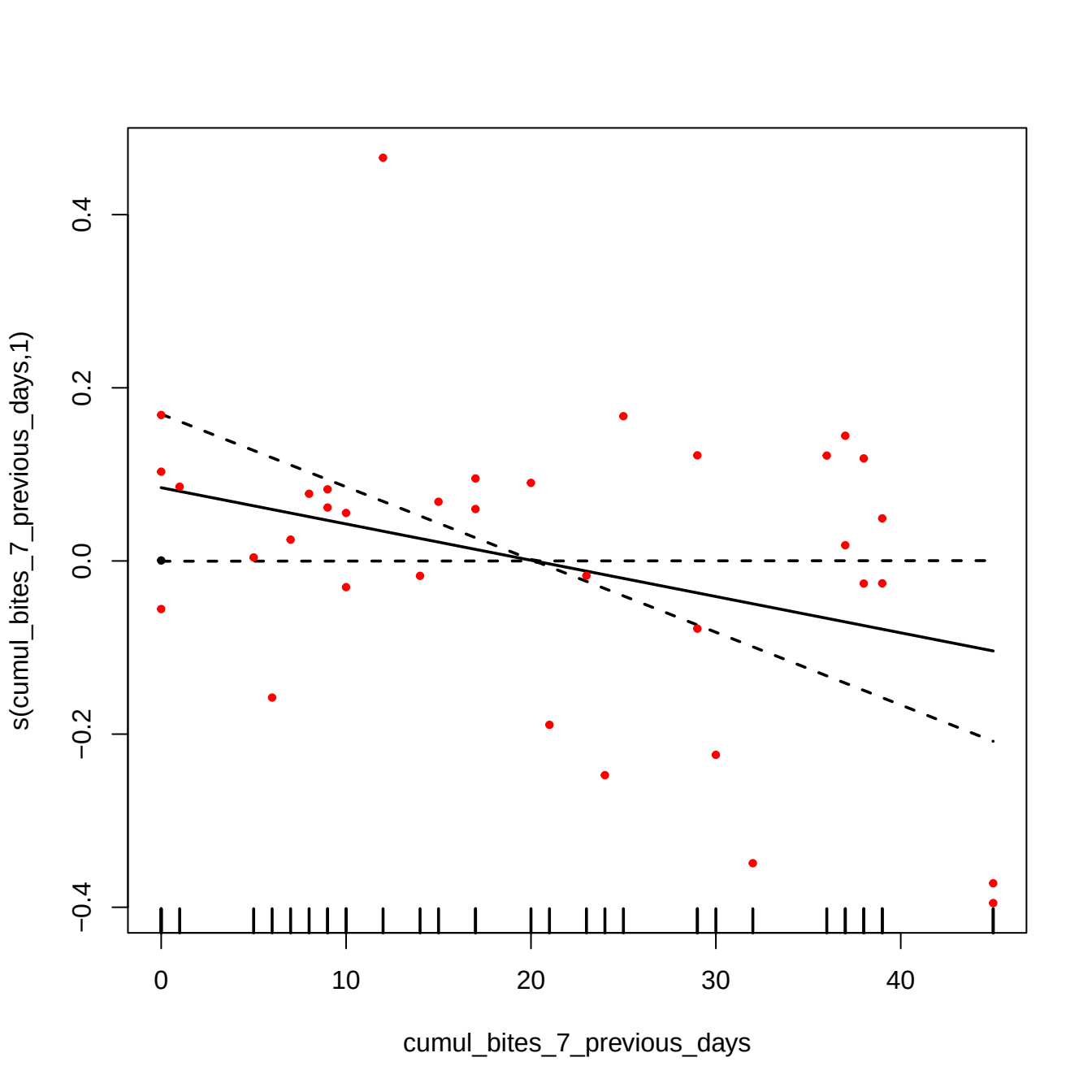
AICc [1] 24.92604

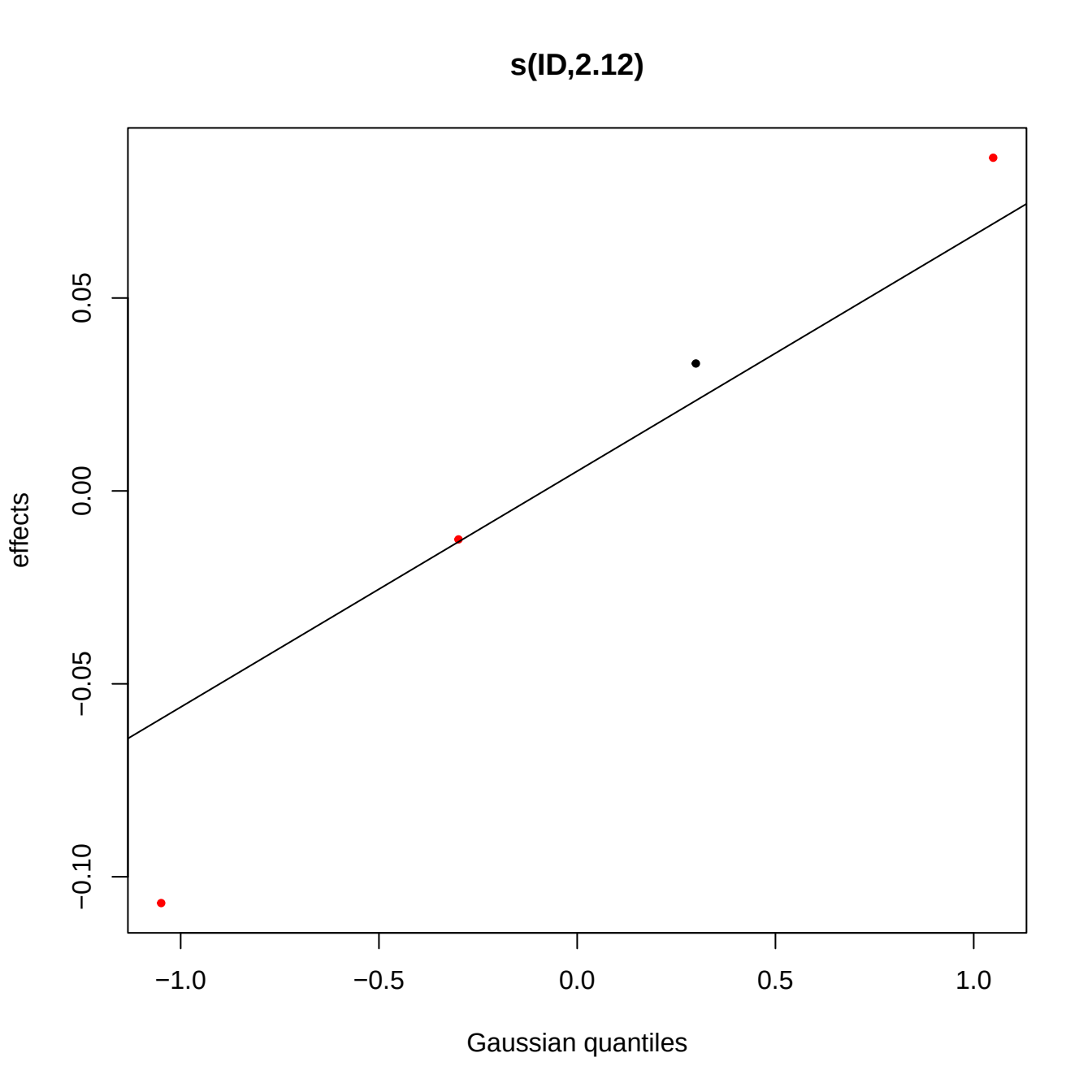
RANTES

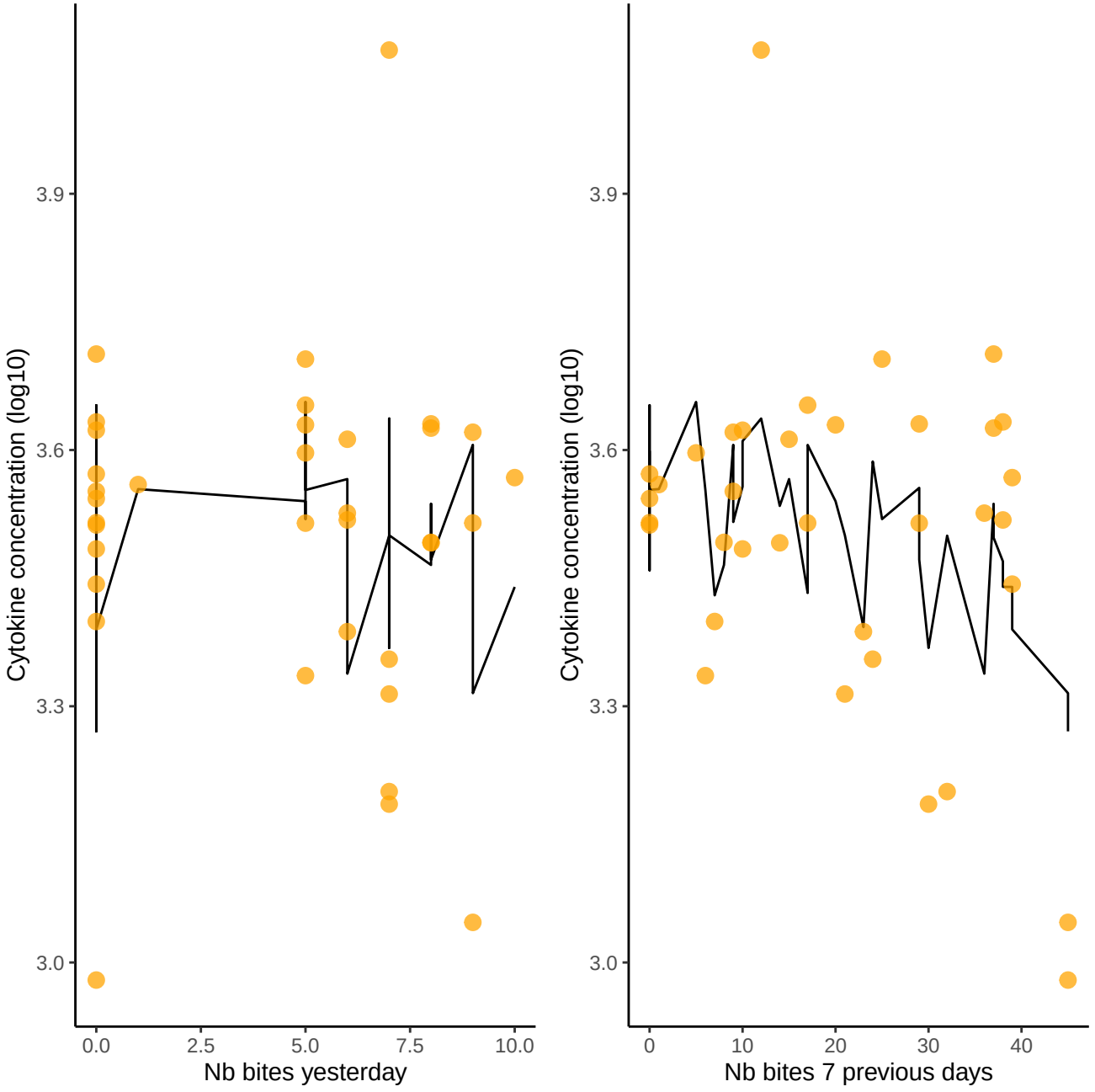
Bites in cyno

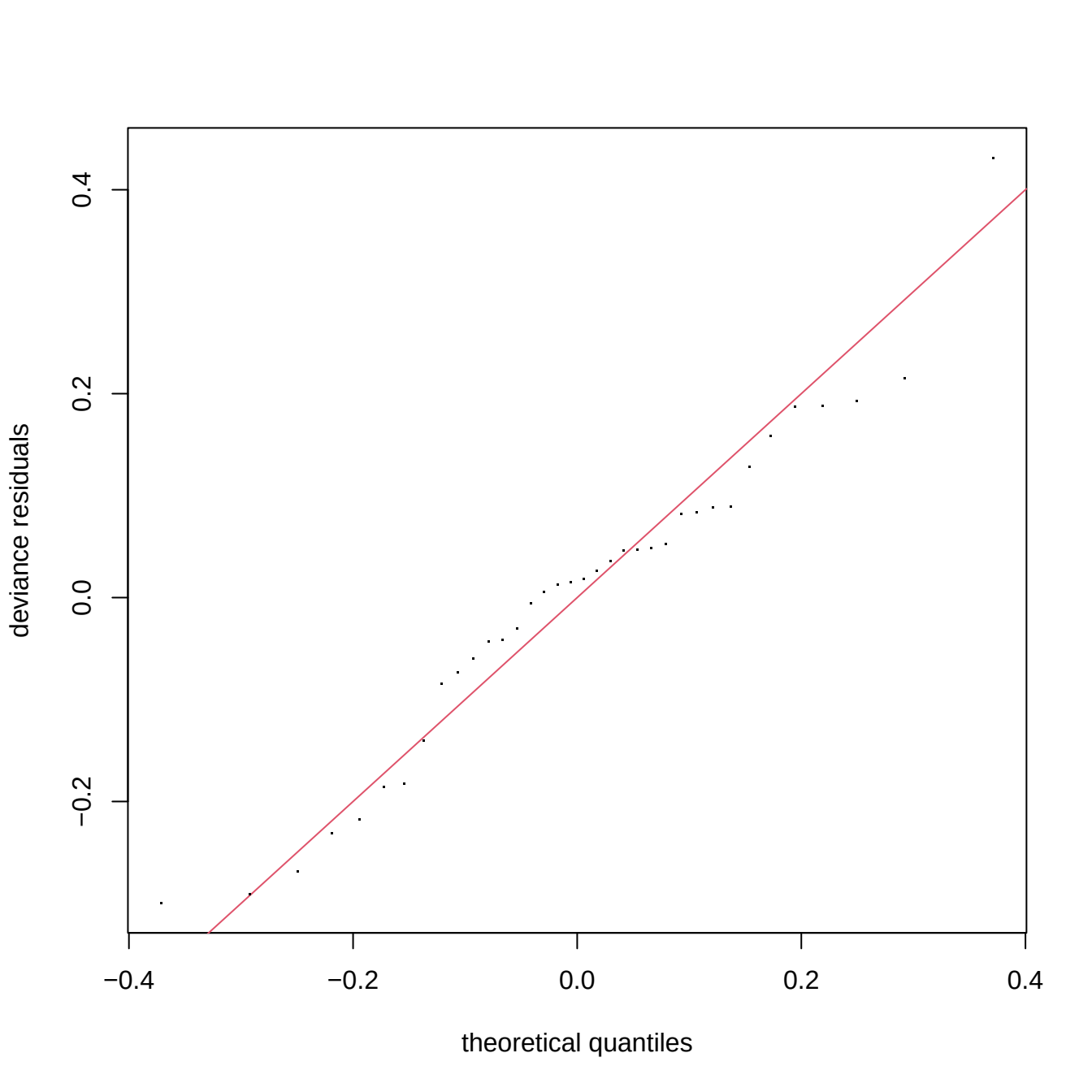
Nb obs: 36

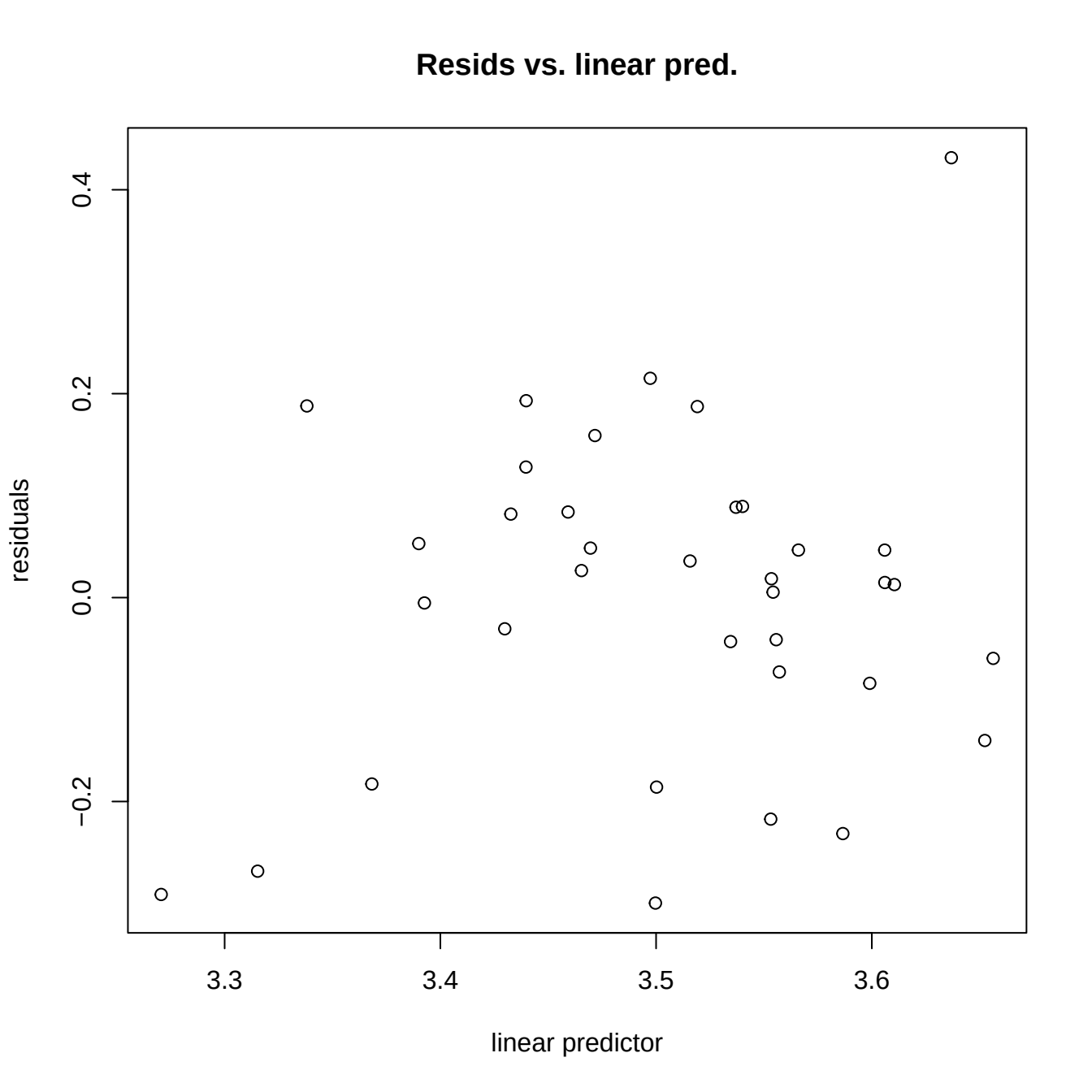

s(bites_of_yesterday,1)
0.4
0.2
0.0
−0.2
−0.4
0
2
4
6
8
10
bites_of_yesterday

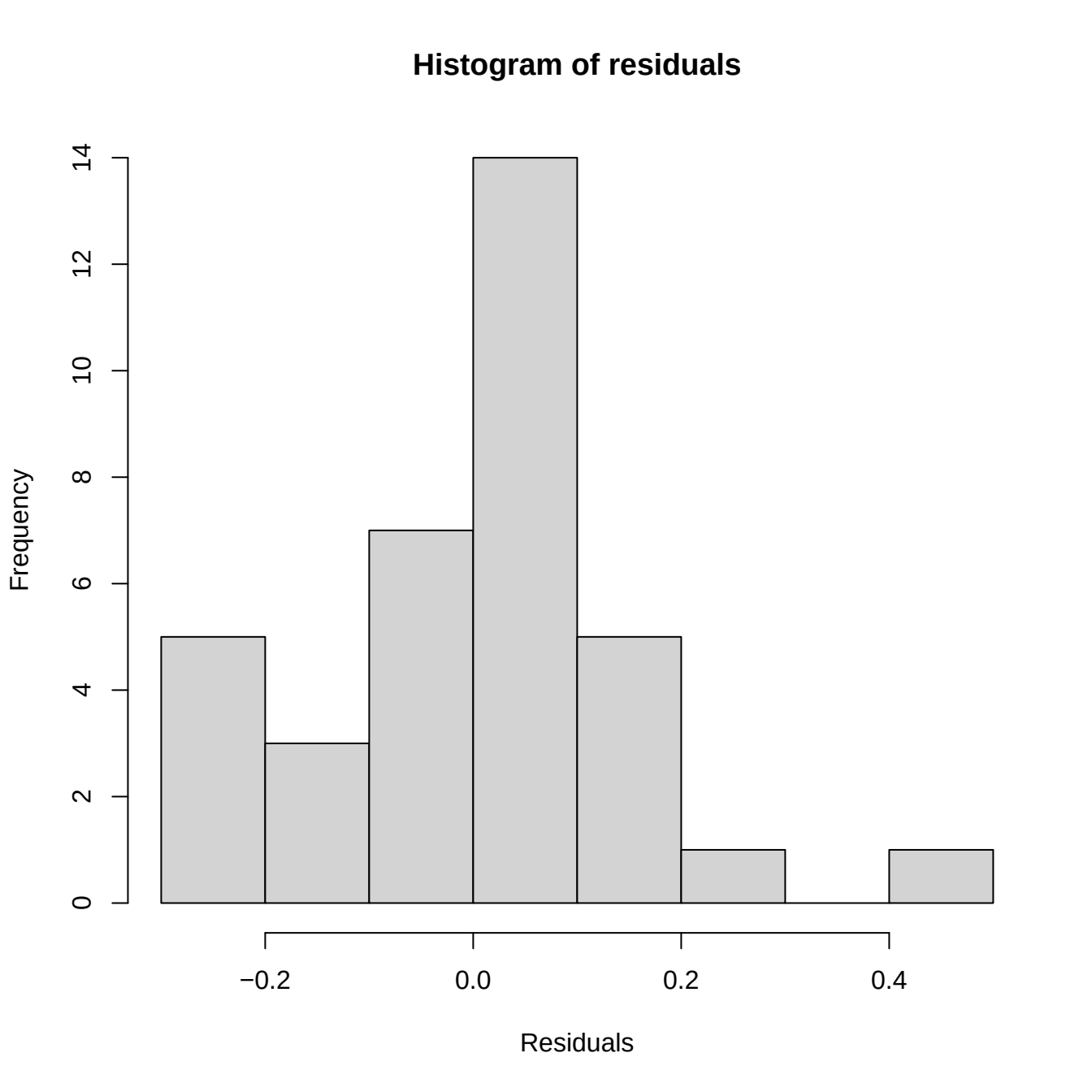

s(cumul_bites_7_previous_days,1)
0.4
0.2
0.0
−0.2
−0.4
0
10
20
30
40
cumul_bites_7_previous_days

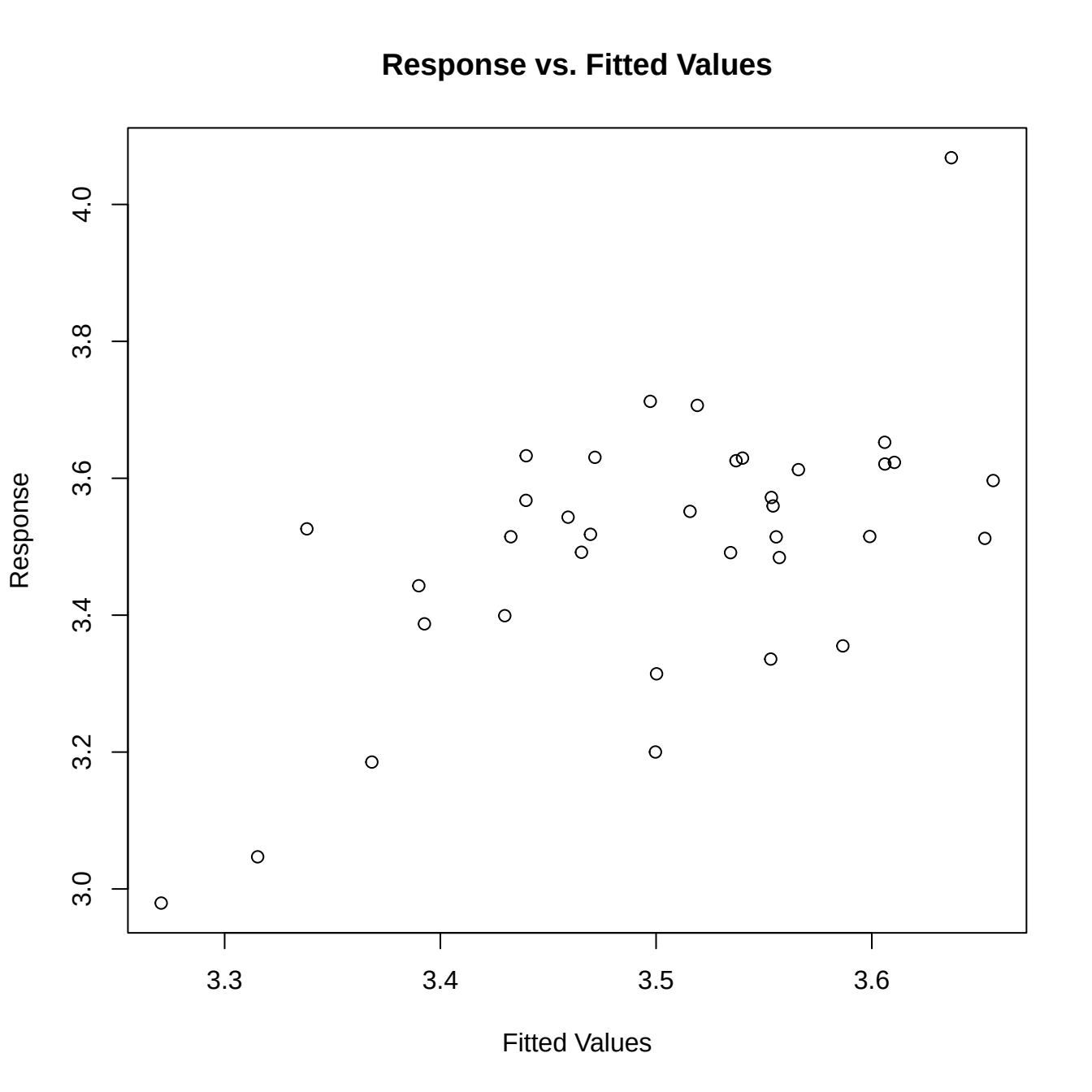

s(ID,2.12)
effects
0.05
0.00
−0.05
−0.10
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
3.9
3.6
3.3
3.0
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
3.9
3.6
3.3
3.0
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.4
0.2
0.0
−0.2
−0.4
−0.2
0.0
0.2
0.4
theoretical quantiles


Resids vs. linear pred.
residuals
0.4
0.2
0.0
−0.2
3.3
3.4
3.5
3.6
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
10
12
14
−0.2
0.0
0.2
0.4
Residuals


Response vs. Fitted Values
Response
Fitted Values
3.0
3.2
3.4
3.6
3.8
4.0
3.3
3.4
3.5
3.6

```
