

Samenvatting:

Relatie huishoudsamenstelling – testgedrag - positieve Coronatest

- In vergelijking met singles en na correctie voor leeftijd, laten deelnemers met kinderen zich vaker testen, met name deelnemers met hele jonge kinderen.
- In vergelijking met singles en na correctie voor leeftijd, in deelnemers die zich laten testen, testen deelnemers in huishoudens met meer dan twee volwassenen of wat oudere kinderen vaker positief. Deelnemers in huishoudens met jongere kinderen testen juist minder vaak positief. Wanneer deze relatie over verschillende periodes bekeken wordt, dan is daar geen duidelijke tijdstrend in te ontdekken.

Relatie kind(eren) op school/dagopvang – testgedrag - positieve Coronatest

- Na correctie voor leeftijd, deelnemers met kinderen op school/dagopvang laten zich vaker testen dan deelnemers zonder kinderen op school/dagopvang.
- Na correctie voor leeftijd, in deelnemers die zich laten testen, testen deelnemers met kinderen op school/dagopvang niet vaker positief dan deelnemers zonder kinderen op school/dagopvang. Wanneer deze relatie over verschillende periodes bekeken wordt, dan blijft de conclusie hetzelfde voor alle periodes.

Relatie huishoudsamenstelling – positieve Coronatest

Cross-sectioneel:

Indeling in categorieën huishoudsamenstelling:

Single: 1 volwassene
 2 adults: 2 volwassenen
 >2 adults: > 2 volwassenen
 Only children < 5: Alleen kinderen onder de 5 jaar + 1/meer volwassenen
 Only children 5-18: Alleen kinderen 5-18 jaar + 1/meer volwassenen
 Children 0-18: Kinderen 0-18 jaar + 1/meer volwassenen (mix van kinderen in verschillende lft)
 Other: Meestal mensen die fout hebben ingevuld, waar bijvoorbeeld alleen kinderen in een huishouden wonen, of alles 0.

Positive_ever == TRUE: indien bij intake is aangegeven dat mensen al eerder positief getest zijn geweest of tijdens hun deelname aan Infectieradar een positieve test hebben gehad.

```
> test_household_table
```

```
Cell Contents
```

	Count
	Row Percent

positive_household_data\$household	positive_household_data\$positive_ever		Total
	FALSE	TRUE	
>2 adults	1541 89.3%	185 10.7%	1726 10.2%
2 adults	4685 92.3%	390 7.7%	5075 30.0%
children 0-18	534 92.1%	46 7.9%	580 3.4%
only children < 5	658 91.5%	61 8.5%	719 4.3%
only children 5-18	3238 89.0%	401 11.0%	3639 21.5%
other	530 90.6%	55 9.4%	585 3.5%
single	4282 93.5%	298 6.5%	4580 27.1%
Total	15468	1436	16904

Statistics for All Table Factors

Pearson's Chi-squared test

```
Chi^2 = 69.25053      d.f. = 6      p = 5.82e-13
```

```
Minimum expected frequency: 49.27118
```

Wanneer gecorrigeerd voor leeftijd in een logistisch regressiemodel met 'single' als referentiegroep:

```
> summary(model_household)
```

```
Call:
glm(formula = positive_ever ~ age + relevel(household, ref = "single"),
     family = binomial(link = "logit"), data = positive_household_data)
```

Deviance Residuals:

```

      Min       1Q   Median       3Q      Max
-0.6324 -0.4592 -0.4002 -0.3593  2.4789

