

Investigating the autism and ADHD prevalence in Chile through
Bayesian prevalence analysis and clinical record data linkage

Student 5526

2023-07-06

This dissertation is submitted for the degree of Master of Philosophy. The dissertation does not exceed the word limit for the respective Degree Committee. Word count: xxx TODO

1 Abstract

TODO

2 Declaration

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except where specifically indicated in the text.

USN: xxxxx July, 2022

TODO - is this section needed?

3 Introduction

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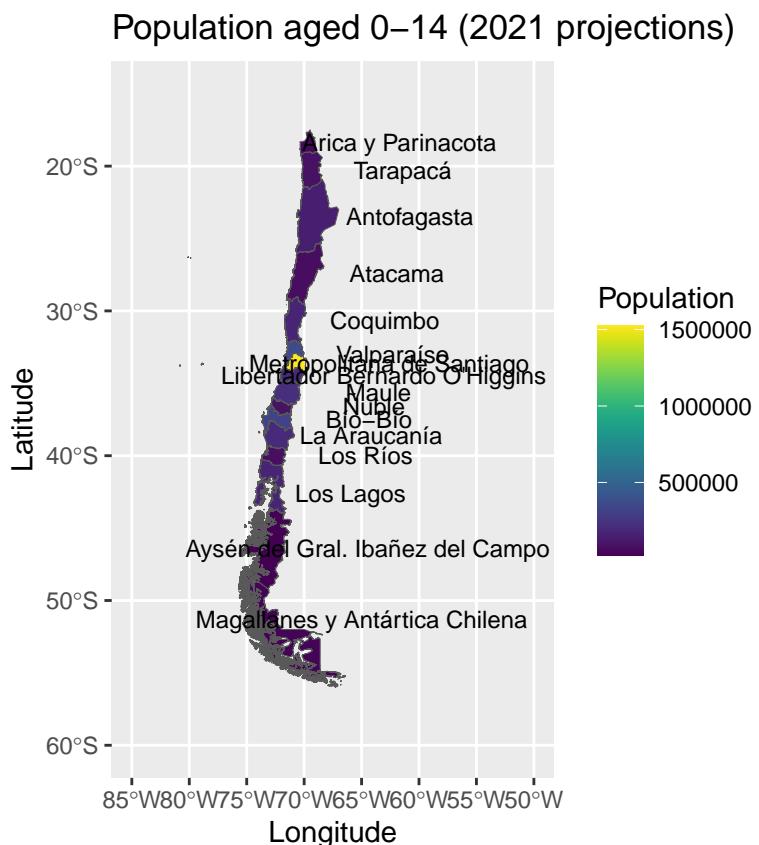


Figure 1: Population of 0-14 year olds in Chile in 2021 by region, from 2017 census projections.

4 Methods

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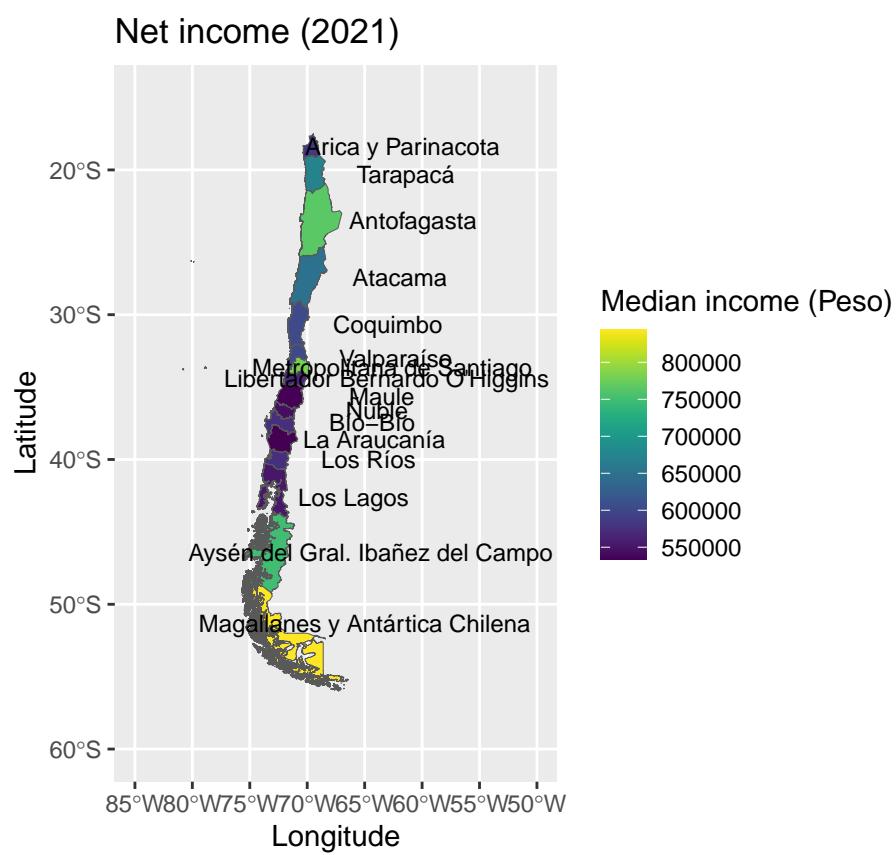


Figure 2: Net income from main job in Chile in 2021 by region, from the INE's Supplementary Income Survey.

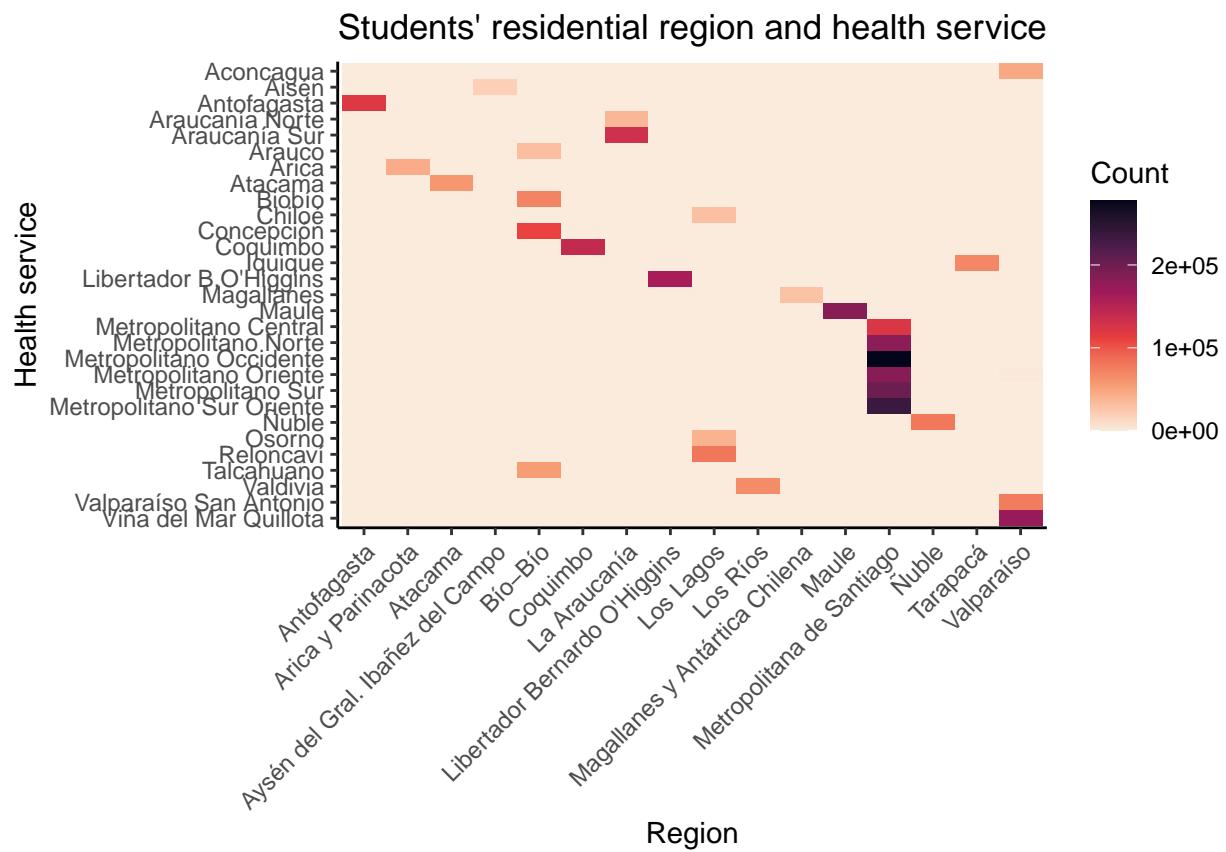


Figure 3: Residential communes aggregated to region level and the health services associated with the aggregated communes, with counts of the number of students resident in the communes in each health service's catchment area.

Communes in La Araucanía

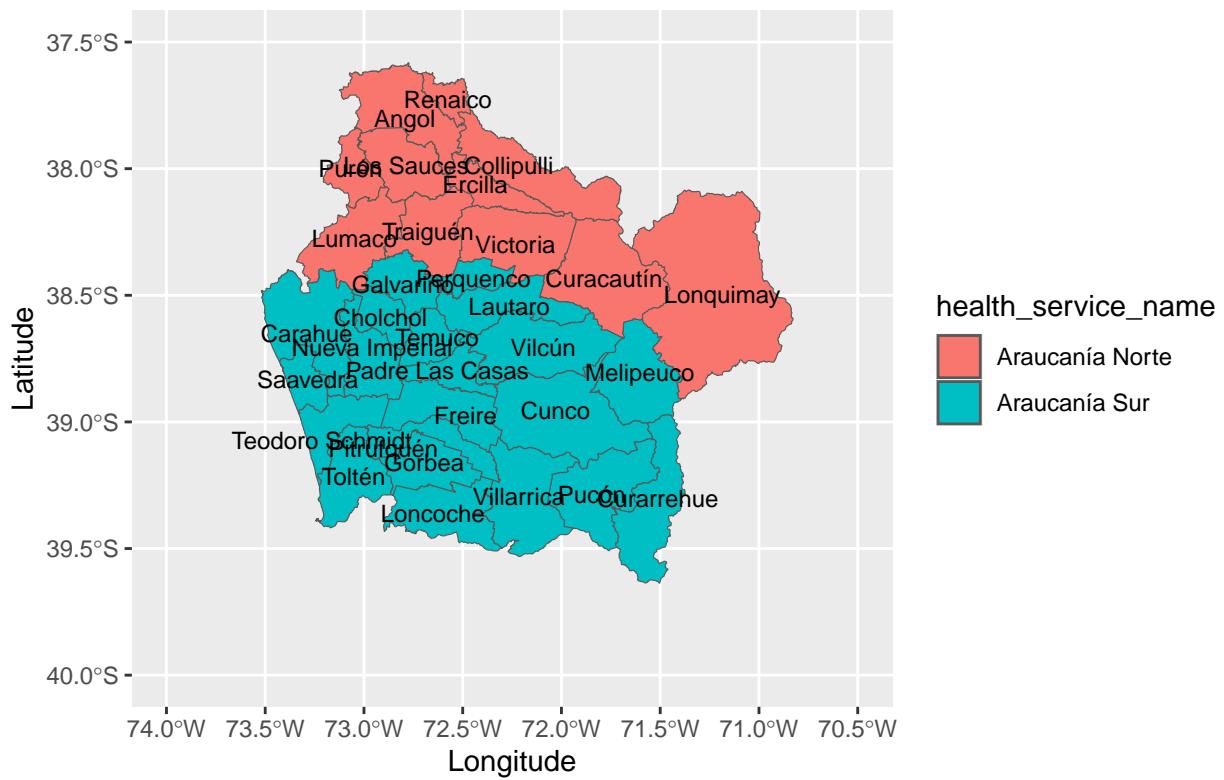


Figure 4: Communes in the Araucanía region, coloured red for the Araucanía Norte (north Araucanía) health services and blue for the Araucanía Sur (south Araucanía) health service.

Table 1: Count and prevalence of autism cases by age in Chile school data with normal confidence intervals.

Age band	Autism cases	Prevalence % (95% CI)
6	1806	0.72 (0.69, 0.75)
7	1724	0.69 (0.66, 0.72)
8	1632	0.66 (0.63, 0.69)
9	1523	0.60 (0.57, 0.63)
10	1435	0.56 (0.53, 0.58)
11	1254	0.49 (0.46, 0.52)
12	1176	0.46 (0.43, 0.48)
13	1057	0.42 (0.40, 0.45)
14	805	0.33 (0.31, 0.36)
15	680	0.29 (0.27, 0.31)
16	665	0.28 (0.26, 0.30)
17	491	0.21 (0.19, 0.23)
18	301	0.34 (0.30, 0.38)

Table 2: Count and prevalence of ADHD cases by age in Chile school data with normal confidence intervals.

Age band	ADHD cases	Prevalence % (95% CI)
6	740	0.29 (0.27, 0.32)
7	1965	0.78 (0.75, 0.82)
8	3231	1.31 (1.27, 1.36)
9	4500	1.78 (1.73, 1.83)
10	5485	2.13 (2.07, 2.18)
11	5564	2.17 (2.11, 2.23)
12	5325	2.07 (2.01, 2.12)
13	4848	1.94 (1.88, 1.99)
14	3926	1.62 (1.57, 1.67)
15	3420	1.45 (1.40, 1.50)
16	3120	1.33 (1.28, 1.38)
17	2870	1.23 (1.19, 1.28)
18	1230	1.40 (1.33, 1.48)

5 Results

5.1 School data

The school dataset contained records for 3,056,306 Chilean students aged 6-18 in 2021. Of these, 1,487,224 (48.66%) were female and the rest were male. A special needs code was recorded for 339,968 (11.12%) students, indicating they received SEED during that school year. Of these students, 14,549 (4.28%) received SEED for autism and 46,224 (13.6%) received SEED for ADHD. Thus the global crude prevalence of autism in the school data was 0.476% (0.468-0.484%) and the global crude prevalence of ADHD was 1.51% (1.50-1.53%).

Tables 1 and 2 and Supplementary Figure x show the crude prevalences of autism and ADHD by age and Figure 5 shows these by 2-year age band. Autism prevalence is highest in the youngest ages and decreases with age while ADHD prevalence peaks at age 11 then decreases. Both conditions show a small increase in prevalence for age 18.

Tables 3 and 4 and figure 6 show prevalence by sex. Autism prevalence is 0.133% (0.127-0.139%) for females and 0.80% (0.79-0.82%) for males. ADHD prevalence is 1.01% (1.00-1.03%) for females and 1.98% (1.96-2.01%) for males. Autism and ADHD prevalences are higher in males than females for all ages.

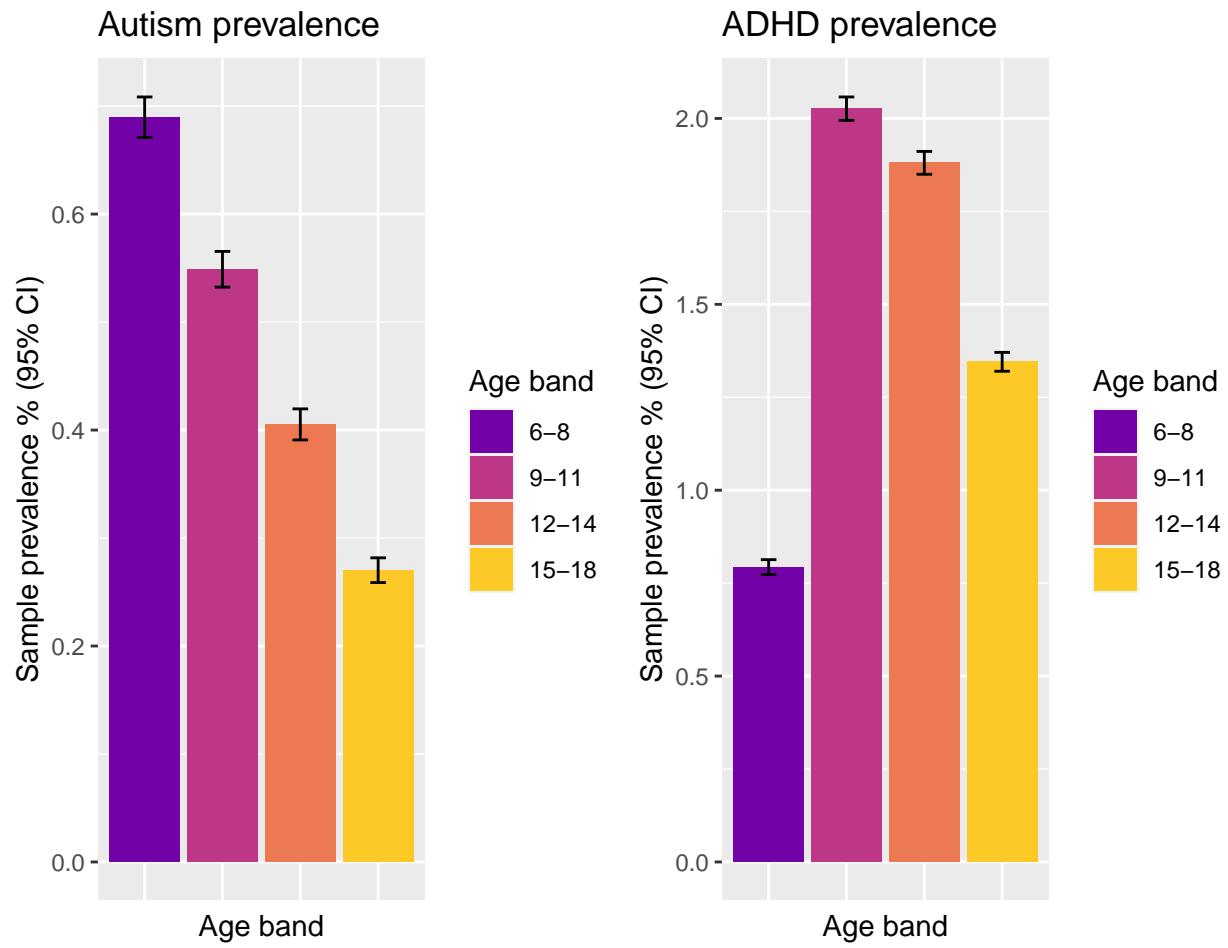


Figure 5: Sample prevalence of autism and adhd by age band. Bars show 95% normal confidence intervals.

Table 3: Count and prevalence of autism cases by age in Chile school data for females (left) and males (right) with normal confidence intervals.

Age band	Autism cases	Prevalence % (95% CI)	Age band	Autism cases	Prevalence % (95% CI)
6	294	0.24 (0.21, 0.27)	6	1512	1.18 (1.12, 1.24)
7	241	0.20 (0.17, 0.22)	7	1483	1.15 (1.10, 1.21)
8	239	0.20 (0.17, 0.22)	8	1393	1.11 (1.05, 1.16)
9	198	0.16 (0.14, 0.18)	9	1325	1.02 (0.97, 1.08)
10	162	0.13 (0.11, 0.15)	10	1273	0.96 (0.91, 1.01)
11	163	0.13 (0.11, 0.15)	11	1091	0.83 (0.78, 0.88)
12	134	0.11 (0.09, 0.12)	12	1042	0.79 (0.74, 0.84)
13	145	0.12 (0.10, 0.14)	13	912	0.71 (0.66, 0.76)
14	112	0.09 (0.08, 0.11)	14	693	0.56 (0.52, 0.60)
15	96	0.08 (0.07, 0.10)	15	584	0.48 (0.44, 0.52)
16	100	0.09 (0.07, 0.10)	16	565	0.47 (0.43, 0.51)
17	55	0.05 (0.04, 0.06)	17	436	0.37 (0.33, 0.40)
18	39	0.10 (0.07, 0.14)	18	262	0.52 (0.46, 0.59)

Table 4: Count and prevalence of ADHD cases by age in Chile school data for females (left) and males (right) with normal confidence intervals.

Age band	ADHD cases	Prevalence % (95% CI)	Age band	ADHD cases	Prevalence % (95% CI)
6	262	0.21 (0.19, 0.24)	6	478	0.37 (0.34, 0.41)
7	650	0.53 (0.49, 0.57)	7	1315	1.02 (0.97, 1.08)
8	1080	0.90 (0.84, 0.95)	8	2151	1.71 (1.64, 1.78)
9	1533	1.24 (1.18, 1.31)	9	2967	2.29 (2.21, 2.37)
10	1821	1.45 (1.38, 1.52)	10	3664	2.77 (2.68, 2.86)
11	1873	1.50 (1.43, 1.56)	11	3691	2.81 (2.72, 2.90)
12	1743	1.39 (1.32, 1.45)	12	3582	2.72 (2.63, 2.81)
13	1472	1.21 (1.14, 1.27)	13	3376	2.63 (2.54, 2.72)
14	1170	0.99 (0.93, 1.05)	14	2756	2.23 (2.15, 2.31)
15	1068	0.93 (0.87, 0.98)	15	2352	1.95 (1.87, 2.02)
16	1023	0.89 (0.84, 0.95)	16	2097	1.75 (1.67, 1.82)
17	994	0.87 (0.82, 0.92)	17	1876	1.58 (1.51, 1.65)
18	390	1.04 (0.94, 1.14)	18	840	1.68 (1.57, 1.79)

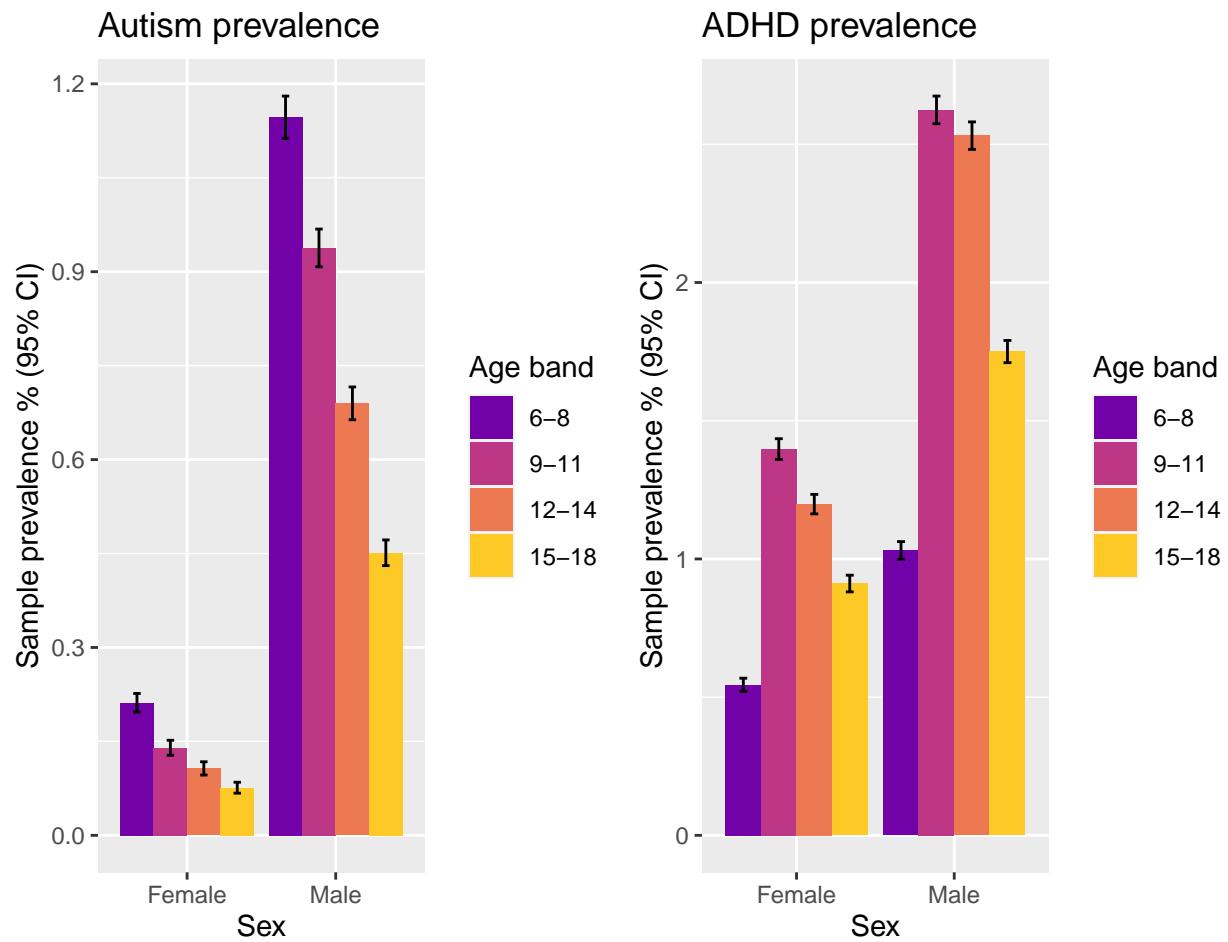


Figure 6: Sample prevalence of autism and ADHD by age band and sex. Bars show 95% normal confidence intervals.

Autism varies by health service, as shown in Table 5 and Figure 7. Autism prevalence is highest in Ñuble at 1.32% (1.24 - 1.40%) and Antofagasta at 0.84% (0.79- 0.89%), and is lowest in Metropolitano Norte at 0.29% (0.27 - 0.32%) and Araucanía Norte at 0.30% (0.24- 0.36%). Autism peaks in the 6-8 age band across all services except Chiloé and Magallanes where it peaks in the 9-11 band.

ADHD prevalence also varies across health services, as shown in Table 6 and Figure 8. ADHD prevalence is highest in Magallanes at 3.07% (2.87 - 3.27%) and Talcahuano at 3.07% (2.93- 3.22%), and is lowest in Atacama at 0.49% (0.44 - 0.55%) and Antofagasta at 1.00% (0.94- 1.06%).

For school fees, which are used here as a proxy for SES, autism prevalence is highest, at . . . , among

Ethnicity

Rurality

5.2 Frequentist prevalence estimation

Text about adjusted prevalence

```
## # A tibble: 1 x 6
##   crude_ci_lower crude_rate crude_ci_upper adjusted_ci_lower adjusted~1 adjus~2
##       <dbl>        <dbl>        <dbl>        <dbl>        <dbl>      <dbl>
## 1     0.00468     0.00476     0.00484     0.00457     0.00465  0.00473
## # ... with abbreviated variable names 1: adjusted_rate, 2: adjusted_ci_upper

## # A tibble: 1 x 6
##   crude_ci_lower crude_rate crude_ci_upper adjusted_ci_lower adjusted~1 adjus~2
##       <dbl>        <dbl>        <dbl>        <dbl>        <dbl>      <dbl>
## 1     0.0150      0.0151      0.0153      0.0148      0.0150   0.0151
## # ... with abbreviated variable names 1: adjusted_rate, 2: adjusted_ci_upper
```

Adjusted sex.

```
## # A tibble: 2 x 7
##   sex_desc crude_ci_lower crude_rate crude_ci_upper adjusted_c~1 adjus~2 adjus~3
##   <chr>        <dbl>        <dbl>        <dbl>        <dbl>        <dbl>      <dbl>
## 1 Female      0.00127     0.00133     0.00139     0.00125  0.00131  0.00138
## 2 Male        0.00787     0.00801     0.00815     0.00773  0.00787  0.00801
## # ... with abbreviated variable names 1: adjusted_ci_lower, 2: adjusted_rate,
## #   3: adjusted_ci_upper

## # A tibble: 2 x 7
##   sex_desc crude_ci_lower crude_rate crude_ci_upper adjusted_c~1 adjus~2 adjus~3
##   <chr>        <dbl>        <dbl>        <dbl>        <dbl>        <dbl>      <dbl>
## 1 Female      0.00127     0.00133     0.00139     0.00125  0.00131  0.00138
## 2 Male        0.00787     0.00801     0.00815     0.00773  0.00787  0.00801
## # ... with abbreviated variable names 1: adjusted_ci_lower, 2: adjusted_rate,
## #   3: adjusted_ci_upper
```

Adjusted health.

	health_service_name	crude_ci_lower	crude_rate	crude_ci_upper
## 1	Aconcagua	0.00378	0.00438	0.00497
## 2	Aisén	0.00629	0.00749	0.00869
## 3	Antofagasta	0.00789	0.00841	0.00893
## 4	Araucanía Norte	0.00244	0.00300	0.00356
## 5	Araucanía Sur	0.00336	0.00369	0.00402
## 6	Arauco	0.00637	0.00731	0.00826
## 7	Arica	0.00540	0.00612	0.00684
## 8	Atacama	0.00262	0.00306	0.00351

Table 5: Count and prevalence of autism cases by health service and age in Chile school data for females (left) and males (right) with normal confidence intervals.

Health service	Age band	Autism cases	Prevalence % (95% CI)
Aconcagua	6	4	0.21 (0.00, 0.41)
Aisén	6	5	0.71 (0.09, 1.33)
Antofagasta	6	17	0.38 (0.20, 0.56)
Araucanía Norte	6	1	0.08 (0.00, 0.22)
Araucanía Sur	6	9	0.17 (0.06, 0.28)
Arauco	6	6	0.50 (0.10, 0.90)
Arica	6	11	0.63 (0.26, 1.01)
Atacama	6	8	0.36 (0.11, 0.61)
Biobío	6	6	0.22 (0.04, 0.39)
Chiloé	6	1	0.09 (0.00, 0.27)
Concepción	6	13	0.29 (0.13, 0.45)
Coquimbo	6	16	0.29 (0.15, 0.43)
Iquique	6	7	0.26 (0.07, 0.45)
Libertador B.O'Higgins	6	8	0.13 (0.04, 0.22)
Magallanes	6	1	0.10 (0.00, 0.29)
Maule	6	15	0.21 (0.10, 0.31)
Metropolitano Central	6	6	0.13 (0.03, 0.24)
Metropolitano Norte	6	11	0.15 (0.06, 0.25)
Metropolitano Occidente	6	32	0.20 (0.13, 0.26)
Metropolitano Oriente	6	7	0.10 (0.03, 0.17)
Metropolitano Sur	6	18	0.23 (0.12, 0.34)
Metropolitano Sur Oriente	6	14	0.16 (0.08, 0.25)
Osorno	6	4	0.29 (0.01, 0.57)
Reloncaví	6	9	0.30 (0.11, 0.50)
Talcahuano	6	15	0.73 (0.36, 1.10)
Valdivia	6	3	0.12 (0.00, 0.27)
Valparaíso San Antonio	6	8	0.26 (0.08, 0.44)
Viña del Mar Quillota	6	23	0.34 (0.20, 0.48)
Ñuble	6	16	0.53 (0.27, 0.79)
Aconcagua	7	5	0.27 (0.03, 0.50)
Aisén	7	4	0.51 (0.01, 1.00)
Antofagasta	7	18	0.39 (0.21, 0.58)
Araucanía Norte	7	2	0.14 (0.00, 0.33)
Araucanía Sur	7	5	0.10 (0.01, 0.18)
Arauco	7	3	0.23 (0.00, 0.49)
Arica	7	3	0.17 (0.00, 0.36)
Atacama	7	8	0.34 (0.10, 0.58)
Biobío	7	2	0.07 (0.00, 0.17)
Chiloé	7	0	0.00 (0.00, 0.00)
Concepción	7	14	0.33 (0.16, 0.50)
Coquimbo	7	9	0.16 (0.05, 0.26)
Iquique	7	4	0.14 (0.00, 0.28)
Libertador B.O'Higgins	7	16	0.25 (0.13, 0.37)
Magallanes	7	2	0.19 (0.00, 0.45)
Maule	7	12	0.16 (0.07, 0.26)
Metropolitano Central	7	9	0.19 (0.07, 0.32)
Metropolitano Norte	7	6	0.08 (0.02, 0.15)
Metropolitano Occidente	7	15	0.13 (0.07, 0.20)
Metropolitano Oriente	7	11	0.15 (0.06, 0.23)
Metropolitano Sur	7	16	0.20 (0.10, 0.29)
Metropolitano Sur Oriente	7	12	0.13 (0.06, 0.20)
Osorno	7	10 ₂	0.13 (0.00, 0.32)
Reloncaví	7	7	0.23 (0.06, 0.39)
Talcahuano	7	6	0.28 (0.06, 0.50)
Valdivia	7	4	0.16 (0.00, 0.31)

Table 6: Count and prevalence of ADHD cases by health service and age in Chile school data for females (left) and males (right) with normal confidence intervals.