Method: ML   Optimizer: outer newton
full convergence after 13 iterations.
Gradient range [−3.764127e−06,6.881425e−07]
(score −11.81336 & scale 0.02846092).
Hessian positive definite, eigenvalue range [1.894229e−06,18.11682].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                 k'  edf k−index p−value
s(bites_of_yesterday)          3.00 1.00    1.18    0.80
s(cumul_bites_7_previous_days) 3.00 1.00    0.93    0.28
s(ID)                          4.00 2.12      NA      NA
```

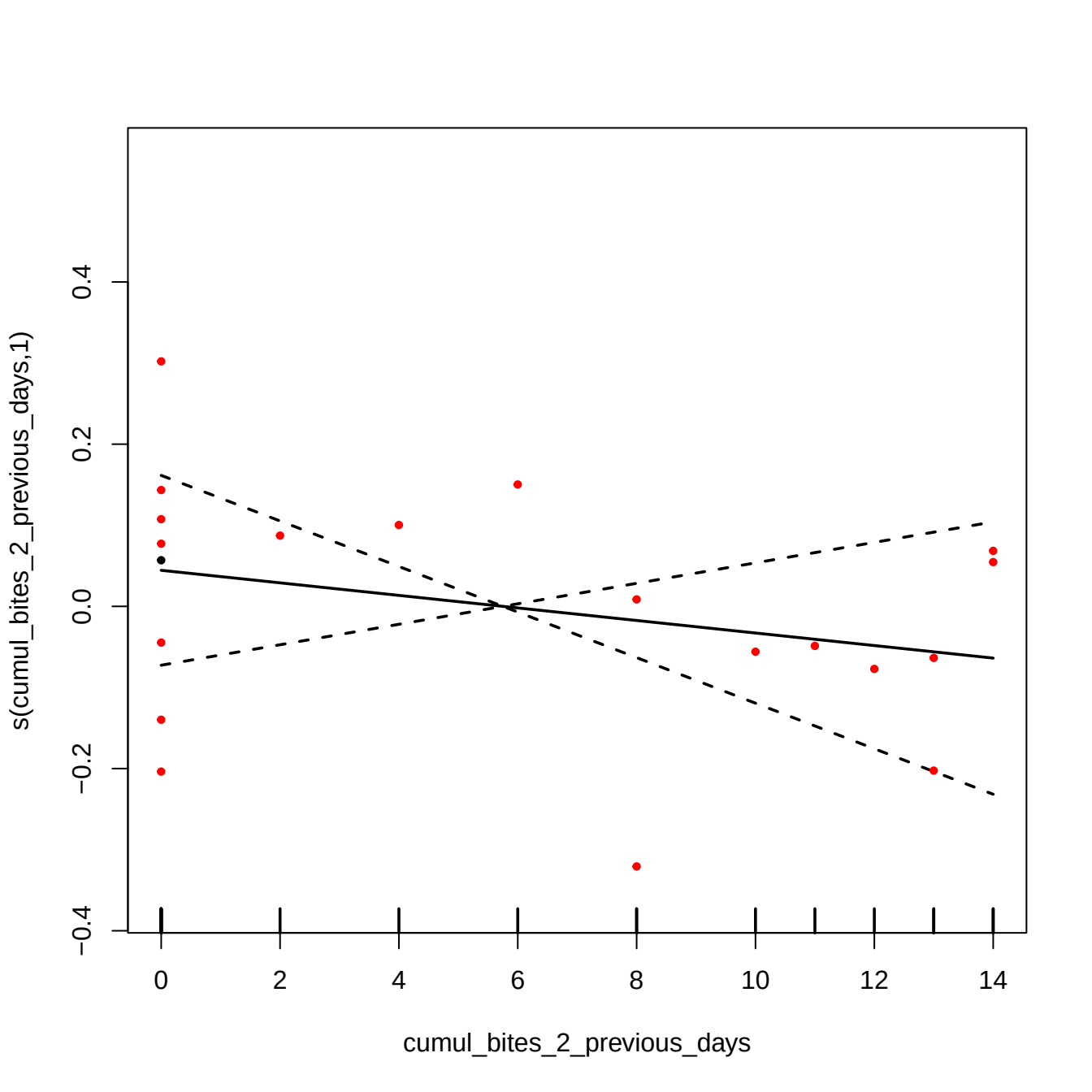
```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

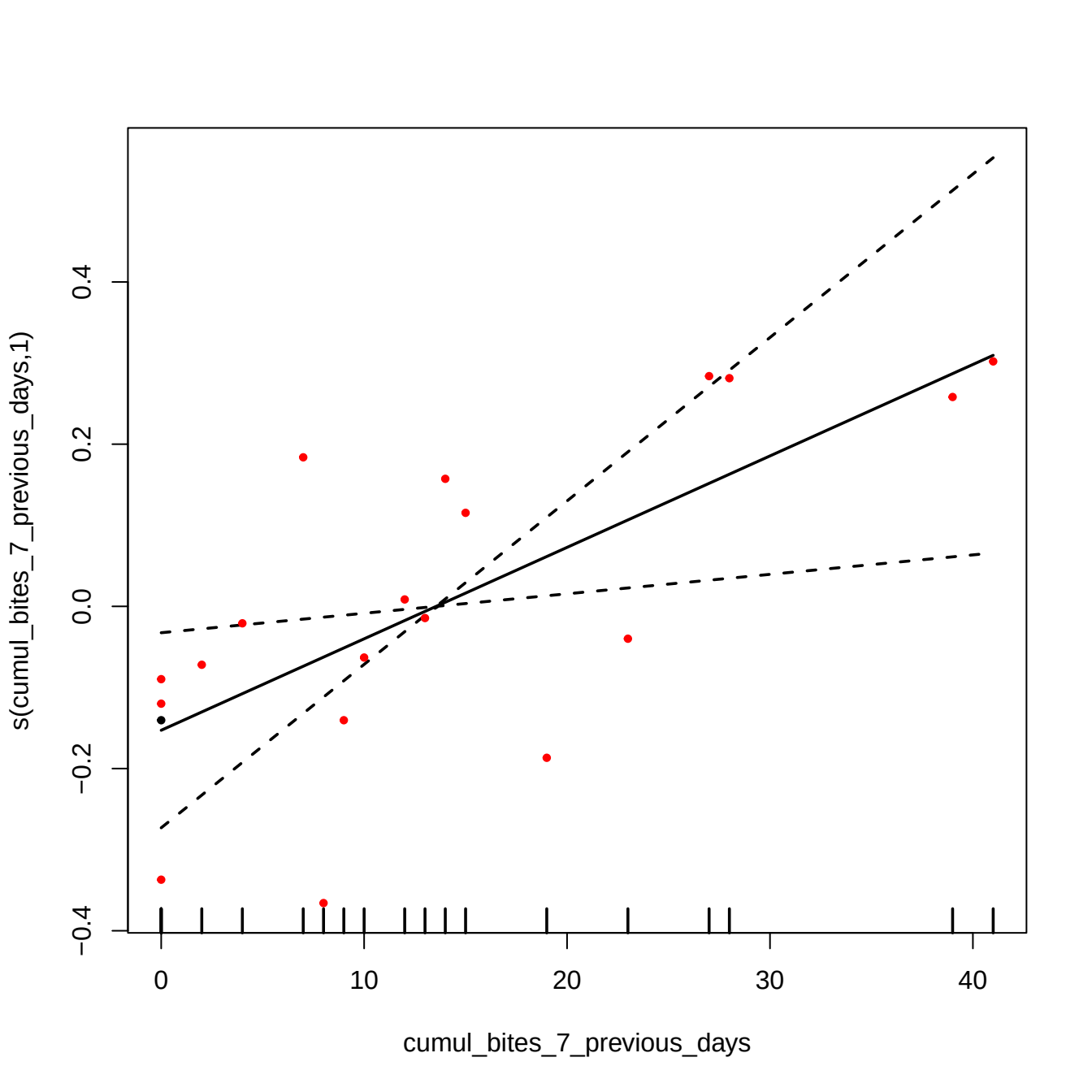
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  3.50332    0.05196   67.42   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df     F p-value
s(bites_of_yesterday)         1.000      1 0.343  0.5626
s(cumul_bites_7_previous_days) 1.000      1 3.972  0.0551 .
s(ID)                         2.115      3 2.968  0.0131 *
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =   0.26   Deviance explained = 34.7%
-ML = -11.813  Scale est. = 0.028461  n = 36
```