```

Coefficients:

```

              Estimate Std. Error z value Pr(> |z|)
(Intercept)   -1.958046   0.122969  -15.923  < 2e-16 ***
age           -0.012736   0.001976  -6.445  1.15e-10 ***
relevel(household, ref = "single")>2 adults    0.451138   0.099402   4.539  5.67e-06 ***
relevel(household, ref = "single")2 adults     0.178453   0.079892   2.234   0.0255 *
relevel(household, ref = "single")children 0-18 -0.024264   0.168795  -0.144   0.8857
relevel(household, ref = "single")only children < 5  0.023923   0.151921   0.157   0.8749
relevel(household, ref = "single")only children 5-18 0.427439   0.083017   5.149  2.62e-07 ***
relevel(household, ref = "single")other        0.372056   0.154103   2.414   0.0158 *

```

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

```

Null deviance: 9827.5 on 16901 degrees of freedom
Residual deviance: 9719.3 on 16894 degrees of freedom
(1499 observations deleted due to missingness)
AIC: 9735.3

```

Number of Fisher Scoring iterations: 5

```

              OR   lowerCI  higherCI
(Intercept)  0.1411339 0.1109067 0.1795994
age          0.9873444 0.9835278 0.9911759
relevel(household, ref = "single")>2 adults  1.5700984 1.2921529 1.9078307
relevel(household, ref = "single")2 adults   1.1953671 1.0221067 1.3979973
relevel(household, ref = "single")children 0-18 0.9760284 0.7011021 1.3587627
relevel(household, ref = "single")only children < 5 1.0242116 0.7604517 1.3794557
relevel(household, ref = "single")only children 5-18 1.5333255 1.3030741 1.8042620
relevel(household, ref = "single")other      1.4507143 1.0725223 1.9622640

```

Netter om dit in een longitudinaal model te doen.

Longitudinaal

Hoe vaak laten mensen met een bepaalde huishoudsamenstelling zich testen?

```

> table_household_test
cell contents

```

```

-----
|                | Count |
|                |-----|
|                | Row Percent |
|                |-----|

```

```

=====
merged2$household   merged2$Covid.test.dich
                    Ja      Nee      Total
-----
>2 adults           1203    18792    19995
                    6.0%    94.0%    10.0%
-----
2 adults             3137    59441    62578
                    5.0%    95.0%    31.3%
-----
children 0-18       636     5610     6246
                    10.2%    89.8%    3.1%
-----
only children < 5   932     6905     7837
                    11.9%    88.1%    3.9%
-----
only children 5-18 3004    37771    40775
                    7.4%    92.6%    20.4%
-----
other                387     6159     6546
                    5.9%    94.1%    3.3%
-----
single              2816    53070    55886
                    5.0%    95.0%    28.0%
-----

```

```
Total          12115  187748  199863
=====
```

Statistics for All Table Factors

Pearson's Chi-squared test

```
-----
Chi^2 = 1000      d.f. = 6      p < 0.0000000000000002
```

Minimum expected frequency: 379

- ➔ Mensen met kinderen laten zich vaker testen
- ➔ Niet gecorrigeerd voor leeftijd en meerdere metingen per persoon, daarvoor GEE model:

```
Call:
geeglm(formula = Covid.test.dich.num ~ relevel(household, ref = "single") +
  age, family = binomial(link = "logit"), data = household_data,
  id = person_id, corstr = "exchangeable", std.err = "san.se")
```

```
Coefficients:
(Intercept)                Estimate Std. err  Wald      Pr(> |W|)
relevel(household, ref = "single")>2 adults  0.078801  0.037148  4.50      0.034 *
relevel(household, ref = "single")2 adults  -0.005296  0.027247  0.04      0.846
relevel(household, ref = "single")children 0-18  0.467546  0.049188  90.35 < 0.0000000000000002 ***
relevel(household, ref = "single")only children < 5  0.616459  0.043415  201.62 < 0.0000000000000002 ***
relevel(household, ref = "single")only children 5-18  0.221168  0.029061  57.92 < 0.000000000000027 ***
relevel(household, ref = "single")other      0.126900  0.058155  4.76      0.029 *
age                                           -0.015675  0.000661  562.45 < 0.0000000000000002 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Correlation structure = exchangeable
Estimated Scale Parameters:
```

```
      Estimate Std. err
(Intercept)  0.99  0.0298
Link = identity
```

```
Estimated Correlation Parameters:
      Estimate Std. err
alpha  0.0499  0.00298
Number of clusters: 151183 Maximum cluster size: 26
```

```
> OR_household_test
      OR lowerCI higherCI
(Intercept)      0.128  0.118  0.139
relevel(household, ref = "single")>2 adults  1.082  1.006  1.164
relevel(household, ref = "single")2 adults  0.995  0.943  1.049
relevel(household, ref = "single")children 0-18  1.596  1.449  1.758
relevel(household, ref = "single")only children < 5  1.852  1.701  2.017
relevel(household, ref = "single")only children 5-18  1.248  1.178  1.321
relevel(household, ref = "single")other      1.135  1.013  1.272
age              0.984  0.983  0.986
```

