

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

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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

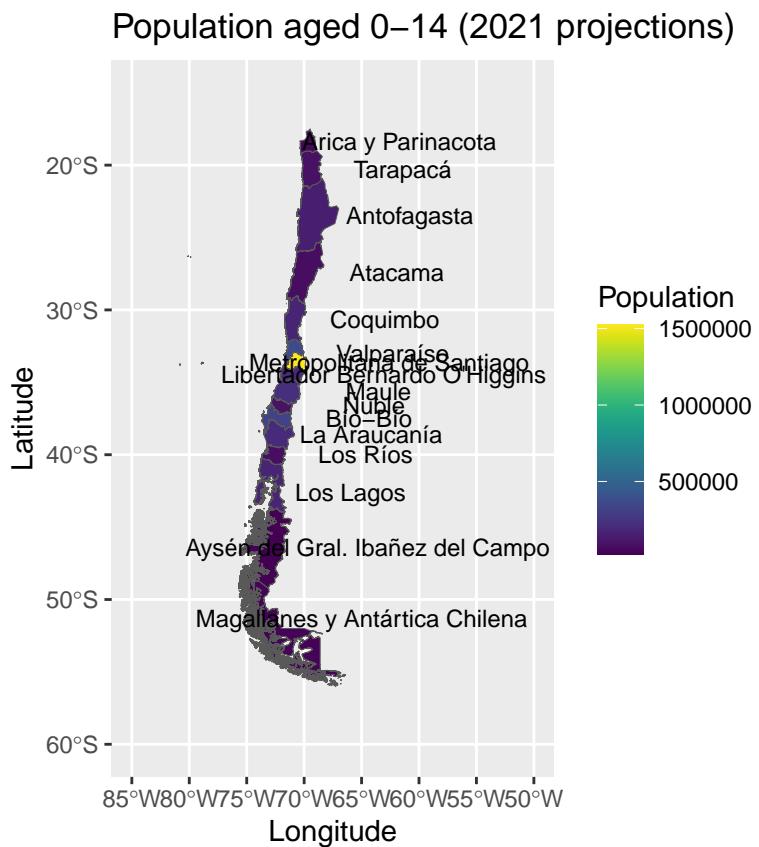


Figure 1: Population of 0-14 year olds in Chile in 2021 by region, from 2017 census projections.

4 Methods

5 Results

5.1 School data

TODO - table summarising data content

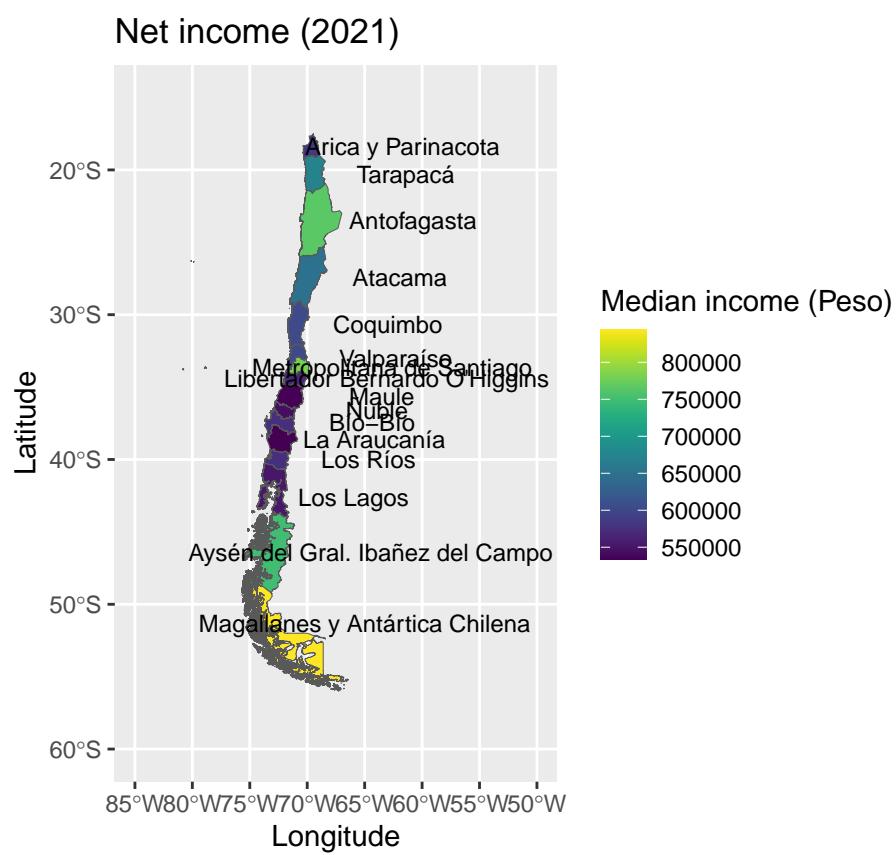


Figure 2: Net income from main job in Chile in 2021 by region, from the INE's Supplementary Income Survey.

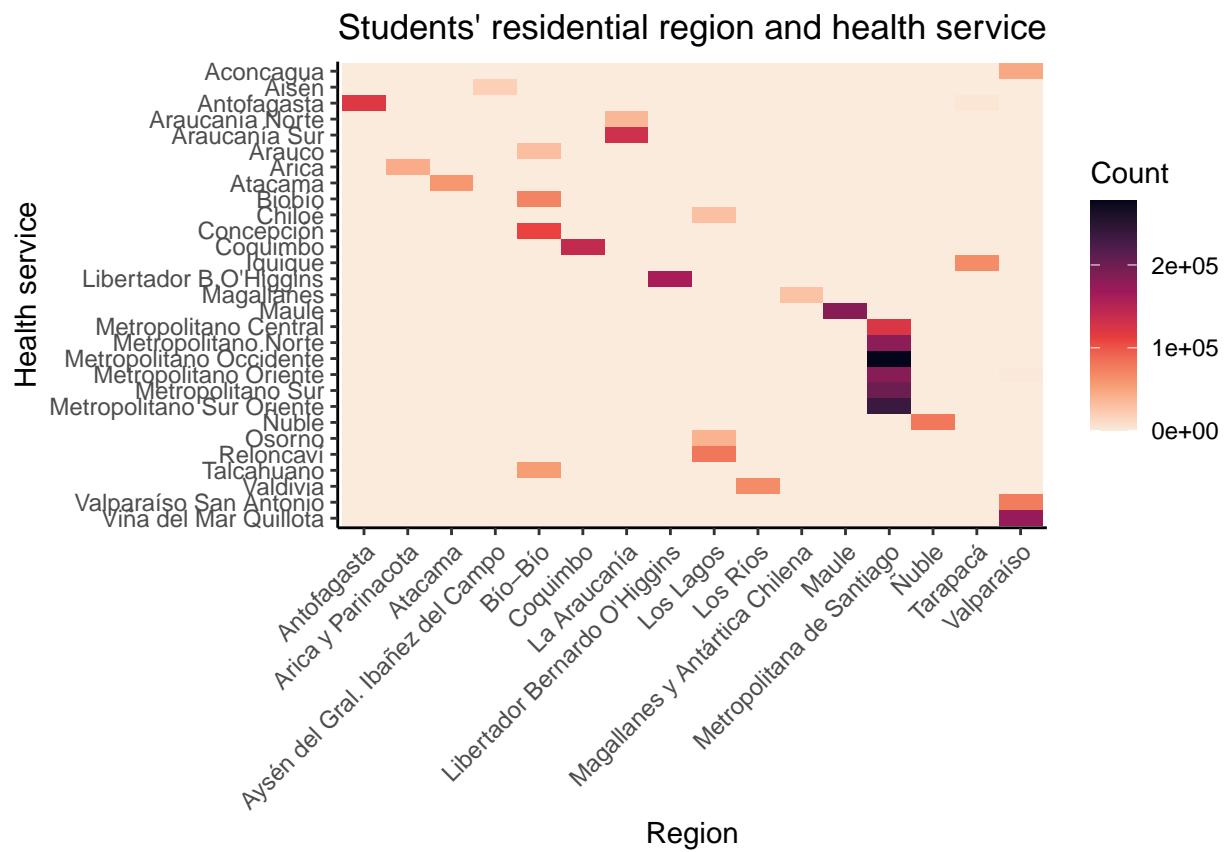


Figure 3: Residential communes aggregated to region level and the health services associated with the aggregated communes, with counts of the number of students resident in the communes in each health service's catchment area.