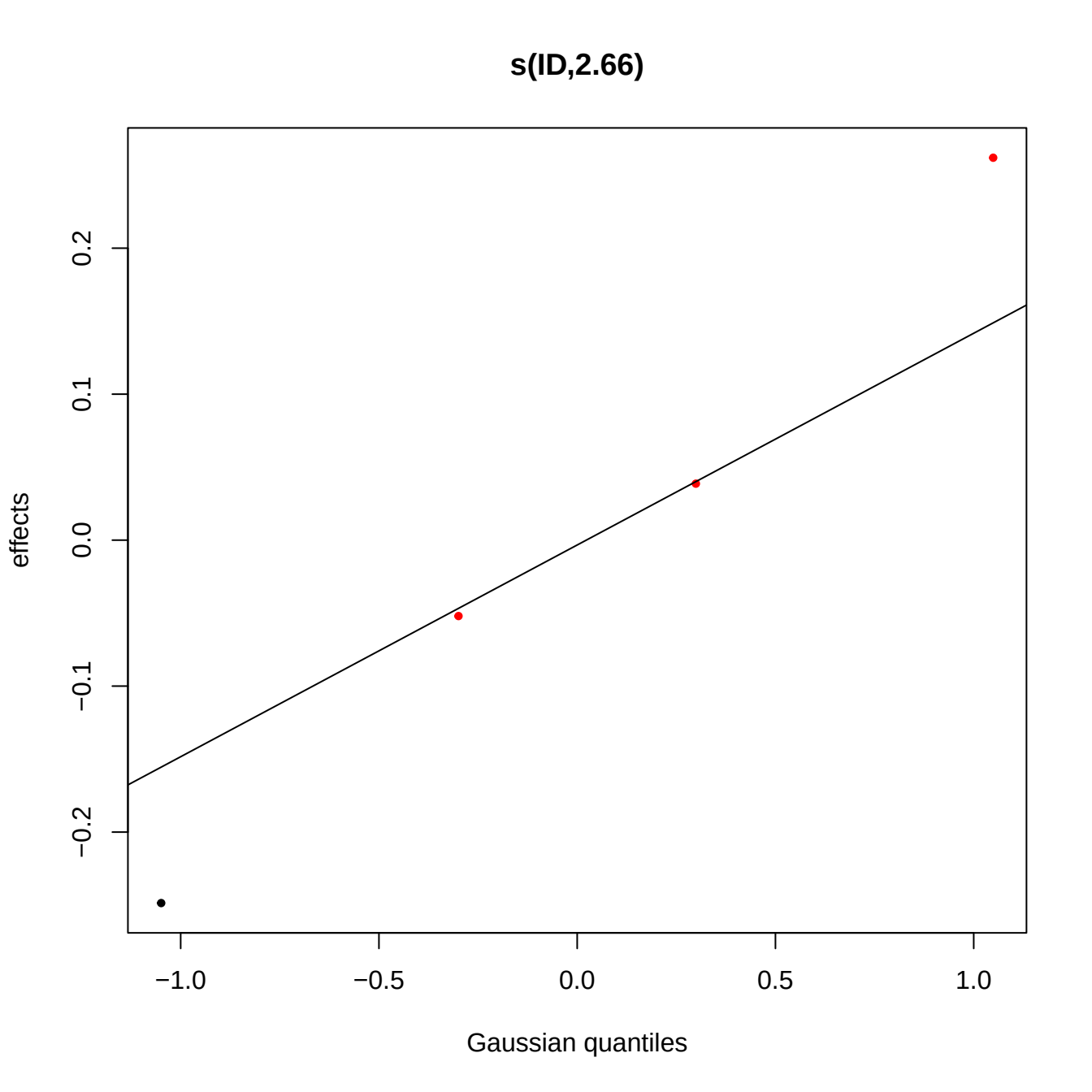
AICc [1] −14.31658

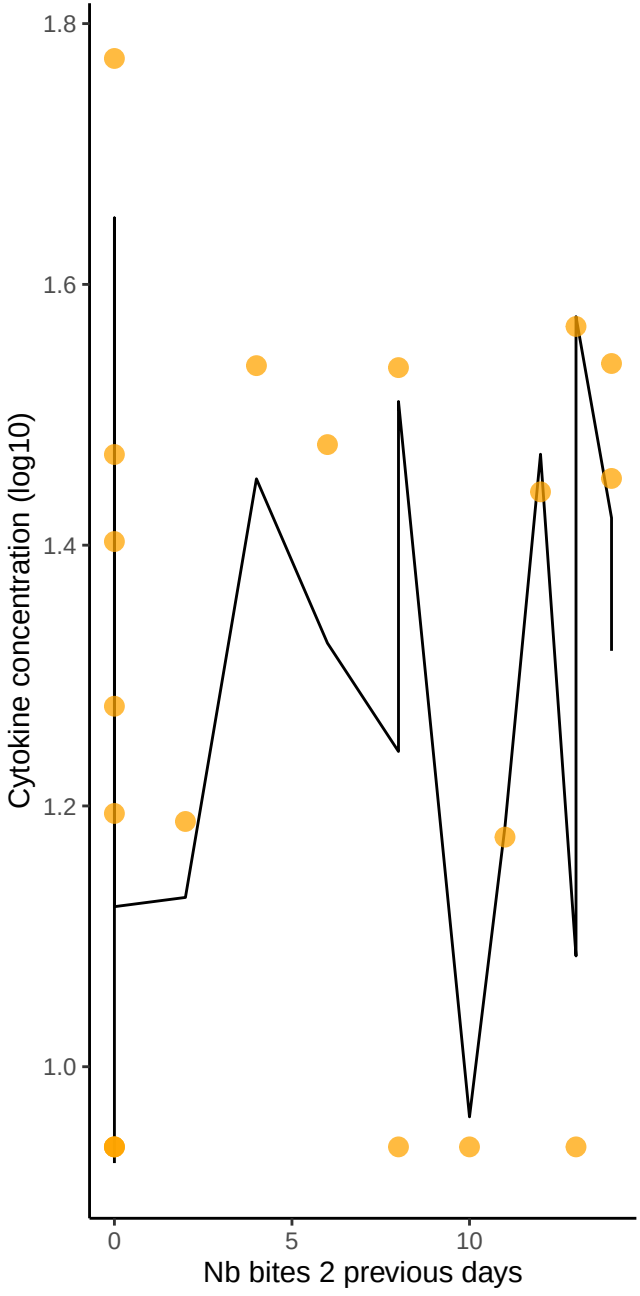
Bites in squirrel

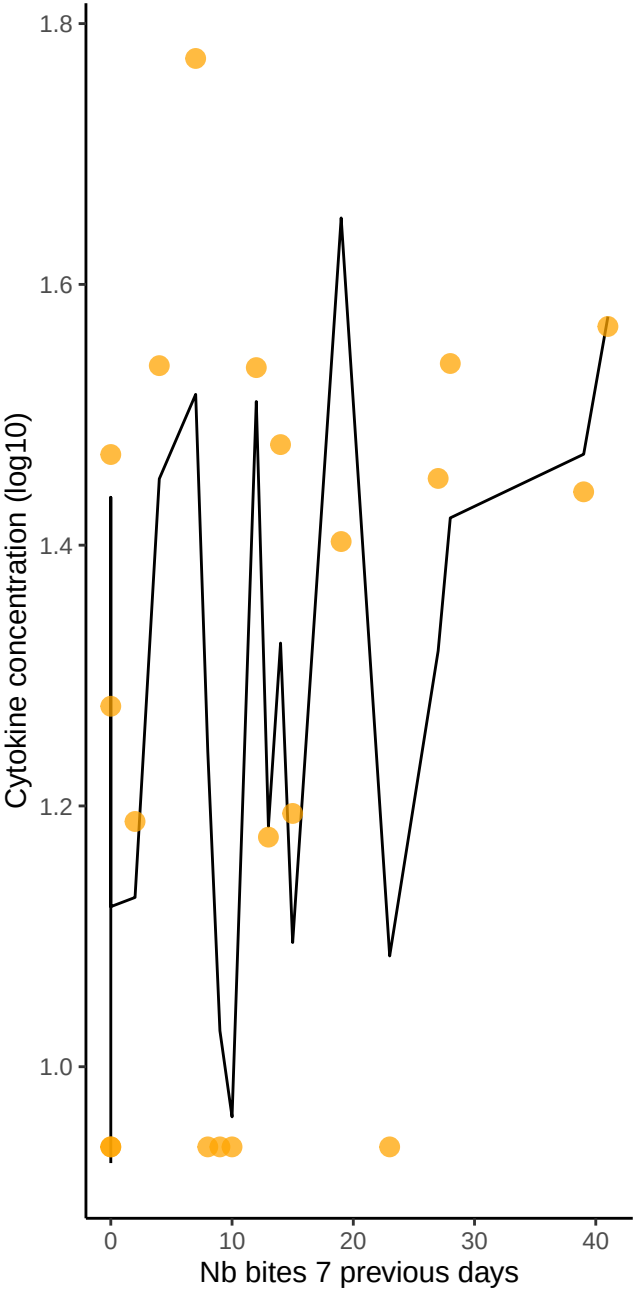
Nb obs: 20

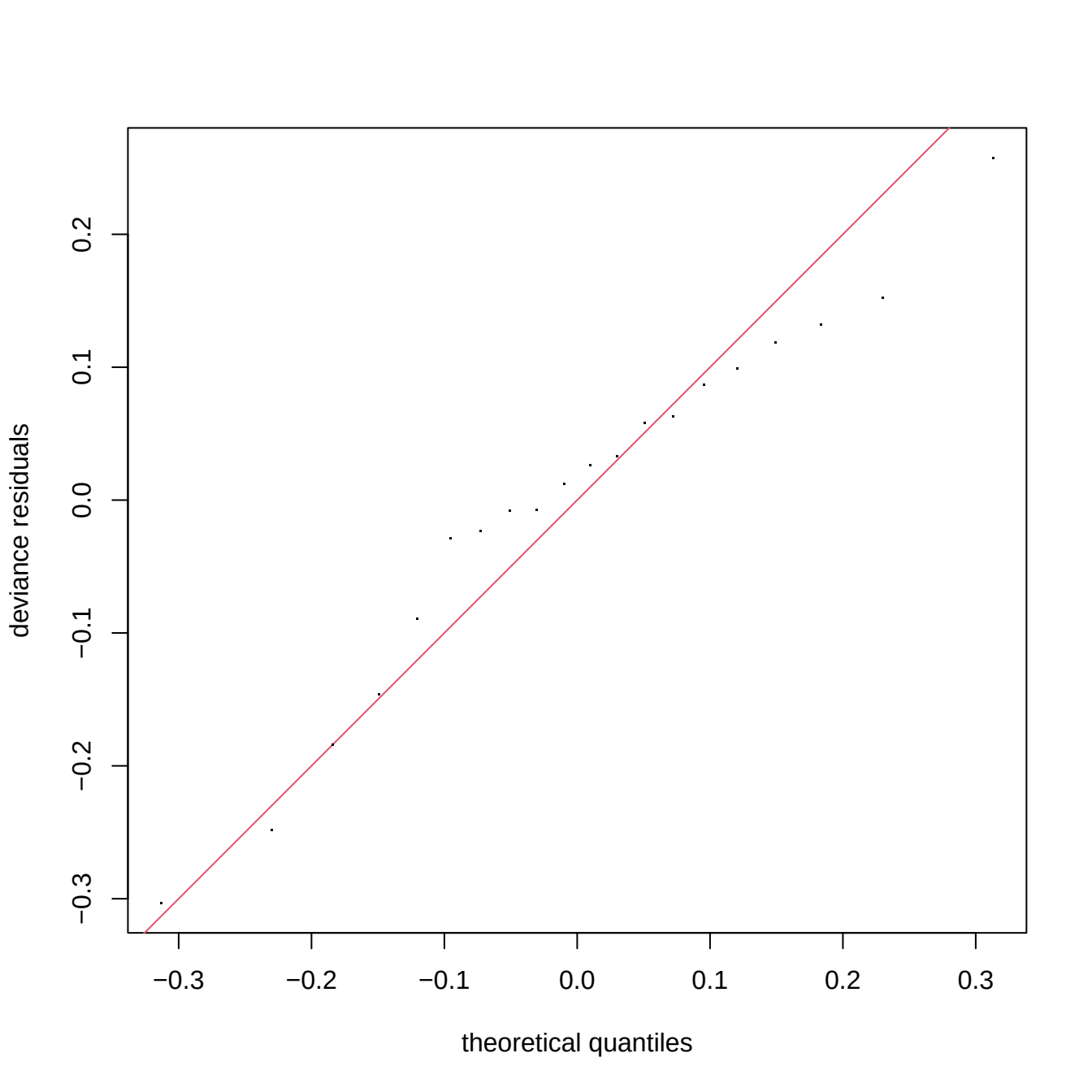

s(cumul_bites_2_previous_days,1)
0.4
0.2
0.0
−0.2
−0.4
0
2
4
6
8
10
12
14
cumul_bites_2_previous_days