- ➔ In vergelijking met singles, laten deelnemers met kinderen zich vaker testen, met name deelnemers met hele jonge kinderen.

Van de deelnemers die zich laten testen, met welke huishoudsamenstelling wordt er dan vaker positief getest?

```
> table_household_positive
```

```
Cell Contents
```

	Count
	Row Percent

```
=====
```

household_data_test\$household	household_data_test\$Covid.test.uitslag.dich.num		Total
	0	1	
>2 adults	1040 86.5%	163 13.5%	1203 9.9%
2 adults	2854 91.0%	283 9.0%	3137 25.9%
children 0-18	601 94.5%	35 5.5%	636 5.3%
only children < 5	872 93.6%	60 6.4%	932 7.7%
only children 5-18	2666 88.8%	337 11.2%	3003 24.8%
other	348 89.9%	39 10.1%	387 3.2%
single	2579 91.6%	237 8.4%	2816 23.2%
Total	10960	1154	12114

```
=====
```

Statistics for All Table Factors

Pearson's Chi-squared test

```
-----
```

Chi^2 = 60 d.f. = 6 p = 0.000000000458

Minimum expected frequency: 36.9

- ➔ Van de deelnemers die zich laten testen, testen deelnemers met oudere kinderen of huishoudens met meerdere volwassenen vaker positief
- ➔ Niet gecorrigeerd voor leeftijd en meerdere metingen per persoon, daarvoor GEE model:


```

> model_household_positive

Call:
geeglm(formula = Covid.test.uitslag.dich.num ~ relevel(household,
  ref = "single") + age, family = binomial(link = "logit"),
  data = household_data_test, id = person_id, corstr = "exchangeable",
  std.err = "san.se")

Coefficients:
(Intercept)                Estimate Std. err  Wald      Pr(>|W|)
relevel(household, ref = "single")>2 adults  0.45903  0.11765  15.22 < 0.0000000000000002 ***
relevel(household, ref = "single")2 adults  0.10242  0.09692   1.12    0.2906
relevel(household, ref = "single")children 0-18 -0.38683  0.19536   3.92    0.0477 *
relevel(household, ref = "single")only children < 5 -0.25774  0.16000   2.59    0.1072
relevel(household, ref = "single")only children 5-18 0.31240  0.09694  10.39    0.0013 **
relevel(household, ref = "single")other      0.25533  0.19197   1.77    0.1835
age                                           -0.00164  0.00260   0.40    0.5279
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation structure = exchangeable
Estimated Scale Parameters:
              Estimate Std. err
(Intercept)    0.98  0.0662
Link = identity

Estimated Correlation Parameters:
              Estimate Std. err
alpha        0.412  0.0322
Number of clusters: 9914 Maximum cluster size: 11
> OR_household_positive
              OR lowerCI higherCI
(Intercept)  0.101  0.0746  0.138
relevel(household, ref = "single")>2 adults  1.583  1.2566  1.993
relevel(household, ref = "single")2 adults  1.108  0.9162  1.340
relevel(household, ref = "single")children 0-18 0.679  0.4631  0.996
relevel(household, ref = "single")only children < 5 0.773  0.5648  1.057
relevel(household, ref = "single")only children 5-18 1.367  1.1302  1.653
relevel(household, ref = "single")other      1.291  0.8861  1.881
age                                              0.998  0.9933  1.003

```

➔ In vergelijking met singles, testen deelnemers in huishoudens met meer dan twee volwassenen of wat oudere kinderen vaker positief. Deelnemers in huishoudens met jongere kinderen testen juist minder vaak positief.