Health service	Age band	ADHD cases	Prevalence % (95% CI)
Aconcagua	6	8	0.42 (0.13, 0.70)
Aisén	6	3	0.43 (0.00, 0.91)
Antofagasta	6	14	0.31 (0.15, 0.47)
Araucanía Norte	6	4	0.30 (0.01, 0.60)
Araucanía Sur	6	12	0.23 (0.10, 0.36)
Arauco	6	4	0.33 (0.01, 0.66)
Arica	6	0	0.00 (0.00, 0.00)
Atacama	6	0	0.00 (0.00, 0.00)
Biobío	6	10	0.36 (0.14, 0.59)
Chiloé	6	3	0.28 (0.00, 0.59)
Concepción	6	11	0.25 (0.10, 0.39)
Coquimbo	6	23	0.42 (0.25, 0.59)
Iquique	6	6	0.22 (0.04, 0.40)
Libertador B.O'Higgins	6	14	0.23 (0.11, 0.35)
Magallanes	6	2	0.20 (0.00, 0.47)
Maule	6	7	0.10 (0.02, 0.17)
Metropolitano Central	6	17	0.37 (0.20, 0.55)
Metropolitano Norte	6	7	0.10 (0.03, 0.17)
Metropolitano Occidente	6	34	0.21 (0.14, 0.28)
Metropolitano Oriente	6	10	0.14 (0.05, 0.22)
Metropolitano Sur	6	10	0.13 (0.05, 0.21)
Metropolitano Sur Oriente	6	24	0.28 (0.17, 0.39)
Osorno	6	3	0.22 (0.00, 0.46)
Reloncaví	6	8	0.27 (0.08, 0.46)
Talcahuano	6	5	0.24 (0.03, 0.46)
Valdivia	6	6	0.25 (0.05, 0.45)
Valparaíso San Antonio	6	2	0.07 (0.00, 0.16)
Viña del Mar Quillota	6	8	0.12 (0.04, 0.20)
Ñuble	6	7	0.23 (0.06, 0.40)
Aconcagua	7	16	0.85 (0.43, 1.26)
Aisén	7	3	0.38 (0.00, 0.81)
Antofagasta	7	27	0.59 (0.37, 0.82)
Araucanía Norte	7	3	0.21 (0.00, 0.44)
Araucanía Sur	7	30	0.58 (0.37, 0.79)
Arauco	7	6	0.46 (0.09, 0.82)
Arica	7	5	0.28 (0.03, 0.52)
Atacama	7	2	0.09 (0.00, 0.20)
Biobío	7	30	1.09 (0.70, 1.47)
Chiloé	7	8	0.72 (0.22, 1.21)
Concepción	7	45	1.05 (0.75, 1.36)
Coquimbo	7	31	0.53 (0.35, 0.72)
Iquique	7	4	0.14 (0.00, 0.28)
Libertador B.O'Higgins	7	31	0.48 (0.31, 0.65)
Magallanes	7	4	0.38 (0.01, 0.74)
Maule	7	31	0.42 (0.27, 0.57)
Metropolitano Central	7	30	0.64 (0.41, 0.86)
Metropolitano Norte	7	36	0.49 (0.33, 0.65)
Metropolitano Occidente	7	52	0.46 (0.33, 0.58)
Metropolitano Oriente	7	44	0.59 (0.42, 0.76)
Metropolitano Sur	7	49	0.60 (0.43, 0.77)
Metropolitano Sur Oriente	7	57	0.60 (0.45, 0.76)
Osorno	7	11 ₅	0.33 (0.04, 0.63)
Reloncaví	7	13	0.42 (0.19, 0.65)
Talcahuano	7	21	0.97 (0.56, 1.39)
Valdivia	7	15	0.59 (0.29, 0.89)

Autism prevalence by health service

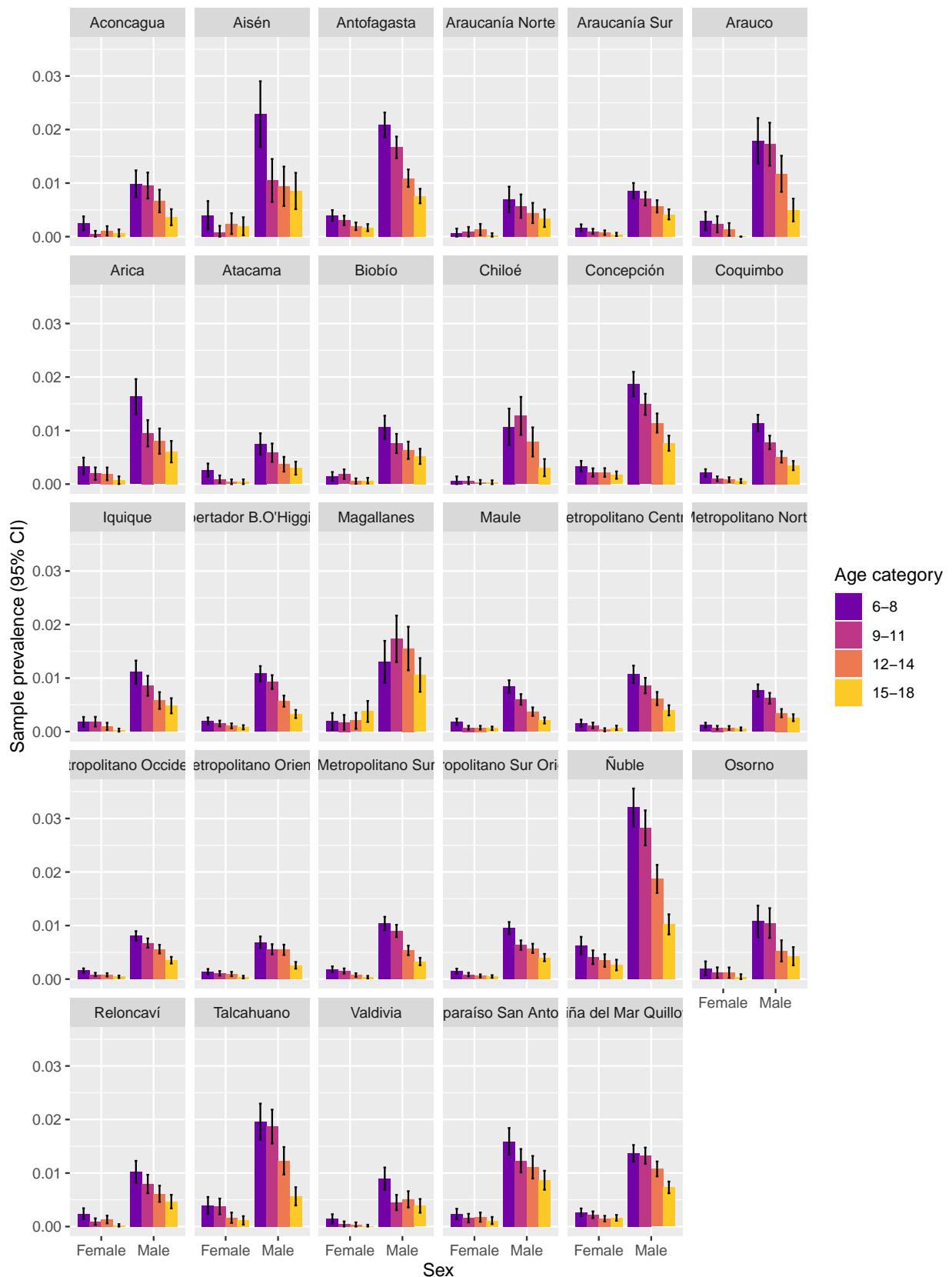


Figure 7: Sample prevalence of autism by health service, age band and sex. Bars show 95% normal confidence intervals.

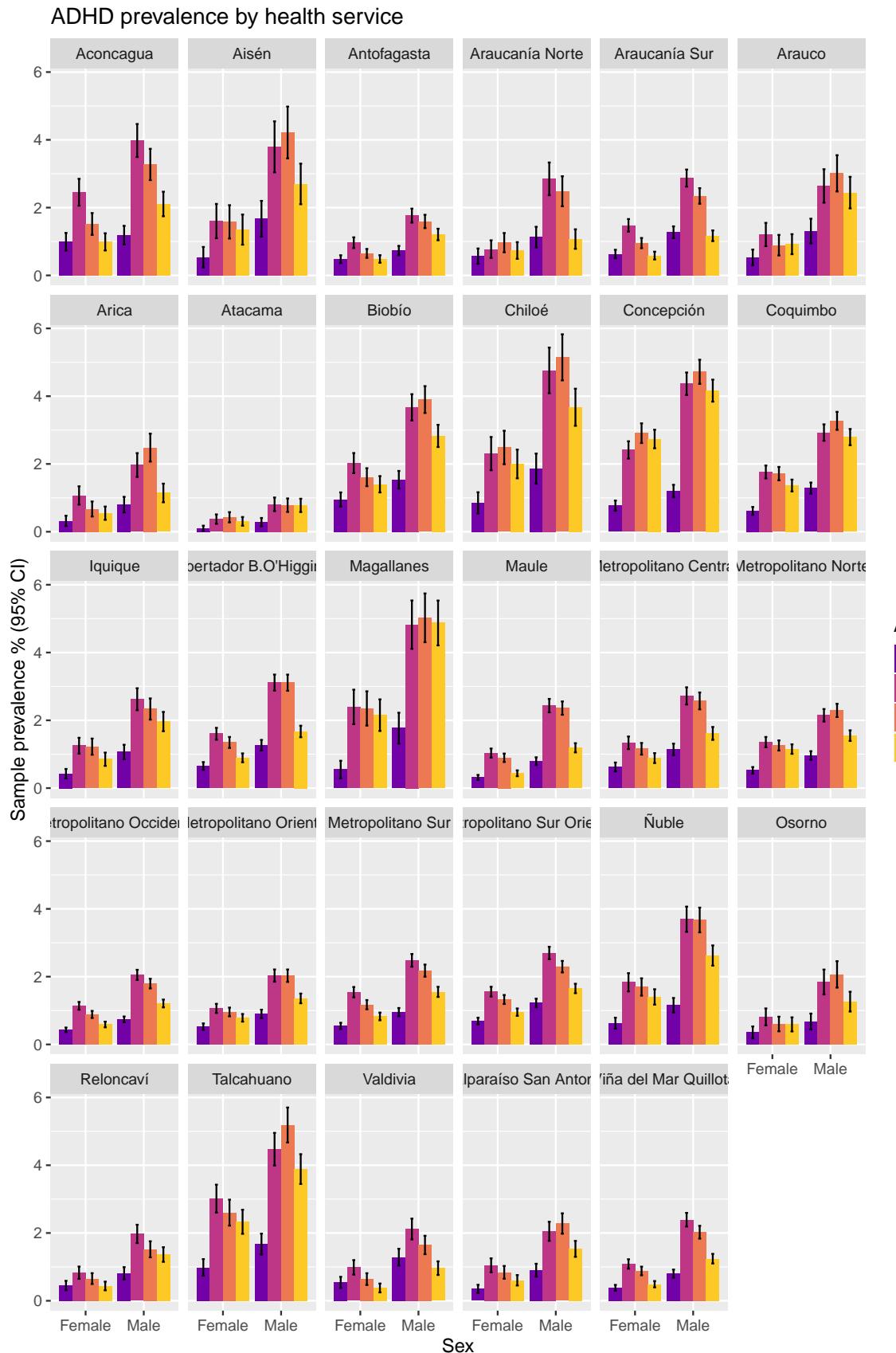


Figure 8: Sample prevalence of ADHD by health service, age band and sex. Bars show 95% normal confidence intervals.

Table 7: Count and prevalence of autism cases by monthly school fees (Peso) and age in Chile school data for females (left) and males (right) with normal confidence intervals.

School fee	Age band	Autism cases	Prevalence % (95% CI)	School fee	Age band	Autism cases
Free	6	256	0.29 (0.26, 0.33)	Free	6	1293
\$1,000-\$10,000	6	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	6	0
\$10,001-\$25,000	6	2	0.13 (0.00, 0.31)	\$10,001-\$25,000	6	6
\$25,001-\$50,000	6	7	0.08 (0.02, 0.15)	\$25,001-\$50,000	6	73
\$50,001-\$100,000	6	21	0.21 (0.12, 0.30)	\$50,001-\$100,000	6	105
\$100,001+	6	4	0.03 (0.00, 0.06)	\$100,001+	6	12
No information	6	4	0.14 (0.00, 0.28)	No information	6	23
Free	7	196	0.23 (0.20, 0.26)	Free	7	1274
\$1,000-\$10,000	7	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	7	1
\$10,001-\$25,000	7	2	0.13 (0.00, 0.30)	\$10,001-\$25,000	7	6
\$25,001-\$50,000	7	18	0.21 (0.11, 0.30)	\$25,001-\$50,000	7	48
\$50,001-\$100,000	7	14	0.13 (0.06, 0.20)	\$50,001-\$100,000	7	119
\$100,001+	7	3	0.02 (0.00, 0.05)	\$100,001+	7	10
No information	7	8	0.38 (0.12, 0.64)	No information	7	25
Free	8	203	0.24 (0.20, 0.27)	Free	8	1232
\$1,000-\$10,000	8	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	8	1
\$10,001-\$25,000	8	1	0.07 (0.00, 0.20)	\$10,001-\$25,000	8	8
\$25,001-\$50,000	8	12	0.14 (0.06, 0.22)	\$25,001-\$50,000	8	47
\$50,001-\$100,000	8	18	0.18 (0.10, 0.26)	\$50,001-\$100,000	8	72
\$100,001+	8	1	0.01 (0.00, 0.02)	\$100,001+	8	8
No information	8	4	0.21 (0.00, 0.41)	No information	8	25
Free	9	169	0.19 (0.16, 0.22)	Free	9	1132
\$1,000-\$10,000	9	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	9	2
\$10,001-\$25,000	9	1	0.07 (0.00, 0.19)	\$10,001-\$25,000	9	8
\$25,001-\$50,000	9	5	0.06 (0.01, 0.11)	\$25,001-\$50,000	9	53
\$50,001-\$100,000	9	15	0.14 (0.07, 0.21)	\$50,001-\$100,000	9	91
\$100,001+	9	3	0.02 (0.00, 0.05)	\$100,001+	9	13
No information	9	5	0.25 (0.03, 0.47)	No information	9	26
Free	10	131	0.15 (0.12, 0.17)	Free	10	1078
\$1,000-\$10,000	10	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	10	0
\$10,001-\$25,000	10	0	0.00 (0.00, 0.00)	\$10,001-\$25,000	10	8
\$25,001-\$50,000	10	10	0.11 (0.04, 0.18)	\$25,001-\$50,000	10	51
\$50,001-\$100,000	10	16	0.15 (0.08, 0.22)	\$50,001-\$100,000	10	92
\$100,001+	10	3	0.02 (0.00, 0.05)	\$100,001+	10	13
No information	10	2	0.10 (0.00, 0.24)	No information	10	31
Free	11	134	0.15 (0.12, 0.17)	Free	11	937
\$1,000-\$10,000	11	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	11	0
\$10,001-\$25,000	11	0	0.00 (0.00, 0.00)	\$10,001-\$25,000	11	7
\$25,001-\$50,000	11	11	0.13 (0.05, 0.20)	\$25,001-\$50,000	11	48
\$50,001-\$100,000	11	14	0.13 (0.06, 0.20)	\$50,001-\$100,000	11	72
\$100,001+	11	0	0.00 (0.00, 0.00)	\$100,001+	11	9
No information	11	4	0.22 (0.00, 0.44)	No information	11	18
Free	12	113	0.12 (0.10, 0.15)	Free	12	892
\$1,000-\$10,000	12	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	12	3
\$10,001-\$25,000	12	1	0.06 (0.00, 0.18)	\$10,001-\$25,000	12	3
\$25,001-\$50,000	12	6	0.07 (0.01, 0.12)	\$25,001-\$50,000	12	49
\$50,001-\$100,000	12	12	0.11 (0.05, 0.18)	\$50,001-\$100,000	12	70
\$100,001+	12	2	0.02 (0.00, 0.04)	\$100,001+	12	10
No information	12	0	0.00 (0.00, 0.00)	No information	12	15
Free	13	130	0.15 (0.12, 0.17)	Free	13	777
\$1,000-\$10,000	13	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	13	1
\$10,001-\$25,000	13	0	0.00 (0.00, 0.00)	\$10,001-\$25,000	13	2
\$25,001-\$50,000	13	7	0.08 (0.02, 0.14)	\$25,001-\$50,000	13	38
\$50,001-\$100,000	13	4	0.04 (0.00, 0.08)	\$50,001-\$100,000	13	68
\$100,001+	13	1	0.01 (0.00, 0.02)	\$100,001+	13	13

Table 8: Count and prevalence of ADHD cases by monthly school fees (Peso) and age in Chile school data for females (left) and males (right) with normal confidence intervals.

School fee	Age band	ADHD cases	Prevalence % (95% CI)	School fee	Age band	ADHD cases	F
Free	6	190	0.22 (0.19, 0.25)	Free	6	363	
\$1,000-\$10,000	6	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	6	0	
\$10,001-\$25,000	6	5	0.33 (0.04, 0.61)	\$10,001-\$25,000	6	2	
\$25,001-\$50,000	6	25	0.30 (0.18, 0.42)	\$25,001-\$50,000	6	39	
\$50,001-\$100,000	6	31	0.31 (0.20, 0.42)	\$50,001-\$100,000	6	66	
\$100,001+	6	3	0.02 (0.00, 0.05)	\$100,001+	6	2	
No information	6	8	0.29 (0.09, 0.49)	No information	6	6	
Free	7	492	0.57 (0.52, 0.62)	Free	7	1031	
\$1,000-\$10,000	7	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	7	1	
\$10,001-\$25,000	7	5	0.32 (0.04, 0.60)	\$10,001-\$25,000	7	12	
\$25,001-\$50,000	7	59	0.68 (0.51, 0.85)	\$25,001-\$50,000	7	104	
\$50,001-\$100,000	7	79	0.76 (0.59, 0.92)	\$50,001-\$100,000	7	137	
\$100,001+	7	3	0.02 (0.00, 0.05)	\$100,001+	7	8	
No information	7	12	0.56 (0.25, 0.88)	No information	7	22	
Free	8	861	1.01 (0.94, 1.07)	Free	8	1723	
\$1,000-\$10,000	8	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	8	0	
\$10,001-\$25,000	8	22	1.46 (0.86, 2.07)	\$10,001-\$25,000	8	18	
\$25,001-\$50,000	8	83	0.98 (0.77, 1.19)	\$25,001-\$50,000	8	124	
\$50,001-\$100,000	8	90	0.89 (0.70, 1.07)	\$50,001-\$100,000	8	234	
\$100,001+	8	14	0.11 (0.05, 0.17)	\$100,001+	8	22	
No information	8	10	0.51 (0.20, 0.83)	No information	8	30	
Free	9	1181	1.34 (1.27, 1.42)	Free	9	2386	
\$1,000-\$10,000	9	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	9	0	
\$10,001-\$25,000	9	17	1.11 (0.59, 1.64)	\$10,001-\$25,000	9	32	
\$25,001-\$50,000	9	121	1.39 (1.14, 1.63)	\$25,001-\$50,000	9	172	
\$50,001-\$100,000	9	170	1.61 (1.37, 1.85)	\$50,001-\$100,000	9	300	
\$100,001+	9	13	0.10 (0.05, 0.16)	\$100,001+	9	28	
No information	9	31	1.55 (1.01, 2.09)	No information	9	49	
Free	10	1422	1.59 (1.50, 1.67)	Free	10	2960	
\$1,000-\$10,000	10	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	10	0	
\$10,001-\$25,000	10	19	1.23 (0.68, 1.78)	\$10,001-\$25,000	10	25	
\$25,001-\$50,000	10	148	1.66 (1.39, 1.92)	\$25,001-\$50,000	10	224	
\$50,001-\$100,000	10	188	1.73 (1.49, 1.98)	\$50,001-\$100,000	10	367	
\$100,001+	10	20	0.16 (0.09, 0.23)	\$100,001+	10	45	
No information	10	24	1.20 (0.72, 1.68)	No information	10	43	
Free	11	1458	1.62 (1.54, 1.71)	Free	11	2977	
\$1,000-\$10,000	11	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	11	0	
\$10,001-\$25,000	11	11	0.69 (0.28, 1.10)	\$10,001-\$25,000	11	45	
\$25,001-\$50,000	11	148	1.69 (1.42, 1.96)	\$25,001-\$50,000	11	220	
\$50,001-\$100,000	11	209	1.94 (1.68, 2.20)	\$50,001-\$100,000	11	357	
\$100,001+	11	29	0.23 (0.15, 0.32)	\$100,001+	11	39	
No information	11	18	1.00 (0.54, 1.45)	No information	11	53	
Free	12	1326	1.46 (1.38, 1.54)	Free	12	2845	
\$1,000-\$10,000	12	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	12	0	
\$10,001-\$25,000	12	18	1.11 (0.60, 1.63)	\$10,001-\$25,000	12	33	
\$25,001-\$50,000	12	147	1.68 (1.41, 1.95)	\$25,001-\$50,000	12	237	
\$50,001-\$100,000	12	198	1.86 (1.60, 2.11)	\$50,001-\$100,000	12	347	
\$100,001+	12	28	0.23 (0.14, 0.31)	\$100,001+	12	52	
No information	12	26	1.55 (0.96, 2.14)	No information	12	68	
Free	13	1147	1.31 (1.23, 1.38)	Free	13	2649	
\$1,000-\$10,000	13	0	0.00 (0.00, 0.00)	\$1,000-\$10,000	13	0	
\$10,001-\$25,000	13	17	1.07 (0.57, 1.58)	\$10,001-\$25,000	13	25	
\$25,001-\$50,000	13	100	1.18 (0.95, 1.41)	\$25,001-\$50,000	13	235	
\$50,001-\$100,000	13	171	1.64 (1.40, 1.88)	\$50,001-\$100,000	13	379	
\$100,001+	13	24	0.20 (0.12, 0.28)	\$100,001+	13	48	

Autism prevalence by SES status



Figure 9: Sample prevalence of autism by socio-economic (SES) status of student's family, age band and sex. Bars show 95% normal confidence intervals.

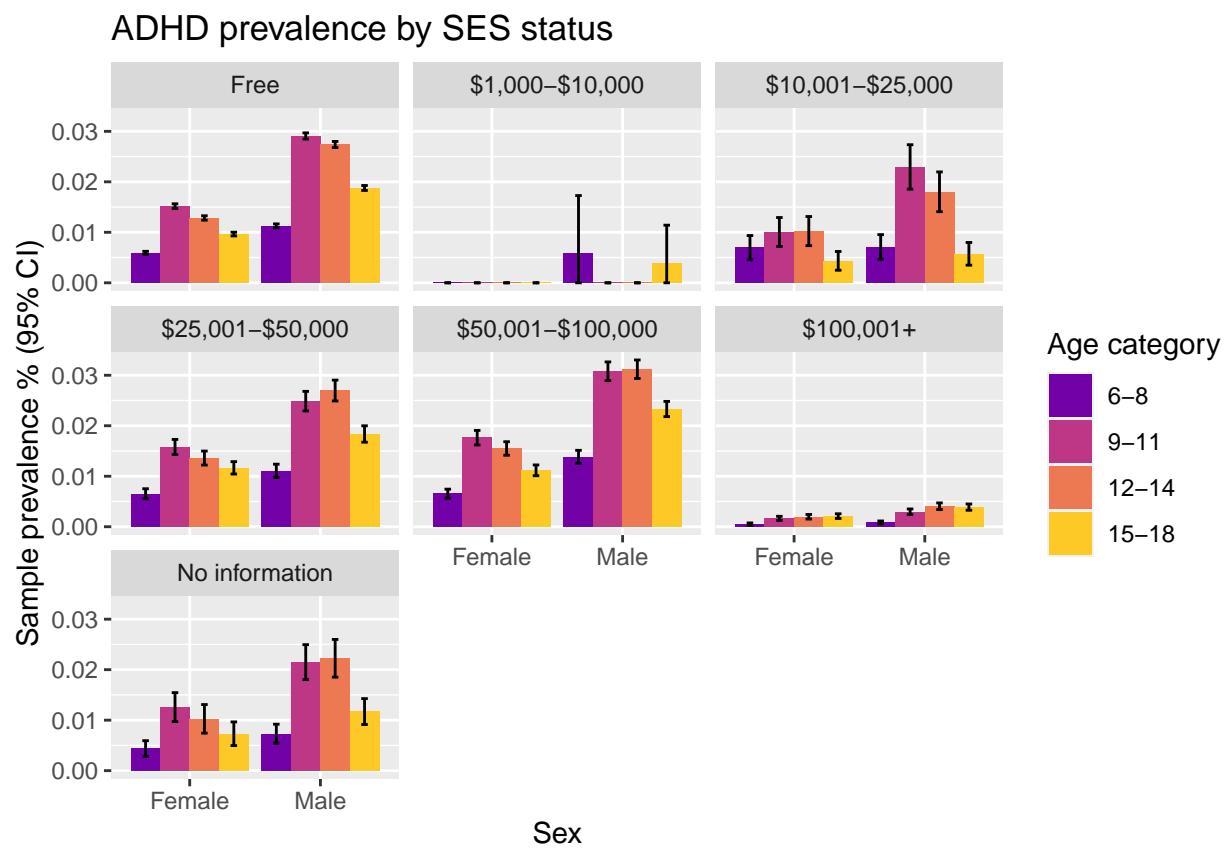


Figure 10: Sample prevalence of ADHD by socio-economic (SES) status of student's family, age band and sex. Bars show 95% normal confidence intervals.

Table 9: Count and prevalence of autism cases by ethnicity and age in Chile school data for females (left) and males (right) with normal confidence intervals.

Ethnicity	Age band	Autism cases	Prevalence % (95% CI)
Mapuche	6	9	0.14 (0.05, 0.23)
No Indigenous group	6	281	0.24 (0.22, 0.27)
Other ethnic group	6	4	0.22 (0.00, 0.43)
Mapuche	7	11	0.15 (0.06, 0.24)
No Indigenous group	7	225	0.20 (0.17, 0.22)
Other ethnic group	7	5	0.31 (0.04, 0.58)
Mapuche	8	13	0.18 (0.08, 0.27)
No Indigenous group	8	222	0.20 (0.17, 0.23)
Other ethnic group	8	4	0.27 (0.01, 0.53)
Mapuche	9	6	0.08 (0.02, 0.15)
No Indigenous group	9	188	0.16 (0.14, 0.19)
Other ethnic group	9	4	0.28 (0.01, 0.55)
Mapuche	10	7	0.09 (0.02, 0.16)
No Indigenous group	10	153	0.13 (0.11, 0.15)
Other ethnic group	10	2	0.14 (0.00, 0.33)
Mapuche	11	3	0.04 (0.00, 0.08)
No Indigenous group	11	157	0.14 (0.11, 0.16)
Other ethnic group	11	3	0.20 (0.00, 0.43)
Mapuche	12	5	0.06 (0.01, 0.12)
No Indigenous group	12	129	0.11 (0.09, 0.13)
Other ethnic group	12	0	0.00 (0.00, 0.00)
Mapuche	13	5	0.07 (0.01, 0.12)
No Indigenous group	13	136	0.12 (0.10, 0.14)
Other ethnic group	13	4	0.27 (0.01, 0.53)
Mapuche	14	3	0.04 (0.00, 0.09)
No Indigenous group	14	107	0.10 (0.08, 0.12)
Other ethnic group	14	2	0.16 (0.00, 0.37)
Mapuche	15	2	0.03 (0.00, 0.08)
No Indigenous group	15	94	0.09 (0.07, 0.10)
Other ethnic group	15	0	0.00 (0.00, 0.00)
Mapuche	16	0	0.00 (0.00, 0.00)
No Indigenous group	16	100	0.09 (0.07, 0.11)
Other ethnic group	16	0	0.00 (0.00, 0.00)
Mapuche	17	1	0.02 (0.00, 0.05)
No Indigenous group	17	53	0.05 (0.04, 0.06)
Other ethnic group	17	1	0.08 (0.00, 0.24)
Mapuche	18	0	0.00 (0.00, 0.00)
No Indigenous group	18	39	0.11 (0.08, 0.15)
Other ethnic group	18	0	0.00 (0.00, 0.00)
Ethnicity	Age band	Autism cases	Prevalence % (95% CI)
Mapuche	6	64	0.95 (0.71, 1.18)
No Indigenous group	6	1420	1.19 (1.13, 1.25)
Other ethnic group	6	28	1.48 (0.94, 2.03)
Mapuche	7	82	1.09 (0.86, 1.33)
No Indigenous group	7	1364	1.14 (1.08, 1.20)
Other ethnic group	7	37	2.08 (1.41, 2.74)
Mapuche	8	64	0.86 (0.65, 1.07)
No Indigenous group	8	1305	1.12 (1.06, 1.18)
Other ethnic group	8	24	1.51 (0.91, 2.12)
Mapuche	9	59	0.78 (0.58, 0.98)
No Indigenous group	9	1247	18 1.04 (0.98, 1.09)
Other ethnic group	9	19	1.23 (0.68, 1.78)
Mapuche	10	49	0.63 (0.45, 0.80)
No Indigenous group	10	1211	0.98 (0.93, 1.04)
Other ethnic group	10	13	0.86 (0.40, 1.33)

Table 10: Count and prevalence of ADHD cases by ethnicity and age in Chile school data for females (left) and males (right) with normal confidence intervals.