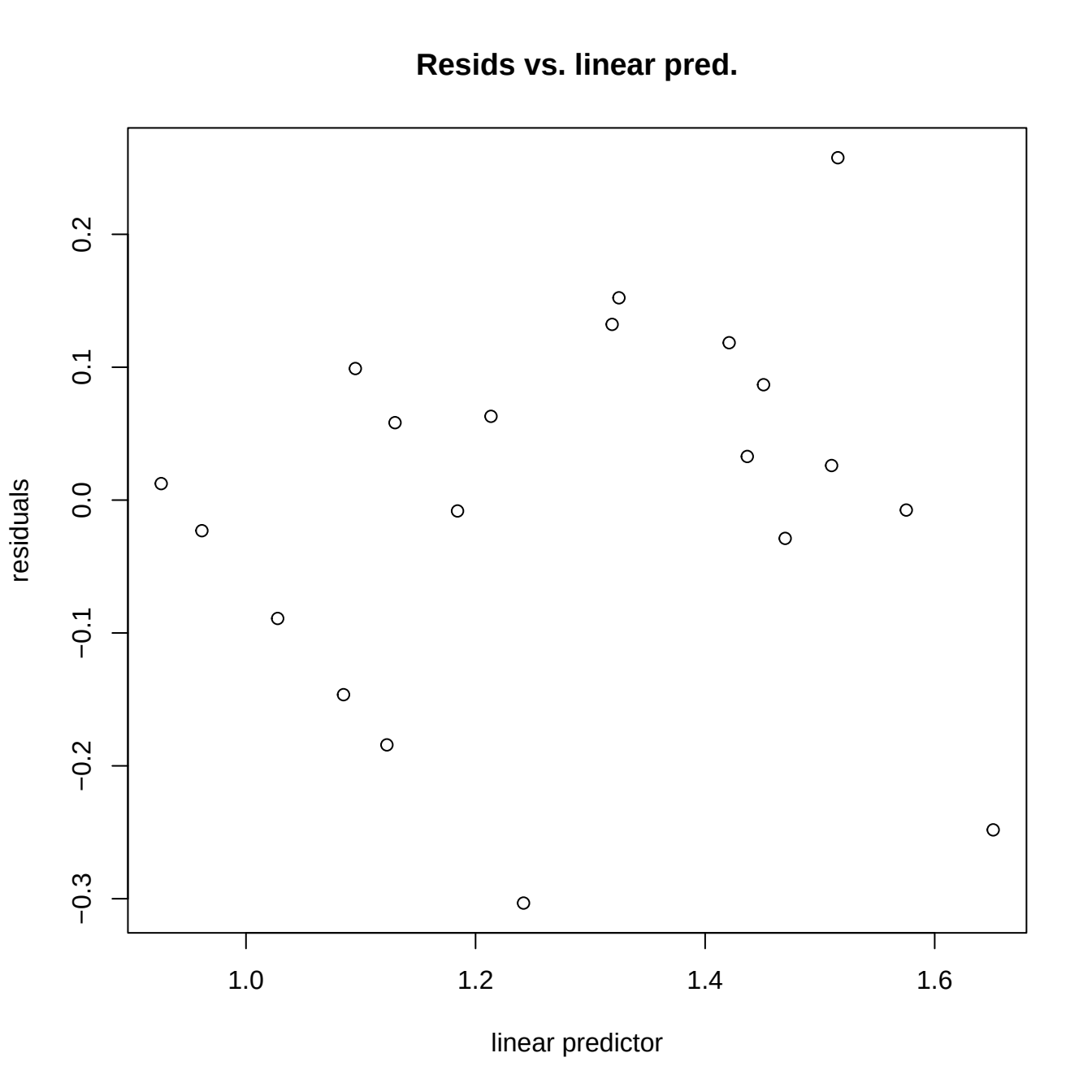

s(cumul_bites_7_previous_days,1)
0.4
0.2
0.0
−0.2
−0.4
0
10
20
30
40
cumul_bites_7_previous_days

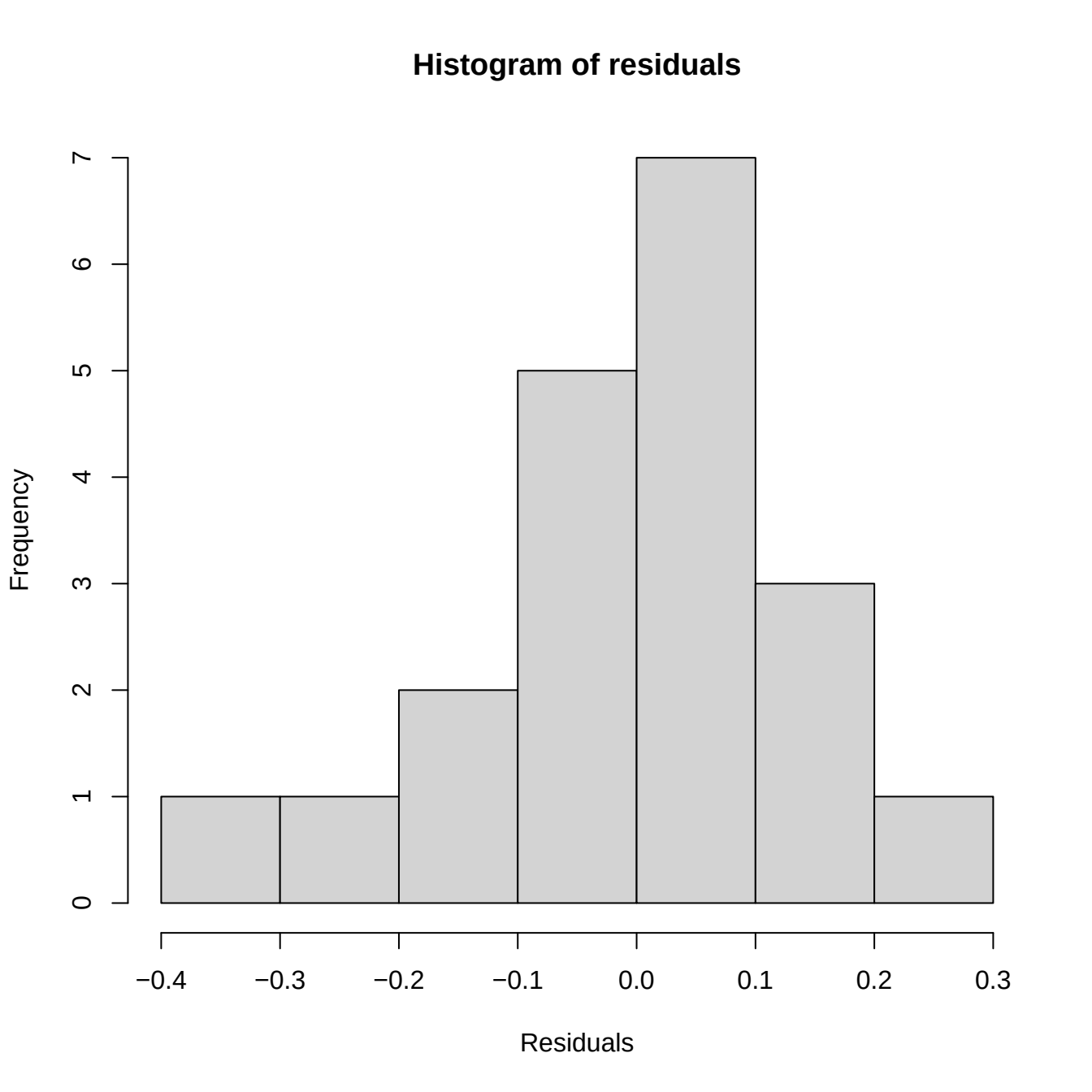

s(ID,2.66)
effects
0.2
0.1
0.0
−0.1
−0.2
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles

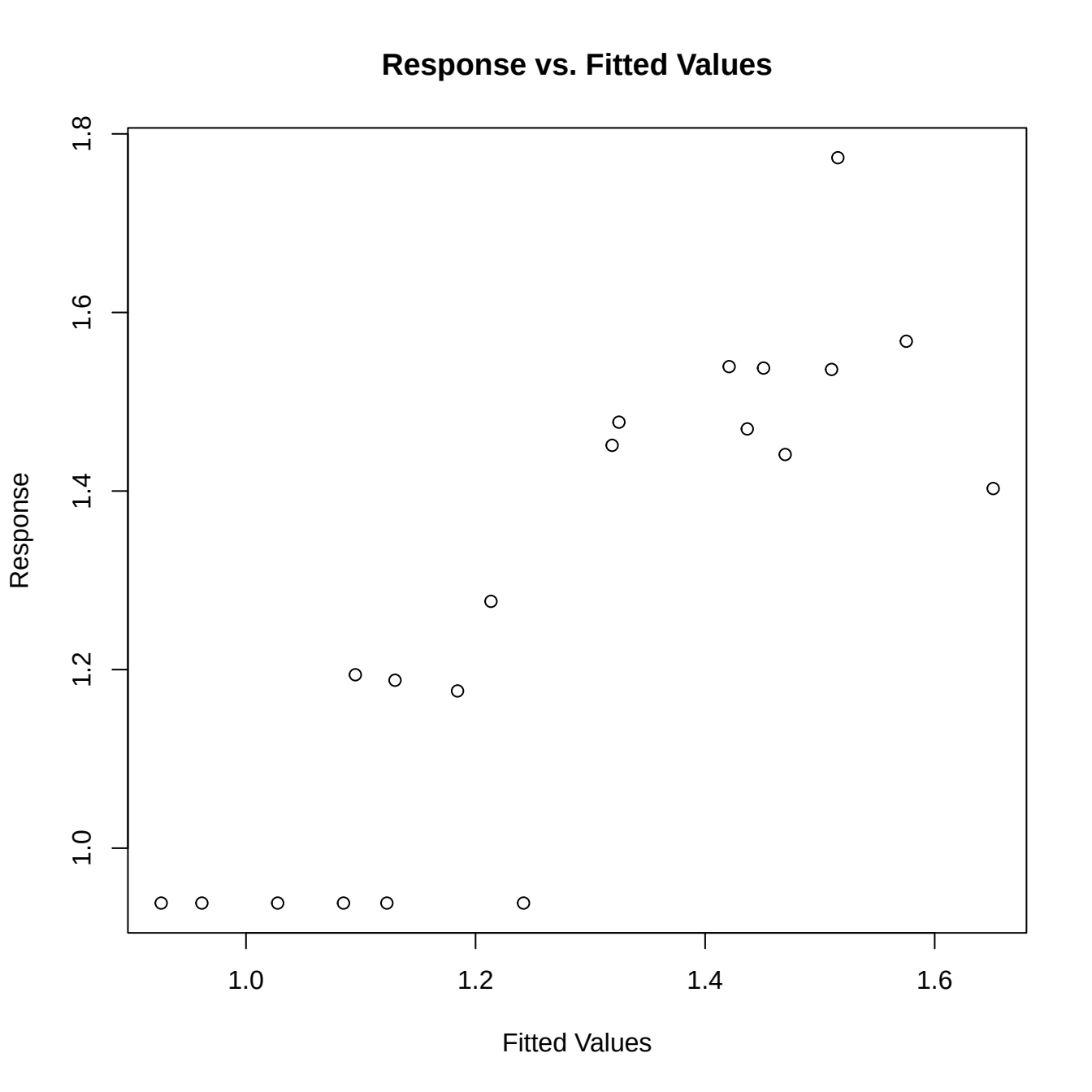

1.8
1.6
1.4
1.2
1.0
Cytokine concentration (log10)
0
5
10
Nb bites 2 previous days


1.8
1.6
1.4
1.2
1.0
Cytokine concentration (log10)
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3
theoretical quantiles


Resids vs. linear pred.
residuals
0.2
0.1
0.0
−0.1
−0.2
−0.3
1.0
1.2
1.4
1.6
linear predictor


Histogram of residuals
Frequency
0
1
2
3
4
5
6
7
−0.4
−0.3
−0.2
−0.1
0.0
0.1
0.2
0.3
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.0
1.2
1.4
1.6
1.8
1.0
1.2
1.4
1.6

```
Method: ML   Optimizer: outer newton
full convergence after 13 iterations.
Gradient range [−2.979423e−06,1.534391e−07]
(score −5.167904 & scale 0.02552625).
Hessian positive definite, eigenvalue range [1.344597e−06,10.36444].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                 k'  edf k−index p−value
s(cumul_bites_2_previous_days) 3.00 1.00    1.14    0.60
s(cumul_bites_7_previous_days) 3.00 1.00    1.10    0.56
s(ID)                          4.00 2.66      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                                Term  VIF    VIF 95% CI Increased SE Tolerance Tolerance 95% CI
 s(cumul_bites_2_previous_days, k = 4) 1.06 [1.00, 15.02]         1.03      0.94     [0.07, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.06 [1.00, 15.02]         1.03      0.94     [0.07, 1.00]
```

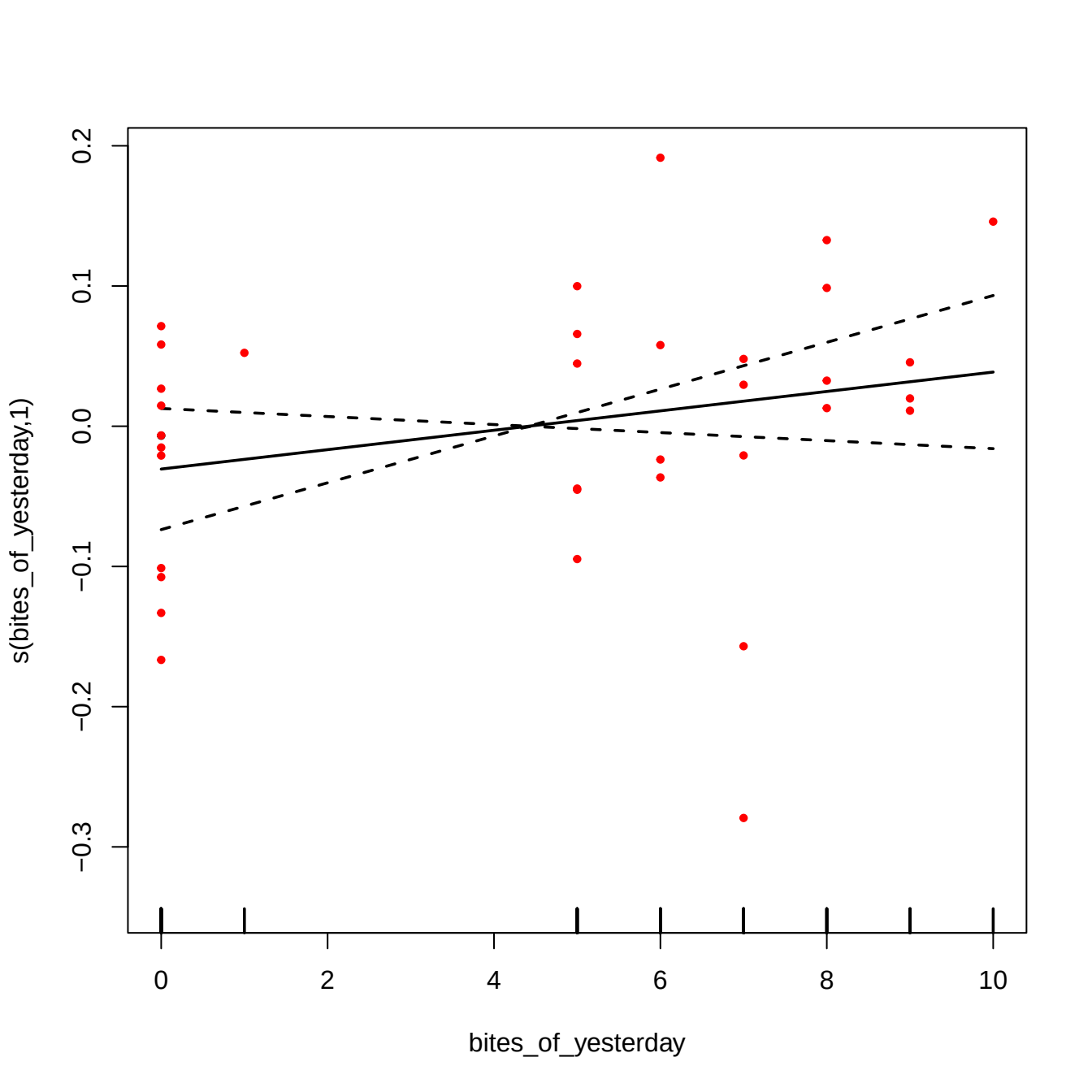
```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(cumul_bites_2_previous_days, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   1.2831     0.1098   11.69 1.02e-08 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df     F  p-value
s(cumul_bites_2_previous_days) 1.000      1 0.577 0.460048
s(cumul_bites_7_previous_days) 1.000      1 6.455 0.023541 *
s(ID)                          2.661      3 9.627 0.000602 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.653   Deviance explained = 73.8%
-ML = -5.1679  Scale est. = 0.025526  n = 20
```