Communes in La Araucanía

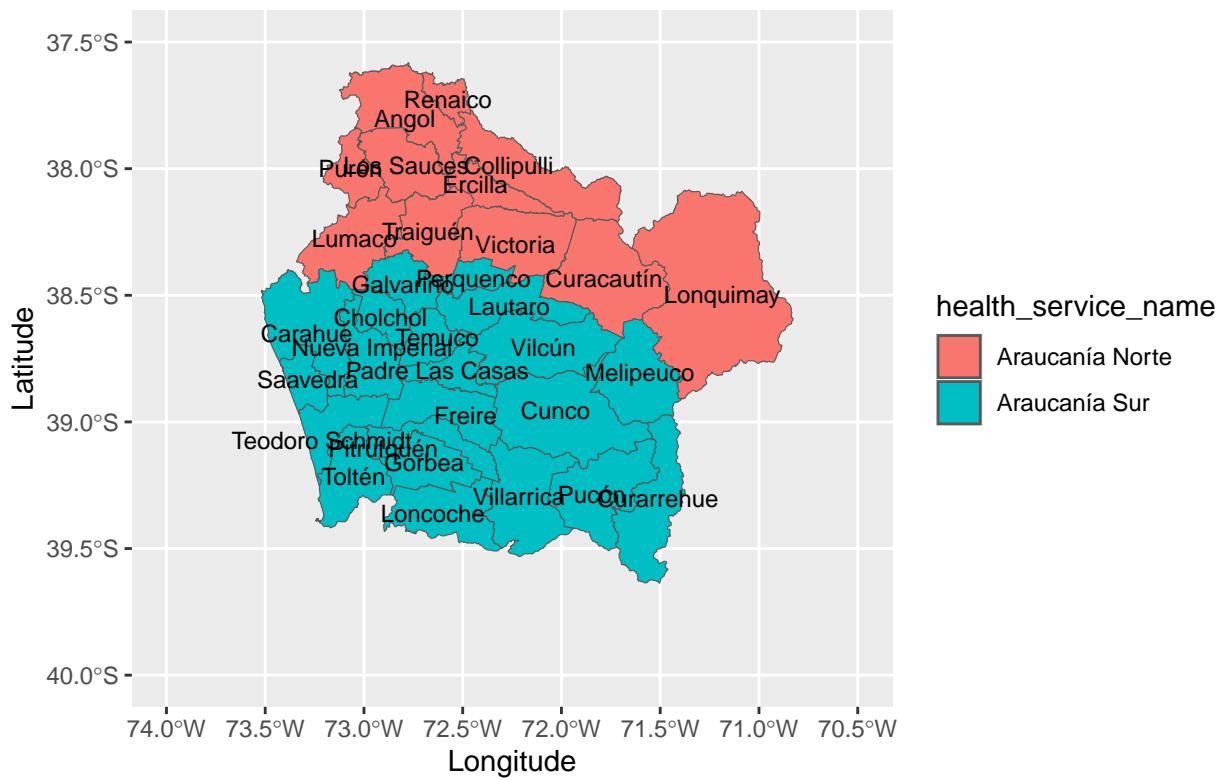


Figure 4: Communes in the Araucanía region, coloured red for the Araucanía Norte (north Araucanía) health services and blue for the Araucanía Sur (south Araucanía) health service.

In the school data, 4078 (0.13%) students were missing commune of residence. These missing values were imputed with their school's commune as most students are likely to go to school near their place of residence.

5.2 Clinical data

TODO - table summarising data content. Number of unique patients

5.3 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.

5.3.1 Number matched

5.3.2 Differences between un/matched

5.3.3 Prev delta

5.4 Frequentist prevalence estimation

5.4.1 Autism and ADHD prevalence by sex

```
## # 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

## # 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 Male         0.00787     0.00801     0.00815     0.00773 0.00787 0.00801
## 2 Female       0.00127     0.00133     0.00139     0.00125 0.00131 0.00138
## # ... 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 Male         0.0196      0.0198      0.0201      0.0194 0.0197 0.0199
## 2 Female       0.00998    0.0101      0.0103      0.00997 0.0101 0.0103
## # ... with abbreviated variable names 1: adjusted_ci_lower, 2: adjusted_rate,
## #   3: adjusted_ci_upper
```

5.4.2 Autism and ADHD prevalence by health service

	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	0.00791	0.00842	0.00893
## 4	Araucanía Norte	0.00244	0.00300	0.00356
## 5	Araucanía Sur	0.00336	0.00369	0.00402

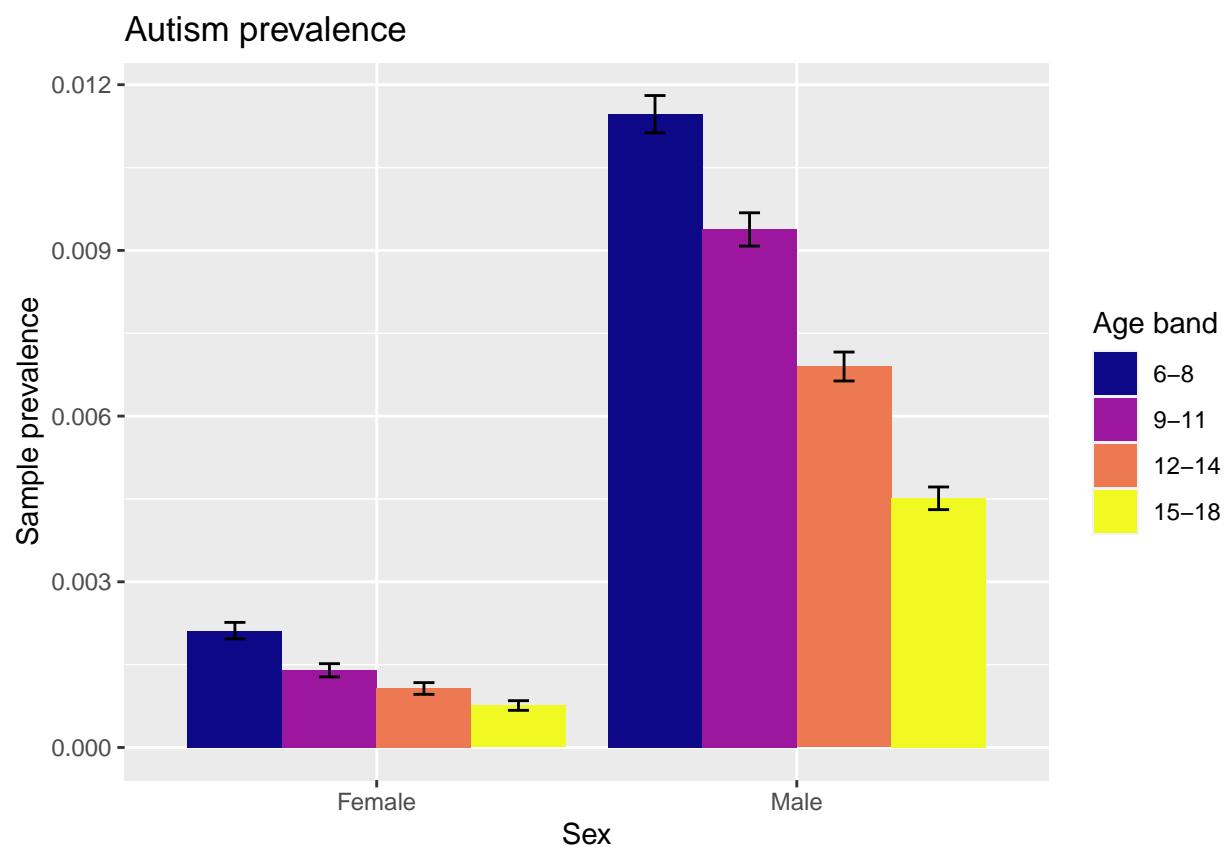


Figure 5: Sample prevalence of autism by age band and sex. Bars show 95% normal confidence intervals.