Veranderd dit over de tijd?

Drie-wekelijkse periodes met periode 1 startend op 1 november 2020.

Periode 1:

```

> OR_household_positive
              OR lowerCI higherCI
(Intercept)  0.0921  0.0475  0.178
relevel(household, ref = "single")>2 adults  2.8849  1.7322  4.805
relevel(household, ref = "single")2 adults  1.1442  0.7189  1.821
relevel(household, ref = "single")children 0-18 0.6342  0.2584  1.557
relevel(household, ref = "single")only children < 5 0.6831  0.3131  1.490
relevel(household, ref = "single")only children 5-18 1.9766  1.2721  3.071
relevel(household, ref = "single")other      1.3679  0.5787  3.233
age                                              0.9934  0.9826  1.004

```

periode 2:

```

> OR_household_positive
              OR lowerCI higherCI
(Intercept)  0.0967  0.0432  0.216
relevel(household, ref = "single")>2 adults  1.6342  0.9557  2.795
relevel(household, ref = "single")2 adults  0.8651  0.5463  1.370

```

relevel(household, ref = "single")children 0-18	0.4951	0.2020	1.214
relevel(household, ref = "single")only children < 5	0.4828	0.2104	1.108
relevel(household, ref = "single")only children 5-18	1.0797	0.6804	1.713
relevel(household, ref = "single")other	1.6796	0.7612	3.706
age	1.0030	0.9898	1.016

periode 3

> OR_household_positive

	OR	lowerCI	higherCI
(Intercept)	0.0789	0.0421	0.148
relevel(household, ref = "single")>2 adults	1.4440	0.8825	2.363
relevel(household, ref = "single")2 adults	1.4751	1.0100	2.154
relevel(household, ref = "single")children 0-18	1.2288	0.6363	2.373
relevel(household, ref = "single")only children < 5	0.7986	0.3957	1.612
relevel(household, ref = "single")only children 5-18	1.5686	1.0701	2.299
relevel(household, ref = "single")other	1.2363	0.5329	2.868
age	1.0018	0.9912	1.012

Periode 4

> OR_household_positive

	OR	lowerCI	higherCI
(Intercept)	0.0495	0.0221	0.111
relevel(household, ref = "single")>2 adults	1.2707	0.7457	2.165
relevel(household, ref = "single")2 adults	0.8921	0.5700	1.396
relevel(household, ref = "single")children 0-18	0.7561	0.2555	2.238
relevel(household, ref = "single")only children < 5	0.8543	0.3693	1.976
relevel(household, ref = "single")only children 5-18	1.5708	1.0035	2.459
relevel(household, ref = "single")other	1.2685	0.5665	2.841
age	1.0130	1.0003	1.026

Periode 5

> OR_household_positive

	OR	lowerCI	higherCI
(Intercept)	0.0946	0.0361	0.248
relevel(household, ref = "single")>2 adults	1.18	0.545	2.55
relevel(household, ref = "single")2 adults	1.07	0.589	1.96
relevel(household, ref = "single")children 0-18	0	0	0
relevel(household, ref = "single")only children < 5	0.991	0.373	2.64
relevel(household, ref = "single")only children 5-18	0.902	0.460	1.77
relevel(household, ref = "single")other	0.572	0.129	2.53
age	1	0.984	1.02