Ethnicity	Age band	ADHD cases	Prevalence % (95% CI)
Mapuche	6	12	0.19 (0.08, 0.29)
No Indigenous group	6	247	0.21 (0.19, 0.24)
Other ethnic group	6	3	0.16 (0.00, 0.35)
Mapuche	7	35	0.48 (0.32, 0.64)
No Indigenous group	7	611	0.54 (0.50, 0.58)
Other ethnic group	7	4	0.25 (0.01, 0.49)
Mapuche	8	74	1.00 (0.78, 1.23)
No Indigenous group	8	993	0.89 (0.83, 0.95)
Other ethnic group	8	13	0.87 (0.40, 1.33)
Mapuche	9	77	1.04 (0.81, 1.27)
No Indigenous group	9	1444	1.26 (1.20, 1.33)
Other ethnic group	9	12	0.84 (0.37, 1.31)
Mapuche	10	106	1.43 (1.16, 1.70)
No Indigenous group	10	1699	1.46 (1.39, 1.52)
Other ethnic group	10	16	1.12 (0.57, 1.67)
Mapuche	11	87	1.16 (0.91, 1.40)
No Indigenous group	11	1766	1.52 (1.45, 1.59)
Other ethnic group	11	20	1.36 (0.77, 1.95)
Mapuche	12	90	1.17 (0.93, 1.40)
No Indigenous group	12	1639	1.41 (1.34, 1.47)
Other ethnic group	12	14	0.98 (0.47, 1.50)
Mapuche	13	80	1.05 (0.82, 1.28)
No Indigenous group	13	1380	1.22 (1.16, 1.28)
Other ethnic group	13	12	0.81 (0.35, 1.26)
Mapuche	14	60	0.86 (0.64, 1.07)
No Indigenous group	14	1094	1.00 (0.94, 1.05)
Other ethnic group	14	16	1.25 (0.64, 1.86)
Mapuche	15	51	0.85 (0.62, 1.08)
No Indigenous group	15	1006	0.93 (0.87, 0.99)
Other ethnic group	15	11	1.10 (0.45, 1.74)
Mapuche	16	31	0.51 (0.33, 0.69)
No Indigenous group	16	985	0.92 (0.86, 0.97)
Other ethnic group	16	7	0.59 (0.16, 1.03)
Mapuche	17	44	0.72 (0.51, 0.94)
No Indigenous group	17	940	0.88 (0.82, 0.94)
Other ethnic group	17	10	0.80 (0.31, 1.30)
Mapuche	18	18	0.77 (0.42, 1.13)
No Indigenous group	18	369	1.06 (0.95, 1.17)
Other ethnic group	18	3	0.75 (0.00, 1.59)
Ethnicity	Age band	ADHD cases	Prevalence % (95% CI)
Mapuche	6	37	0.55 (0.37, 0.72)
No Indigenous group	6	438	0.37 (0.33, 0.40)
Other ethnic group	6	3	0.16 (0.00, 0.34)
Mapuche	7	78	1.04 (0.81, 1.27)
No Indigenous group	7	1226	1.03 (0.97, 1.09)
Other ethnic group	7	11	0.62 (0.25, 0.98)
Mapuche	8	125	1.68 (1.39, 1.98)
No Indigenous group	8	2002	1.71 (1.64, 1.79)
Other ethnic group	8	24	1.51 (0.91, 2.12)
Mapuche	9	163	2.16 (1.83, 2.49)
No Indigenous group	9	2778	19 2.31 (2.22, 2.39)
Other ethnic group	9	26	1.69 (1.04, 2.33)
Mapuche	10	215	2.74 (2.38, 3.10)
No Indigenous group	10	3413	2.77 (2.68, 2.86)
Other ethnic group	10	36	2.39 (1.62, 3.16)

Autism prevalence by ethnicity

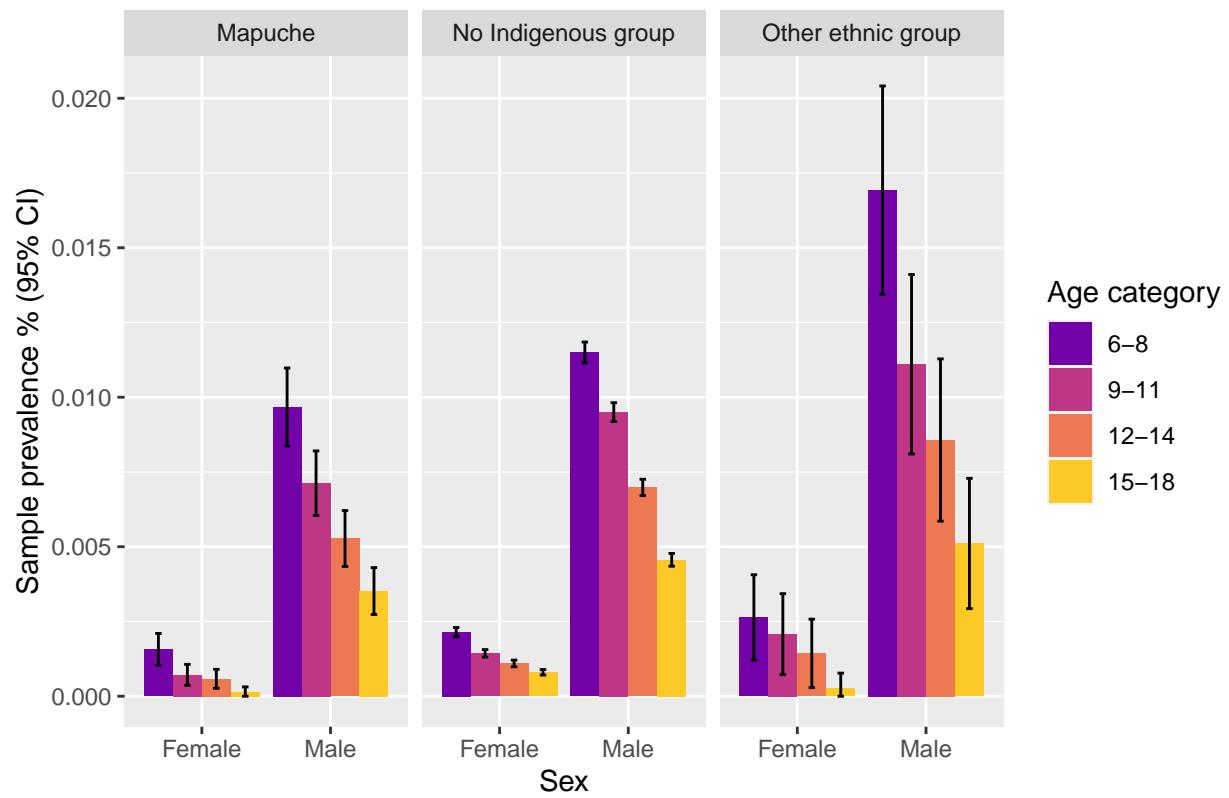


Figure 11: Sample prevalence of autism by ethnicity, age band and sex. Bars show 95% normal confidence intervals.

ADHD prevalence by ethnicity

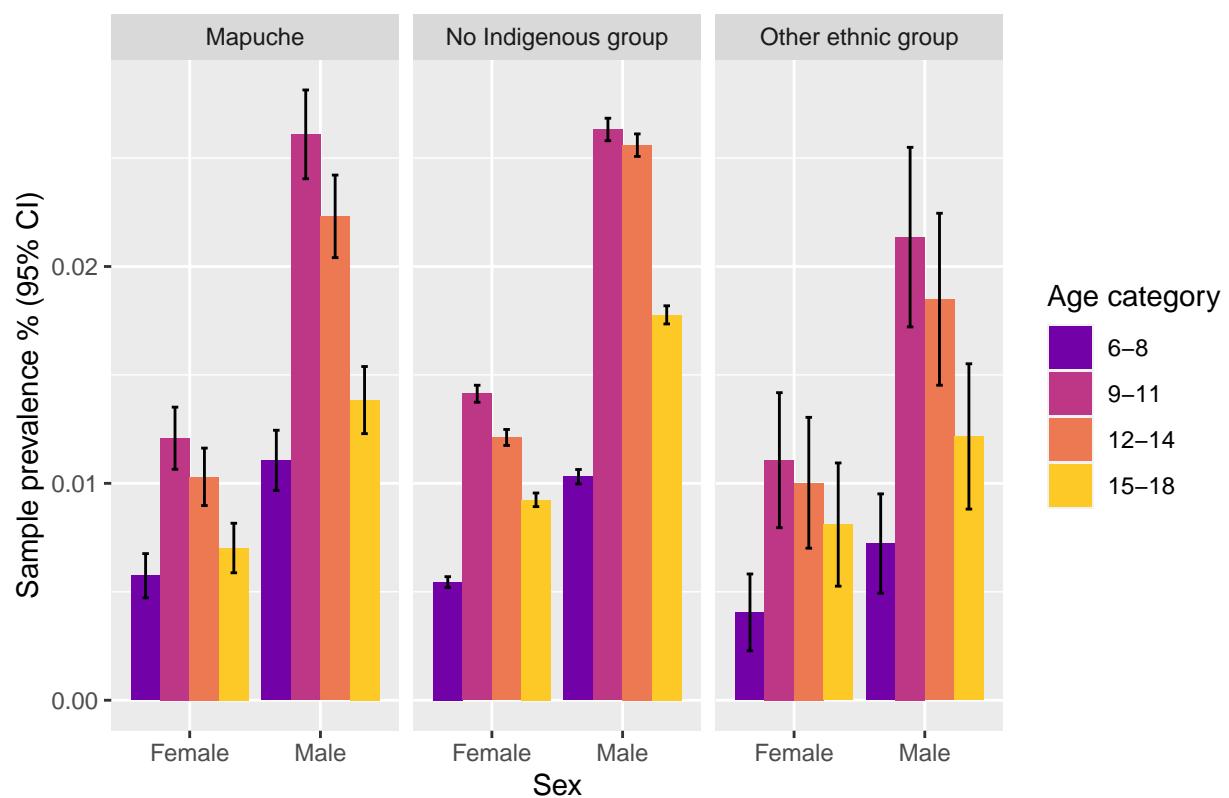


Figure 12: Sample prevalence of ADHD by ethnicity, age band and sex. Bars show 95% normal confidence intervals.

Table 11: Count and prevalence of autism cases by rurality of students' school and age in Chile school data for females (left) and males (right) with normal confidence intervals.

School's rurality	Age band	Autism cases	Prevalence % (95% CI)	School's rurality	Age band	Autism cases	P
Rural	6	33	0.28 (0.19, 0.38)	Rural	6	168	
Urban	6	261	0.23 (0.21, 0.26)	Urban	6	1344	
Rural	7	31	0.26 (0.17, 0.35)	Rural	7	184	
Urban	7	210	0.19 (0.17, 0.22)	Urban	7	1299	
Rural	8	29	0.24 (0.15, 0.33)	Rural	8	167	
Urban	8	210	0.19 (0.17, 0.22)	Urban	8	1226	
Rural	9	26	0.21 (0.13, 0.29)	Rural	9	166	
Urban	9	172	0.16 (0.13, 0.18)	Urban	9	1159	
Rural	10	13	0.10 (0.05, 0.16)	Rural	10	157	
Urban	10	149	0.13 (0.11, 0.15)	Urban	10	1116	
Rural	11	22	0.17 (0.10, 0.24)	Rural	11	149	
Urban	11	141	0.13 (0.10, 0.15)	Urban	11	942	
Rural	12	20	0.17 (0.10, 0.25)	Rural	12	120	
Urban	12	114	0.10 (0.08, 0.12)	Urban	12	922	
Rural	13	20	0.19 (0.11, 0.27)	Rural	13	107	
Urban	13	125	0.11 (0.09, 0.13)	Urban	13	805	
Rural	14	4	0.09 (0.00, 0.17)	Rural	14	64	
Urban	14	108	0.10 (0.08, 0.11)	Urban	14	629	
Rural	15	2	0.05 (0.00, 0.13)	Rural	15	35	
Urban	15	94	0.08 (0.07, 0.10)	Urban	15	549	
Rural	16	6	0.17 (0.04, 0.31)	Rural	16	30	
Urban	16	94	0.08 (0.07, 0.10)	Urban	16	535	
Rural	17	0	0.00 (0.00, 0.00)	Rural	17	16	
Urban	17	55	0.05 (0.04, 0.06)	Urban	17	420	
Rural	18	1	0.08 (0.00, 0.25)	Rural	18	11	
Urban	18	38	0.10 (0.07, 0.14)	Urban	18	251	

Table 12: Count and prevalence of ADHD cases by rurality of students' school and age in Chile school data for females (left) and males (right) with normal confidence intervals.

School's rurality	Age band	ADHD cases	Prevalence % (95% CI)	School's rurality	Age band	ADHD cases	Prevalence % (95% CI)
Rural	6	25	0.21 (0.13, 0.30)	Rural	6	65	
Urban	6	237	0.21 (0.19, 0.24)	Urban	6	413	
Rural	7	58	0.48 (0.36, 0.60)	Rural	7	172	
Urban	7	592	0.54 (0.50, 0.58)	Urban	7	1143	
Rural	8	138	1.14 (0.95, 1.33)	Rural	8	266	
Urban	8	942	0.87 (0.81, 0.92)	Urban	8	1885	
Rural	9	155	1.26 (1.06, 1.45)	Rural	9	382	
Urban	9	1378	1.24 (1.18, 1.31)	Urban	9	2585	
Rural	10	177	1.41 (1.20, 1.61)	Rural	10	483	
Urban	10	1644	1.45 (1.38, 1.52)	Urban	10	3181	
Rural	11	200	1.56 (1.35, 1.78)	Rural	11	439	
Urban	11	1673	1.49 (1.42, 1.56)	Urban	11	3252	
Rural	12	141	1.23 (1.03, 1.43)	Rural	12	402	
Urban	12	1602	1.40 (1.34, 1.47)	Urban	12	3180	
Rural	13	123	1.16 (0.96, 1.37)	Rural	13	344	
Urban	13	1349	1.21 (1.15, 1.27)	Urban	13	3032	
Rural	14	59	1.26 (0.94, 1.58)	Rural	14	200	
Urban	14	1111	0.98 (0.92, 1.04)	Urban	14	2556	
Rural	15	45	1.21 (0.86, 1.56)	Rural	15	106	
Urban	15	1023	0.92 (0.86, 0.98)	Urban	15	2246	
Rural	16	29	0.84 (0.54, 1.15)	Rural	16	81	
Urban	16	994	0.89 (0.84, 0.95)	Urban	16	2016	
Rural	17	30	0.93 (0.60, 1.26)	Rural	17	71	
Urban	17	964	0.87 (0.81, 0.92)	Urban	17	1805	
Rural	18	8	0.67 (0.21, 1.13)	Rural	18	29	
Urban	18	382	1.05 (0.95, 1.16)	Urban	18	811	

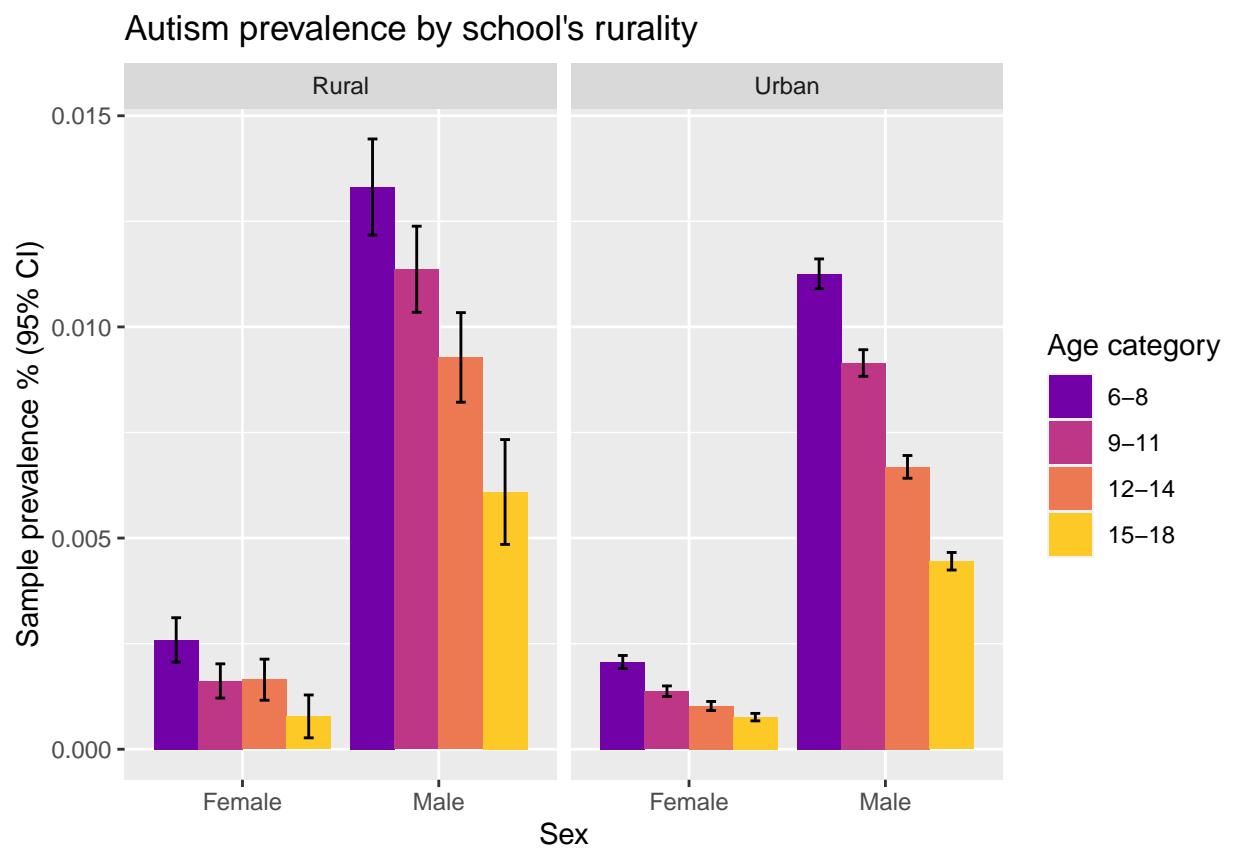


Figure 13: Sample prevalence of autism by school's rurality, age band and sex. Bars show 95% normal confidence intervals.

ADHD prevalence by school's rurality

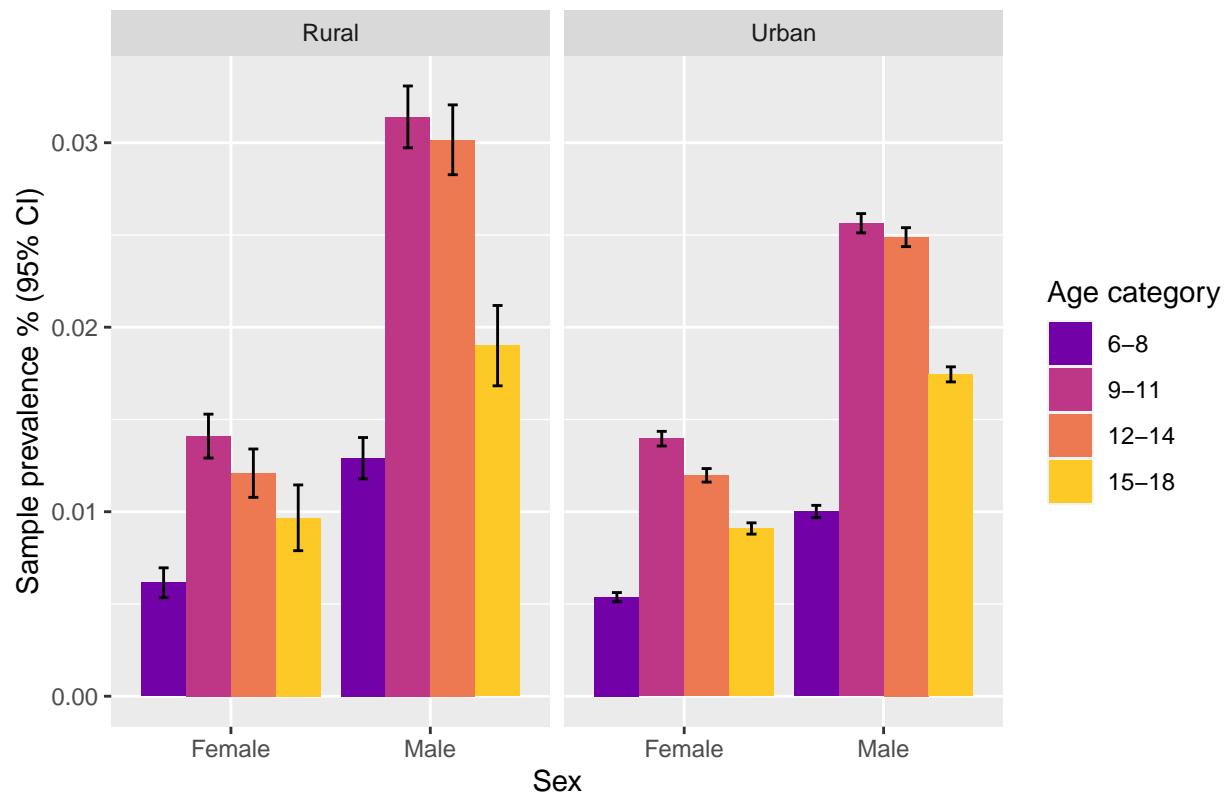


Figure 14: Sample prevalence of ADHD by school's rurality, age band and sex. Bars show 95% normal confidence intervals.

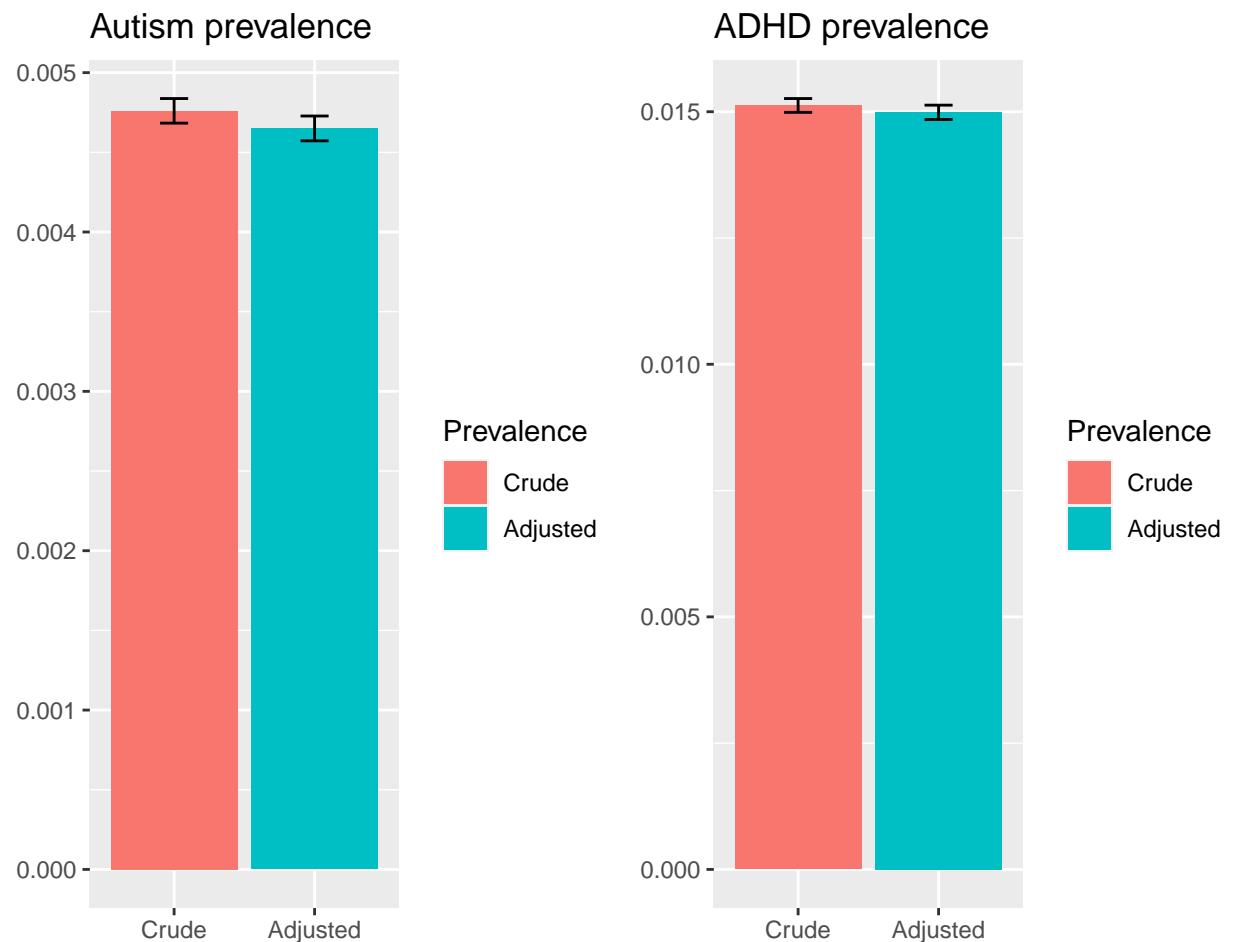


Figure 15: Crude and age- and sex-adjusted sample prevalences of autism and ADHD. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

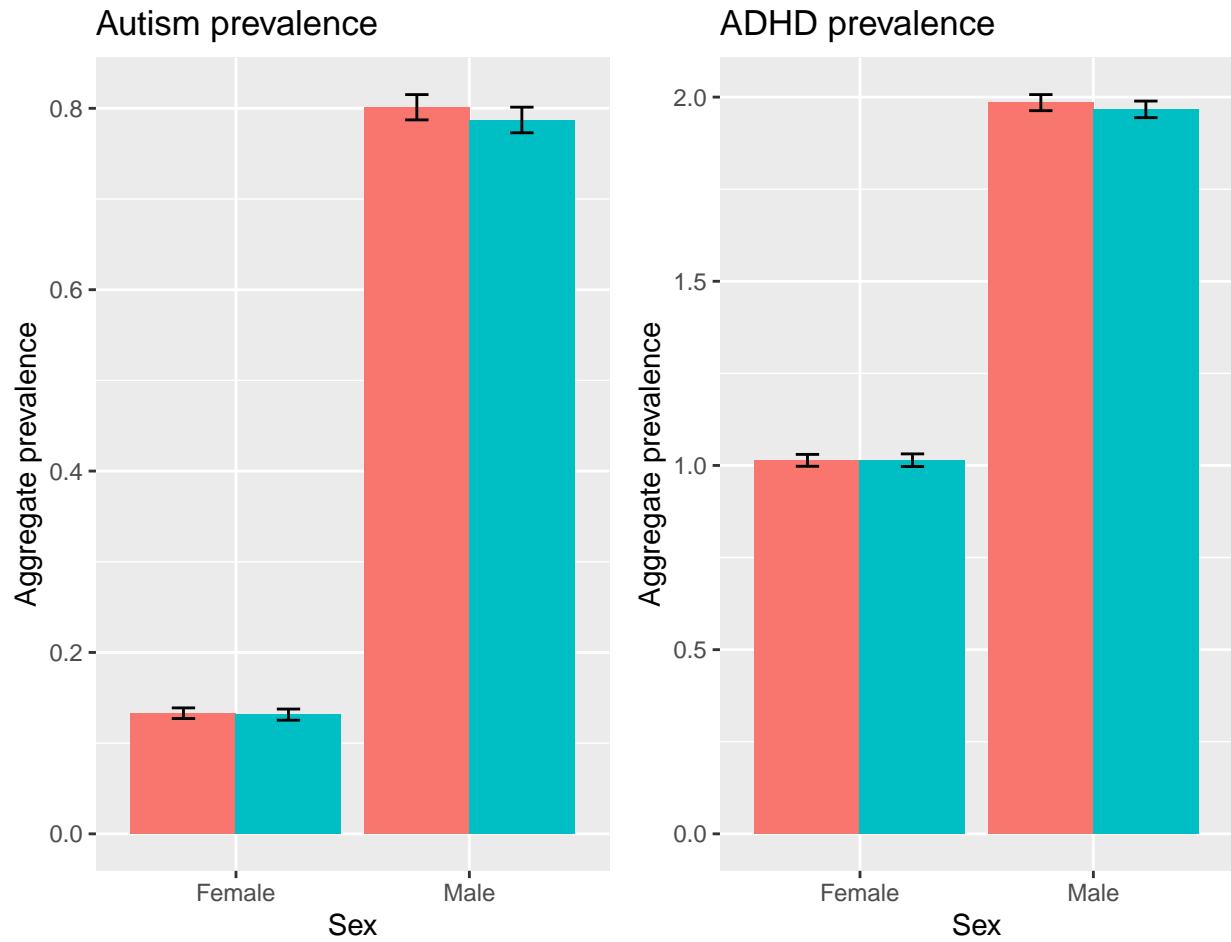


Figure 16: Crude and age- and sex-adjusted sample prevalences of autism and ADHD by sex. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

		Biobío	0.00383	0.00431	0.00479
## 9		Chiloé	0.00375	0.00450	0.00524
## 10		Concepción	0.00732	0.00784	0.00837
## 11		Coquimbo	0.00378	0.00412	0.00445
## 12		Libertador B.O'Higgins	0.00402	0.00434	0.00467
## 13		Maule	0.00280	0.00305	0.00331
## 14		Reloncaví	0.00379	0.00424	0.00469
## 15		Iquique	0.00403	0.00453	0.00503
## 16		Magallanes	0.00725	0.00831	0.00938
## 17		Metropolitano Central	0.00385	0.00421	0.00457
## 18		Metropolitano Norte	0.00269	0.00294	0.00318
## 19		Metropolitano Occidente	0.00336	0.00358	0.00381
## 20		Metropolitano Oriente	0.00279	0.00304	0.00329
## 21		Metropolitano Sur	0.00385	0.00413	0.00442
## 22		Metropolitano Sur Oriente	0.00342	0.00367	0.00391
## 23		Osorno	0.00380	0.00445	0.00510
## 24		Talcahuano	0.00763	0.00839	0.00916
## 25		Valdivia	0.00269	0.00311	0.00354
## 26		Valparaíso San Antonio	0.00635	0.00694	0.00752
## 27		Viña del Mar Quillota	0.00632	0.00670	0.00709
## 28		Ñuble	0.01238	0.01317	0.01396
##	adjusted_ci_lower	adjusted_rate	adjusted_ci_upper		
## 1	0.00369	0.00427	0.00499		
## 2	0.00634	0.00752	0.00895		
## 3	0.00773	0.00825	0.00882		
## 4	0.00245	0.00300	0.00376		
## 5	0.00338	0.00372	0.00410		
## 6	0.00624	0.00715	0.00825		
## 7	0.00539	0.00614	0.00704		
## 8	0.00266	0.00312	0.00368		
## 9	0.00373	0.00420	0.00475		
## 10	0.00364	0.00433	0.00518		
## 11	0.00718	0.00771	0.00828		
## 12	0.00364	0.00396	0.00433		
## 13	0.00393	0.00425	0.00460		
## 14	0.00277	0.00303	0.00332		
## 15	0.00373	0.00417	0.00467		
## 16	0.00384	0.00431	0.00486		
## 17	0.00724	0.00831	0.00958		
## 18	0.00380	0.00416	0.00456		
## 19	0.00262	0.00287	0.00314		
## 20	0.00316	0.00338	0.00361		
## 21	0.00274	0.00298	0.00325		
## 22	0.00371	0.00398	0.00427		
## 23	0.00339	0.00364	0.00390		
## 24	0.00371	0.00433	0.00507		
## 25	0.00739	0.00813	0.00898		
## 26	0.00260	0.00300	0.00349		
## 27	0.00625	0.00683	0.00749		
## 28	0.00620	0.00658	0.00699		
## 29	0.01208	0.01286	0.01371		
##	health_service_name	crude_ci_lower	crude_rate	crude_ci_upper	
## 1	Aconcagua	0.01950	0.02079	0.02209	