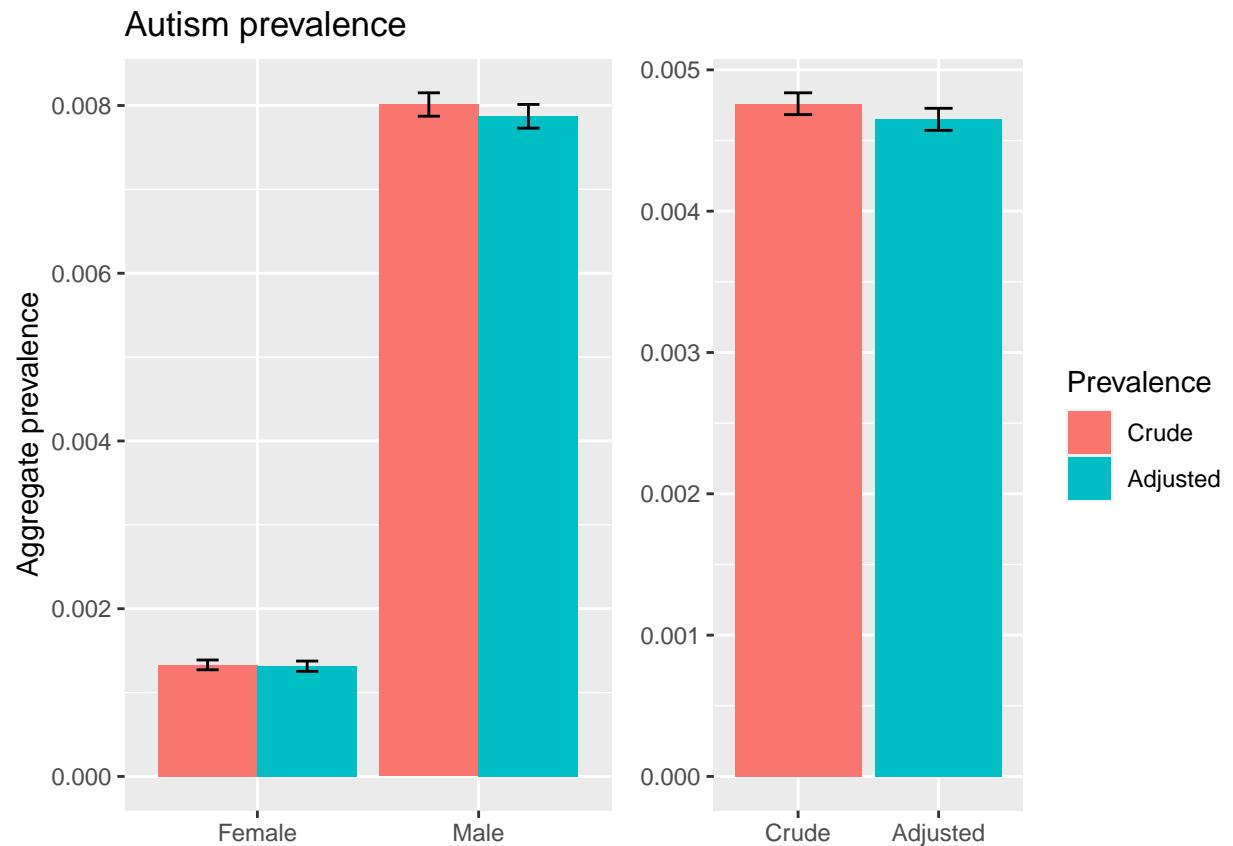


Figure 6: Crude and age- and sex-adjusted sample prevalences of autism, by sex and in aggregate. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

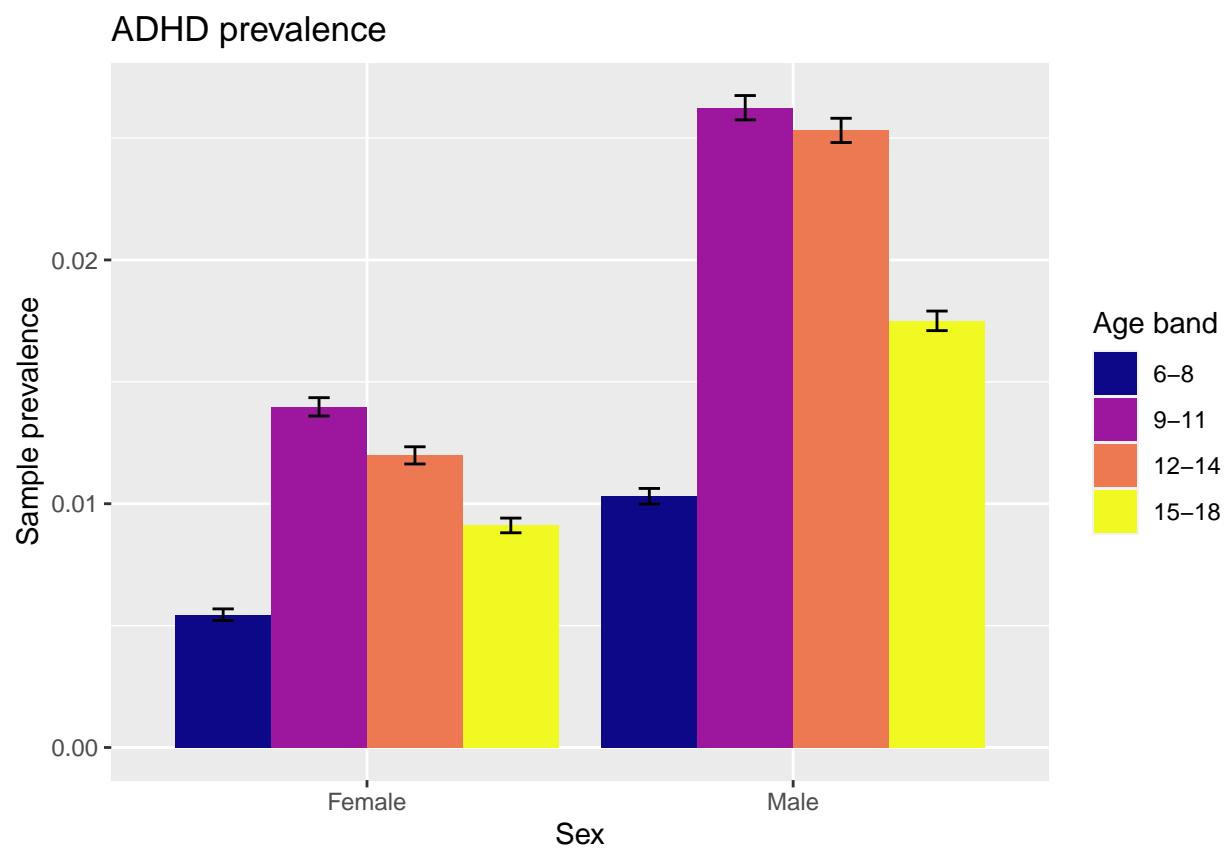


Figure 7: Sample prevalence of ADHD by age band and sex. Bars show 95% normal confidence intervals.