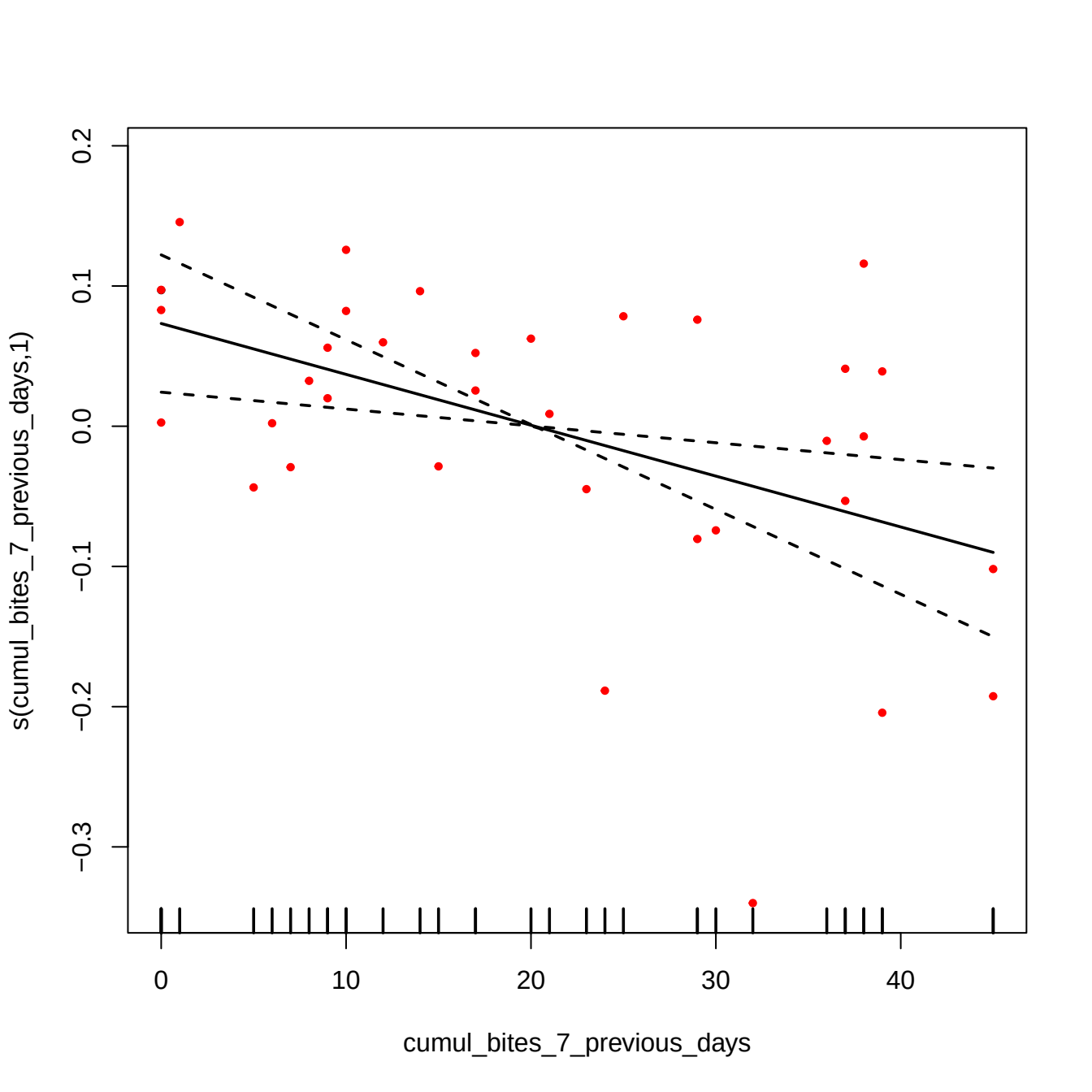
AICc [1] −0.2788531

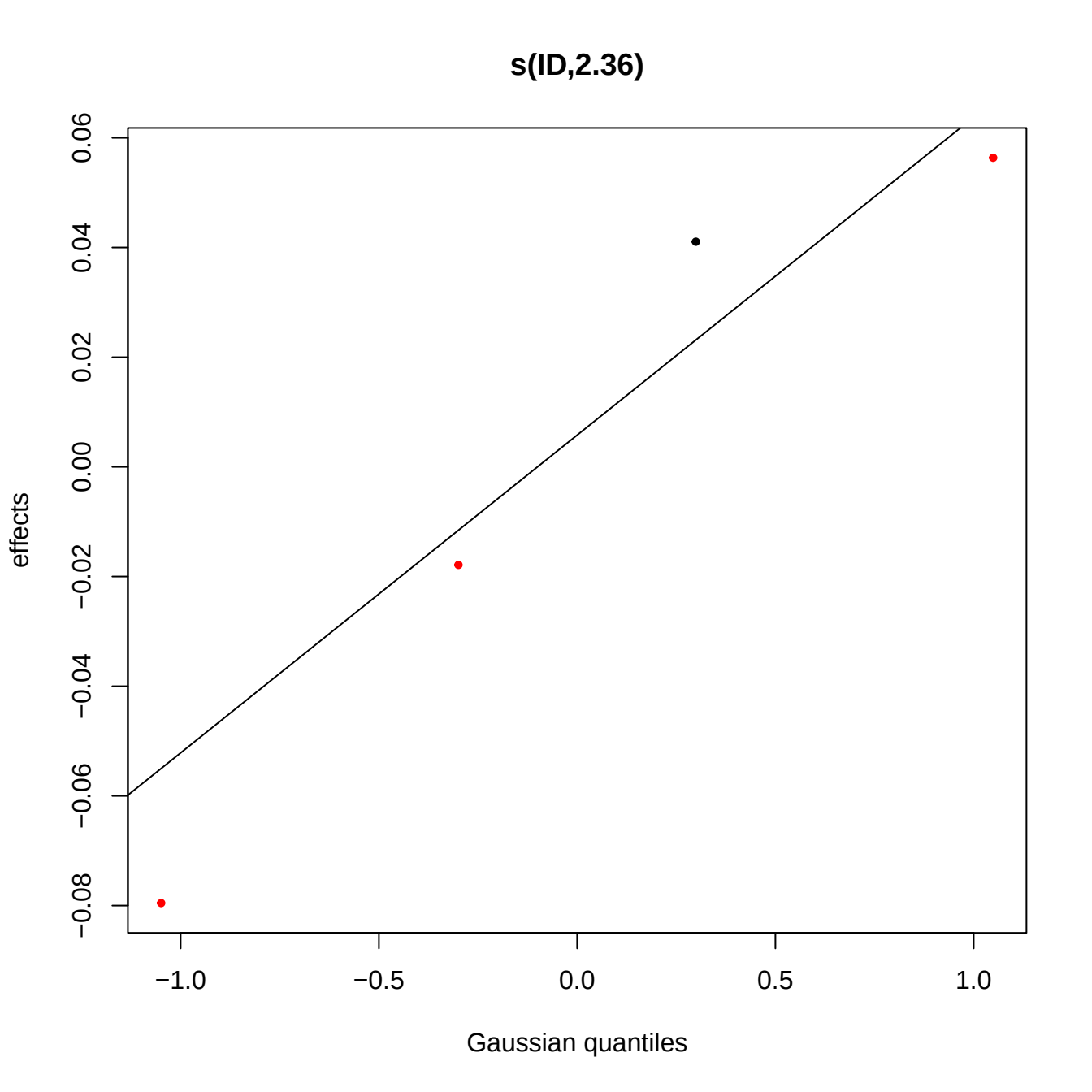
TGFbeta

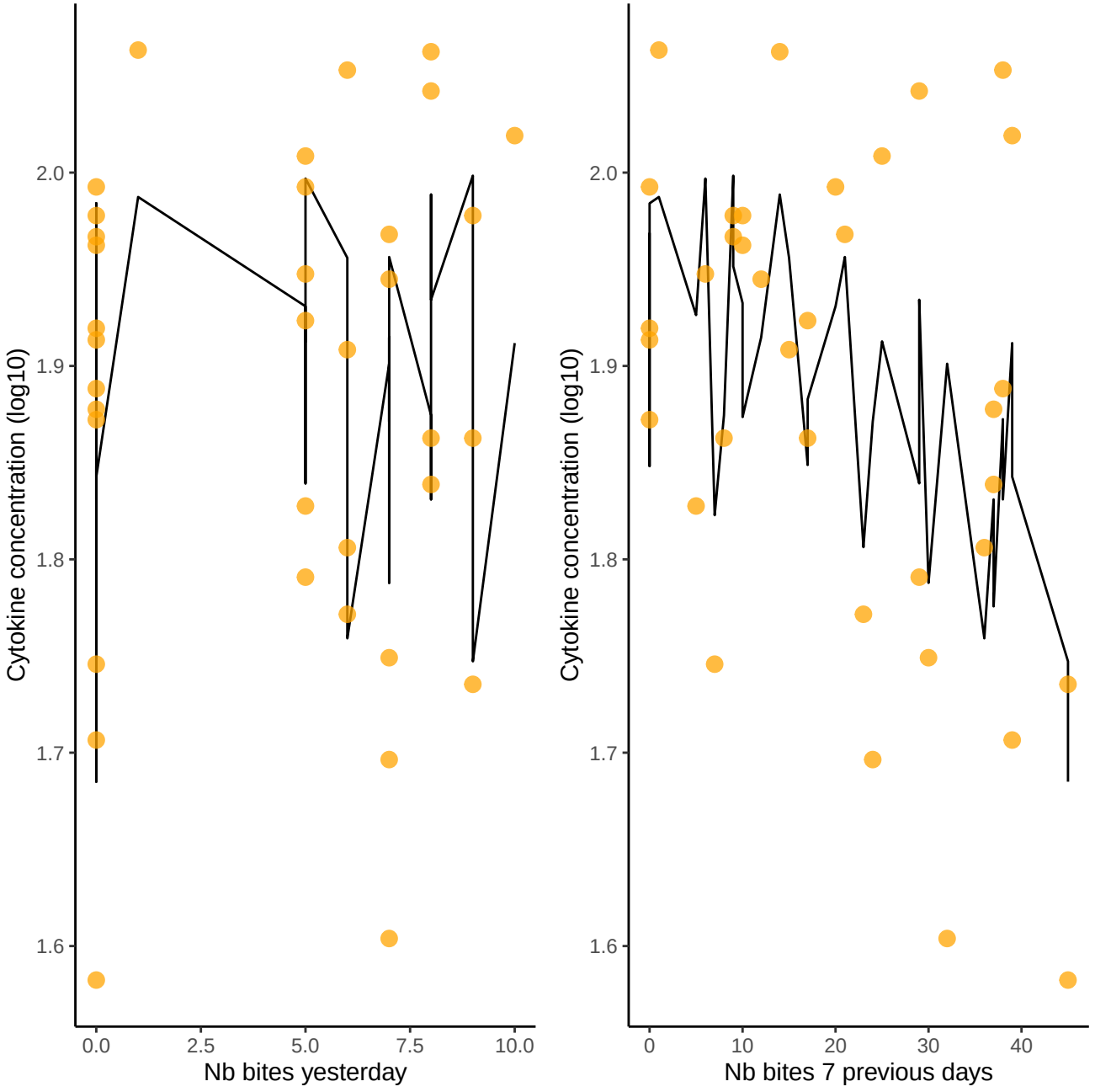
Bites in cyno

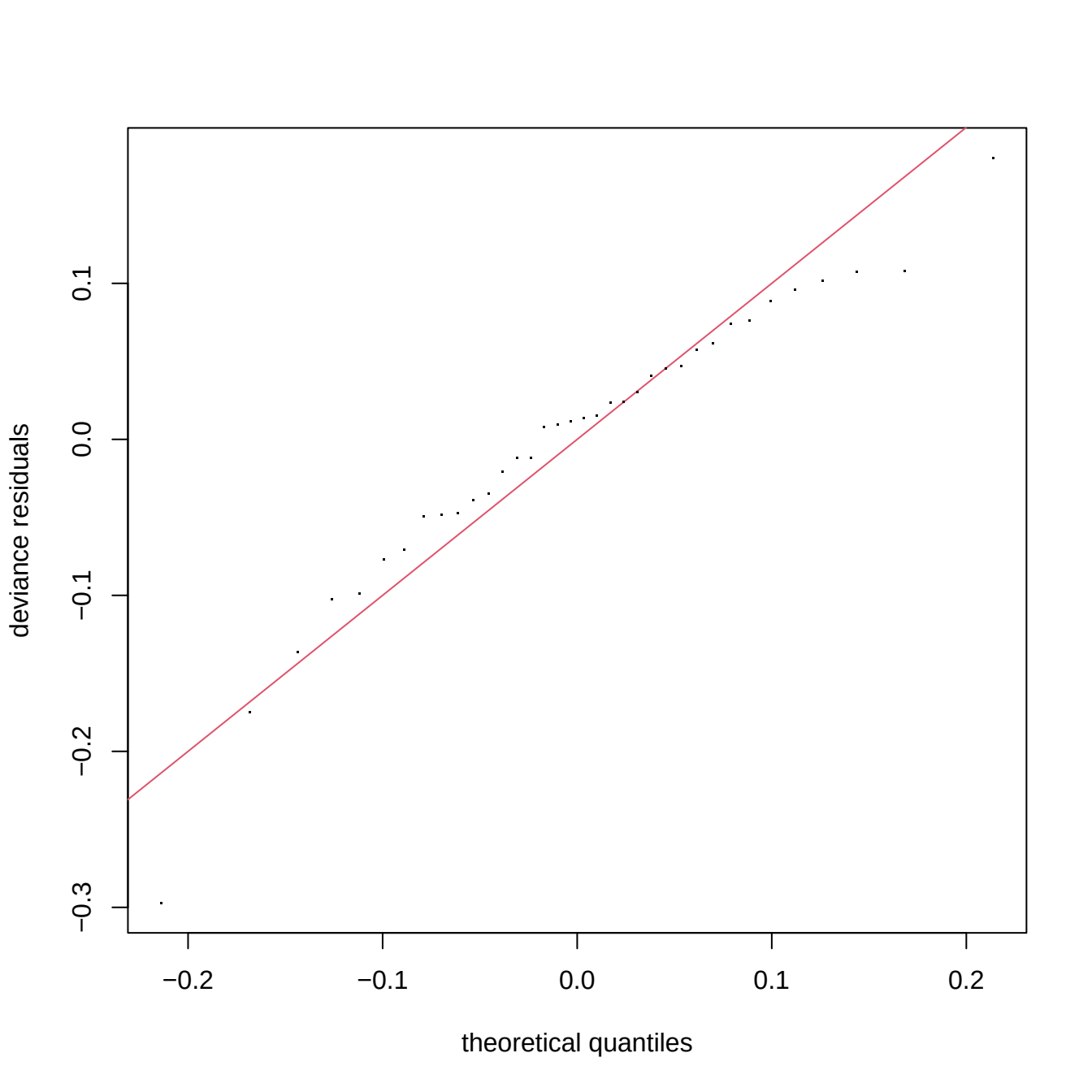
Nb obs: 36

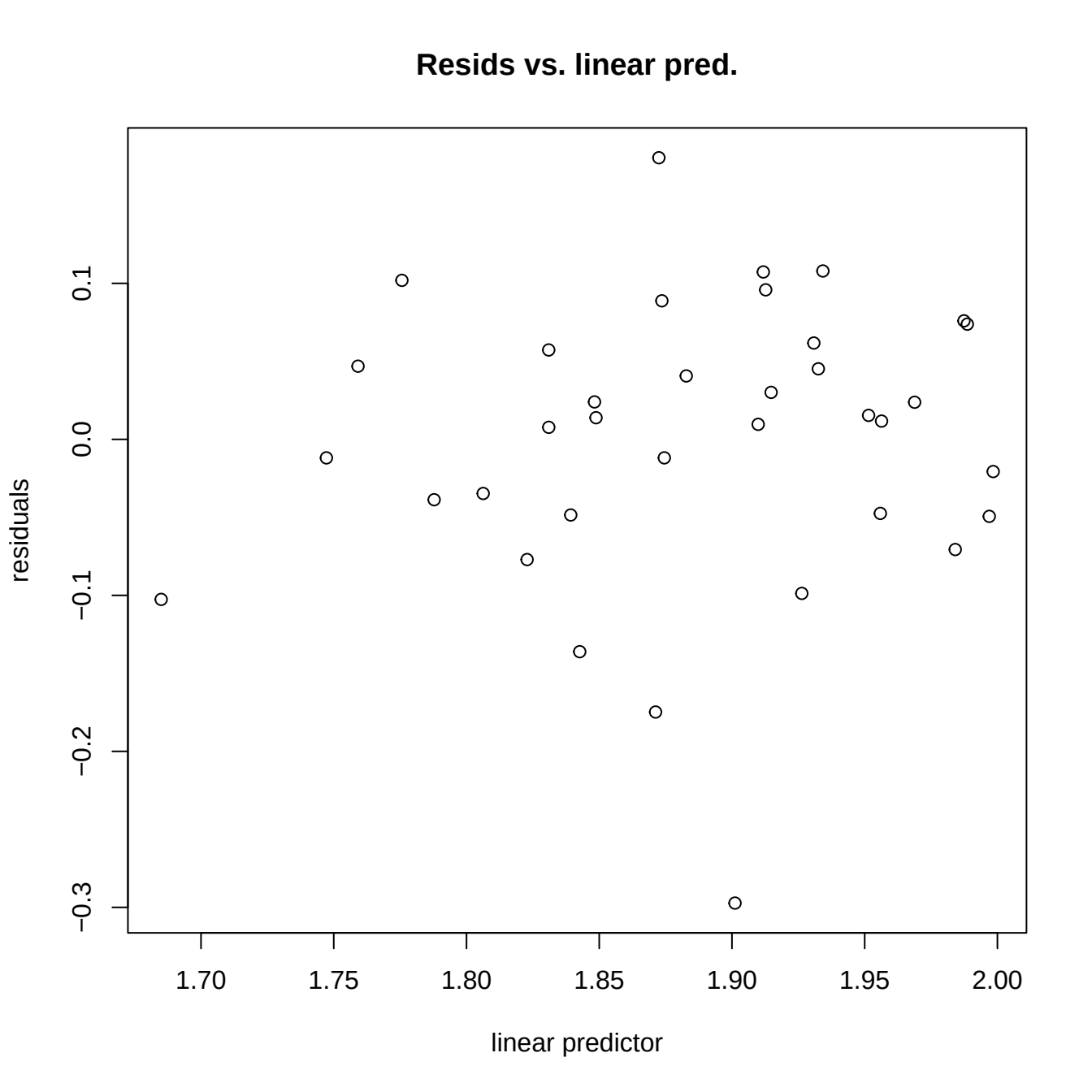

s(bites_of_yesterday,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
2
4
6
8
10
bites_of_yesterday

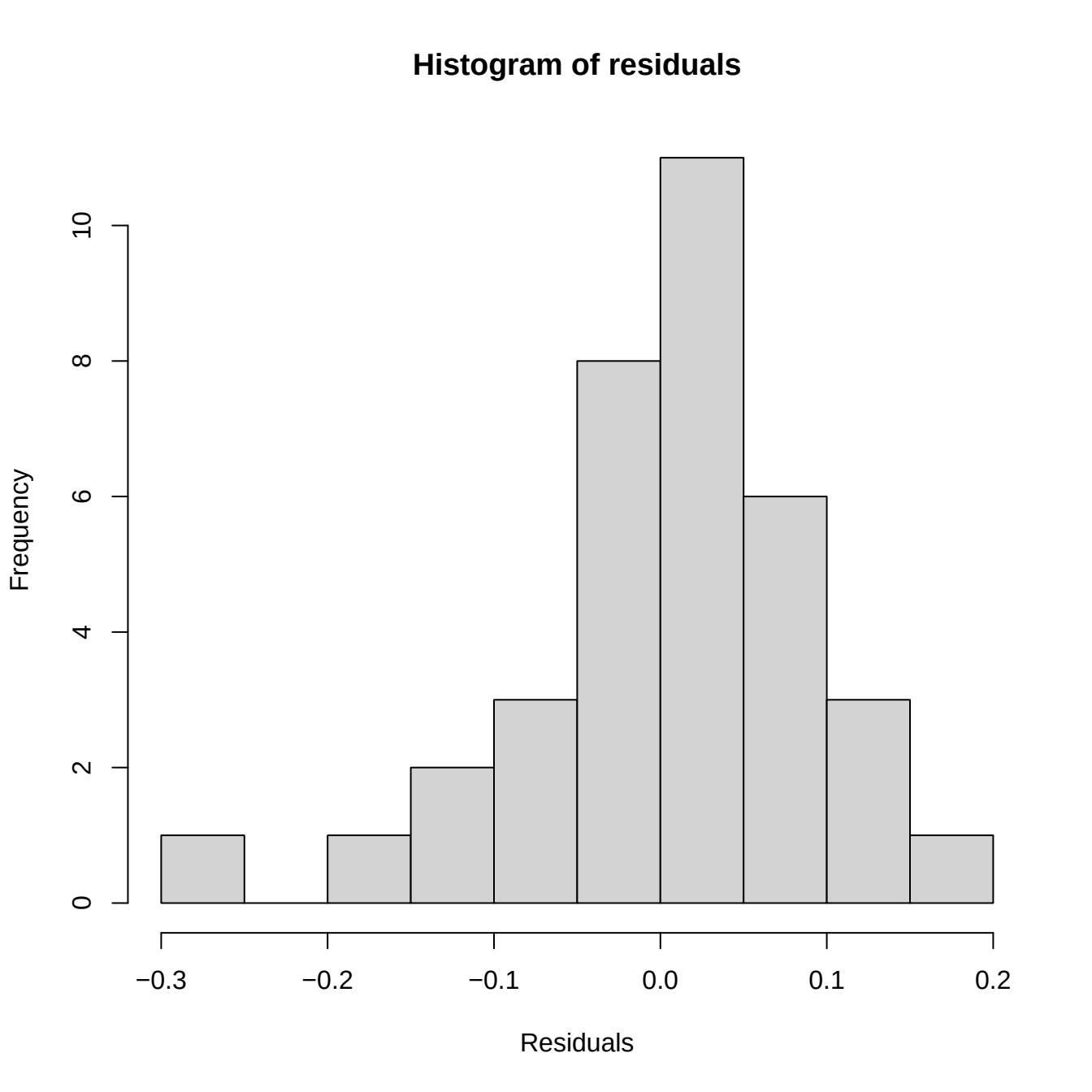

s(cumul_bites_7_previous_days,1)
0.2
0.1
0.0
−0.1
−0.2
−0.3
0
10
20
30
40
cumul_bites_7_previous_days

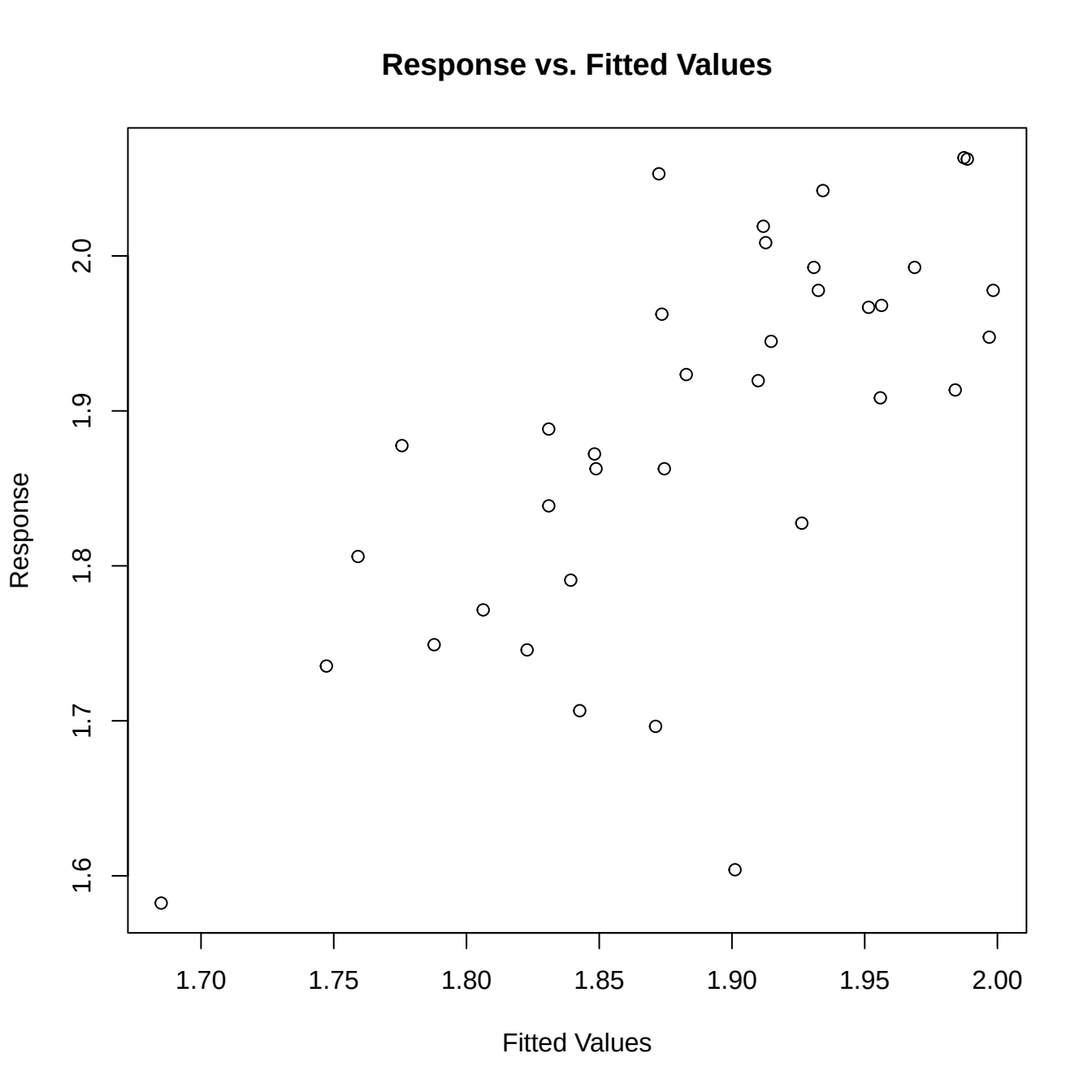

s(ID,2.36)
effects
0.06
0.04
0.02
0.00
−0.02
−0.04
−0.06
−0.08
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
2.0
1.9
1.8
1.7
1.6
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
2.0
1.9
1.8
1.7
1.6
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.1
0.0
−0.1
−0.2
−0.3
−0.2
−0.1
0.0
0.1
0.2
theoretical quantiles


Resids vs. linear pred.
residuals
0.1
0.0
−0.1
−0.2
−0.3
1.70
1.75
1.80
1.85
1.90
1.95
2.00
linear predictor


Histogram of residuals
Frequency
0
2
4
6
8
10
−0.3
−0.2
−0.1
0.0
0.1
0.2
Residuals


Response vs. Fitted Values
Response
Fitted Values
1.6
1.7
1.8
1.9
2.0
1.70
1.75
1.80
1.85
1.90
1.95
2.00

```
Method: ML   Optimizer: outer newton
full convergence after 12 iterations.
Gradient range [−6.829766e−06,4.496022e−07]
(score −30.98978 & scale 0.009441773).
Hessian positive definite, eigenvalue range [3.872079e−06,18.14705].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                 k'  edf k−index p−value
s(bites_of_yesterday)          3.00 1.00    1.09    0.66
s(cumul_bites_7_previous_days) 3.00 1.00    1.00    0.37
s(ID)                          4.00 2.36      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.88505    0.03522   53.53   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                                edf Ref.df     F p-value
s(bites_of_yesterday)         1.000      1 2.000 0.16727
s(cumul_bites_7_previous_days) 1.000      1 8.954 0.00539 **
s(ID)                         2.361      3 4.580 0.00282 **
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.403   Deviance explained = 47.8%
-ML = -30.99  Scale est. = 0.0094418  n = 36
```