## 2	Aisén	0.02027	0.02232	0.02438
## 3	Antofagasta	0.00945	0.01001	0.01057
## 4	Araucanía Norte	0.01217	0.01334	0.01452
## 5	Araucanía Sur	0.01358	0.01422	0.01485
## 6	Arauco	0.01501	0.01641	0.01782
## 7	Arica	0.01040	0.01139	0.01237
## 8	Atacama	0.00435	0.00492	0.00549
## 9	Biobío	0.02159	0.02269	0.02378
## 10	Chiloé	0.02771	0.02960	0.03149
## 11	Concepción	0.02842	0.02942	0.03043
## 12	Coquimbo	0.01907	0.01980	0.02053
## 13	Libertador B.O'Higgins	0.01662	0.01726	0.01789
## 14	Maule	0.01143	0.01193	0.01243
## 15	Reloncaví	0.00952	0.01022	0.01092
## 16	Iquique	0.01403	0.01493	0.01583
## 17	Magallanes	0.02870	0.03072	0.03274
## 18	Metropolitano Central	0.01457	0.01526	0.01594
## 19	Metropolitano Norte	0.01361	0.01416	0.01471
## 20	Metropolitano Occidente	0.01054	0.01093	0.01131
## 21	Metropolitano Oriente	0.01163	0.01213	0.01263
## 22	Metropolitano Sur	0.01372	0.01424	0.01476
## 23	Metropolitano Sur Oriente	0.01512	0.01562	0.01611
## 24	Osorno	0.00946	0.01046	0.01145
## 25	Talcahuano	0.02926	0.03071	0.03215
## 26	Valdivia	0.00998	0.01077	0.01156
## 27	Valparaíso San Antonio	0.01132	0.01209	0.01286
## 28	Viña del Mar Quillota	0.01123	0.01174	0.01224
## 29	Ñuble	0.02019	0.02120	0.02220
##	adjusted_ci_lower	adjusted_rate	adjusted_ci_upper	
## 1	0.01913	0.02044	0.02187	
## 2	0.01970	0.02171	0.02398	
## 3	0.00925	0.00983	0.01045	
## 4	0.01179	0.01294	0.01426	
## 5	0.01320	0.01384	0.01452	
## 6	0.01497	0.01642	0.01806	
## 7	0.01022	0.01122	0.01237	
## 8	0.00431	0.00488	0.00556	
## 9	0.02146	0.02260	0.02382	
## 10	0.02680	0.02867	0.03069	
## 11	0.02889	0.02998	0.03112	
## 12	0.01922	0.02000	0.02082	
## 13	0.01626	0.01691	0.01759	
## 14	0.01105	0.01154	0.01207	
## 15	0.00923	0.00991	0.01065	
## 16	0.01403	0.01497	0.01599	
## 17	0.02853	0.03064	0.03294	
## 18	0.01426	0.01495	0.01568	
## 19	0.01361	0.01417	0.01476	
## 20	0.01082	0.01123	0.01166	
## 21	0.01146	0.01196	0.01248	
## 22	0.01354	0.01407	0.01462	
## 23	0.01481	0.01531	0.01583	
## 24	0.00922	0.01020	0.01129	
## 25	0.02872	0.03022	0.03182	

```

## 26      0.00983    0.01062    0.01150
## 27      0.01129    0.01208    0.01294
## 28      0.01097    0.01147    0.01201
## 29      0.02001    0.02105    0.02217

```

Autism prevalence by health service



Figure 17: Crude and age- and sex-adjusted sample prevalences of autism by health service. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

Adjusted school fees.

```

## # A tibble: 7 x 7
##   school_fee      crude_ci_lower crude_rate crude_ci_~1 adjus~2 adjus~3 adjus~4
##   <fct>          <dbl>        <dbl>        <dbl>        <dbl>        <dbl>        <dbl>
## 1 Free            0.00556     0.00566     0.00576     0.00537     0.00547     0.00557
## 2 $1,000-$10,000 0.00221     0.00714     0.0121      0.00293     0.00686     0.0325 
## 3 $10,001-$25,000 0.00154     0.002       0.00246     0.00157     0.00203     0.00269 
## 4 $25,001-$50,000 0.0028      0.00303     0.00327     0.0029      0.00316     0.00345 
## 5 $50,001-$100,000 0.00365     0.00388     0.00411     0.00373     0.00399     0.00427 
## 6 $100,001+        0.00039     0.00047     0.00055     0.00039     0.00046     0.00056 
## 7 No information   0.00442     0.00504     0.00566     0.00403     0.00458     0.00524 
## # ... with abbreviated variable names 1: crude_ci_upper, 2: adjusted_ci_lower,
## #   3: adjusted_rate, 4: adjusted_ci_upper

## # A tibble: 7 x 7
##   school_fee      crude_ci_lower crude_rate crude_ci_~1 adjus~2 adjus~3 adjus~4
##   <fct>          <dbl>        <dbl>        <dbl>        <dbl>        <dbl>        <dbl>

```

ADHD prevalence by health service



Figure 18: Crude and age- and sex-adjusted sample prevalences of ADHD by health service. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

```

## 1 Free 0.0163 0.0165 0.0167 0.0160 0.0162 0.0164
## 2 $1,000-$10,000 0 0.00179 0.00426 0.00013 0.00108 0.0274
## 3 $10,001-$25,000 0.00953 0.0106 0.0116 0.0094 0.0105 0.0117
## 4 $25,001-$50,000 0.0154 0.0159 0.0165 0.0159 0.0165 0.0172
## 5 $50,001-$100,000 0.0184 0.0190 0.0195 0.0184 0.0190 0.0196
## 6 $100,001+ 0.00208 0.00225 0.00242 0.00212 0.00231 0.00251
## 7 No information 0.0111 0.0121 0.0131 0.0113 0.0122 0.0133
## # ... with abbreviated variable names 1: crude_ci_upper, 2: adjusted_ci_lower,
## # 3: adjusted_rate, 4: adjusted_ci_upper

```

Autism prevalence by SES status

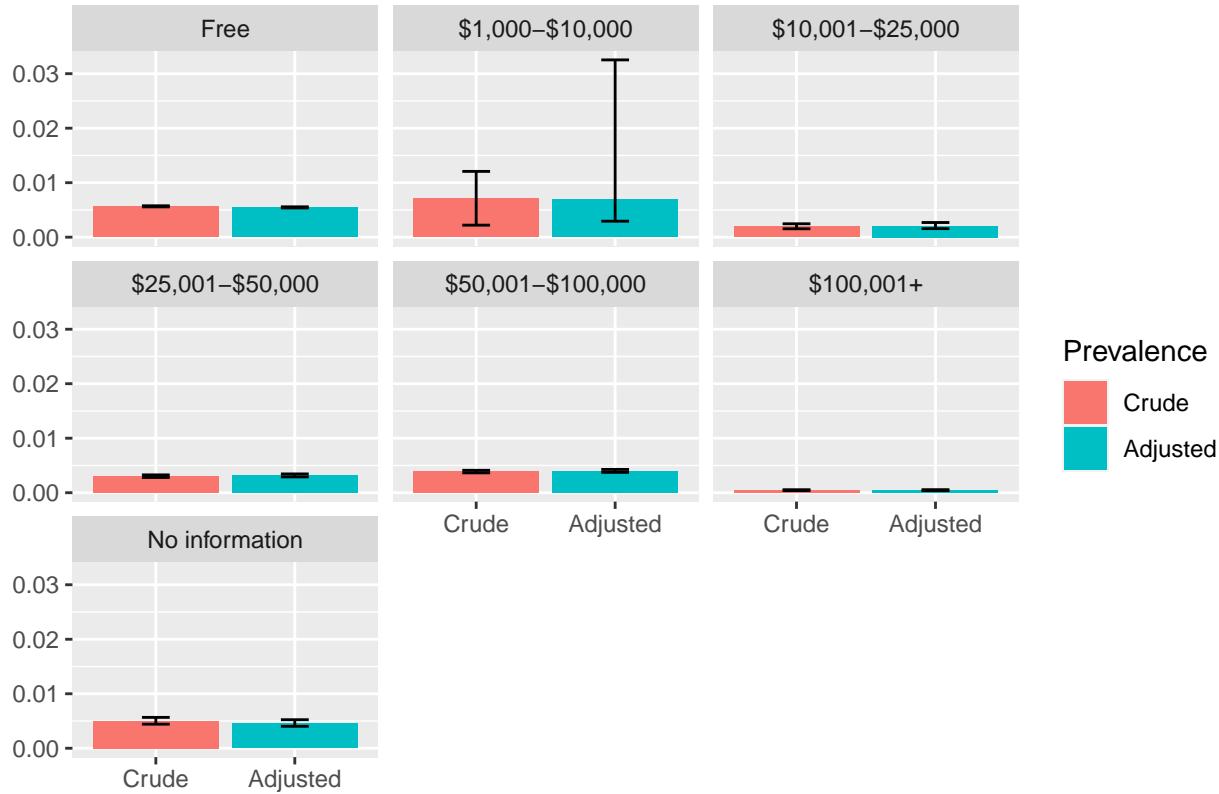


Figure 19: Crude and age- and sex-adjusted sample prevalences of autism by socio-economic (SES) status of student's family. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

Adjusted ethnicity.

```

## # A tibble: 3 x 7
##   ethnic_2_group      crude_ci_lower crude_rate crude_~1 adjus~2 adjus~3 adjus~4
##   <chr>                  <dbl>        <dbl>     <dbl>    <dbl>    <dbl>    <dbl>
## 1 Mapuche            0.00335     0.00363  0.00391 0.0032  0.00347 0.00376
## 2 No Indigenous group 0.00473     0.00481  0.00489 0.00462 0.0047  0.00479
## 3 Other ethnic group  0.00557     0.0064   0.00723 0.00523 0.00604 0.00702
## # ... with abbreviated variable names 1: crude_ci_upper, 2: adjusted_ci_lower,
## # 3: adjusted_rate, 4: adjusted_ci_upper
## # # A tibble: 3 x 7
##   ethnic_2_group      crude_ci_lower crude_rate crude_~1 adjus~2 adjus~3 adjus~4
##   <chr>                  <dbl>        <dbl>     <dbl>    <dbl>    <dbl>    <dbl>

```

ADHD prevalence by SES status



Figure 20: Crude and age- and sex-adjusted sample prevalences of ADHD by socio-economic (SES) status of student's family. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

```

##   <chr>          <dbl>      <dbl>      <dbl>      <dbl>      <dbl>      <dbl>
## 1 Mapuche        0.0132     0.0138     0.0143     0.0128     0.0133     0.0139
## 2 No Indigenous group 0.0151     0.0152     0.0154     0.0150     0.0151     0.0153
## 3 Other ethnic group 0.0104     0.0115     0.0126     0.0106     0.0118     0.0132
## # ... with abbreviated variable names 1: crude_ci_upper, 2: adjusted_ci_lower,
## #   3: adjusted_rate, 4: adjusted_ci_upper

```

Adjusted rurality.

Autism prevalence by school's rurality

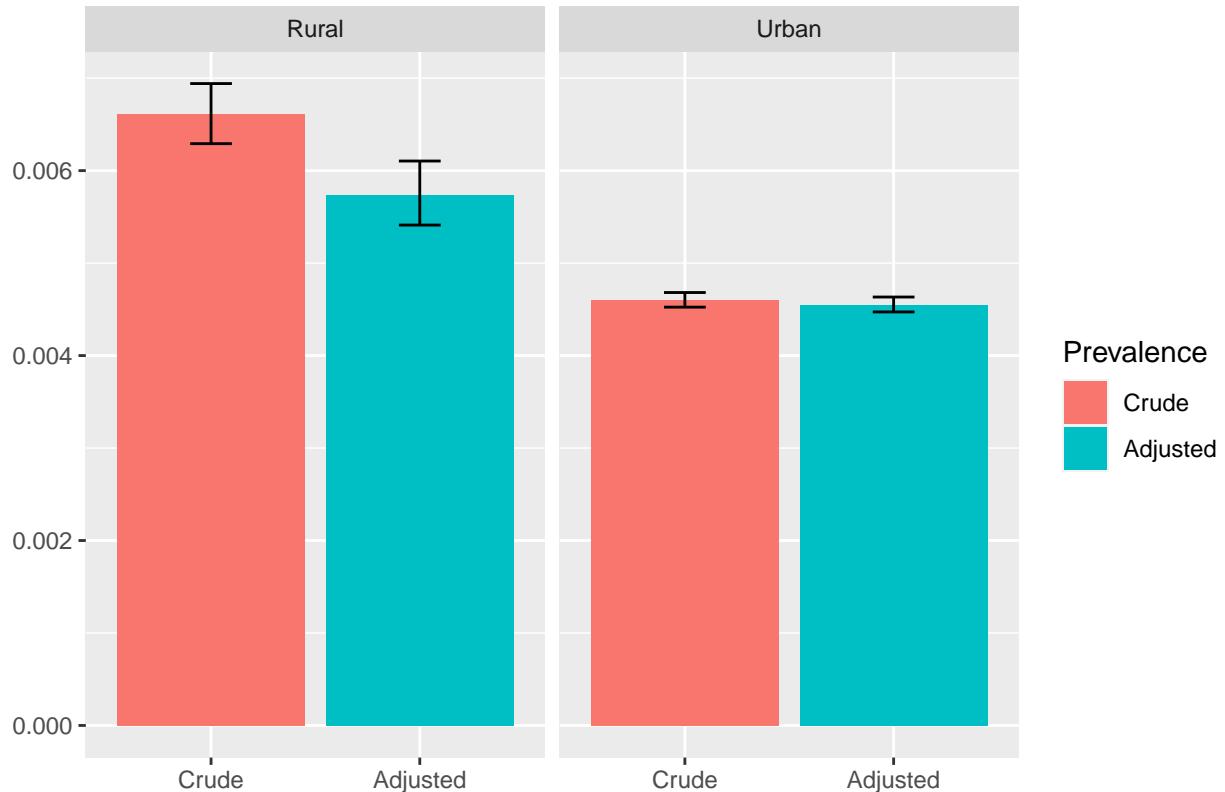


Figure 21: Crude and age- and sex-adjusted sample prevalences of autism by school's rurality. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

5.3 Clinical data

TODO - table summarising data content. Number of unique patients

ADHD prevalence by rurality

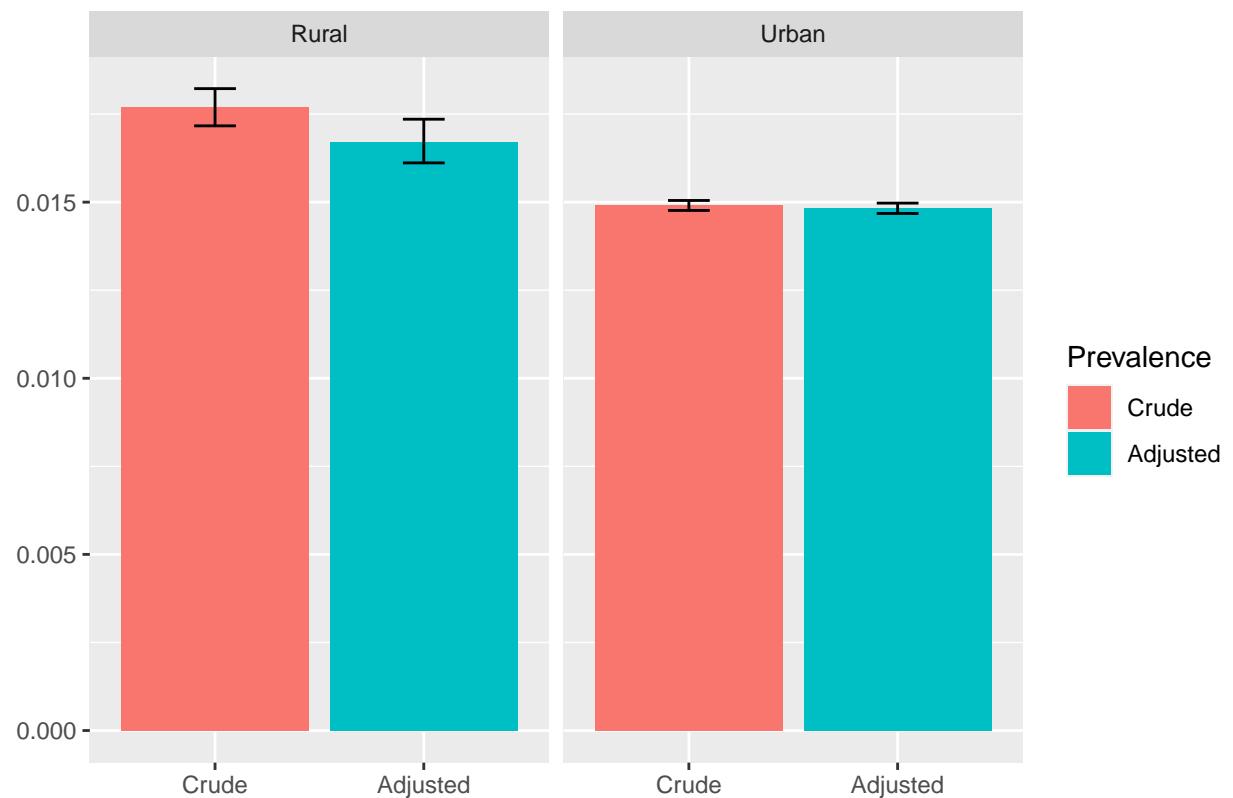
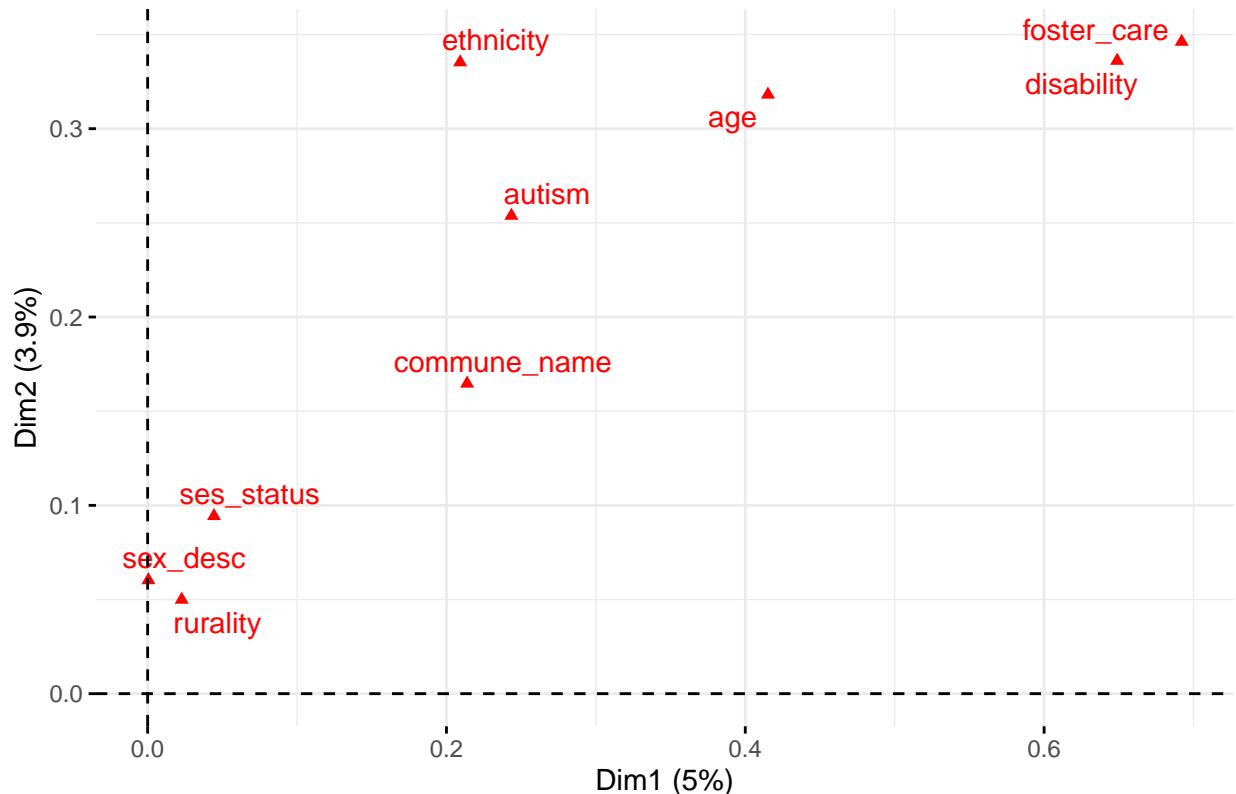


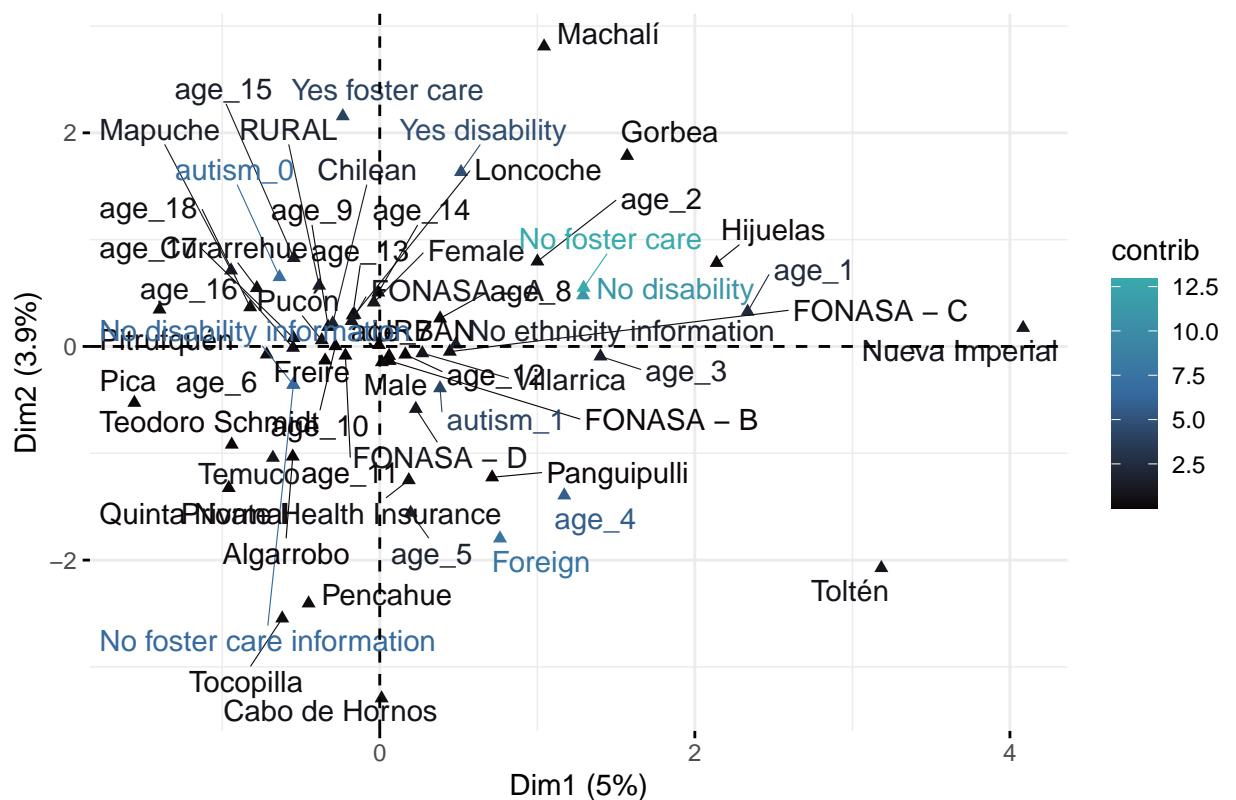
Figure 22: Crude and age- and sex-adjusted sample prevalences of ADHD by school's rurality. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