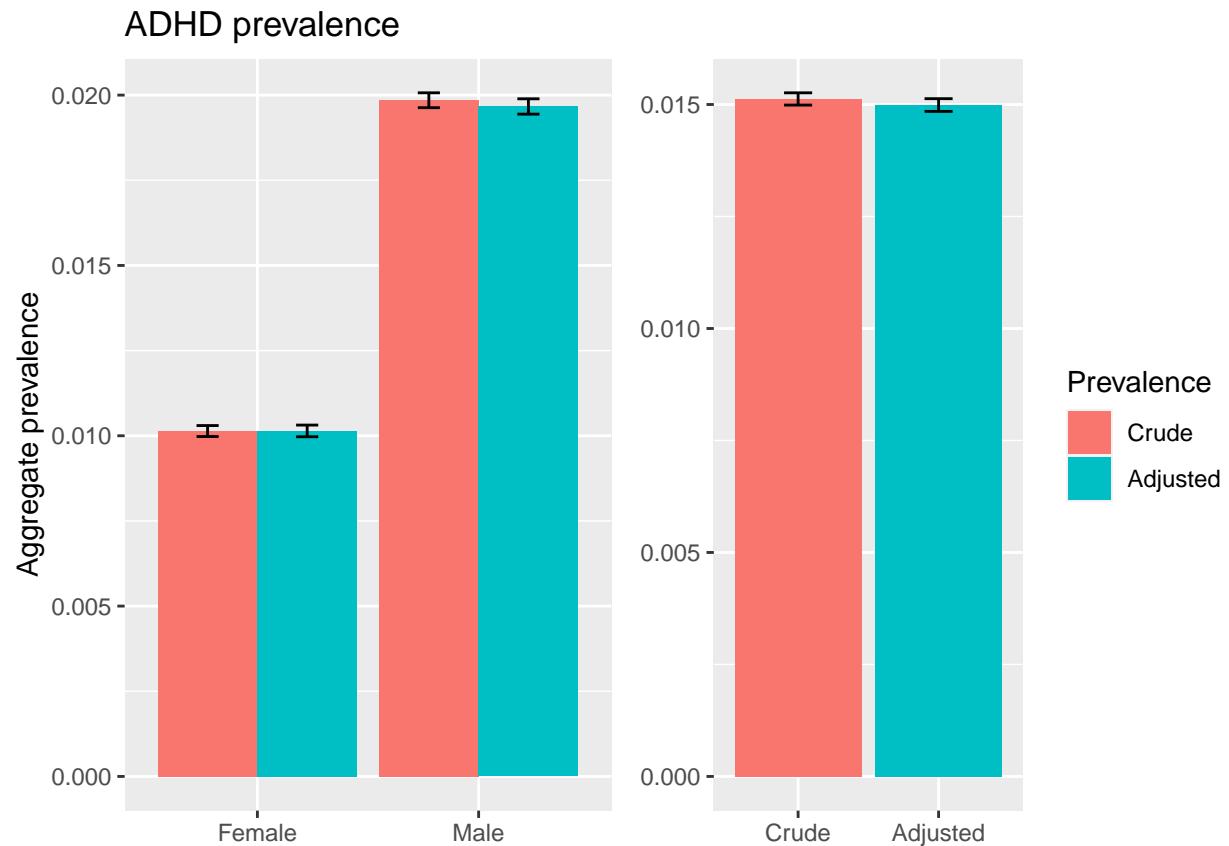


Figure 8: Crude and age- and sex-adjusted sample prevalences of ADHD, by sex and in aggregate. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

## 6	Arauco	0.00637	0.00731	0.00826
## 7	Arica	0.00540	0.00612	0.00684
## 8	Atacama	0.00262	0.00306	0.00351
## 9	Biobío	0.00383	0.00431	0.00479
## 10	Chiloé	0.00375	0.00450	0.00524
## 11	Concepción	0.00732	0.00784	0.00837
## 12	Coquimbo	0.00378	0.00412	0.00445
## 13	Libertador B.O'Higgins	0.00402	0.00434	0.00467
## 14	Maule	0.00280	0.00305	0.00331
## 15	Reloncaví	0.00379	0.00424	0.00469
## 16	Iquique	0.00381	0.00431	0.00481
## 17	Magallanes	0.00725	0.00831	0.00938
## 18	Metropolitano Central	0.00385	0.00421	0.00457
## 19	Metropolitano Norte	0.00269	0.00294	0.00318
## 20	Metropolitano Occidente	0.00336	0.00358	0.00381
## 21	Metropolitano Oriente	0.00279	0.00304	0.00329
## 22	Metropolitano Sur	0.00385	0.00413	0.00442
## 23	Metropolitano Sur Oriente	0.00342	0.00367	0.00391
## 24	Osorno	0.00380	0.00445	0.00510
## 25	Talcahuano	0.00763	0.00839	0.00916
## 26	Valdivia	0.00269	0.00311	0.00354
## 27	Valparaíso San Antonio	0.00635	0.00694	0.00752
## 28	Viña del Mar Quillota	0.00632	0.00670	0.00709
## 29	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	0.00774	0.00825	0.00881	
## 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	0.00363	0.00410	0.00466	
## 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	

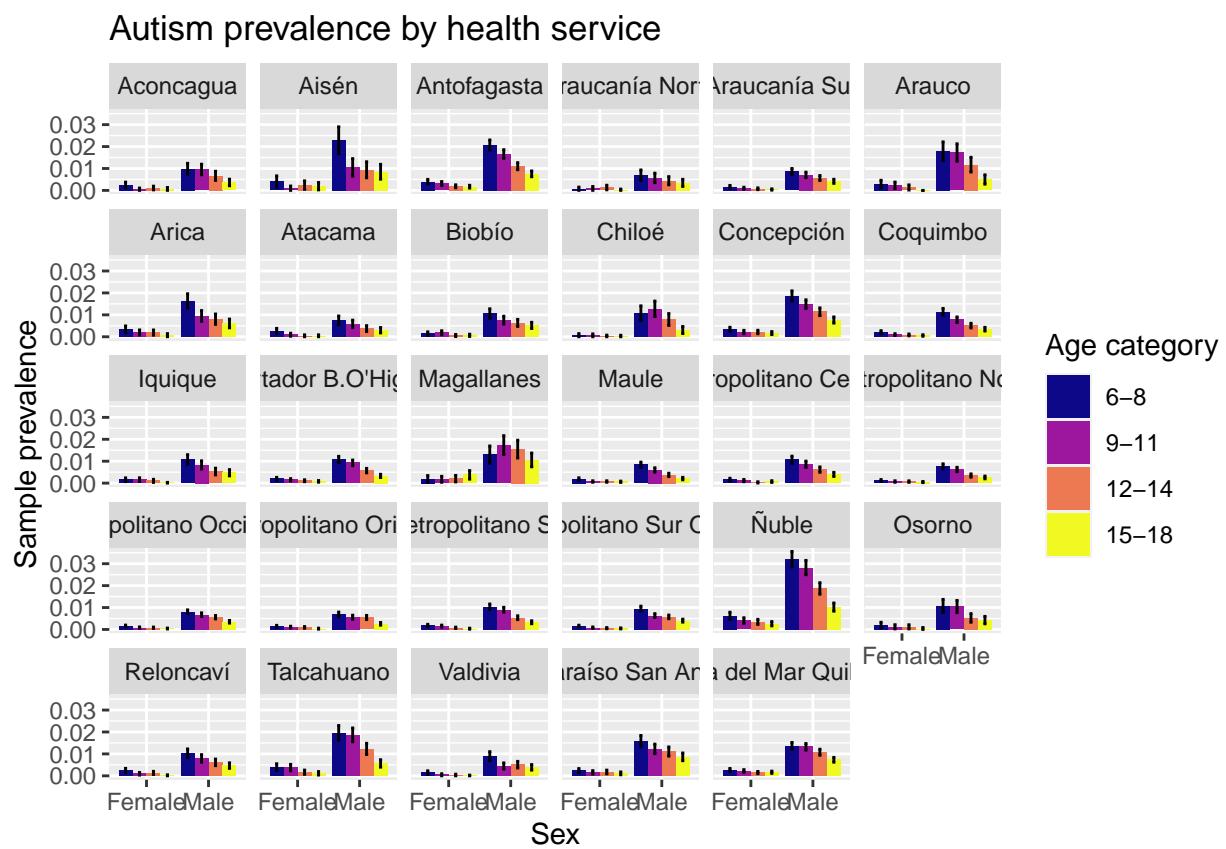


Figure 9: Sample prevalence of autism by health service, age band and sex. Bars show 95% normal confidence intervals.