➔ Geen duidelijke trend over de tijd

Relatie schoolgaande kinderen – positieve Coronatest

Cross-sectioneel

Cell Contents		
	Count	Column Percent
positive_school_data\$positive_ever	positive_school_data\$school_dich	
Total	Geen kind(eren) op school/dagopvang	Kind(eren) op school/dagopvang
FALSE	11918	4463
16381	92.0%	89.3%
TRUE	1031	533
1564	8.0%	10.7%
Total	12949	4996
17945	72.2%	27.8%

Statistics for All Table Factors

Pearson's Chi-squared test

Chi^2 = 33.19332 d.f. = 1 p = 8.34e-09

Pearson's Chi-squared test with Yates' continuity correction

Chi^2 = 32.854 d.f. = 1 p = 9.93e-09
Minimum expected frequency: 435.4274

→ na correctie voor leeftijd:

> summary(model)

Call:

```
glm(formula = positive_ever ~ age + school_dich, family = binomial(link = "logit"),
    data = positive_school_data)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-0.6006	-0.4513	-0.3999	-0.3720	2.4194

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-1.746078	0.106301	-16.426	< 2e-16 ***
age	-0.013436	0.001922	-6.993	2.7e-12 ***
school_dichKind(eren) op school/dagopvang	0.125848	0.063399	1.985	0.0471 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 9728.2 on 16797 degrees of freedom
Residual deviance: 9658.1 on 16795 degrees of freedom
(1585 observations deleted due to missingness)
AIC: 9664.1

Number of Fisher Scoring iterations: 5

OR voor hebben van schoolgaande kinderen op positieve testuitslag, gecorrigeerd voor leeftijd:

OR = $e^{0.126} = 1.13$

Longitudinaal**Hoe vaak laten deelnemers met/zonder kinderen op school/dagopvang zich testen?**

```
> table_school_test
Cell Contents
-----|-----|
|                | Count |
|                | Row Percent |
|-----|-----|

=====
merged2$school_dich      merged2$Covid.test.dich
                        Ja      Nee      Total
-----|-----|-----|
Geen kind(eren) op school/dagopvang  7856  140709  148565
                                         5.3%  94.7%  74.3%
-----|-----|-----|
Kind(eren) op school/dagopvang      4259  47039  51298
                                         8.3%  91.7%  25.7%
-----|-----|-----|
Total                                12115  187748  199863
=====
```

Statistics for All Table Factors

Pearson's Chi-squared test

```
-----|-----|
Chi^2 = 609      d.f. = 1      p <0.0000000000000002
```

Pearson's Chi-squared test with Yates' continuity correction

```
-----|-----|
Chi^2 = 608      d.f. = 1      p <0.0000000000000002
Minimum expected frequency: 3110
```

➔ Deelnemers met kinderen op school/dagopvang laten zich vaker testen

➔ Niet gecorrigeerd voor leeftijd en meerdere metingen per persoon, daarvoor GEE model:

```
> model_school_test

Call:
geeglm(formula = Covid.test.dich.num ~ school_dich + age, family = binomial(link = "logit"),
       data = school_data, id = person_id, constr = "exchangeable",
       std.err = "san.se")

Coefficients:
              Estimate      Std.err Wald      Pr(>|W|)
(Intercept) -1.930415    0.035228 3003 <0.0000000000000002 ***
school_dichKind(eren) op school/dagopvang  0.271289    0.021692  156 <0.0000000000000002 ***
age          -0.017485    0.000623   789 <0.0000000000000002 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation structure = exchangeable
Estimated Scale Parameters:

              Estimate Std.err
(Intercept)  0.991    0.0298
Link = identity

Estimated Correlation Parameters:
              Estimate Std.err
alpha        0.0505    0.00299
Number of clusters: 151183 Maximum cluster size: 26

> OR_school_test

              OR lowerCI higherCI
(Intercept)  0.145    0.135    0.155
school_dichKind(eren) op school/dagopvang  1.312    1.257    1.369
age          0.983    0.981    0.984
```

- ➔ Deelnemers met kinderen op school/dagopvang laten zich vaker testen dan deelnemers zonder kinderen op school/dagopvang.

Van de deelnemers die zich laten testen, testen deelnemers met/zonder kinderen op school/dagopvang dan vaker positief?