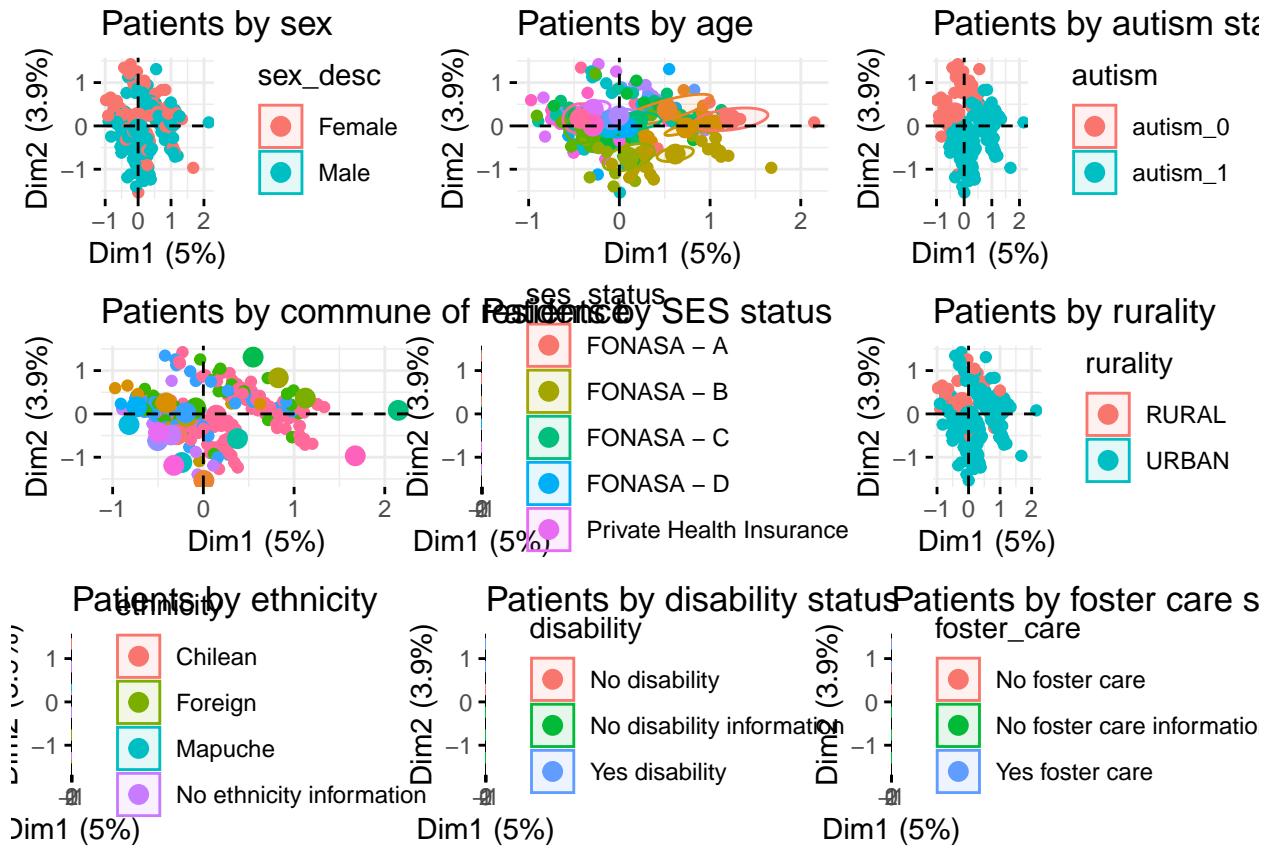
5.4 MCA

Variables – MCA

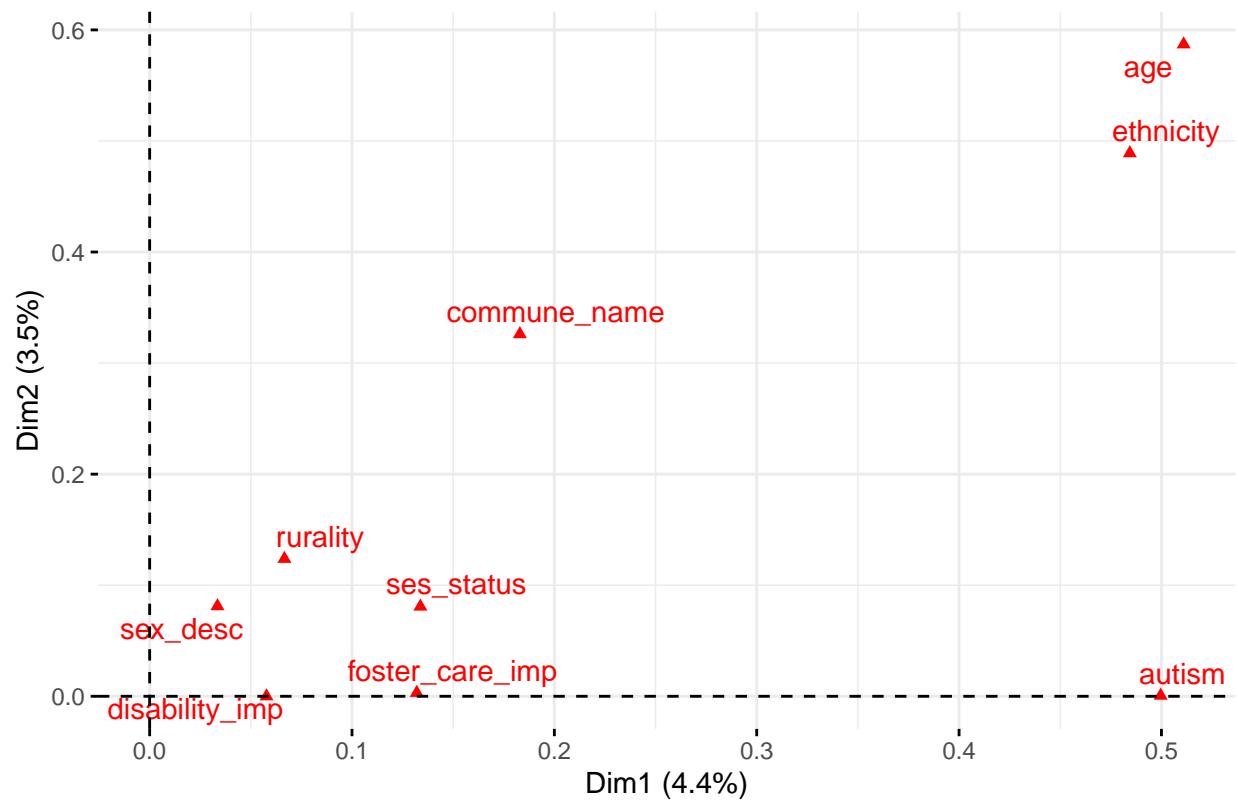


Variable categories – MCA

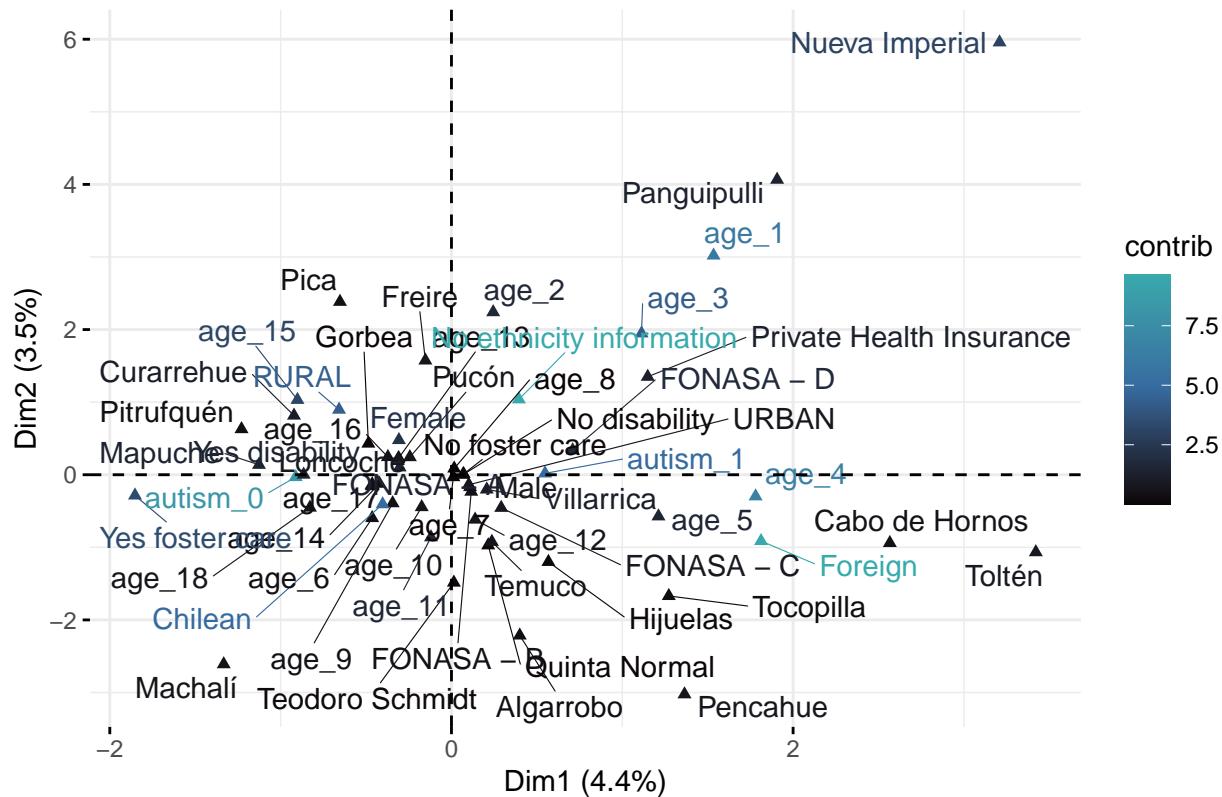


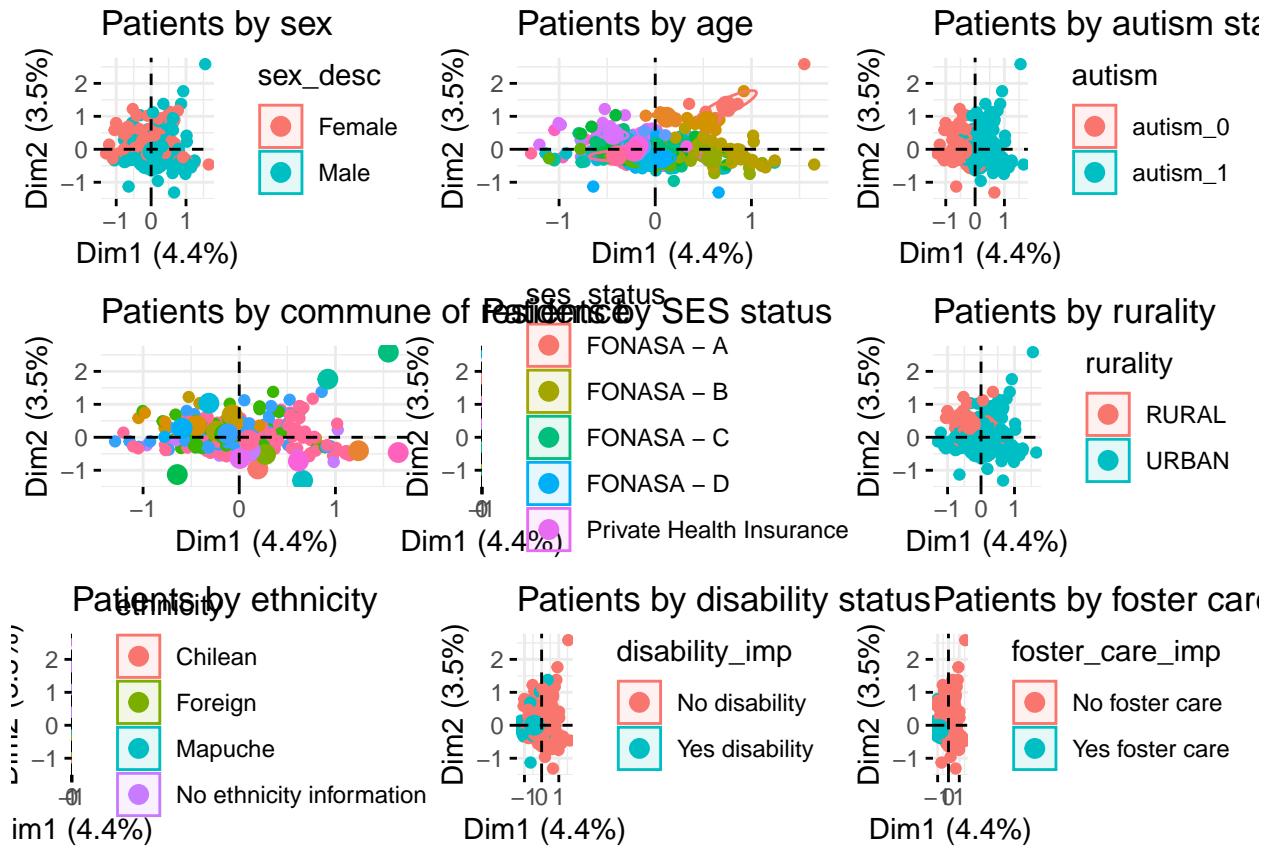


Variables – MCA



Variable categories – MCA





5.5 Probabilistic data linkage

NB: there are 1688 unique ID's in patients and it's 1702 rows long because some people are represented in 2 communes.

5.5.1 Number matched

Using perfect match on sex, date of birth and commune of residence, 197 matches can be found between the school and patient records. 187 unique school records can be perfectly matched to clinical records. 193 patients can be linked to school records.

There are no patients that lived in different communes therefore were in the patient dataset twice that are matched to multiple school records.

5.5.2 Differences between un/matched

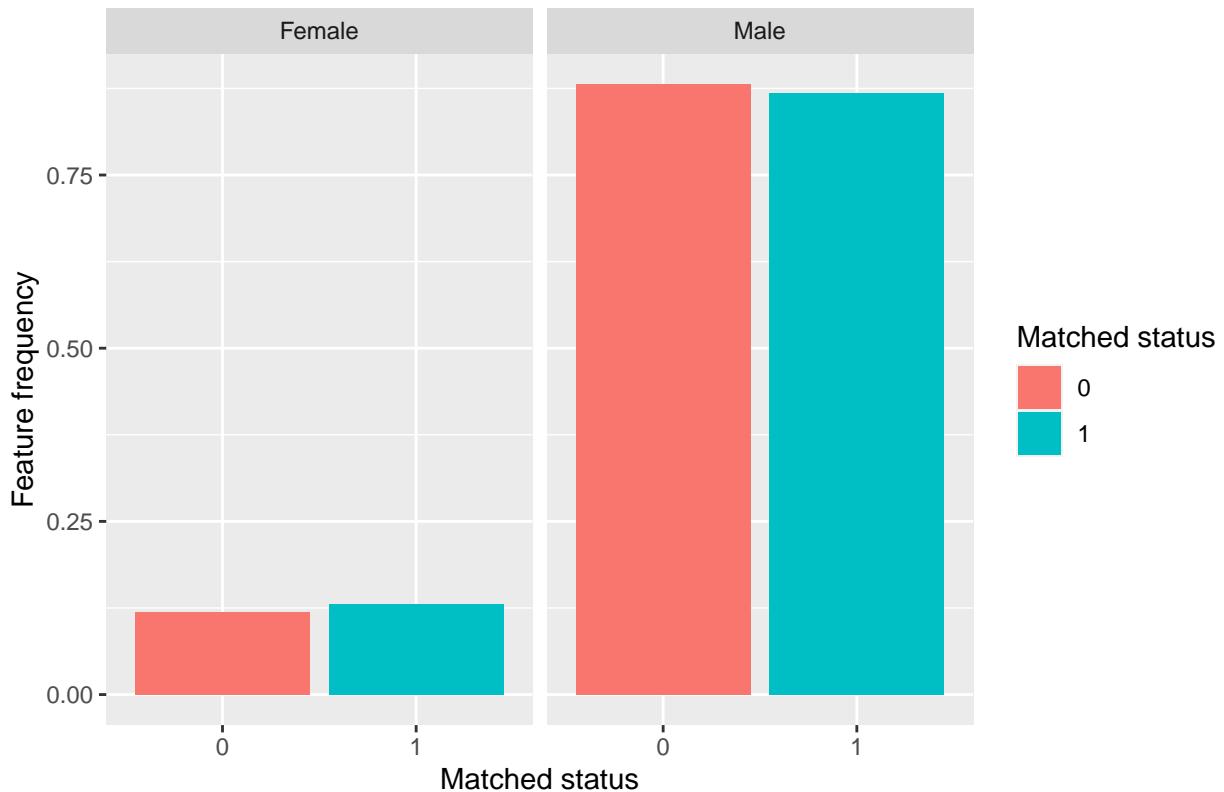
```
##  
## Two-sample Kolmogorov-Smirnov test  
##  
## data: na.omit(school_yes$sex.school) and na.omit(school_no$sex.school)  
## D = 0.012308, p-value = 1  
## alternative hypothesis: two-sided  
  
##  
## Two-sample Kolmogorov-Smirnov test  
##  
## data: as.numeric(na.omit(school_yes$ses_status.school)) and as.numeric(na.omit(school_no$ses_status.school))
```

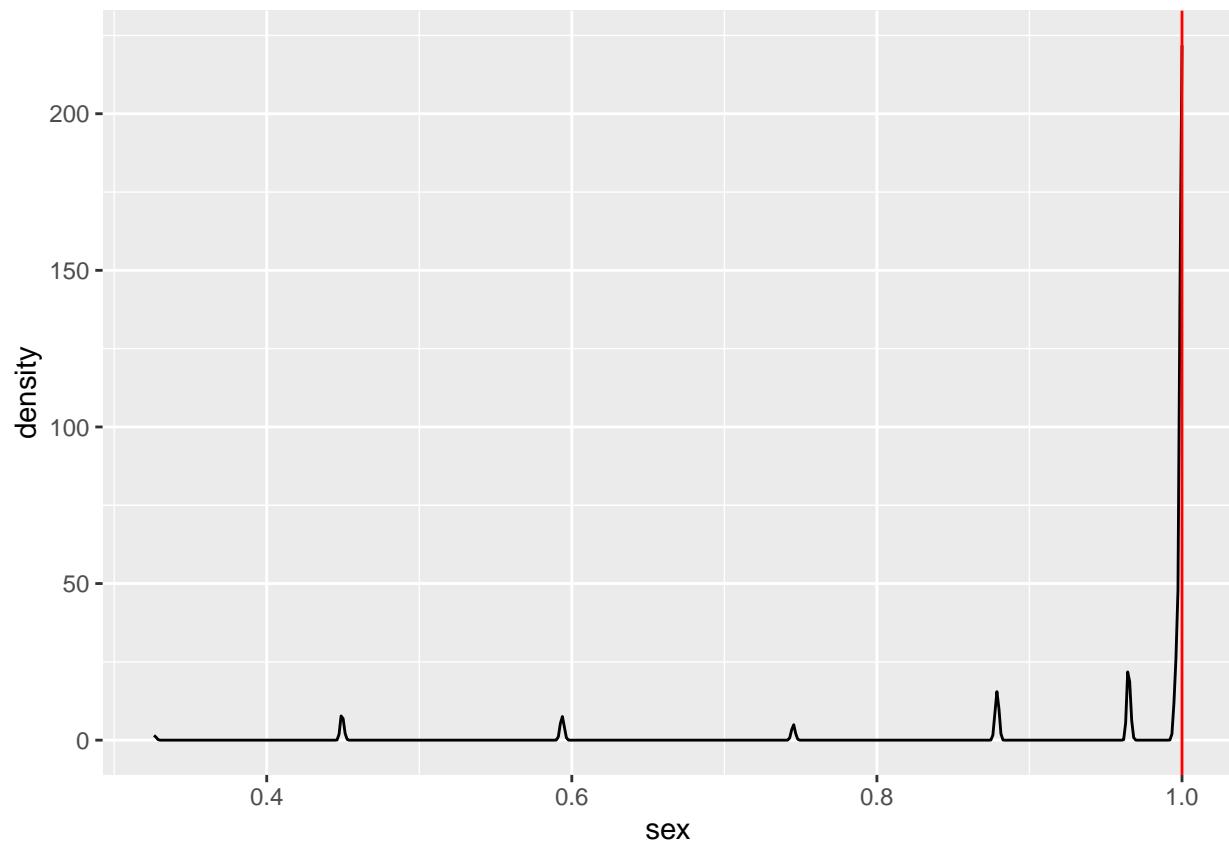
```

## D = 0.094886, p-value = 0.2286
## alternative hypothesis: two-sided
##
## Two-sample Kolmogorov-Smirnov test
##
## data: as.numeric(na.omit(school_yes$commune_code)) and as.numeric(na.omit(school_no$commune_code))
## D = 0.20245, p-value = 9.174e-05
## alternative hypothesis: two-sided

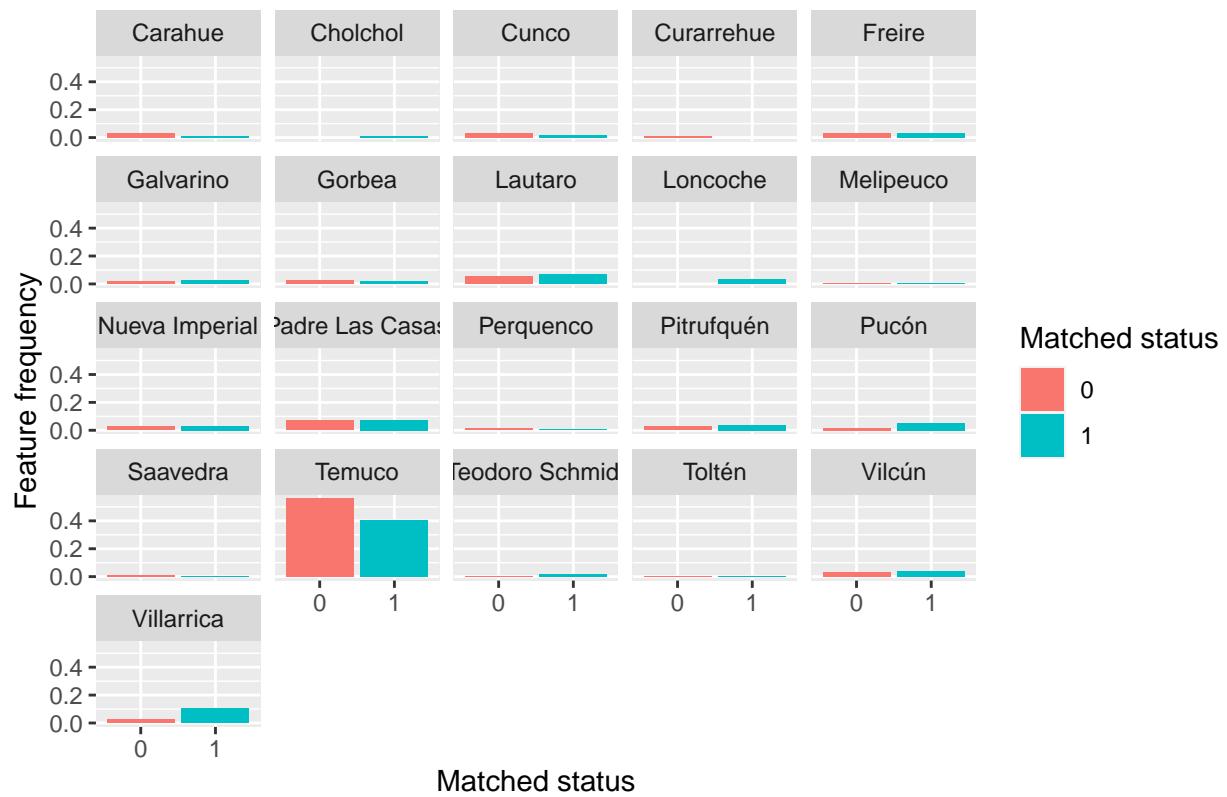
```

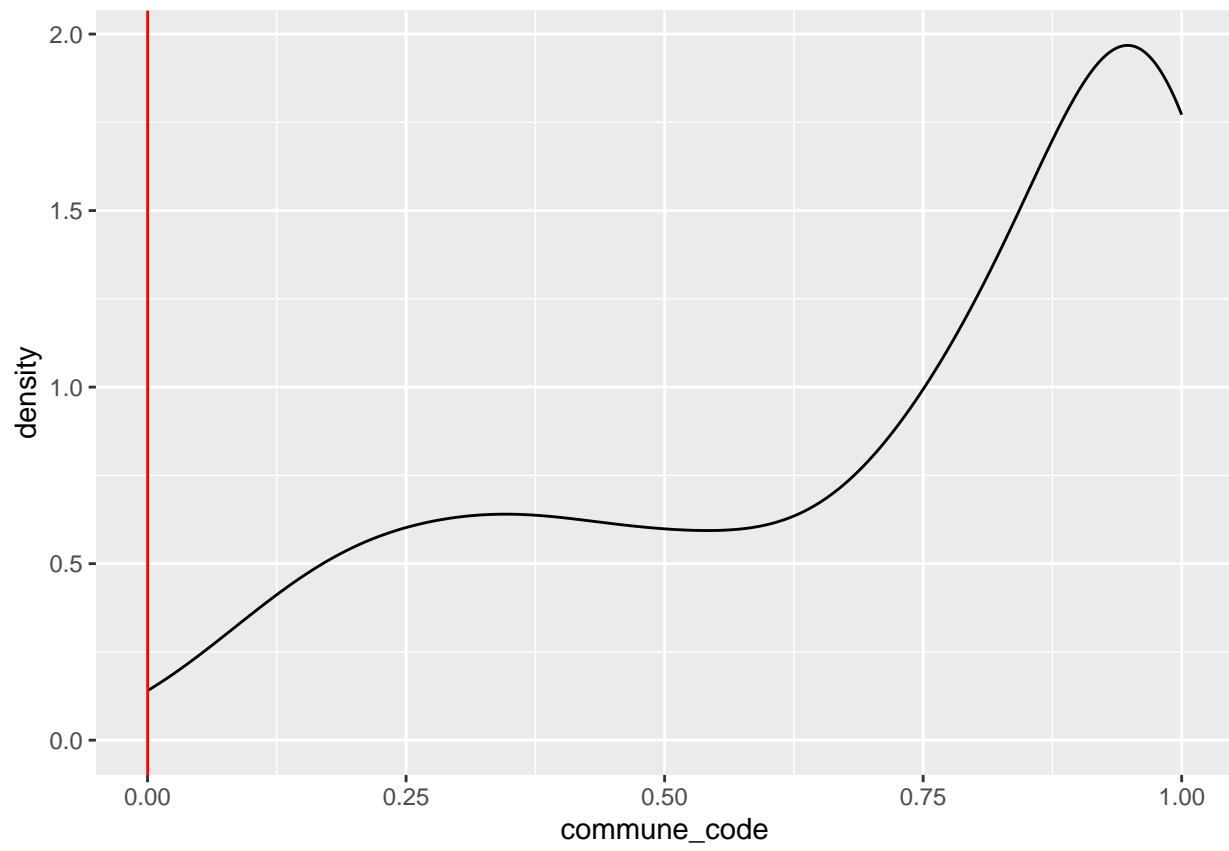
Matching of school record to clinical record by sex



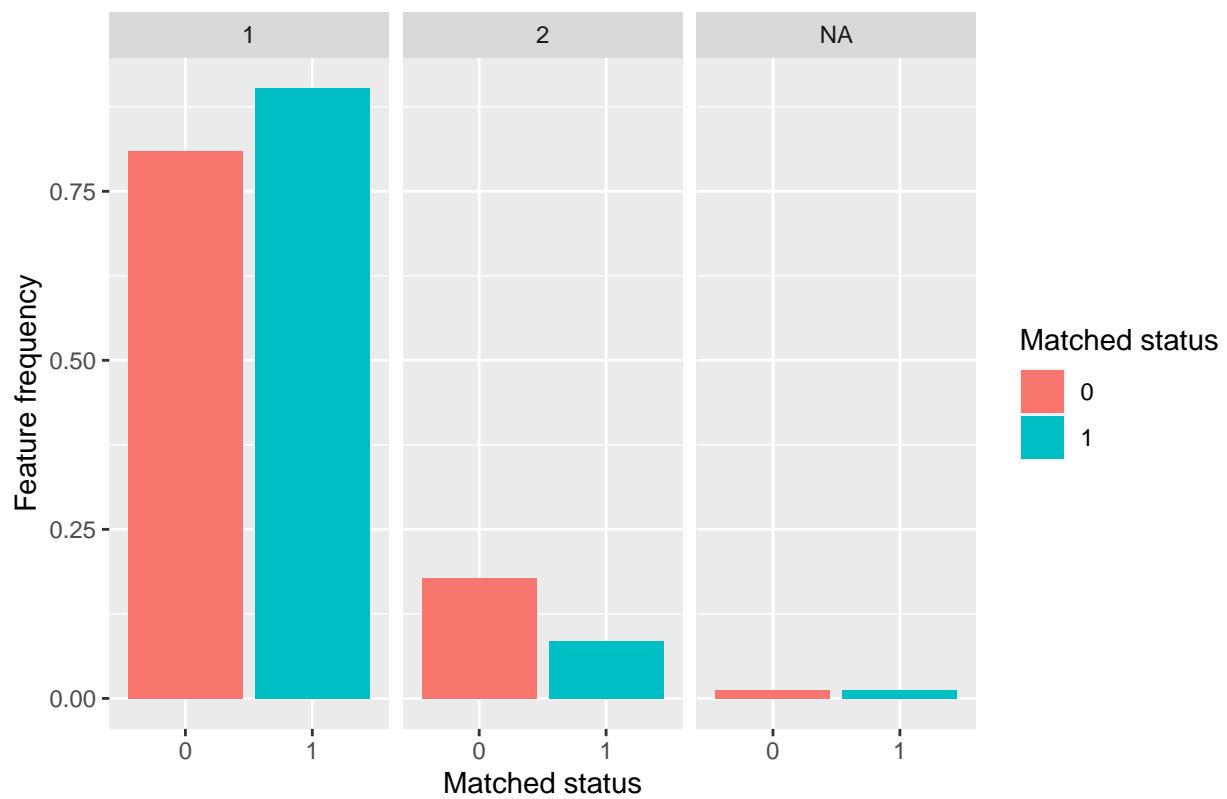


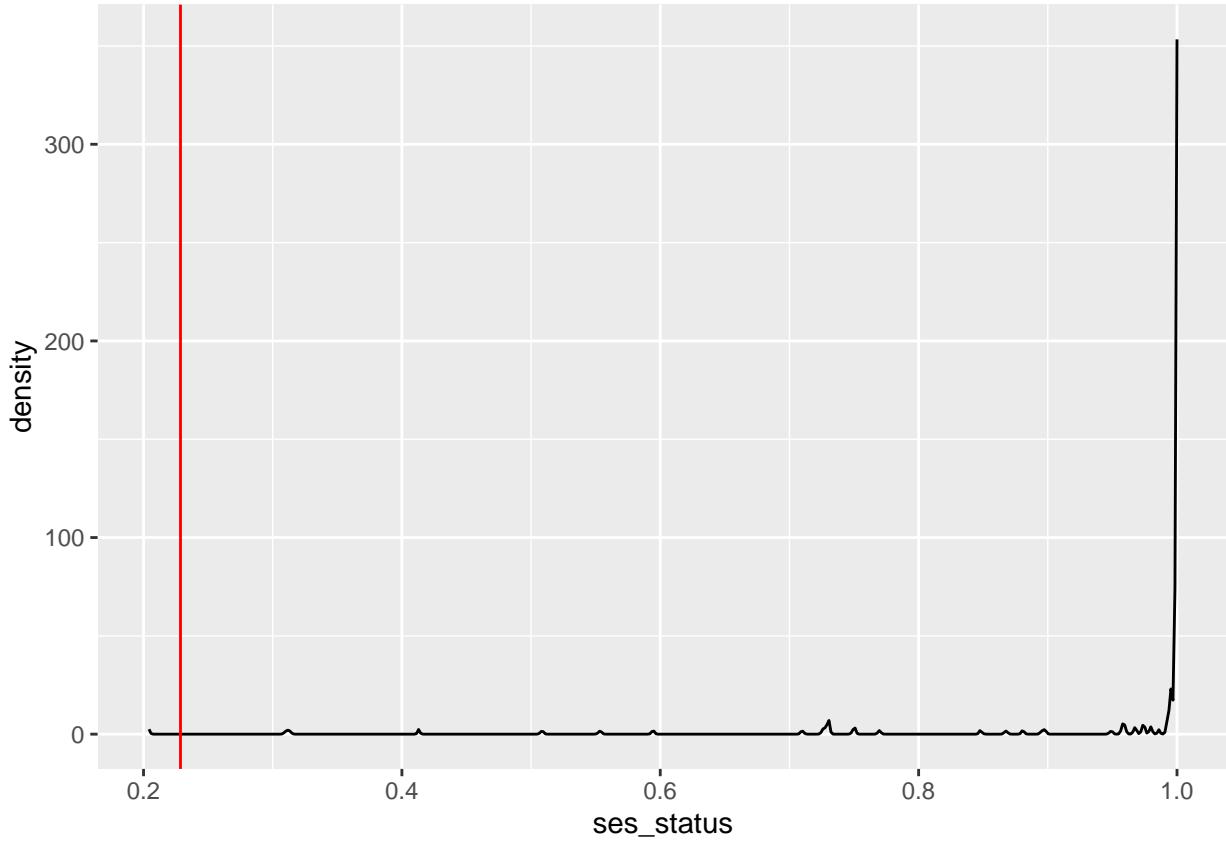
Matching of school record to clinical record by commune





Matching of school record to clinical record by SES status





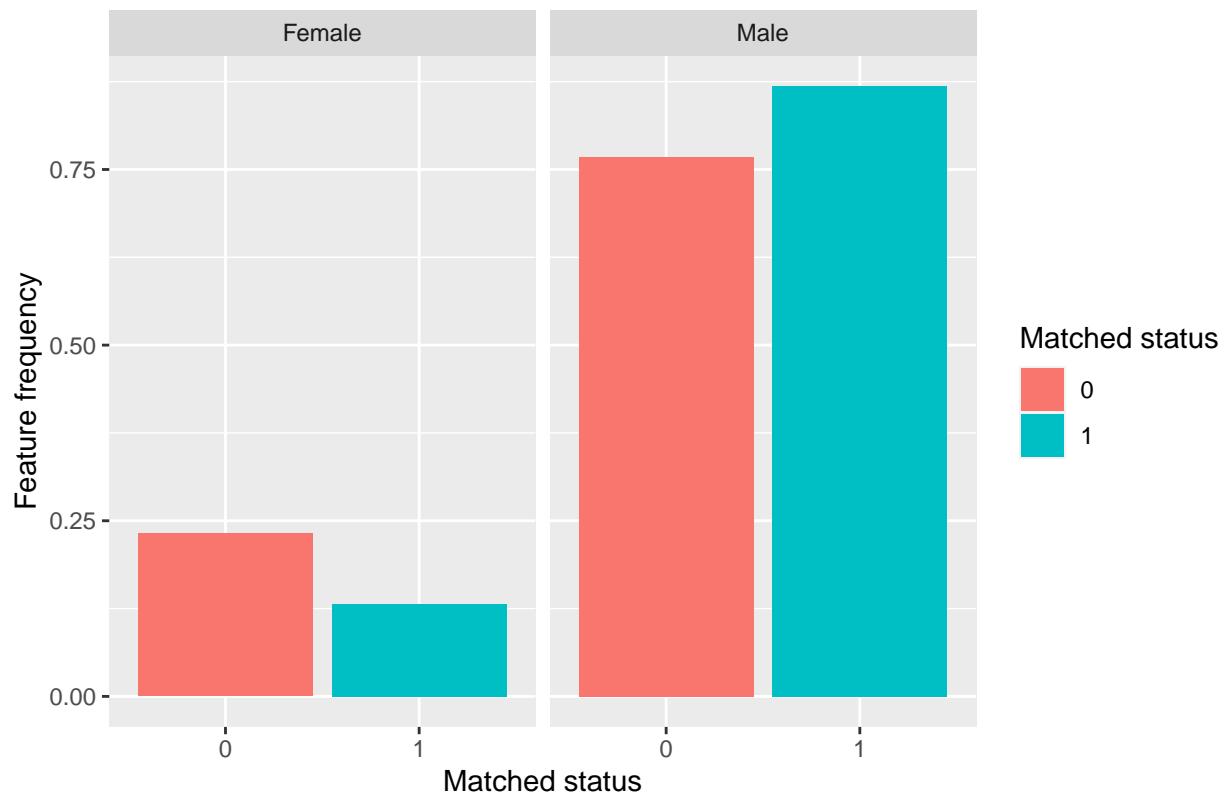
Bit easier to match SES status of 1 (probably more common)

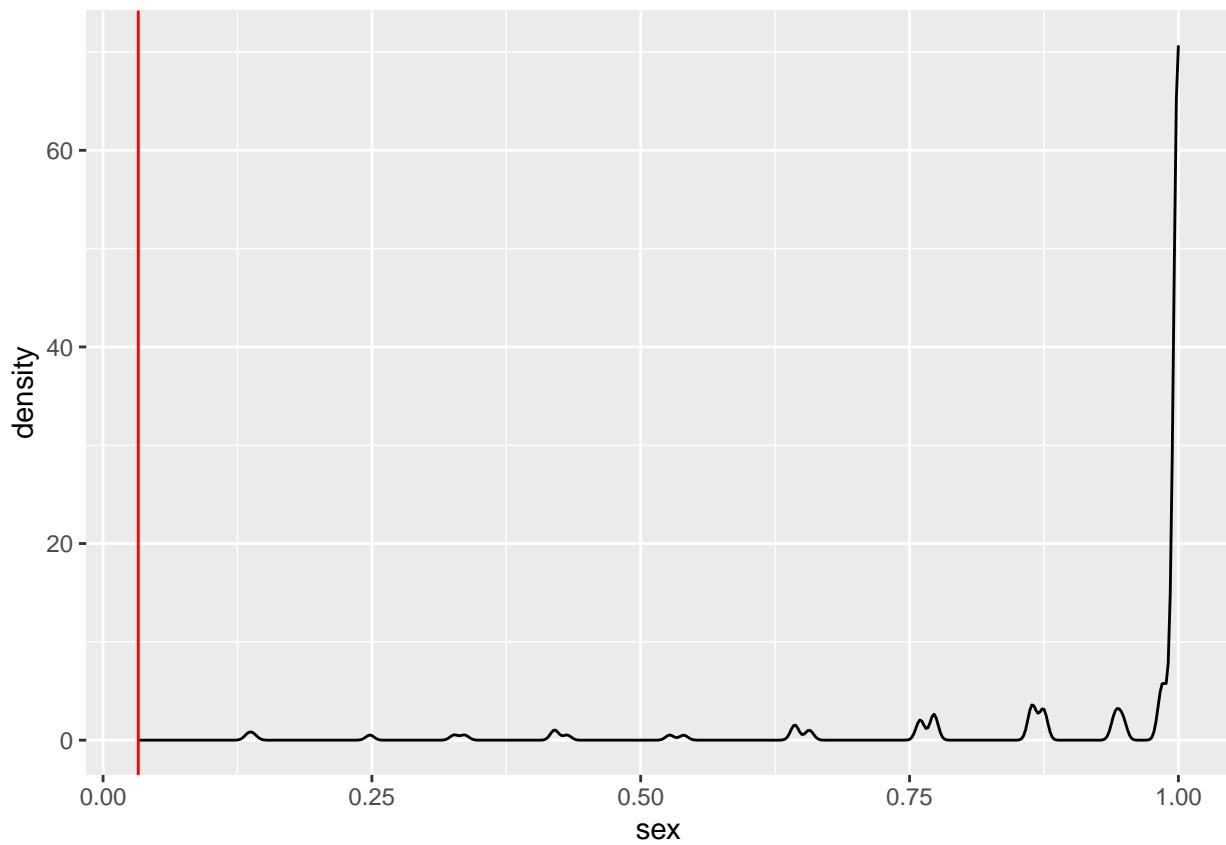
Our matched/non-matched are not different by sex (p-value in Kolmog is same as most of distribution of permuted pvals) but are different by commune and ses status. Cohen's D test isn't suitable to compare the matched and un-matched because the data don't have standard deviations.