Autism prevalence by health service



Figure 10: 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.

```

##          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   0.00958    0.01014    0.01071
## 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     0.01402    0.01494    0.01586
## 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           0.00938    0.00994    0.01056
## 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          0.01405    0.01502    0.01608
## 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

```

ADHD prevalence by health service

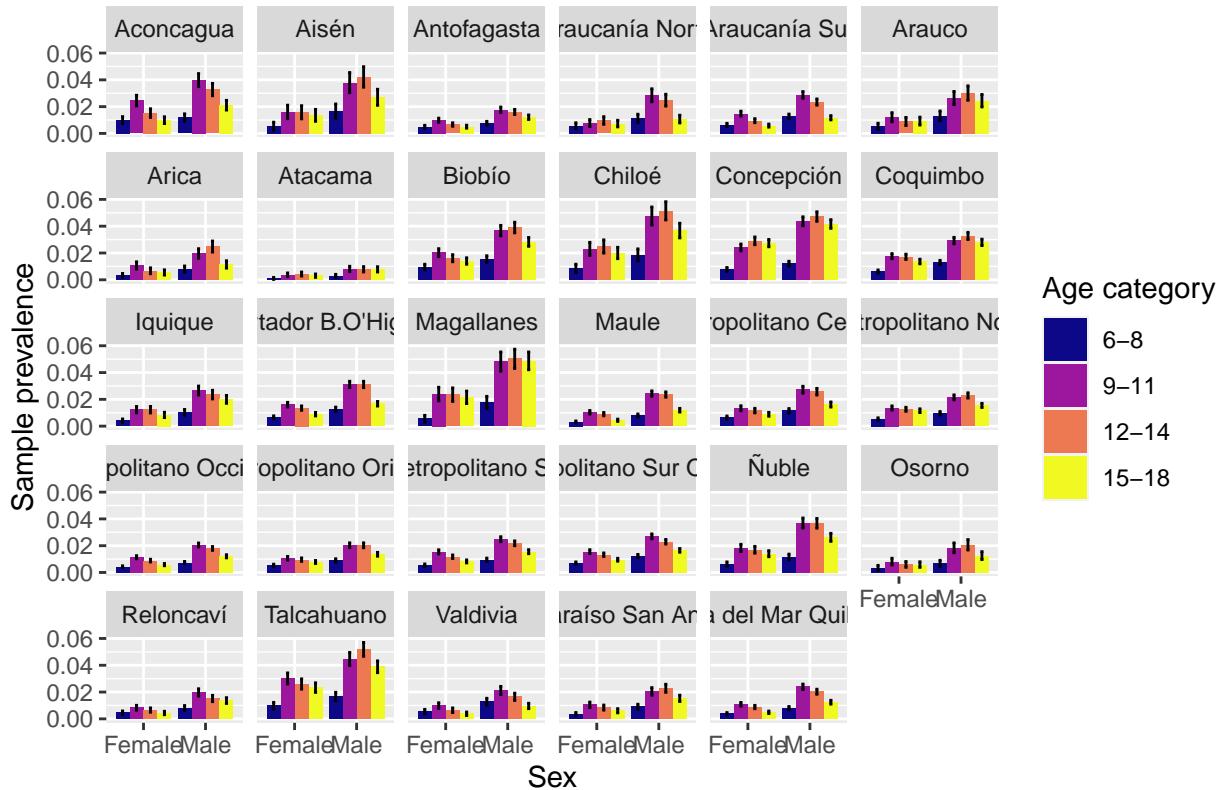


Figure 11: Sample prevalence of ADHD by health service, age band and sex. Bars show 95% normal confidence intervals.

```

## # A tibble: 21 x 7
##   commune_name crude_ci_lower crude_rate crude_ci_upper adjus~1 adjus~2 adjus~3
##   <chr>          <dbl>       <dbl>        <dbl>      <dbl>      <dbl>      <dbl>
## 1 Carahue        0.00116     0.00266     0.00416  0.00129  0.0025  0.00588
## 2 Cholchol        0           0.00138     0.00295  0.00026  0.00128  0.00816
## 3 Cunco          0.00229     0.0048      0.00732  0.00258  0.00472  0.0100 
## 4 Curarrehue     0           0.00147     0.00351  0.00017  0.00142  0.00804
## 5 Freire          0.00195     0.00381     0.00567  0.0021   0.00369  0.00672
## 6 Galvarino       0.00196     0.00478     0.0076   0.0023   0.00463  0.0101 
## 7 Gorbea          0.00235     0.0054      0.00844  0.00258  0.0052   0.0118 
## 8 Lautaro         0.00255     0.00401     0.00546  0.00259  0.00387  0.00647
## 9 Loncoche        0.00062     0.00202     0.00341  0.0009   0.00295  0.00845
## 10 Melipeuco       0           0.00187     0.00445  0.00022  0.00183  0.0144 
## # ... with 11 more rows, and abbreviated variable names 1: adjusted_ci_lower,
## # 2: adjusted_rate, 3: adjusted_ci_upper

```

ADHD prevalence by health service



Figure 12: 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.