AICc [1] −53.93073

Bites in squirrel

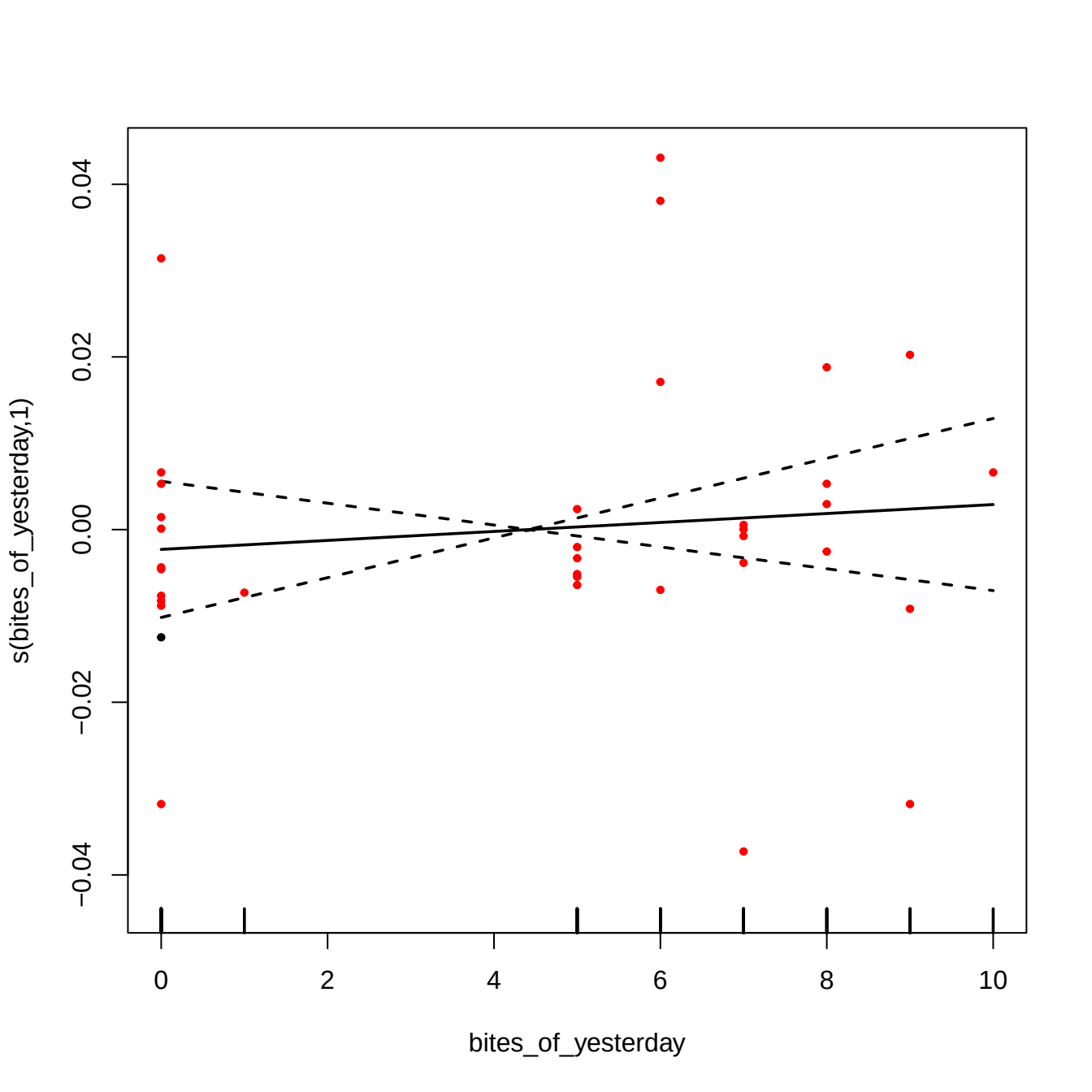
Nb obs: 20

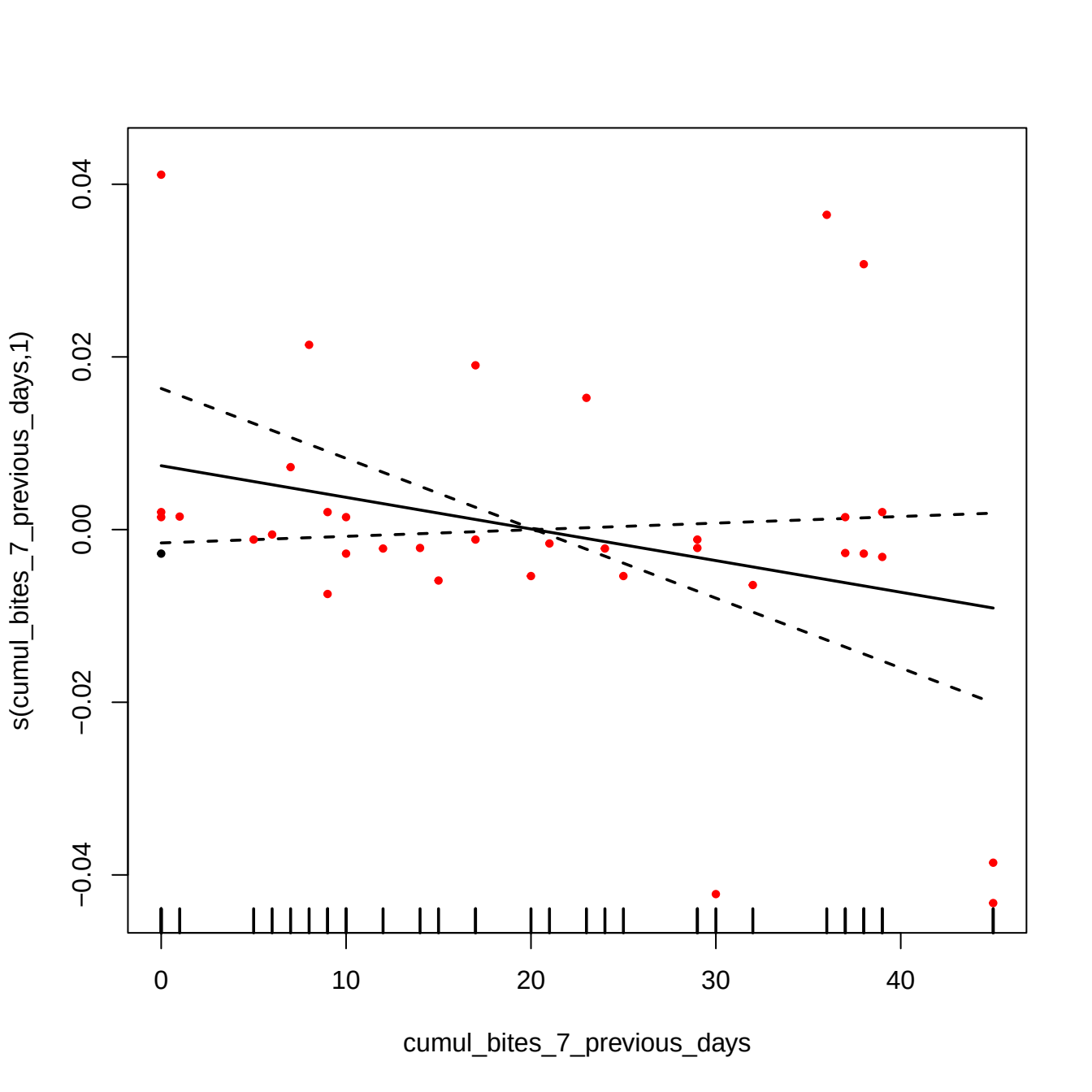
TGFbeta ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