??Add commune maps here with size of sample for school and clinical?? Also size of other features.

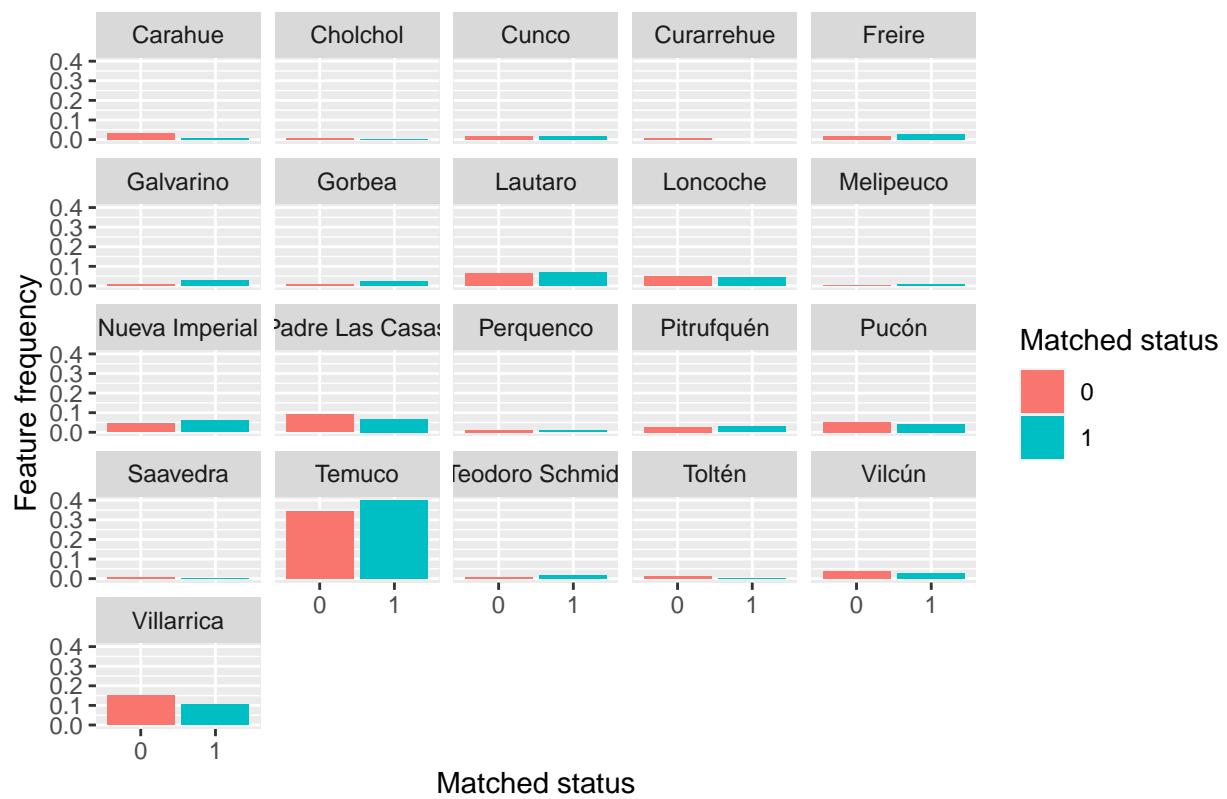
```
##  
## Two-sample Kolmogorov-Smirnov test  
##  
## data: na.omit(patients_yes$sex.patient) and na.omit(patients_no$sex.patient)  
## D = 0.10057, p-value = 0.03276  
## alternative hypothesis: two-sided  
  
##  
## Two-sample Kolmogorov-Smirnov test  
##  
## data: as.numeric(na.omit(patients_yes$ses_status.patient)) and as.numeric(na.omit(patients_no$ses_s  
## D = 0.067733, p-value = 0.3086  
## alternative hypothesis: two-sided  
  
##  
## Two-sample Kolmogorov-Smirnov test  
##  
## data: as.numeric(na.omit(patients_yes$commune_code)) and as.numeric(na.omit(patients_no$commune_code))  
## D = 0.084804, p-value = 0.1074  
## alternative hypothesis: two-sided
```

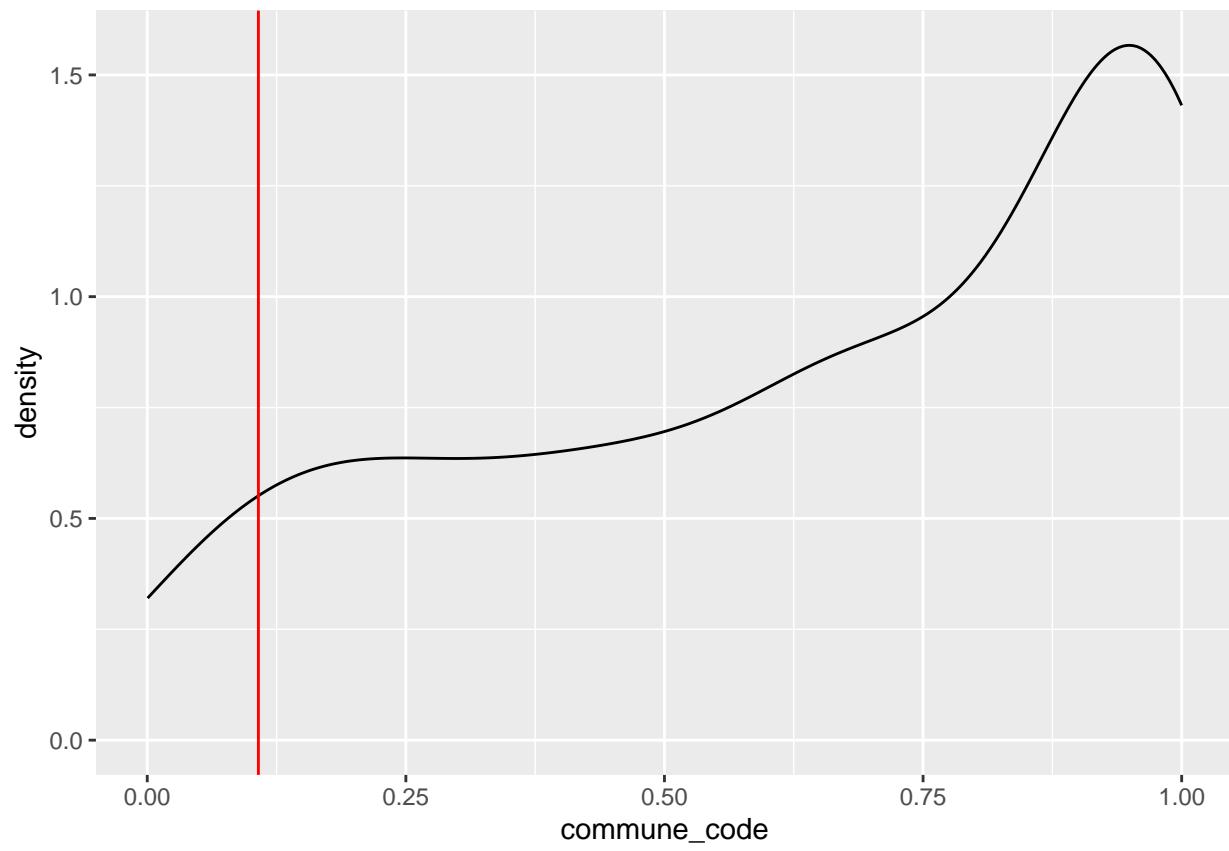
Matching of clinical record to school record by sex



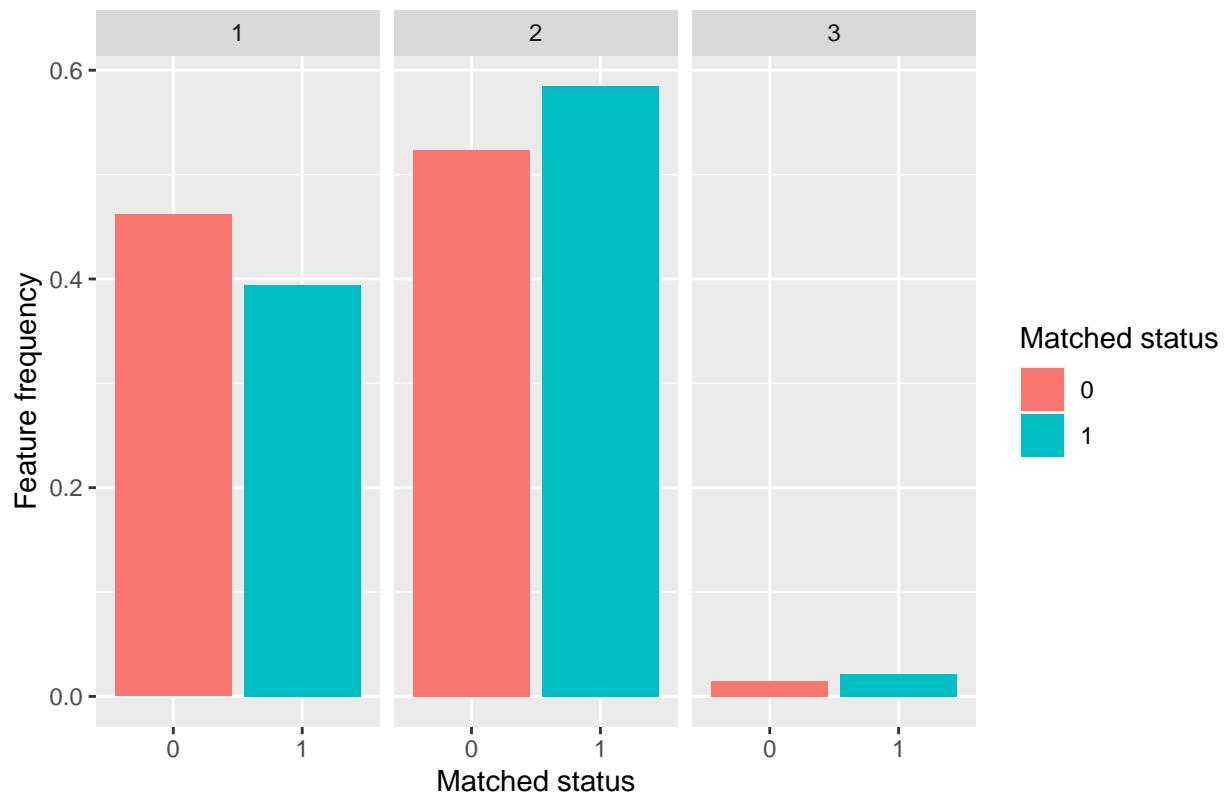


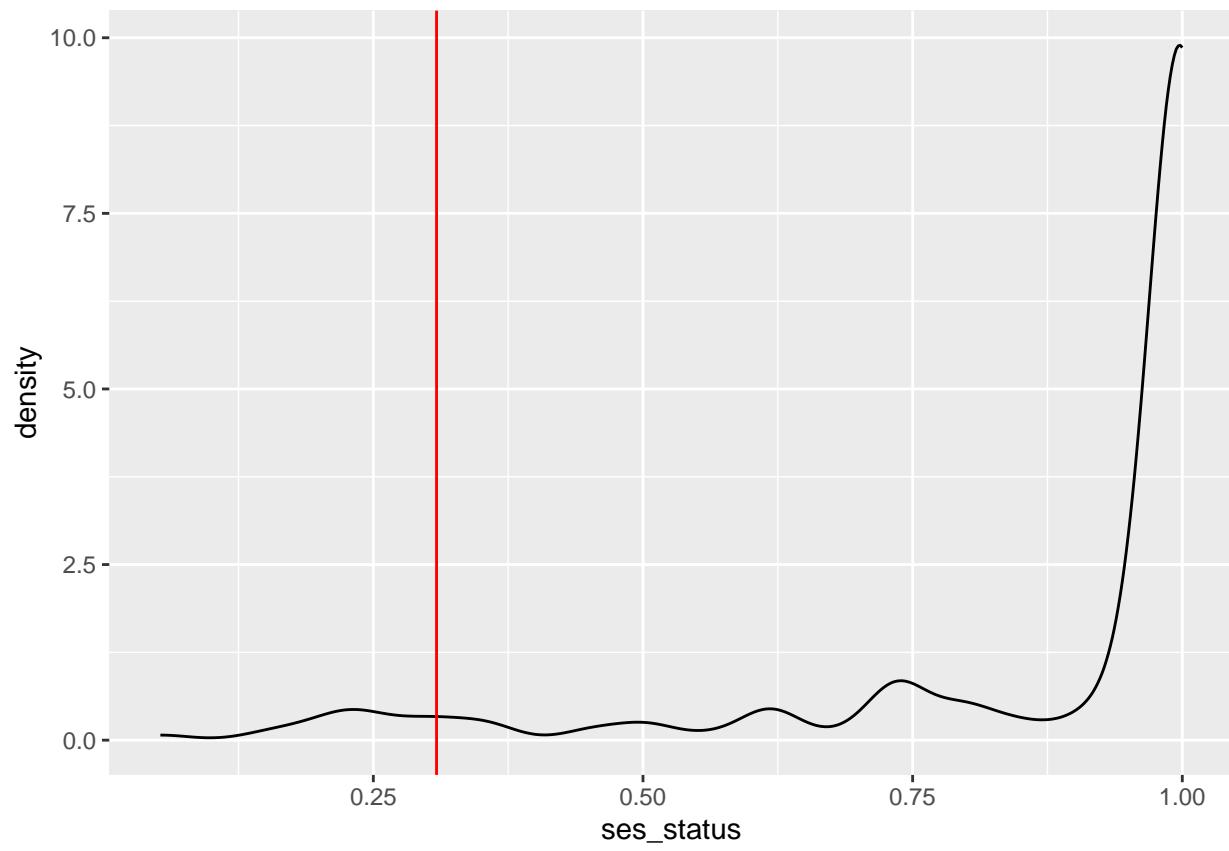
Matching of clinical record to school record by commune





Matching of clinical record to school record by SES status



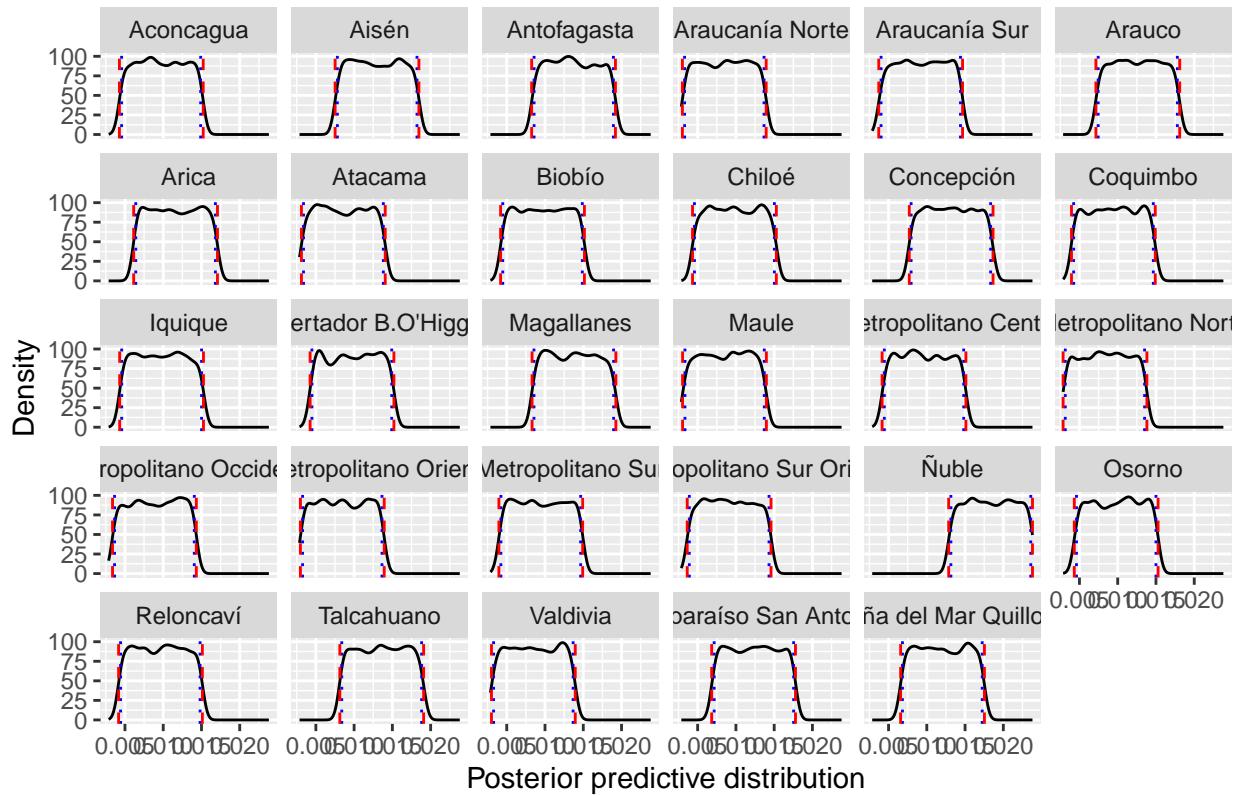


TODO - comment on whether any of the matched patients had only intellectual disability and not autism.

5.5.3 Prev delta

5.6 Bayesian prevalence projection

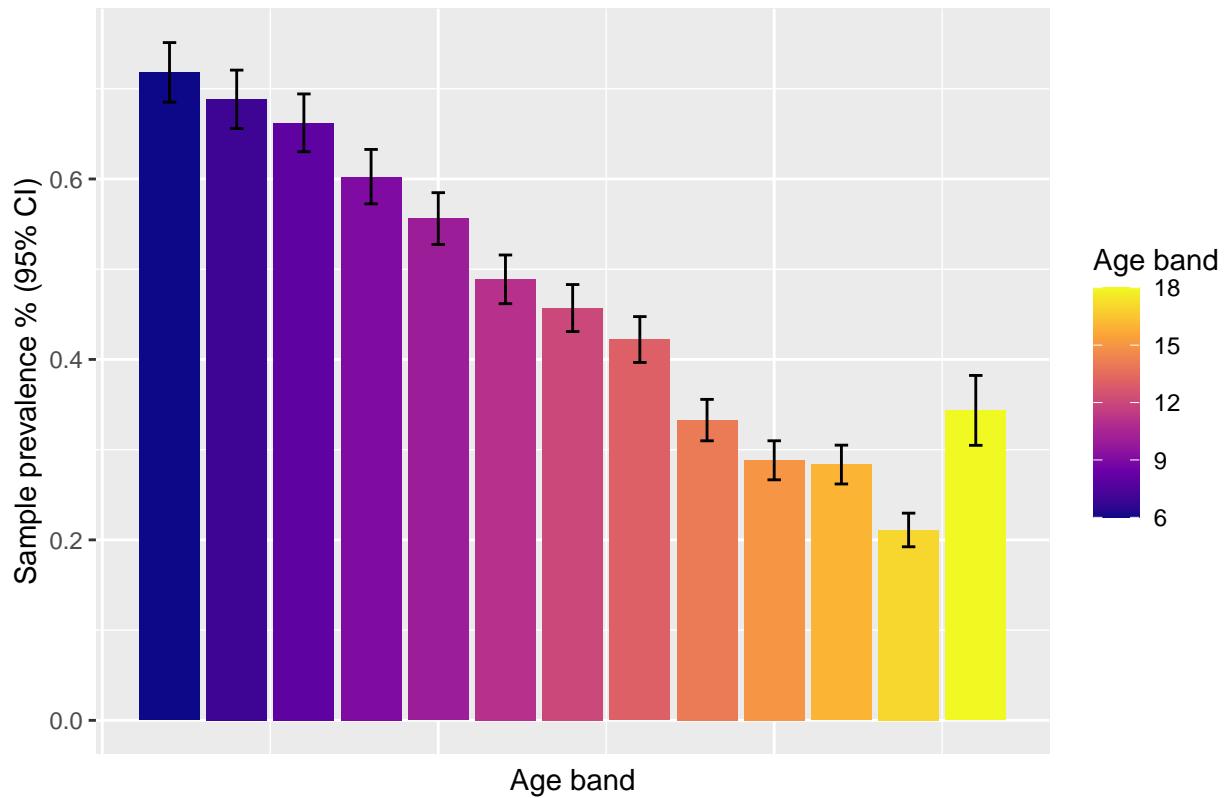
Region specific priors informed by clinical data from Araucanía Sur



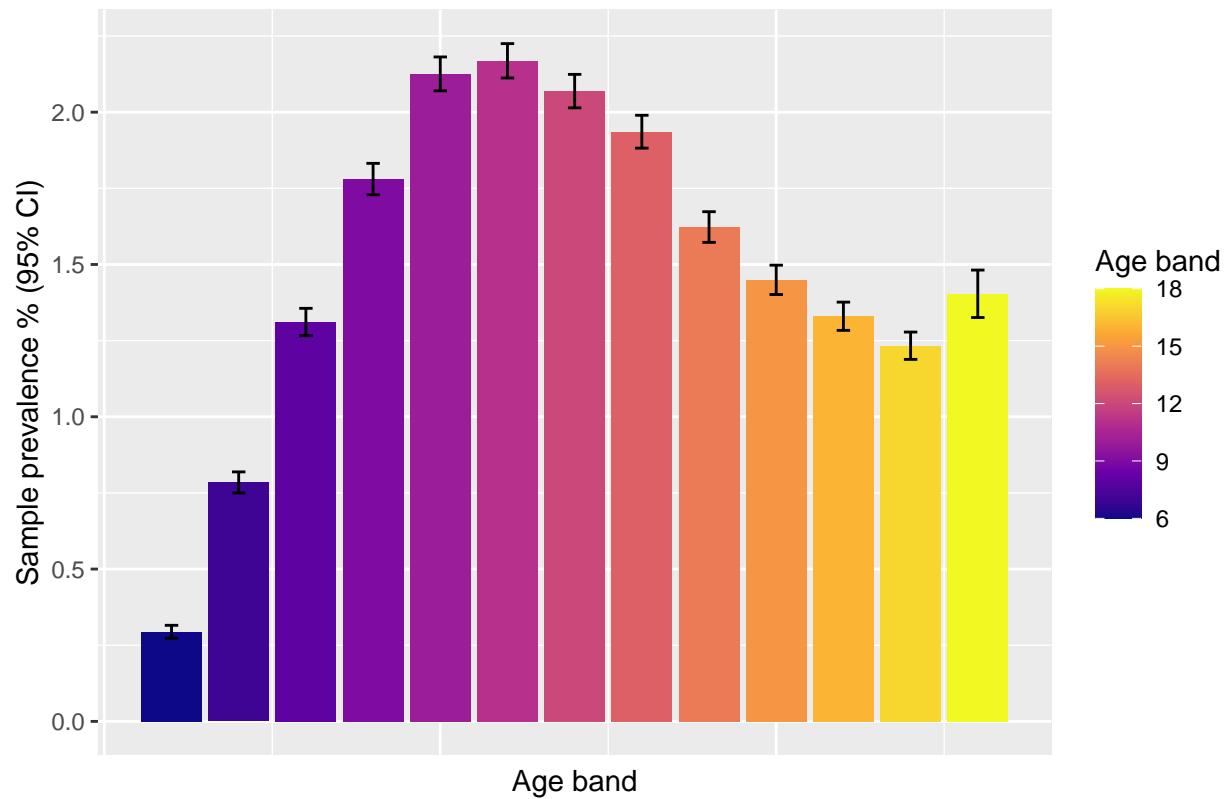
Red is the prior 95% CI (adjusted sample rate and it + prev_delta), blue is posterior 95% CrI

6 Supplementary materials

Autism prevalence



ADHD prevalence



6.1 Bayesian prevalence estimation

6.1.1 Random effect on sex

6.1.2 Random effect on health service

6.1.3 Random effect on commune in Araucanía Sur health service

6.1.4 Random effect on socio-economic status

6.1.5 Random effect on ethnicity

6.1.6 Random effect on school's rurality

6.2 AraucS prevalence

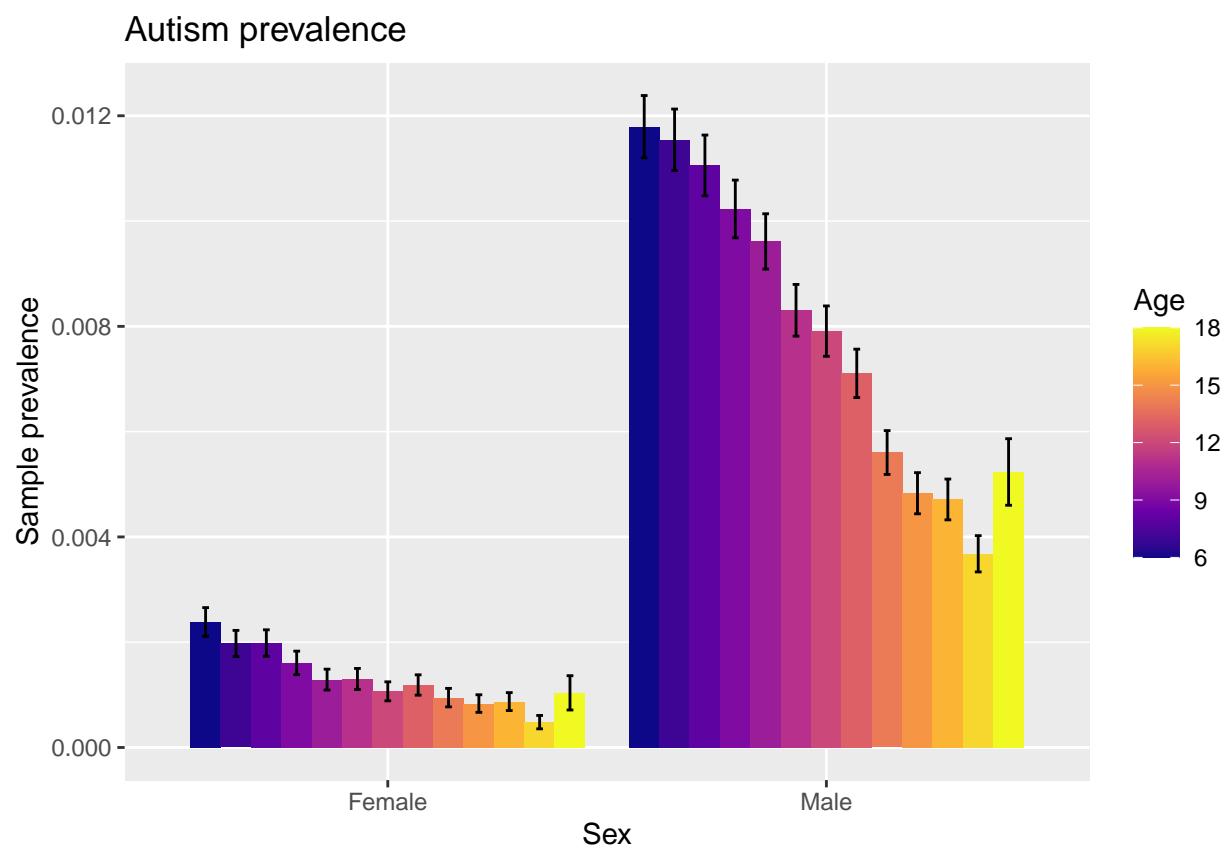


Figure 23: Sample prevalence of autism by age and sex. Bars show 95% normal confidence intervals.