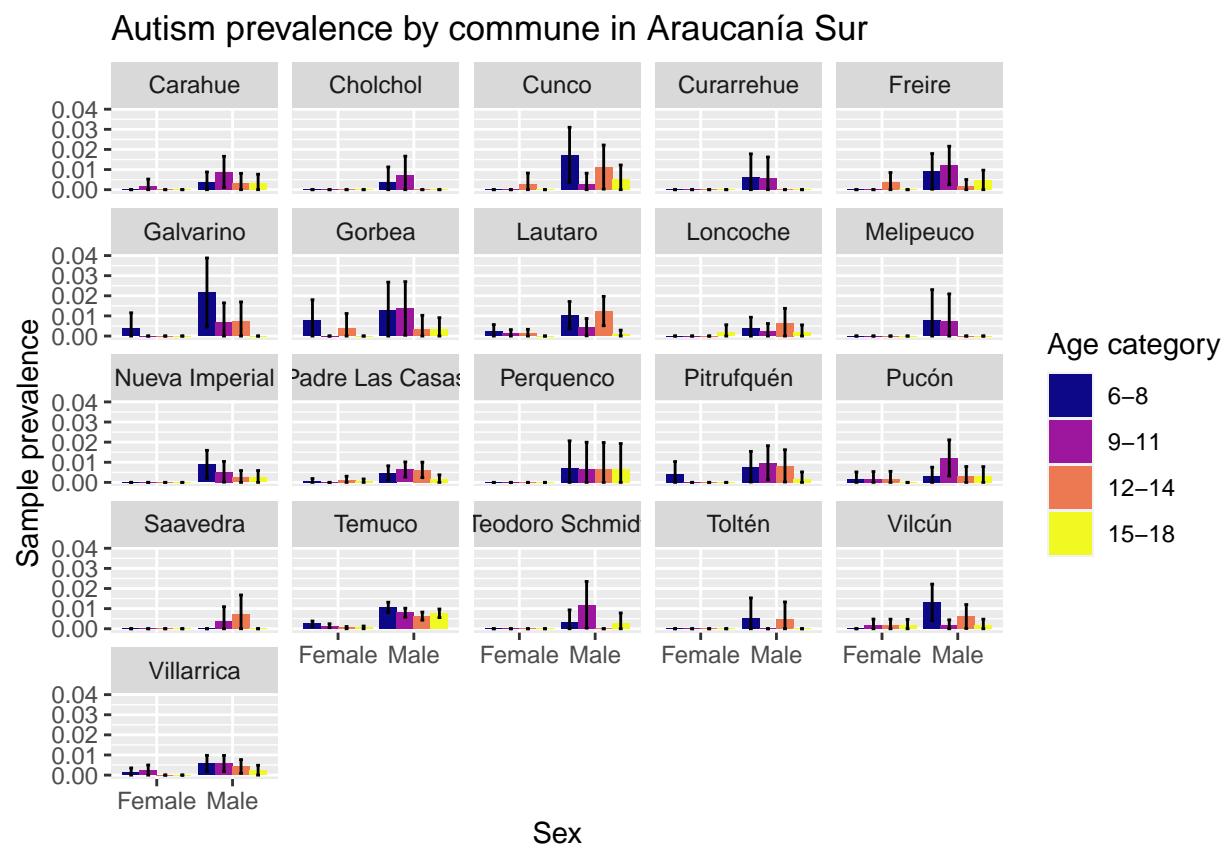


Figure 13: Sample prevalence of autism by commune in Araucanía Sur health service, age band and sex. Bars show 95% normal confidence intervals.

Autism prevalence by commune in Araucanía Sur

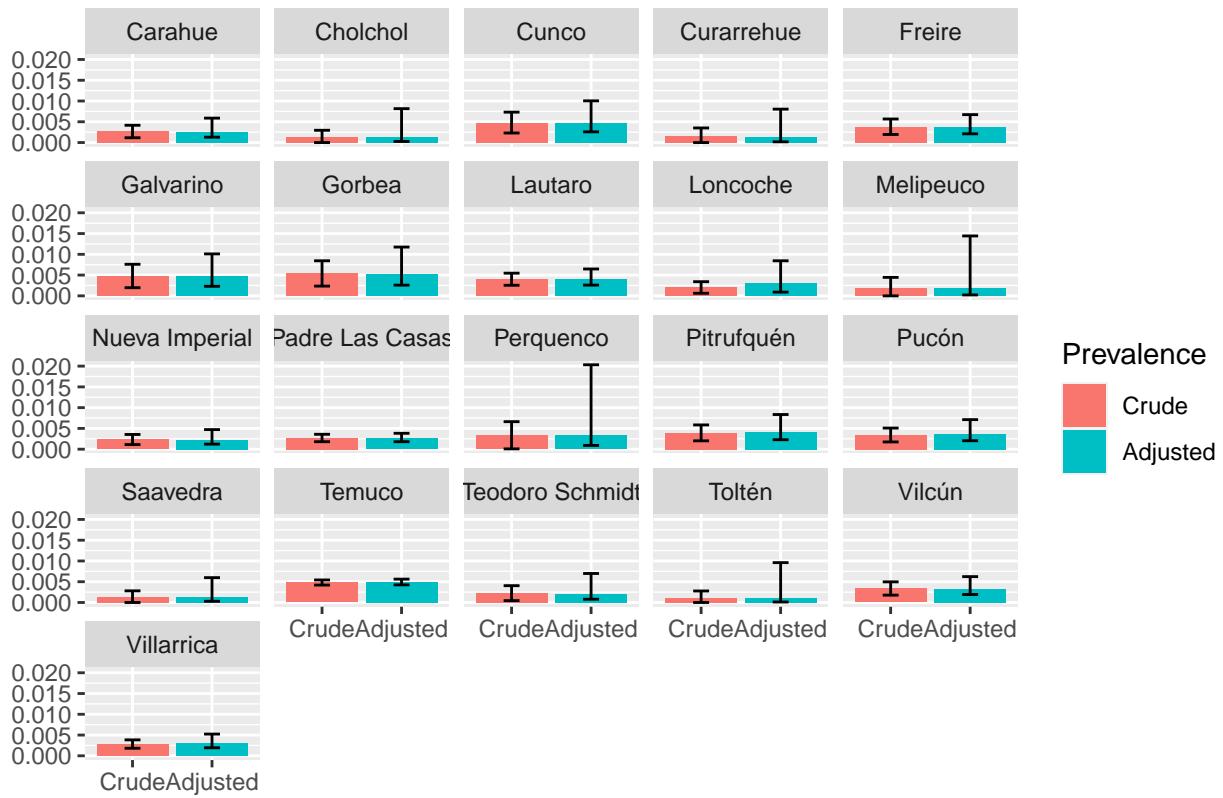


Figure 14: Crude and age- and sex-adjusted sample prevalences of autism by commune in Araucanía Sur health service. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

5.4.3 Autism and ADHD prevalence by socio-economic status

```
## # 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
```

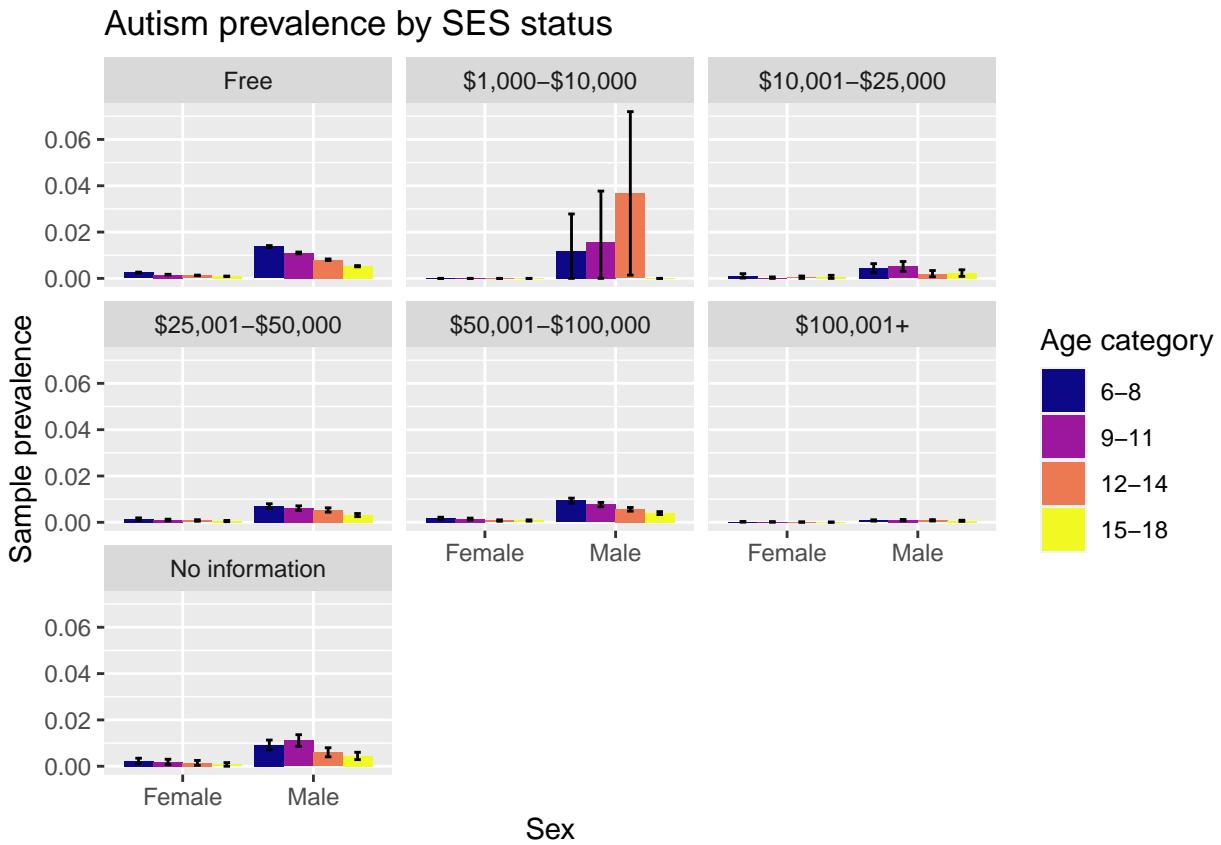


Figure 15: Sample prevalence of autism by socio-economic (SES) status of student's family, age band and sex. Bars show 95% normal confidence intervals.

```
## # 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            0.0163      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
```