```
> table_school_positive
Cell Contents
```

	Count
	Row Percent

```
=====
```

school_data_test\$school_dich	school_data_test\$Covid.test.uitslag.dich.num		Total
	0	1	
Geen kind(eren) op school/dagopvang	7093 90.3%	763 9.7%	7856 64.9%
Kind(eren) op school/dagopvang	3867 90.8%	391 9.2%	4258 35.1%
Total	10960	1154	12114

```
=====
```

Statistics for All Table Factors

Pearson's Chi-squared test

```
-----
```

Chi^2 = 0.899 d.f. = 1 p = 0.343

Pearson's Chi-squared test with Yates' continuity correction

```
-----
```

Chi^2 = 0.838 d.f. = 1 p = 0.36
Minimum expected frequency: 406

- ➔ Deelnemers met kinderen op school/dagopvang testen niet vaker positief dan deelnemers zonder kinderen op school/dagopvang
- ➔ Niet gecorrigeerd voor leeftijd en meerdere metingen per persoon, daarvoor GEE model:

```
> model_school_positive
```

Call:

```
geeglm(formula = Covid.test.uitslag.dich.num ~ school_dich +
  age, family = binomial(link = "logit"), data = school_data_test,
  id = person_id, constr = "exchangeable", std.err = "san.se")
```

Coefficients:

	Estimate	Std.err	Wald	Pr(> W)
(Intercept)	-2.15803	0.13708	247.83	<0.0000000000000002 ***
school_dichKind(eren) op school/dagopvang	-0.04571	0.07372	0.38	0.54
age	-0.00116	0.00252	0.21	0.65

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation structure = exchangeable

Estimated Scale Parameters:

	Estimate	Std.err
(Intercept)	0.983	0.0618

Link = identity

Estimated Correlation Parameters:

	Estimate	Std.err
alpha	0.443	0.0301

Number of clusters: 9914 Maximum cluster size: 11

```

> OR_school_positive
              OR lowerCI higherCI
(Intercept)  0.116  0.0883  0.151
school_dichKind(eren) op school/dagopvang 0.955  0.8268  1.104
age          0.999  0.9939  1.004

```

➔ Deelnemers met kinderen op school/dagopvang testen niet vaker positief dan deelnemers zonder kinderen op school/dagopvang

Over de tijd:

Periode is driewekelijkse periode, met periode 1 start op 1 nov 2020.

GEE modellen herhaald voor verschillende periodes

School_dich → test

OR en 95% CI:

Periode 1:	school_dichKind(eren) op school/dagopvang	1.360	1.243	1.489
Periode 2:	school_dichKind(eren) op school/dagopvang	1.5631	1.4100	1.733
Periode 3:	school_dichKind(eren) op school/dagopvang	1.259	1.150	1.377
Periode 4:	school_dichKind(eren) op school/dagopvang	1.148	1.0327	1.275
Periode 5:	school_dichKind(eren) op school/dagopvang	1.0536	0.9121	1.217

School_dich → positief

OR en 95% CI:

Periode 1:	school_dichKind(eren) op school/dagopvang	1.140	0.823	1.579
Periode 2:	school_dichKind(eren) op school/dagopvang	0.830	0.5710	1.207
Periode 3:	school_dichKind(eren) op school/dagopvang	0.961	0.7234	1.277
Periode 4:	school_dichKind(eren) op school/dagopvang	1.2431	0.8727	1.771
Periode 5:	school_dichKind(eren) op school/dagopvang	0.7131	0.4082	1.246