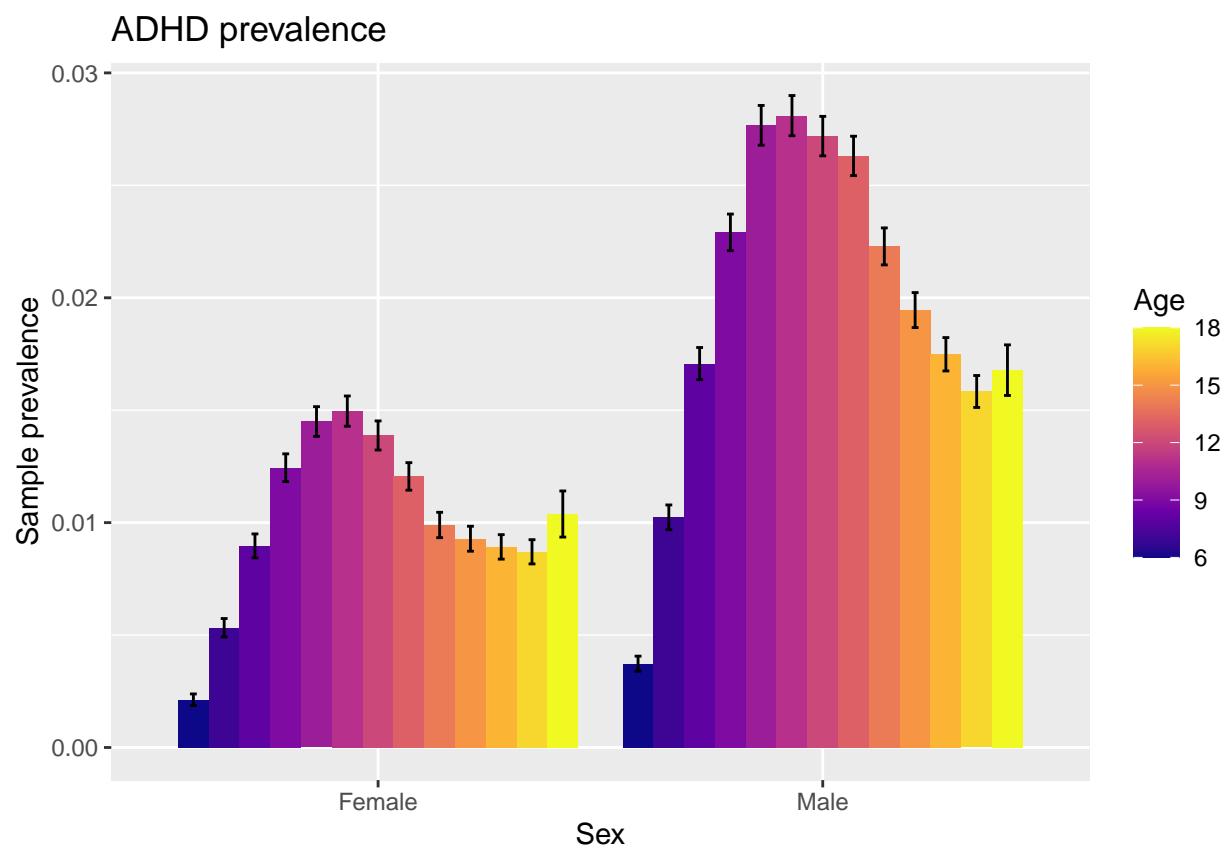


Figure 24: Sample prevalence of ADHD by age and sex. Bars show 95% normal confidence intervals.

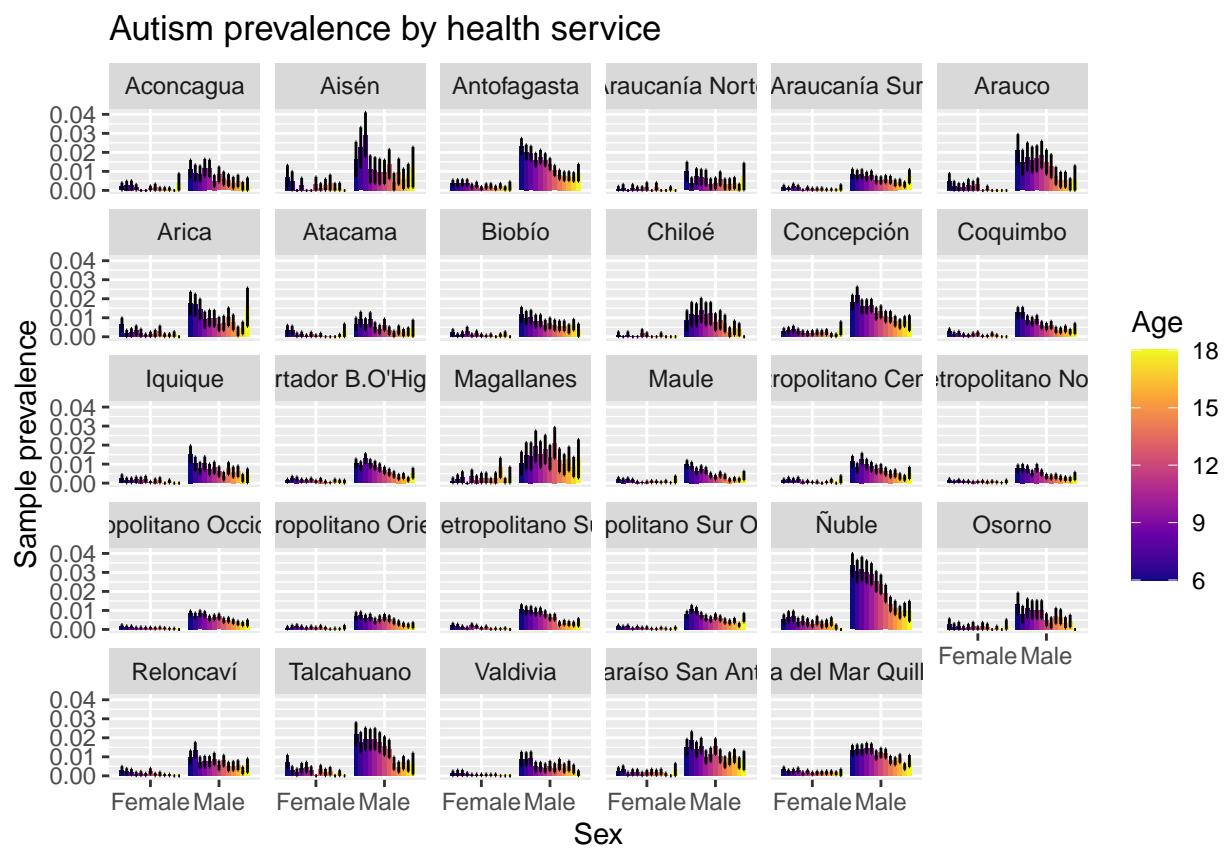


Figure 25: Sample prevalence of autism by health service, age and sex. Bars show 95% normal confidence intervals.

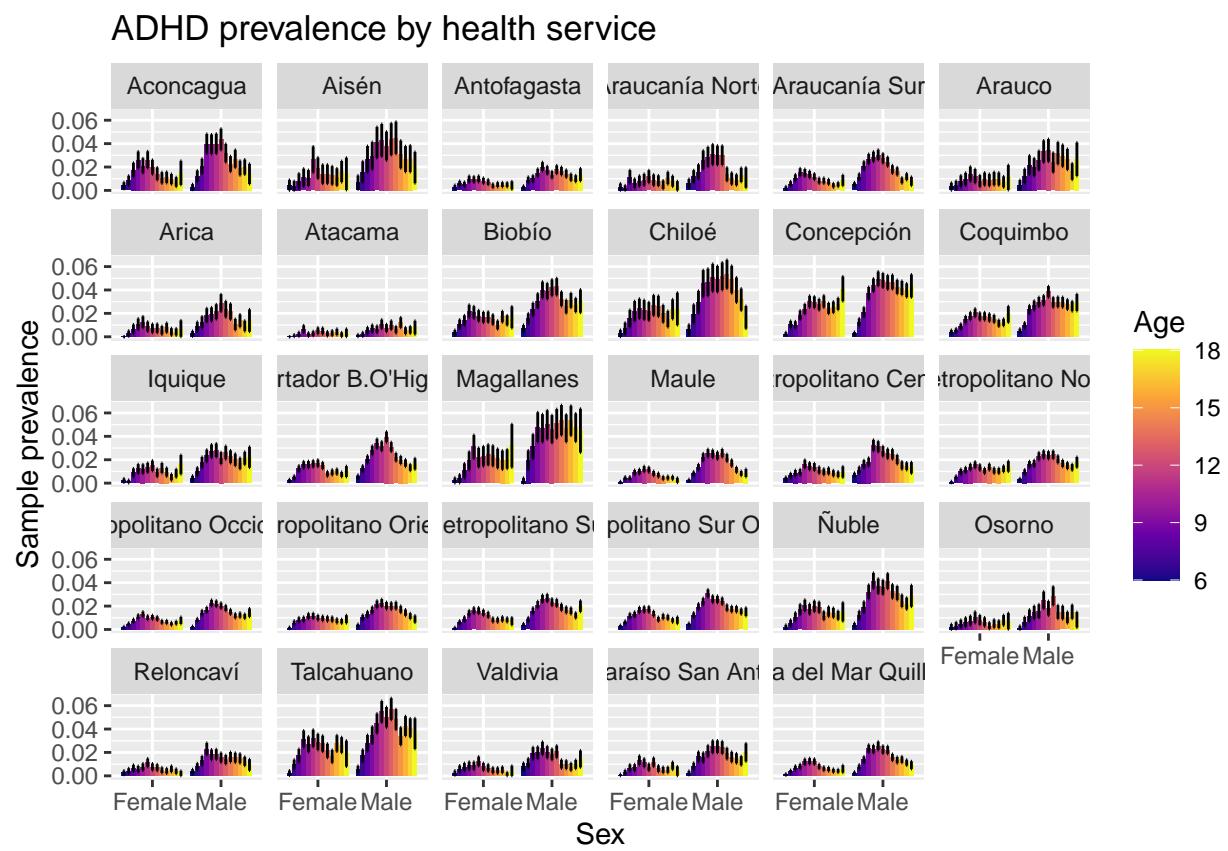


Figure 26: Sample prevalence of ADHD by health service, age and sex. Bars show 95% normal confidence intervals.

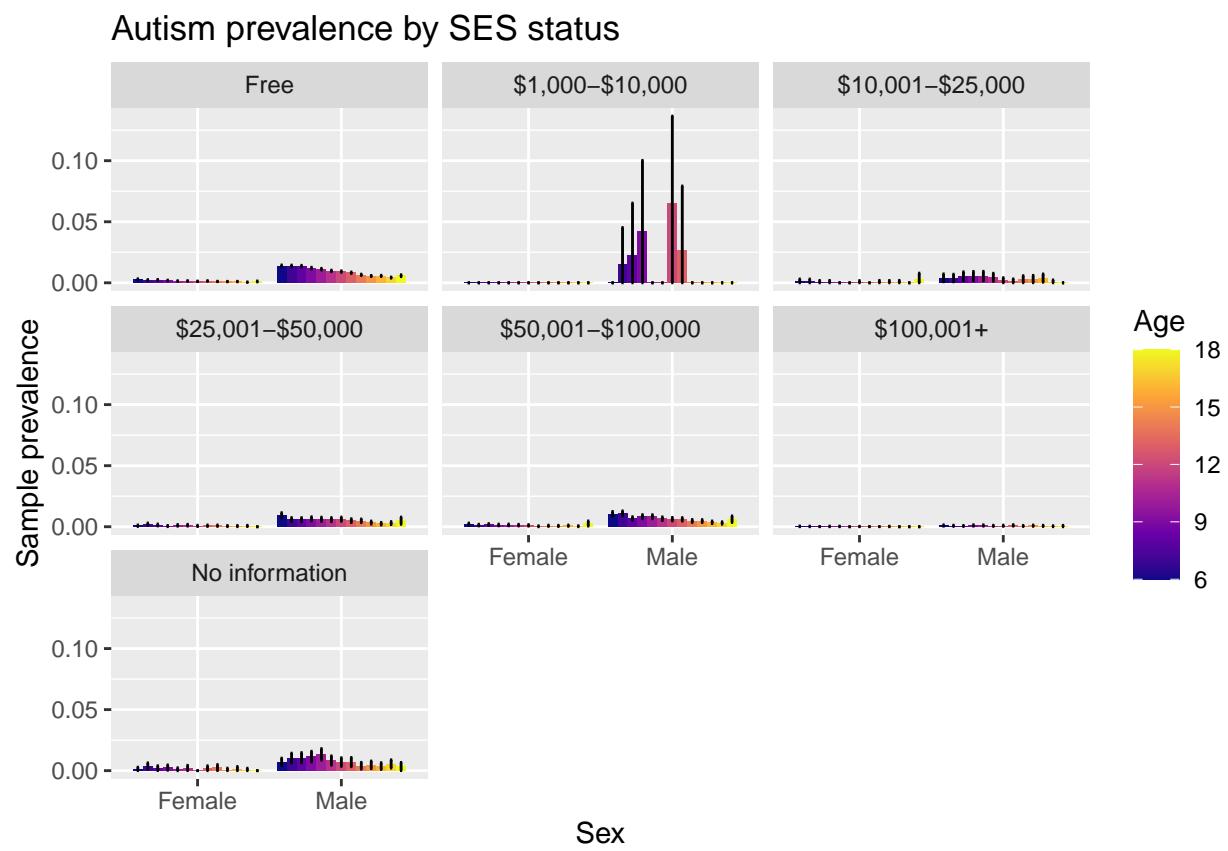


Figure 27: Sample prevalence of autism by socio-economic (SES) status of student's family, age and sex. Bars show 95% normal confidence intervals.

ADHD prevalence by SES status

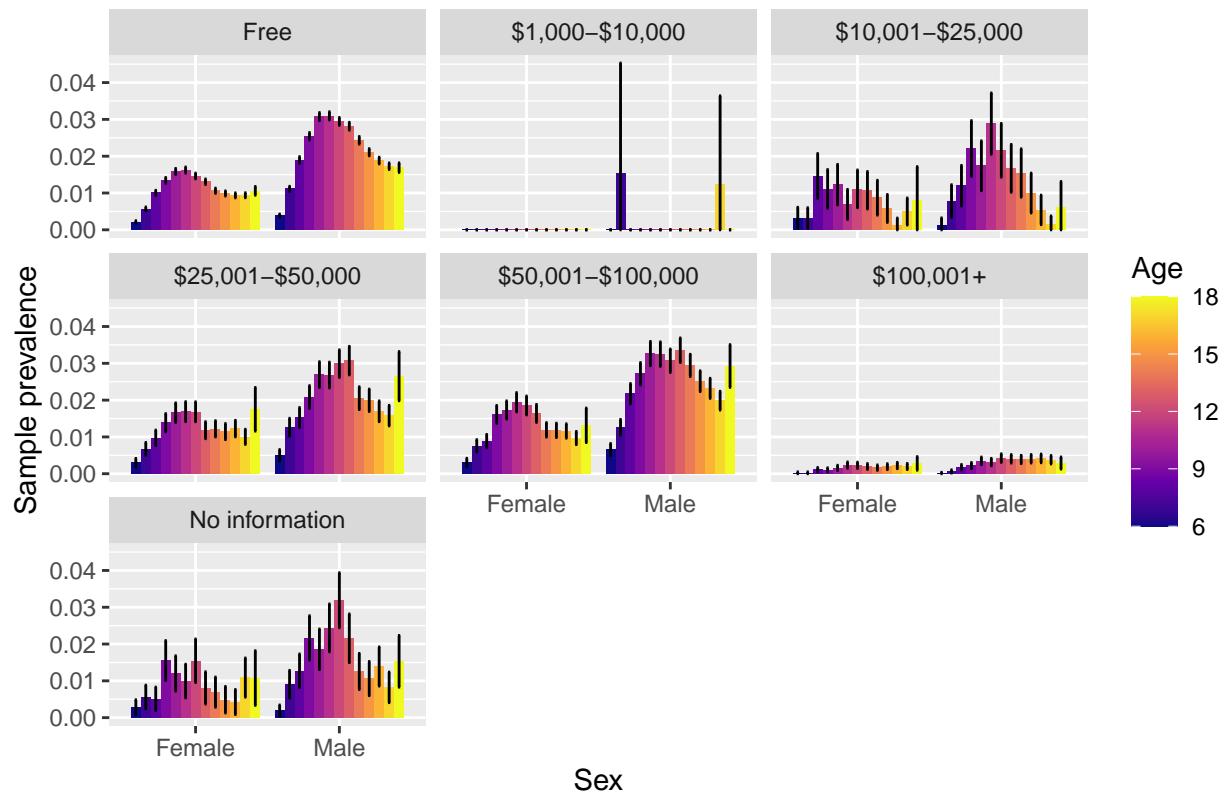


Figure 28: Sample prevalence of ADHD by socio-economic (SES) status of student's family, age and sex. Bars show 95% normal confidence intervals.

Autism prevalence by ethnicity

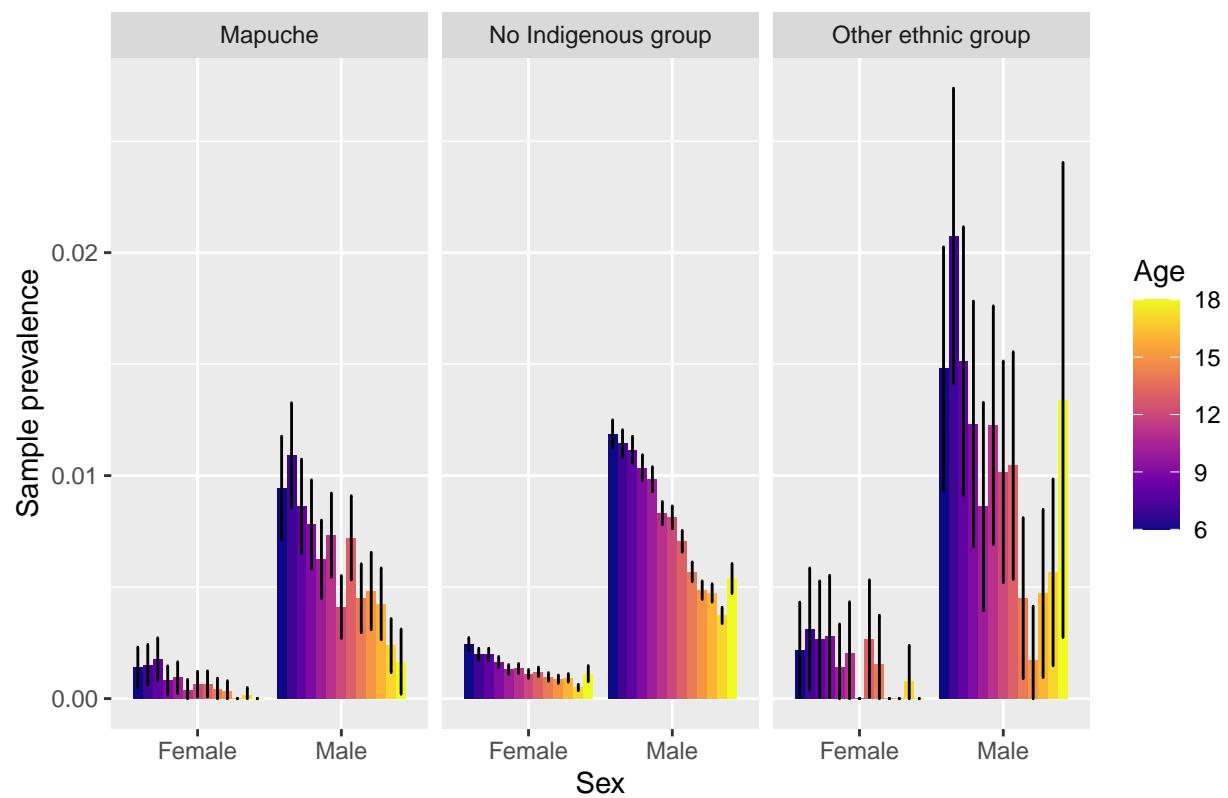


Figure 29: Sample prevalence of autism by ethnicity, age and sex. Bars show 95% normal confidence intervals.

ADHD prevalence by ethnicity

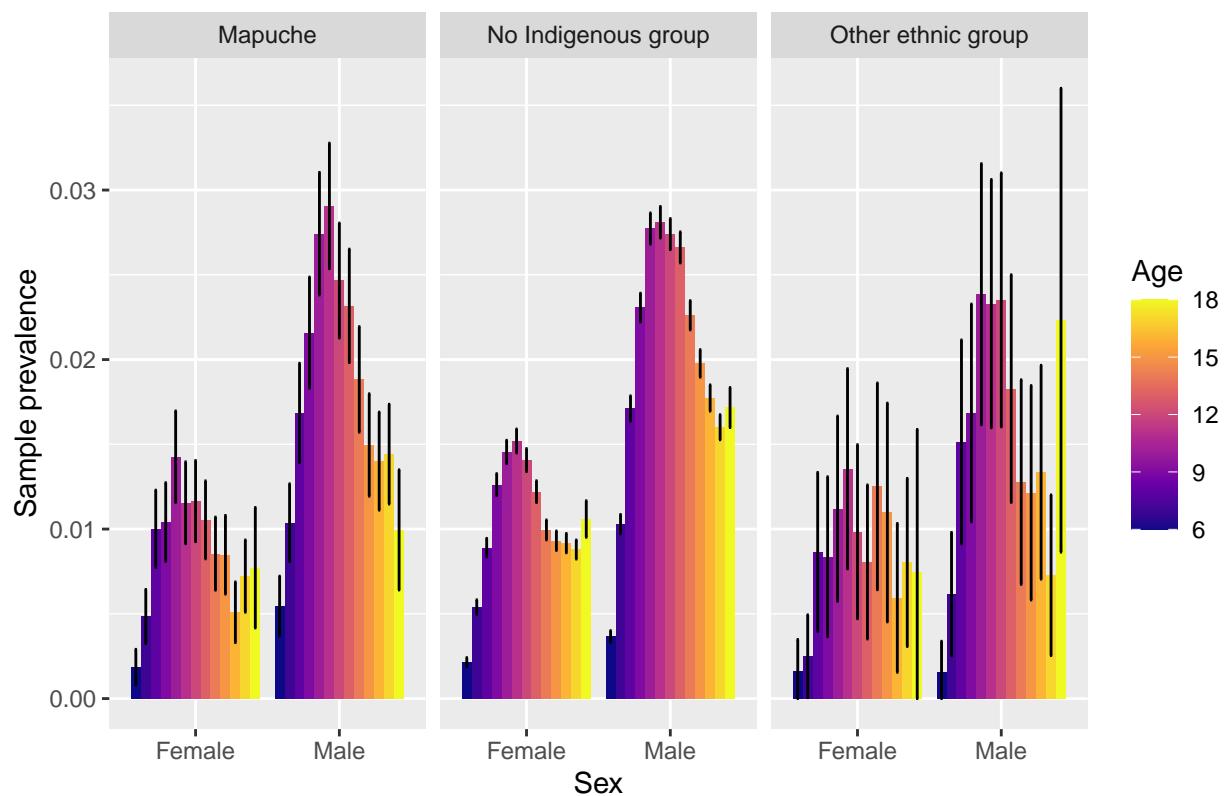


Figure 30: Sample prevalence of ADHD by ethnicity, age and sex. Bars show 95% normal confidence intervals.

Autism prevalence by school's rurality

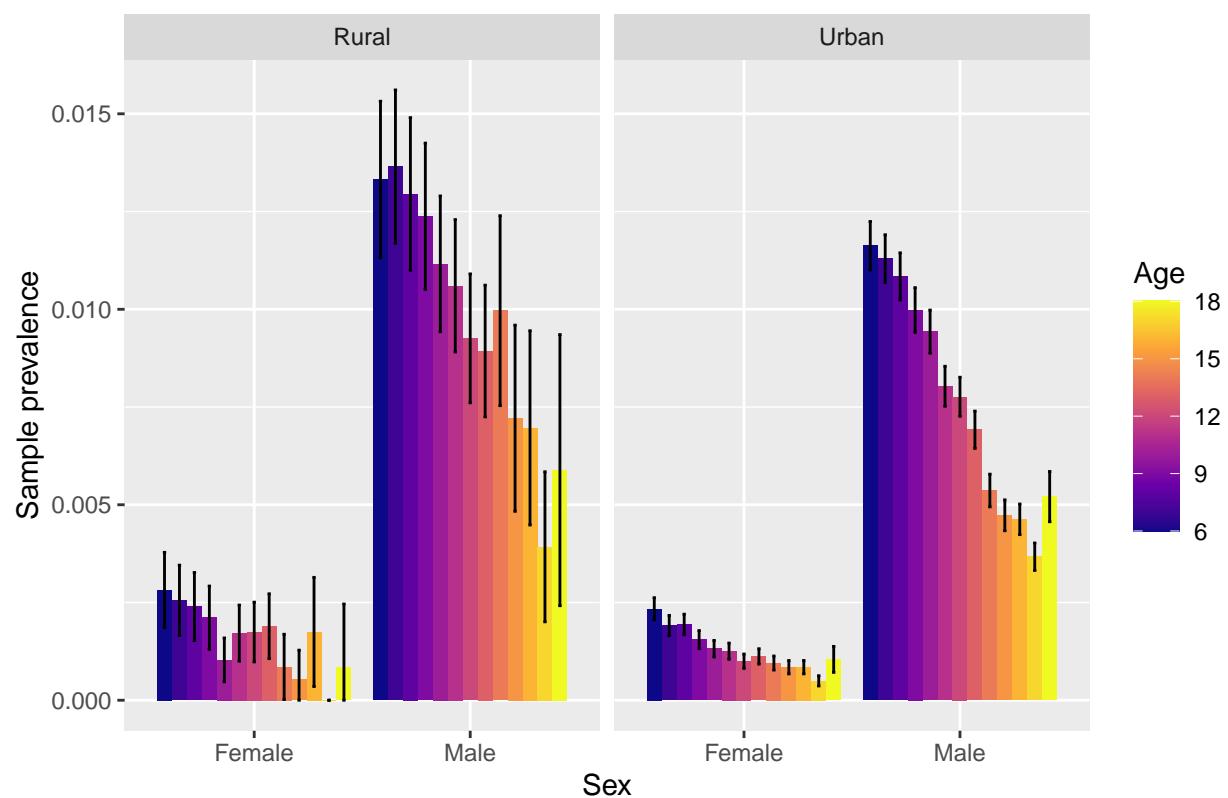


Figure 31: Sample prevalence of autism by school's rurality, age and sex. Bars show 95% normal confidence intervals.

ADHD prevalence by school's rurality

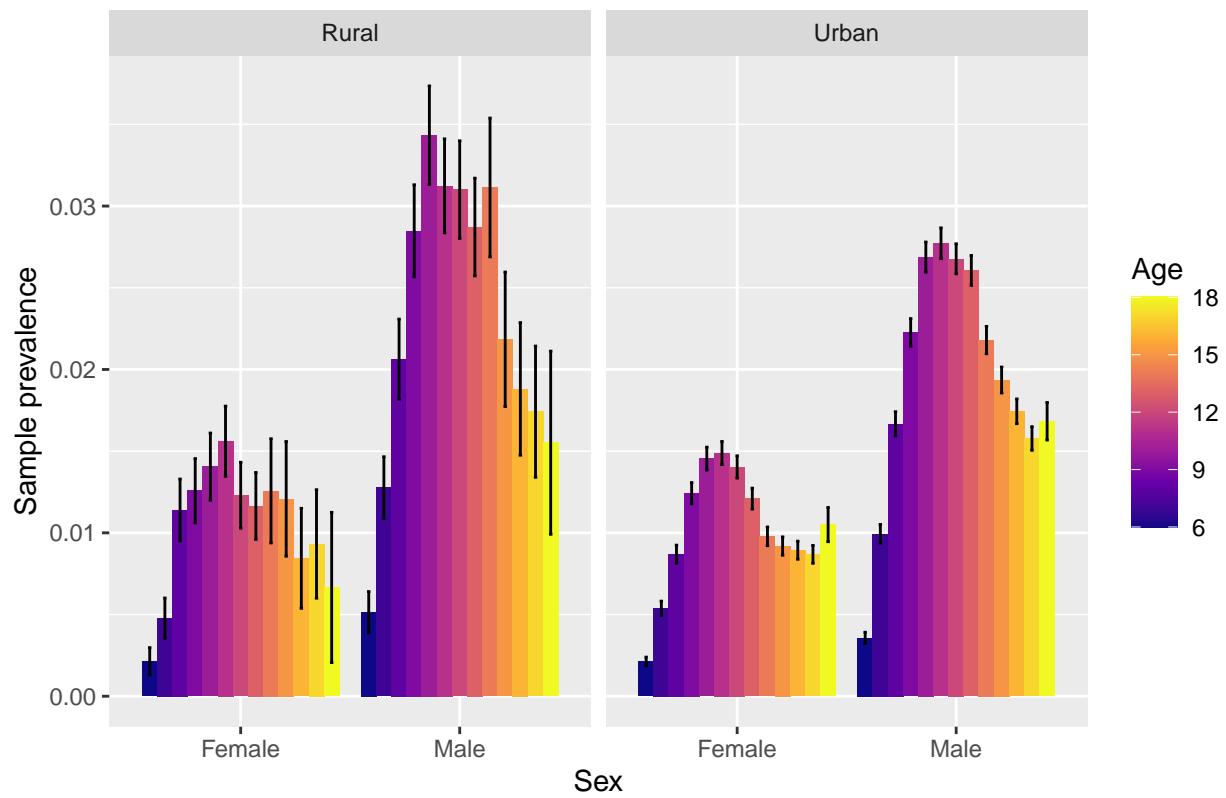


Figure 32: Sample prevalence of ADHD by school's rurality, age and sex. Bars show 95% normal confidence intervals.

Autism prevalence, prior mean = 0.00465, prior sd = 3.98e-05

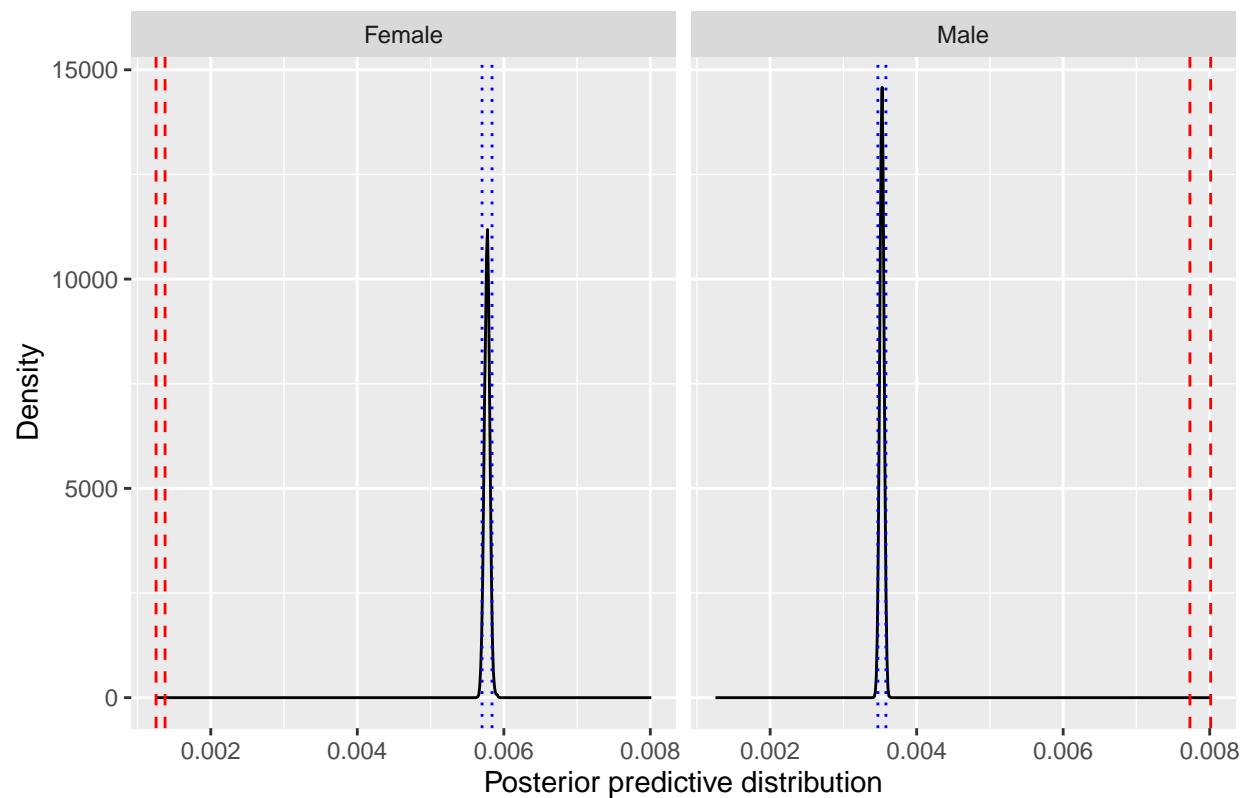


Figure 33: Posterior predictive distribution for autism with a random effect on sex, and with age- and sex-adjusted global prevalence prior.