Autism prevalence by SES status

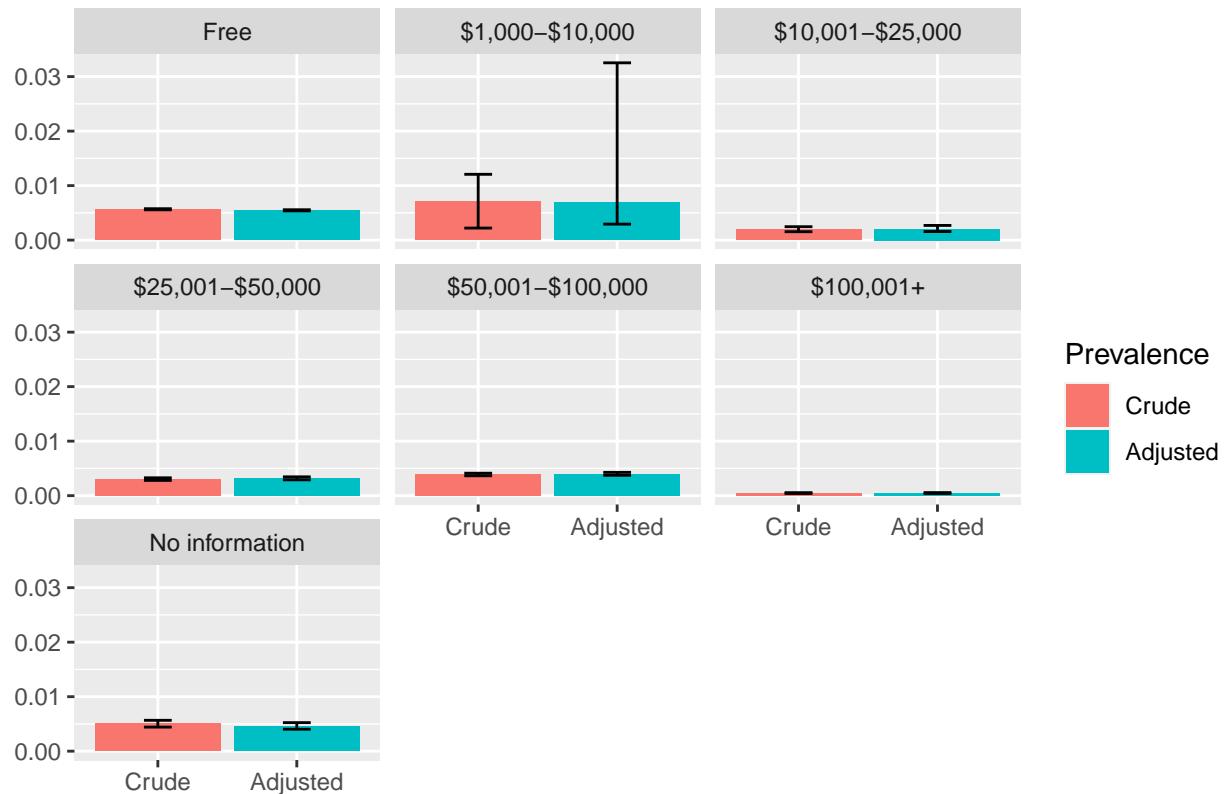


Figure 16: Crude and age- and sex-adjusted sample prevalences of autism by socio-economic (SES) status of student's family. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

```

## 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

```

ADHD prevalence by SES status



Figure 17: Sample prevalence of ADHD by socio-economic (SES) status of student's family, age band and sex. Bars show 95% normal confidence intervals.

5.4.4 Autism and ADHD prevalence by ethnicity

```

## # A tibble: 3 x 7
##   ethnic_2_group      crude_ci_lower crude~1 crude~2 adjus~3 adjus~4 adjus~5
##   <chr>                  <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  0.00463 0.00471 0.00479
## 3 Other Indigenous group 0.00538  0.00612  0.00686  0.00491 0.00565 0.00655
## # ... with abbreviated variable names 1: crude_rate, 2: crude_ci_upper,
## #   3: adjusted_ci_lower, 4: adjusted_rate, 5: adjusted_ci_upper

## # A tibble: 3 x 7
##   ethnic_2_group      crude_ci_lower crude~1 crude~2 adjus~3 adjus~4 adjus~5
##   <chr>                  <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    0.0153    0.0154    0.0150    0.0151 0.0153
## 3 Other Indigenous group 0.00914  0.0101    0.0110    0.0103    0.0115 0.0128
## # ... with abbreviated variable names 1: crude_rate, 2: crude_ci_upper,
## #   3: adjusted_ci_lower, 4: adjusted_rate, 5: adjusted_ci_upper

```

ADHD prevalence by SES status

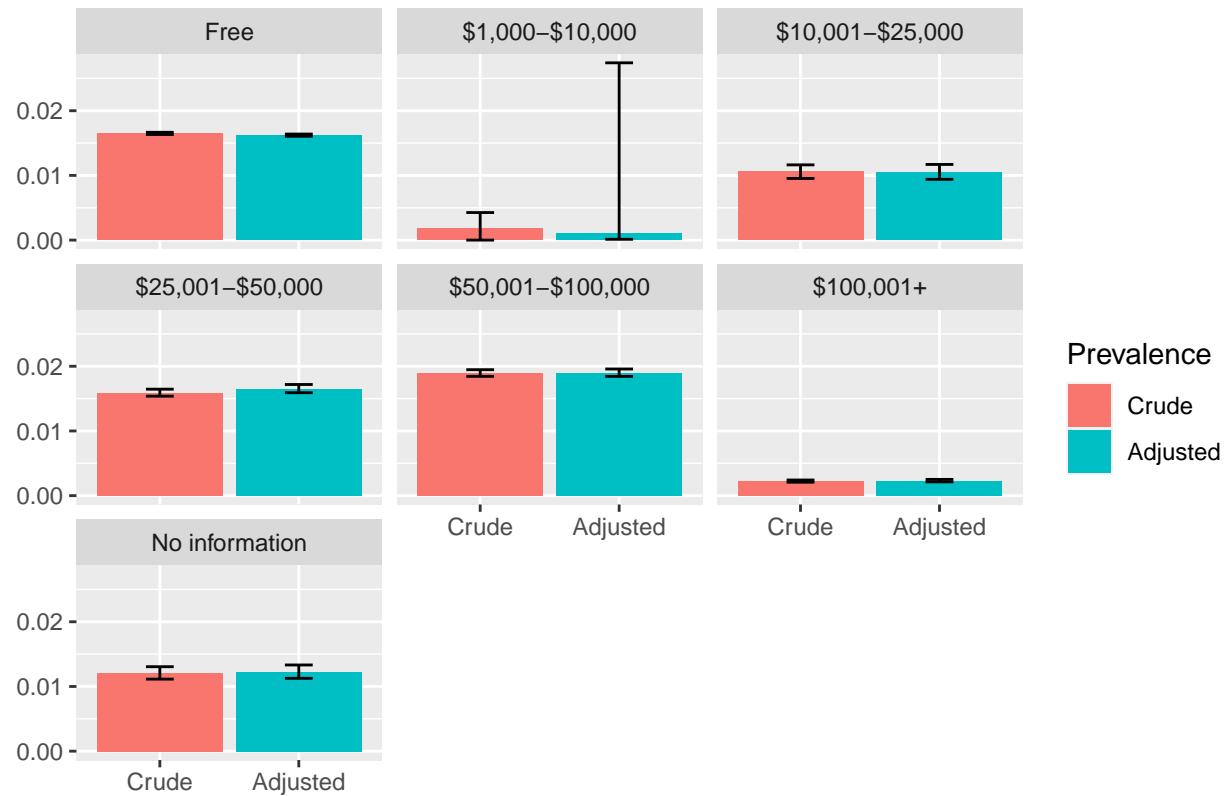


Figure 18: Crude and age- and sex-adjusted sample prevalences of ADHD by socio-economic (SES) status of student's family. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