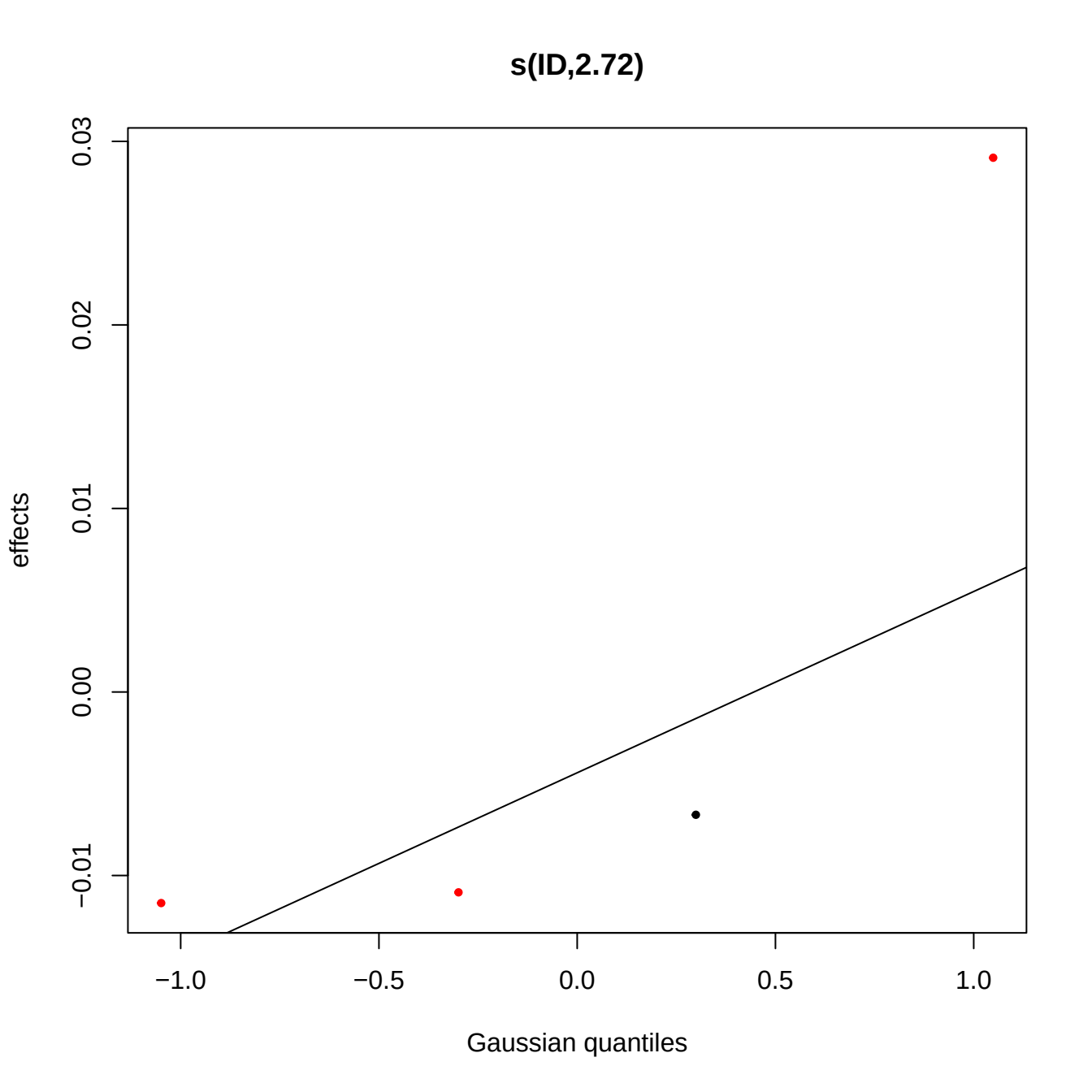
TNF.alpha

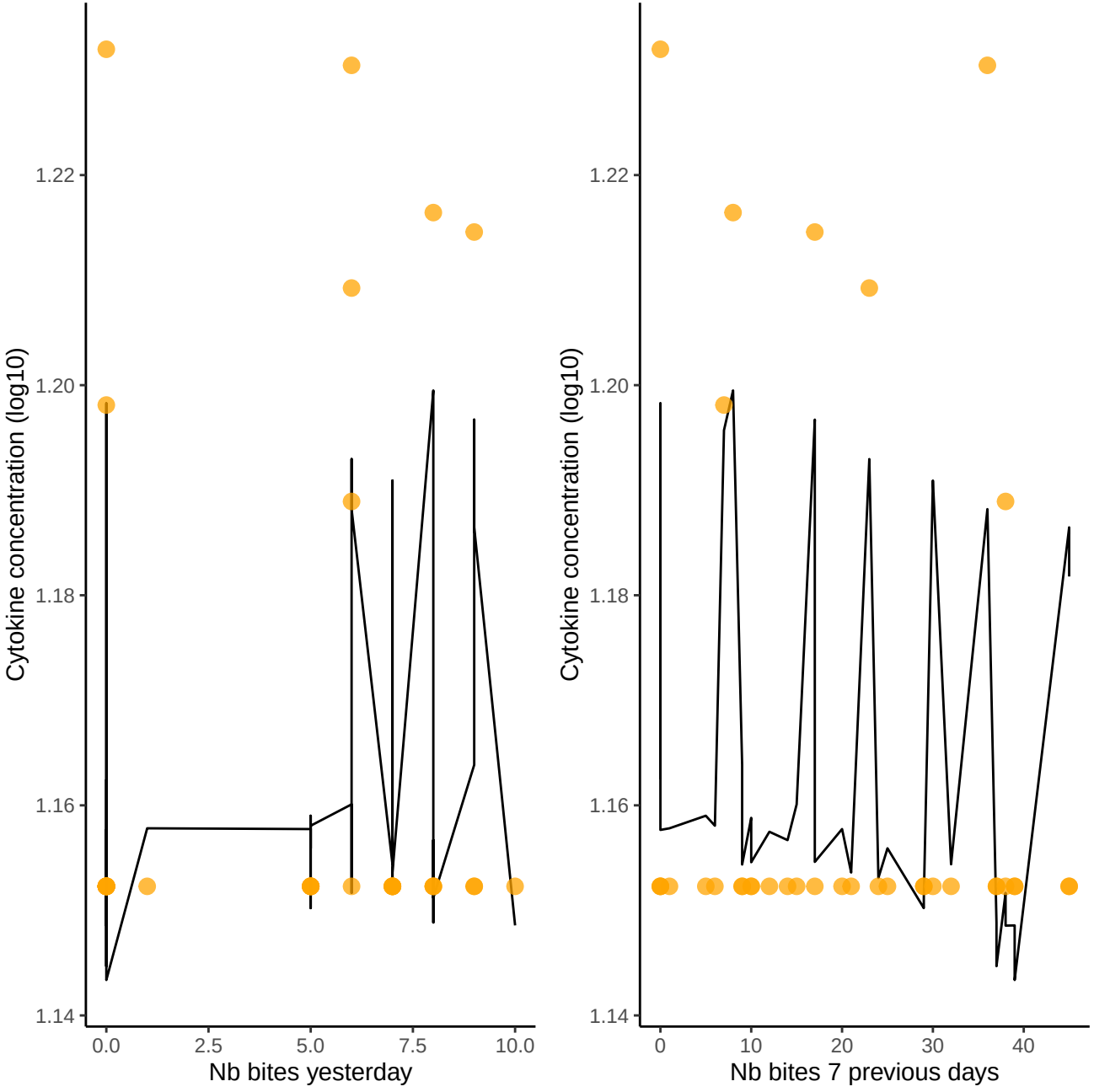
Bites in cyno

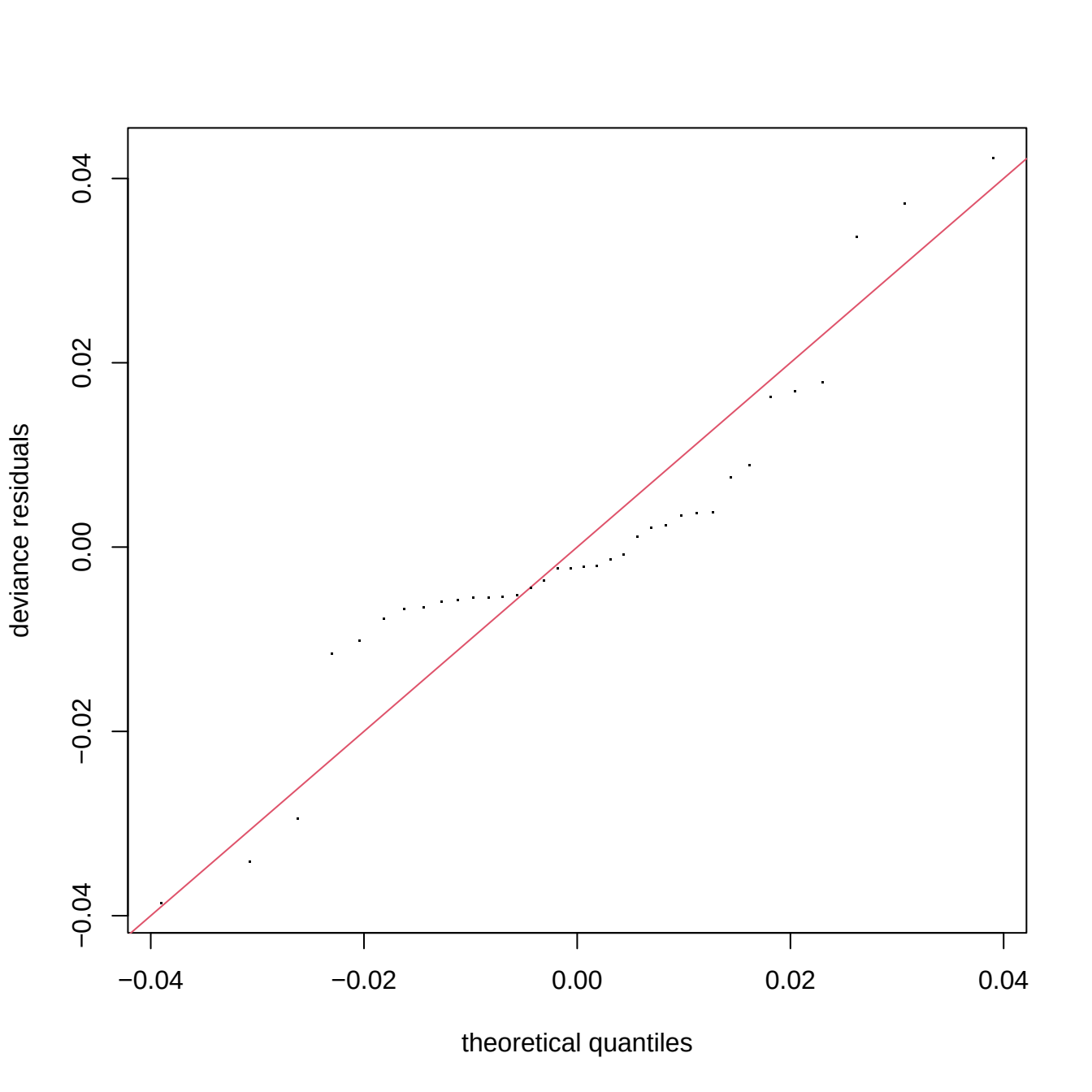
Nb obs: 36

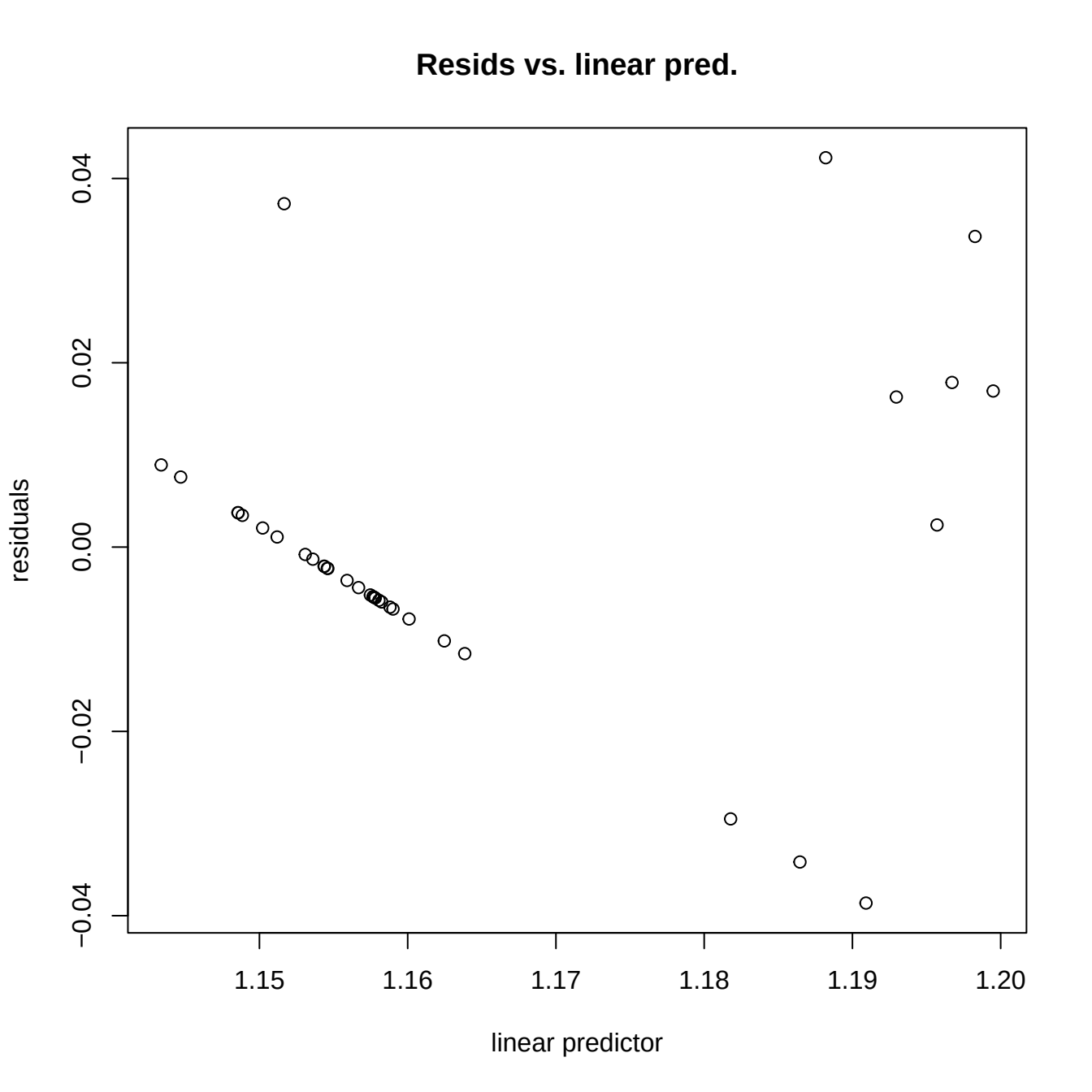

s(bites_of_yesterday,1)
0.04
0.02
0.00
−0.02
−0.04
0
2
4
6
8
10
bites_of_yesterday

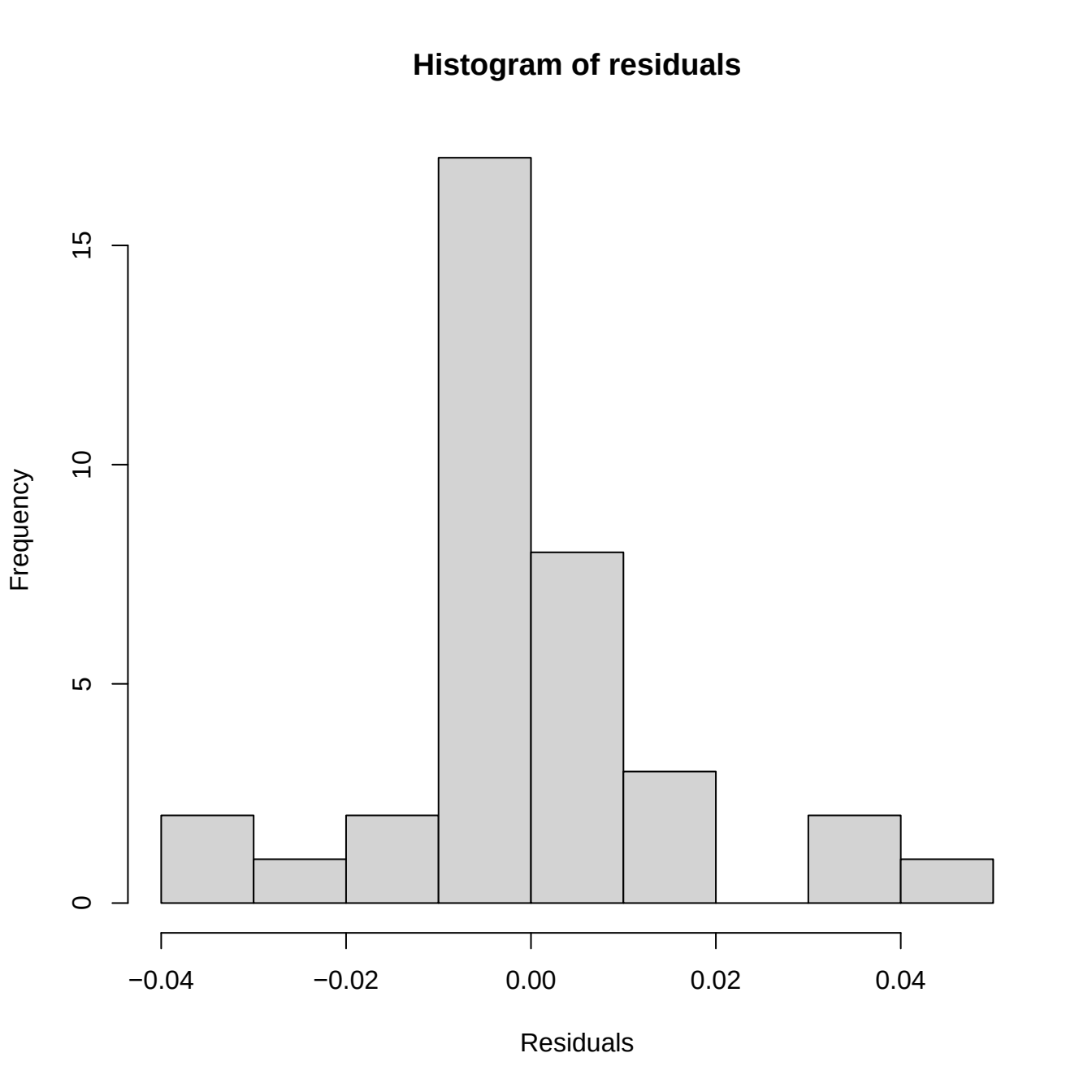

s(cumul_bites_7_previous_days,1)
0.04
0.02
0.00
−0.02
−0.04
0
10
20
30
40
cumul_bites_7_previous_days

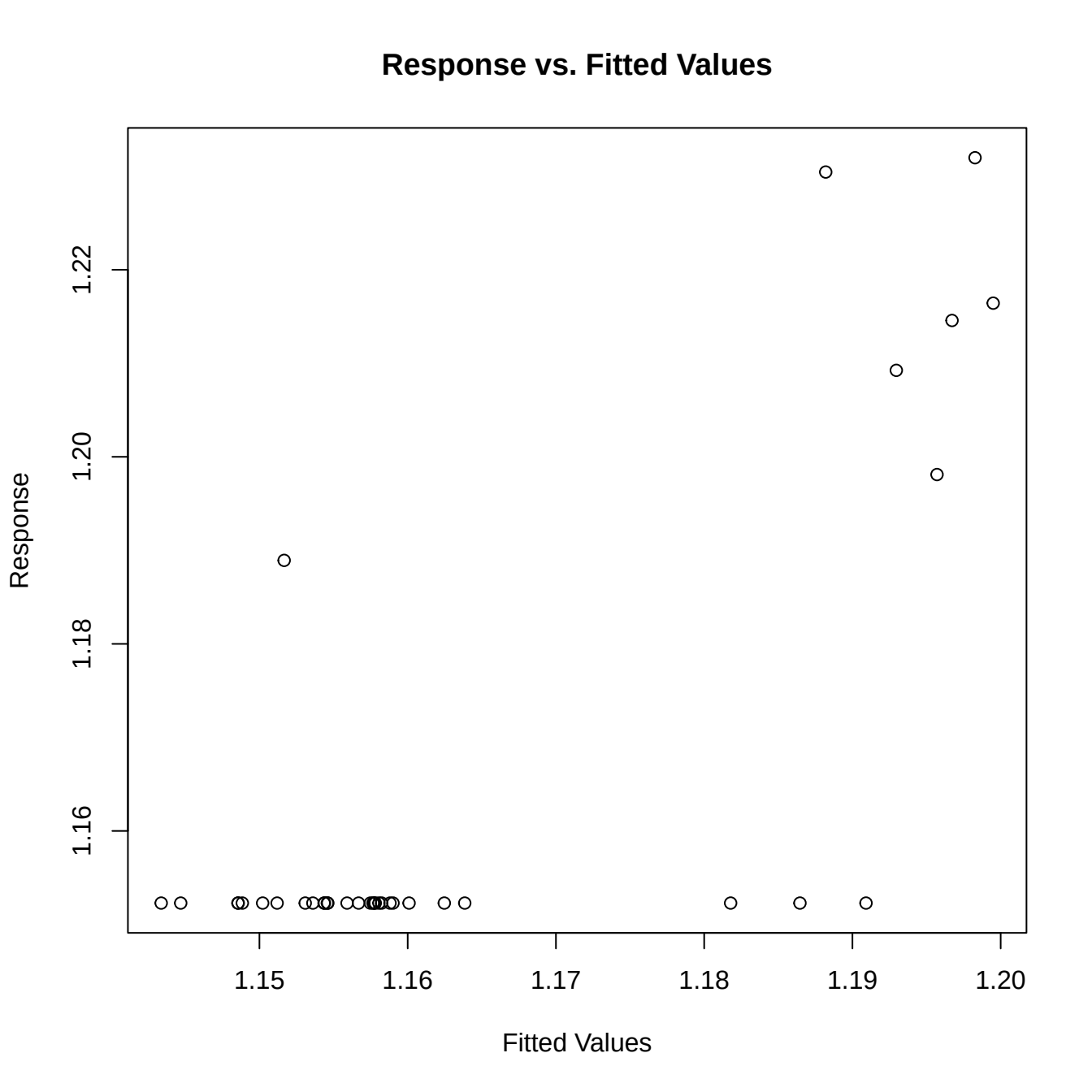

s(ID,2.72)
effects
0.03
0.02
0.01
0.00
−0.01
−1.0
−0.5
0.0
0.5
1.0
Gaussian quantiles


Cytokine concentration (log10)
1.22
1.20
1.18
1.16
1.14
0.0
2.5
5.0
7.5
10.0
Nb bites yesterday
Cytokine concentration (log10)
1.22
1.20
1.18
1.16
1.14
0
10
20
30
40
Nb bites 7 previous days


deviance residuals
0.04
0.02
0.00
−0.02
−0.04
−0.04
−0.02
0.00
0.02
0.04
theoretical quantiles


Resids vs. linear pred.
residuals
0.04
0.02
0.00
−0.02
−0.04
1.15
1.16
1.17
1.18
1.19
1.20
linear predictor


Histogram of residuals
Frequency
0
5
10
15
−0.04
−0.02
0.00
0.02
0.04
Residuals


Response vs. Fitted Values
Response
1.16
1.18
1.20
1.22
1.15
1.16
1.17
1.18
1.19
1.20
Fitted Values

```
Method: ML   Optimizer: outer newton
full convergence after 12 iterations.
Gradient range [−1.86098e−05,4.695873e−06]
(score −90.55096 & scale 0.0003144821).
Hessian positive definite, eigenvalue range [1.685682e−05,18.19828].
Model rank =  11 / 11

Basis dimension (k) checking results. Low p−value (k−index<1) may
indicate that k is too low, especially if edf is close to k'.

                                  k'  edf k−index p−value
s(bites_of_yesterday)          3.00 1.00    0.95    0.34
s(cumul_bites_7_previous_days) 3.00 1.00    0.91    0.28
s(ID)                          4.00 2.72      NA      NA
```

```
# Check for Multicollinearity

Low Correlation

                              Term  VIF   VIF 95% CI Increased SE Tolerance Tolerance 95% CI
          s(bites_of_yesterday, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
 s(cumul_bites_7_previous_days, k = 4) 1.11 [1.00, 3.31]         1.05      0.90     [0.30, 1.00]
```

```
Family: gaussian
Link function: identity

Formula:
log10(value) ~ s(bites_of_yesterday, k = 4) + s(cumul_bites_7_previous_days,
    k = 4) + s(ID, bs = "re", k = 2)

Parametric coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 1.164058   0.009647   120.7   <2e-16 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

Approximate significance of smooth terms:
                               edf Ref.df      F  p-value
s(bites_of_yesterday)        1.000      1  0.339    0.565
s(cumul_bites_7_previous_days) 1.000      1  2.736    0.109
s(ID)                        2.716      3 11.791 1.32e-05 ***
---
Signif. codes:  0 ...***... 0.001 ...**... 0.01 ...*... 0.05 ..... 0.1 ... ... 1

R-sq.(adj) =  0.503   Deviance explained =   57%
-ML = -90.551  Scale est. = 0.00031448  n = 36
```

AICc [1] −176.5597

Bites in squirrel

Nb obs: 20

TNF.alpha ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

VEGF

Bites in cyno

Nb obs: 36

VEGF ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)

Bites in squirrel

Nb obs: 20

VEGF ERROR : NA/NaN/Inf dans un appel à une fonction externe (argument 3)