ADHD prevalence, prior mean = 0.015, prior sd = 7.25e-05

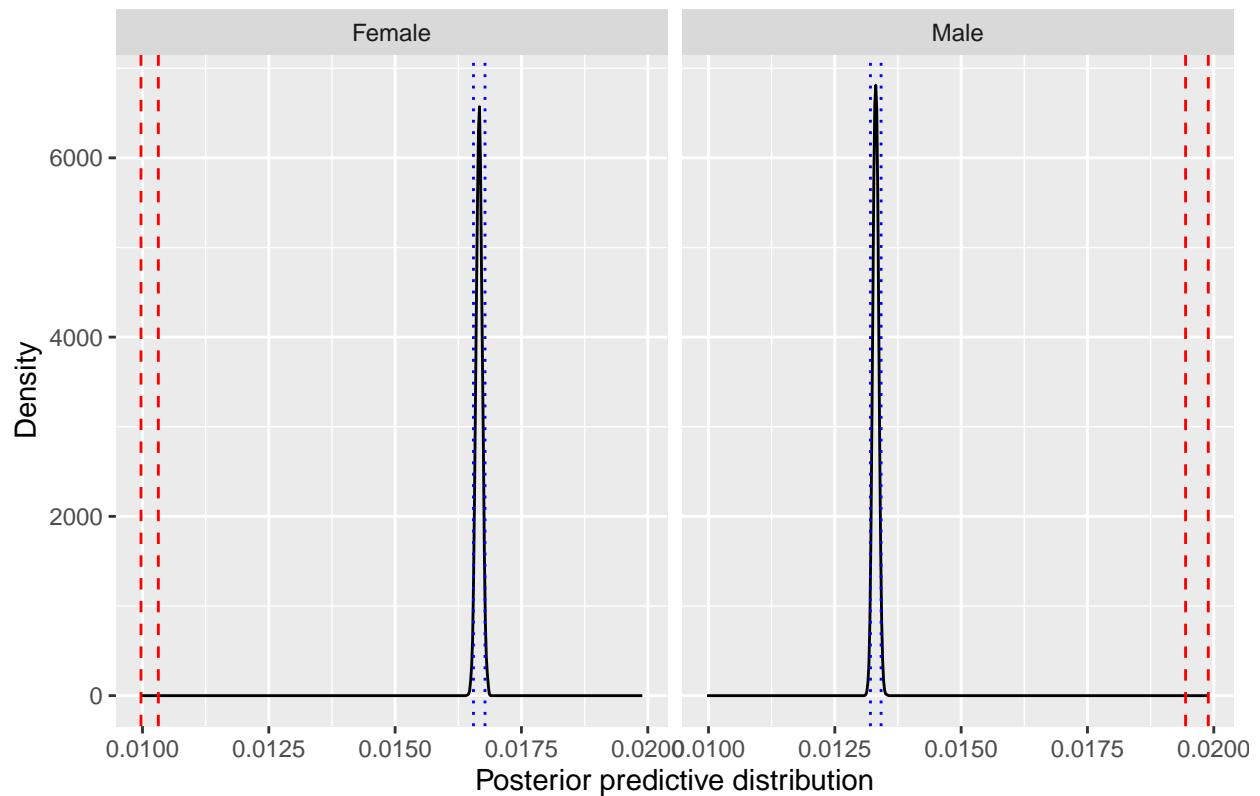


Figure 34: Posterior predictive distribution for ADHD with a random effect on sex, and with age- and sex-adjusted global prevalence prior.

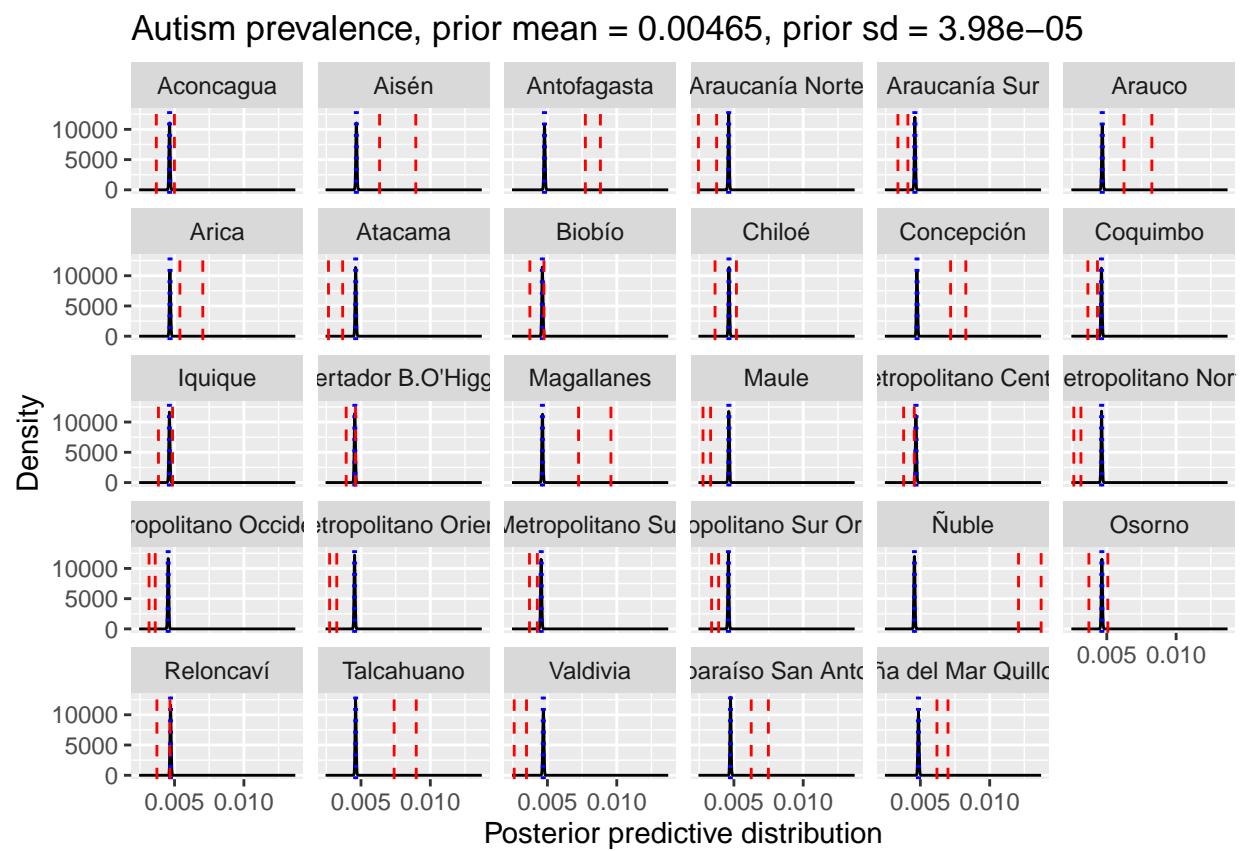


Figure 35: Posterior predictive distribution for autism with a random effect on student's health service, and with age- and sex-adjusted global prevalence prior.

ADHD prevalence, prior mean = 0.015, prior sd = 7.25e-05

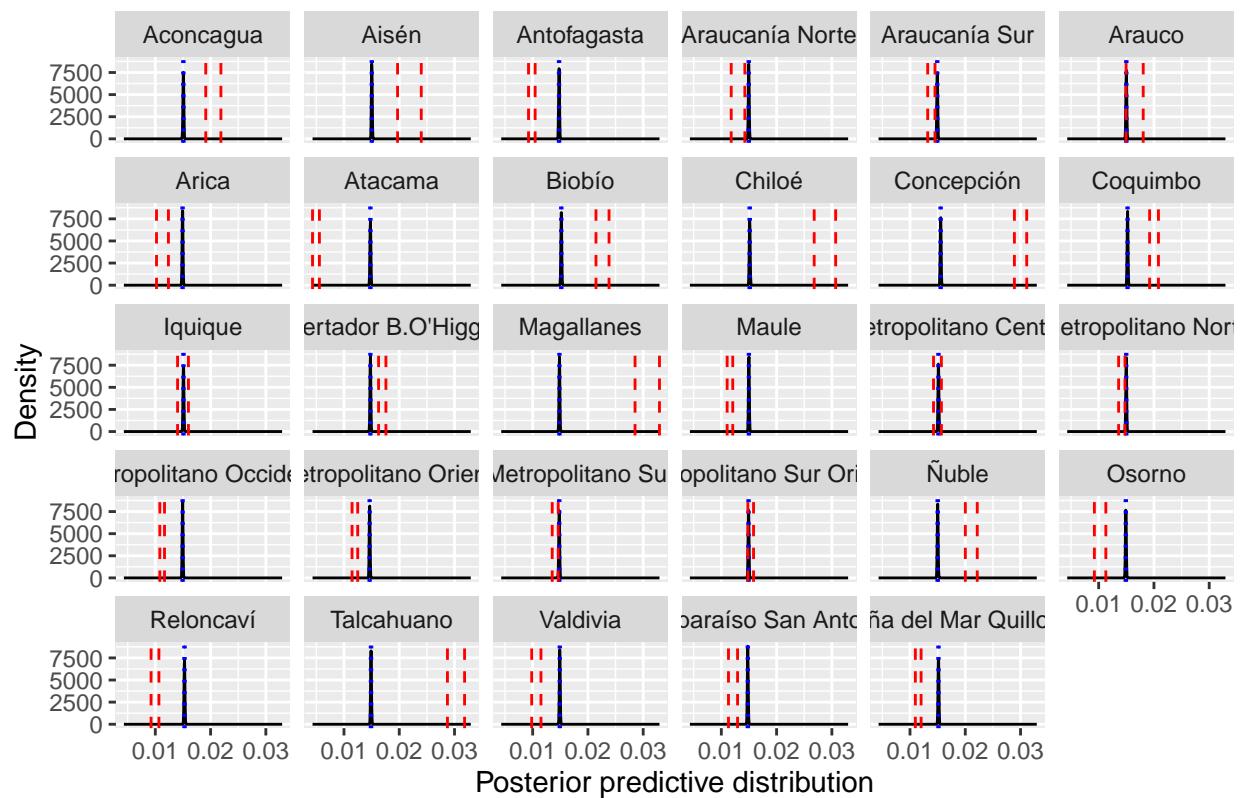


Figure 36: Posterior predictive distribution for ADHD with a random effect on health service, and with age- and sex-adjusted global prevalence prior.

Autism prevalence, prior mean = 0.00465, prior sd = 3.98e-05

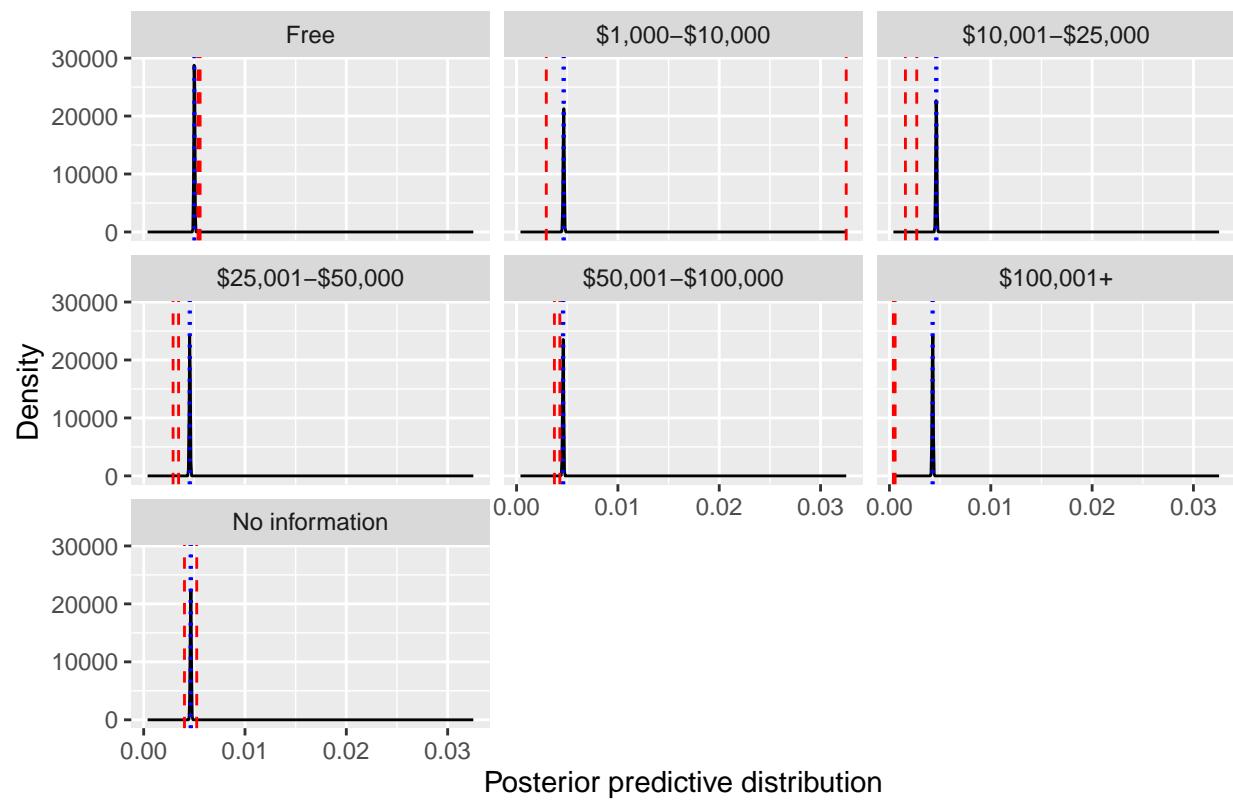


Figure 37: Posterior predictive distribution for autism with a random effect on socio-economic status of student's family, and with age- and sex-adjusted global prevalence prior.

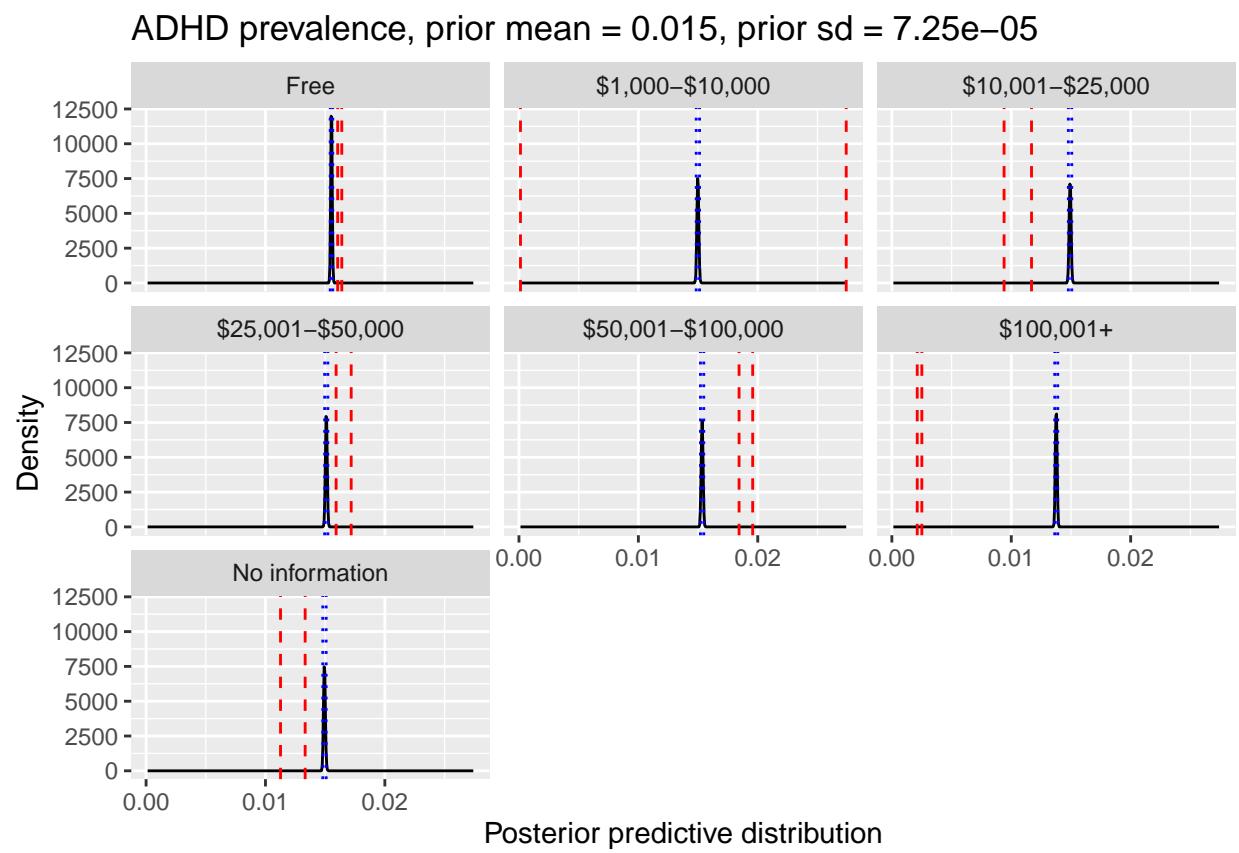


Figure 38: Posterior predictive distribution for ADHD with a random effect on socio-economic status of student's family, and with age- and sex-adjusted global prevalence prior.

Autism prevalence, prior mean = 0.00465, prior sd = 3.98e-05

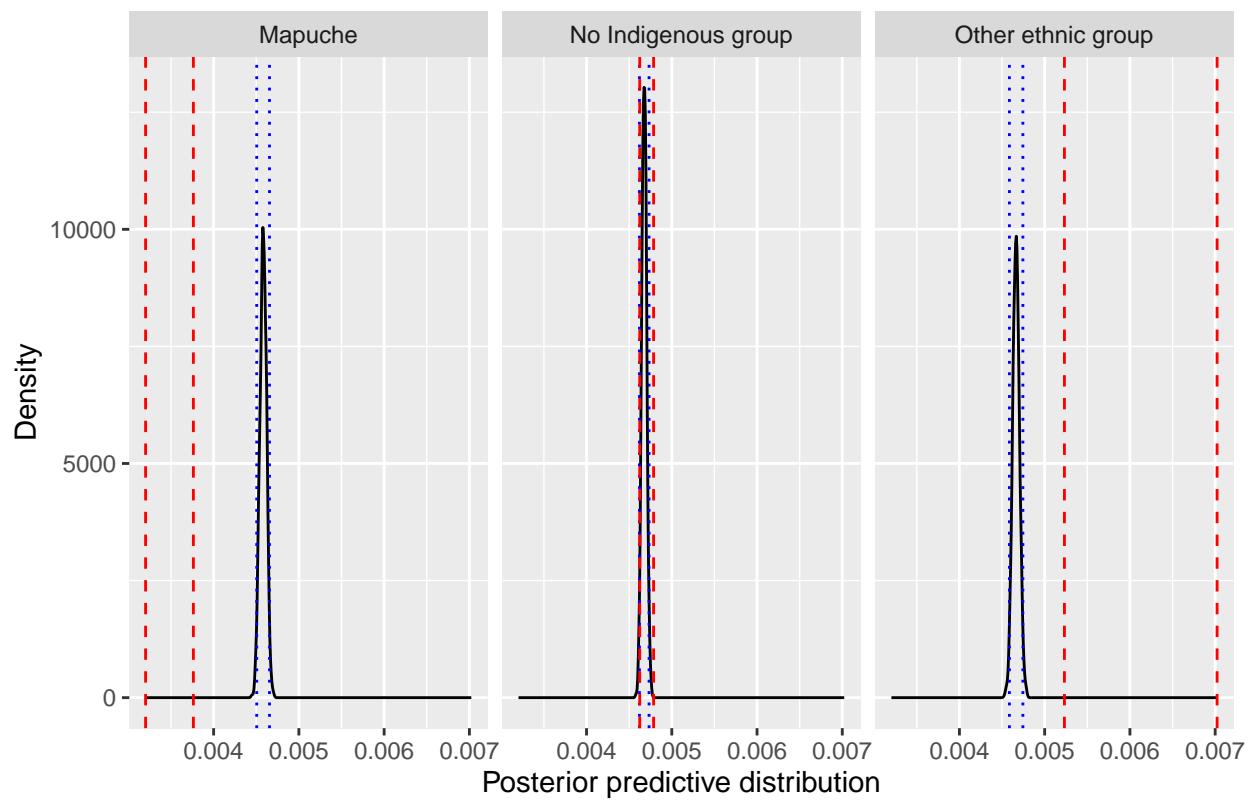


Figure 39: Posterior predictive distribution for autism with a random effect on ethnicity, and with age- and sex-adjusted global prevalence prior.

ADHD prevalence, prior mean = 0.015, prior sd = 7.25e-05

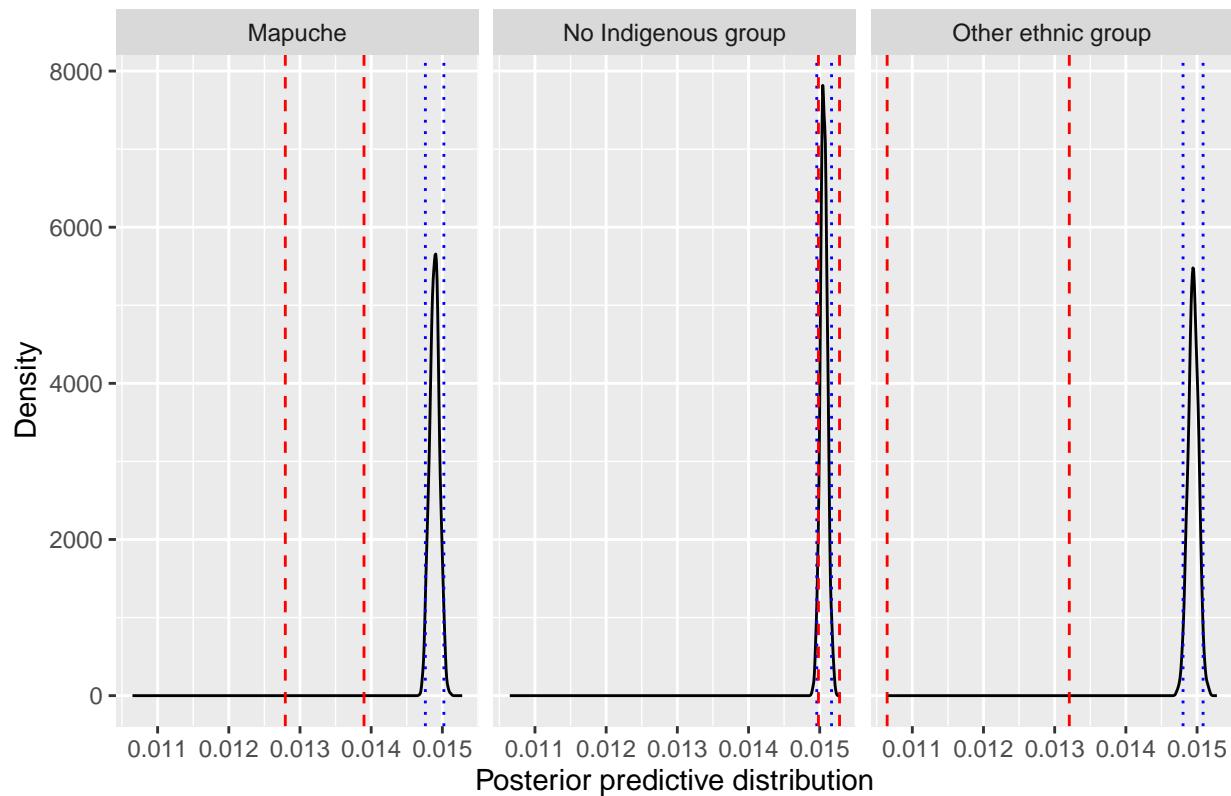


Figure 40: Posterior predictive distribution for ADHD with a random effect on ethnicity, and with age- and sex-adjusted global prevalence prior.

Autism prevalence, prior mean = 0.00465, prior sd = 3.98e-05

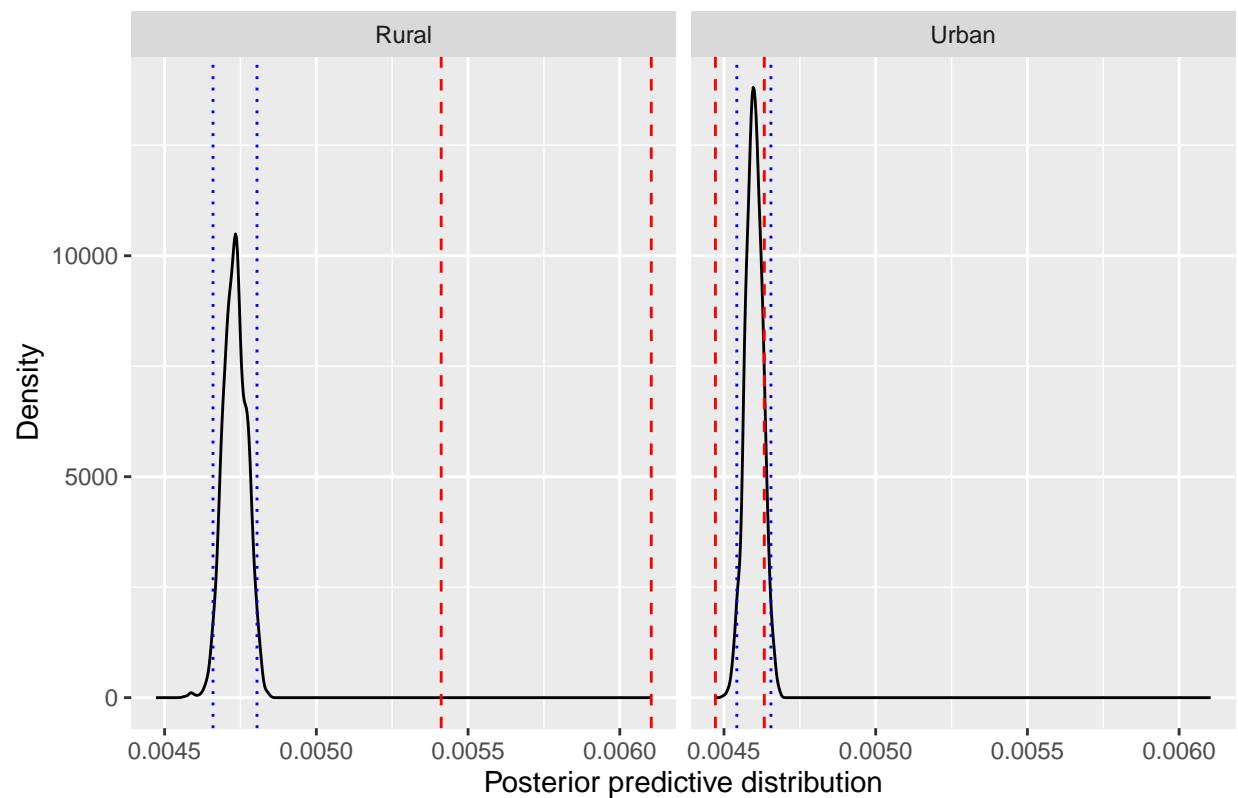


Figure 41: Posterior predictive distribution for autism with a random effect on school's rurality, and with age- and sex-adjusted global prevalence prior.

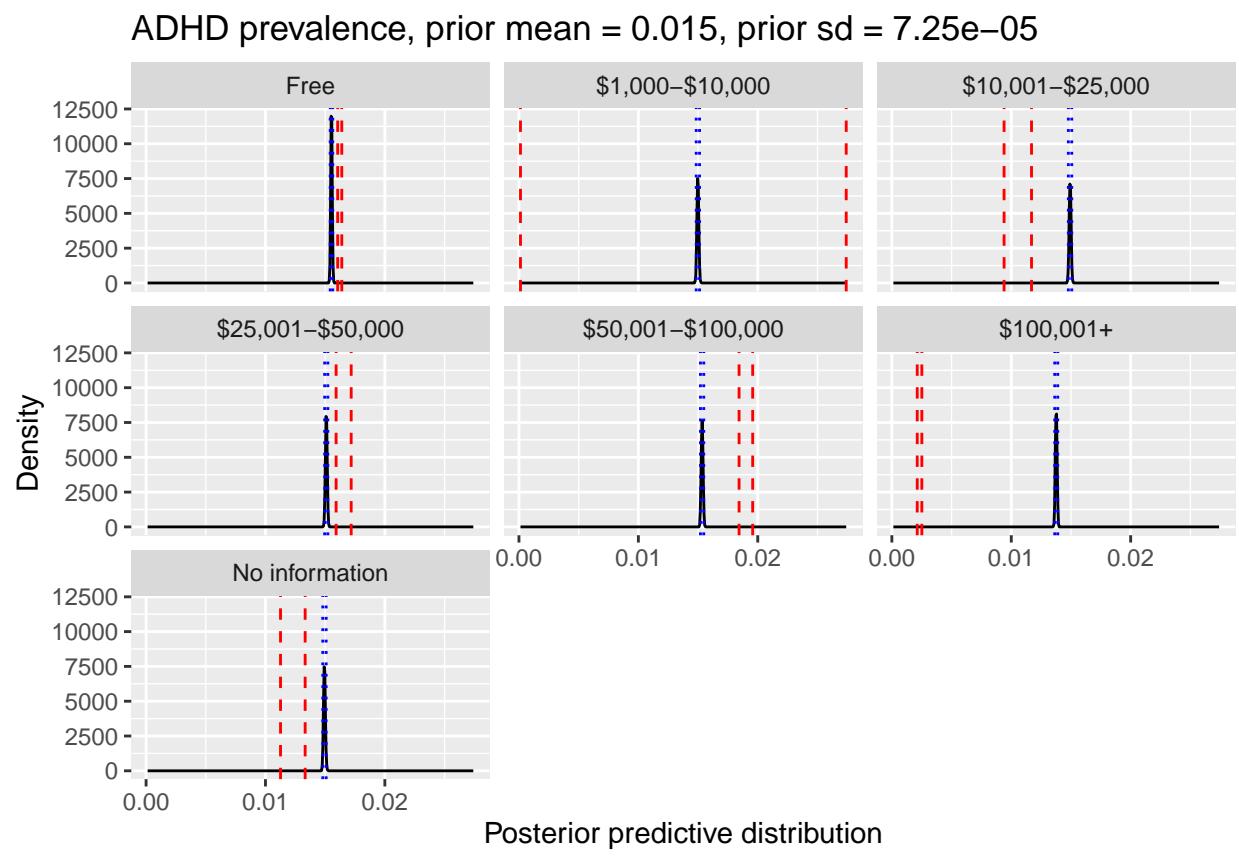


Figure 42: Posterior predictive distribution for ADHD with a random effect on school's rurality, and with age- and sex-adjusted global prevalence prior.