Autism prevalence by ethnicity

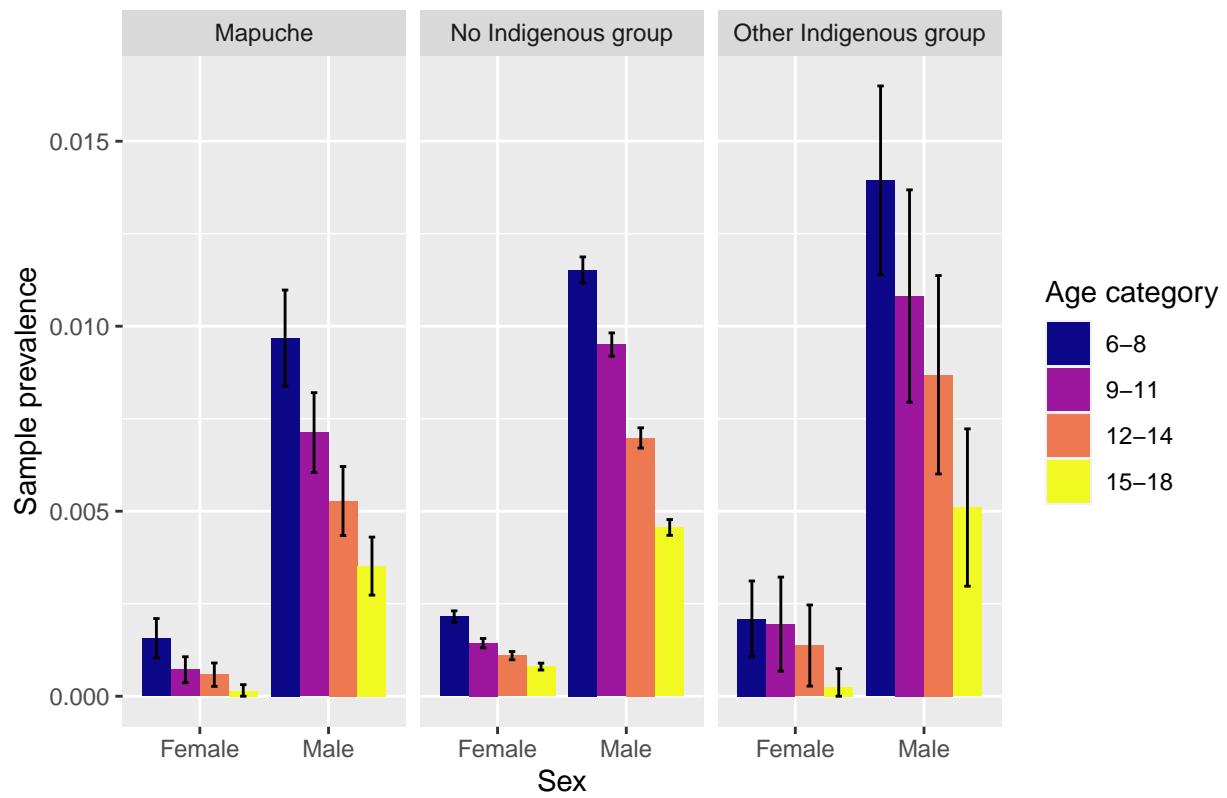


Figure 19: Sample prevalence of autism by ethnicity, age band and sex. Bars show 95% normal confidence intervals.

Autism prevalence by ethnicity

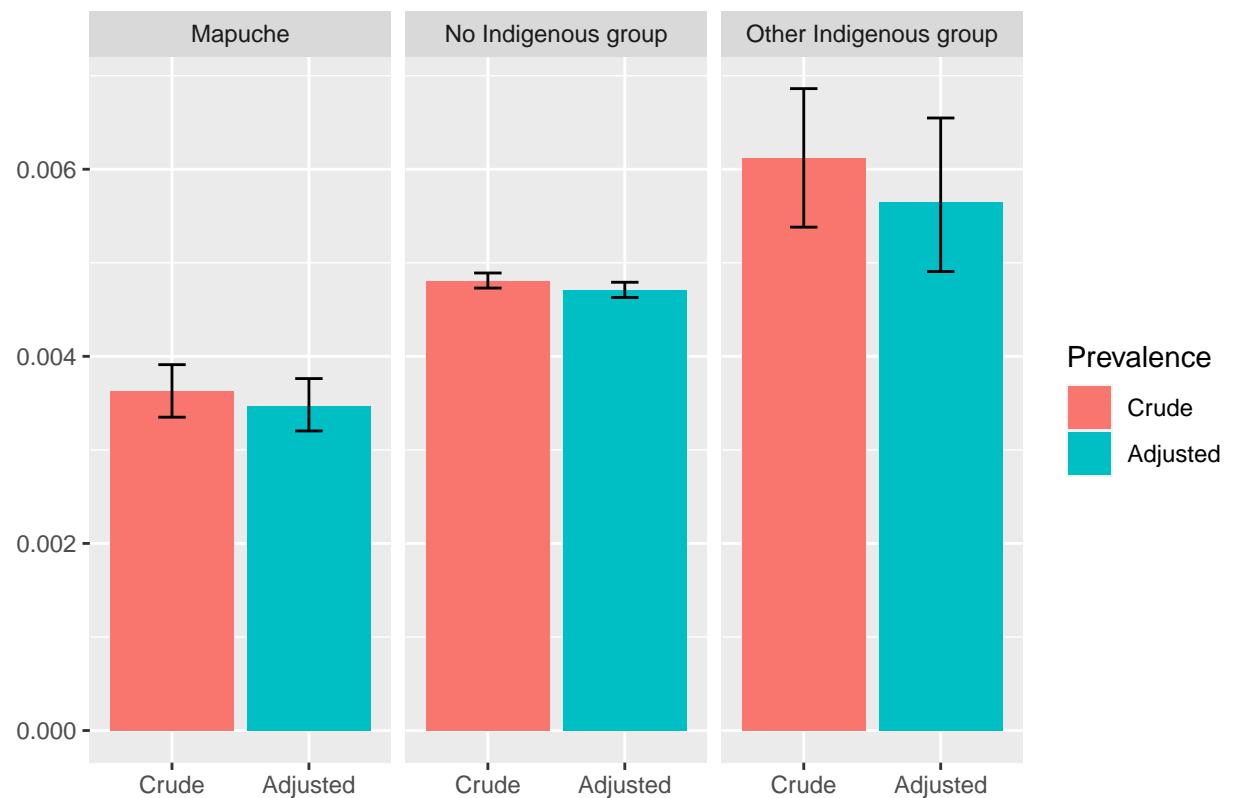


Figure 20: Crude and age- and sex-adjusted sample prevalences of autism by ethnicity. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

ADHD prevalence by ethnicity

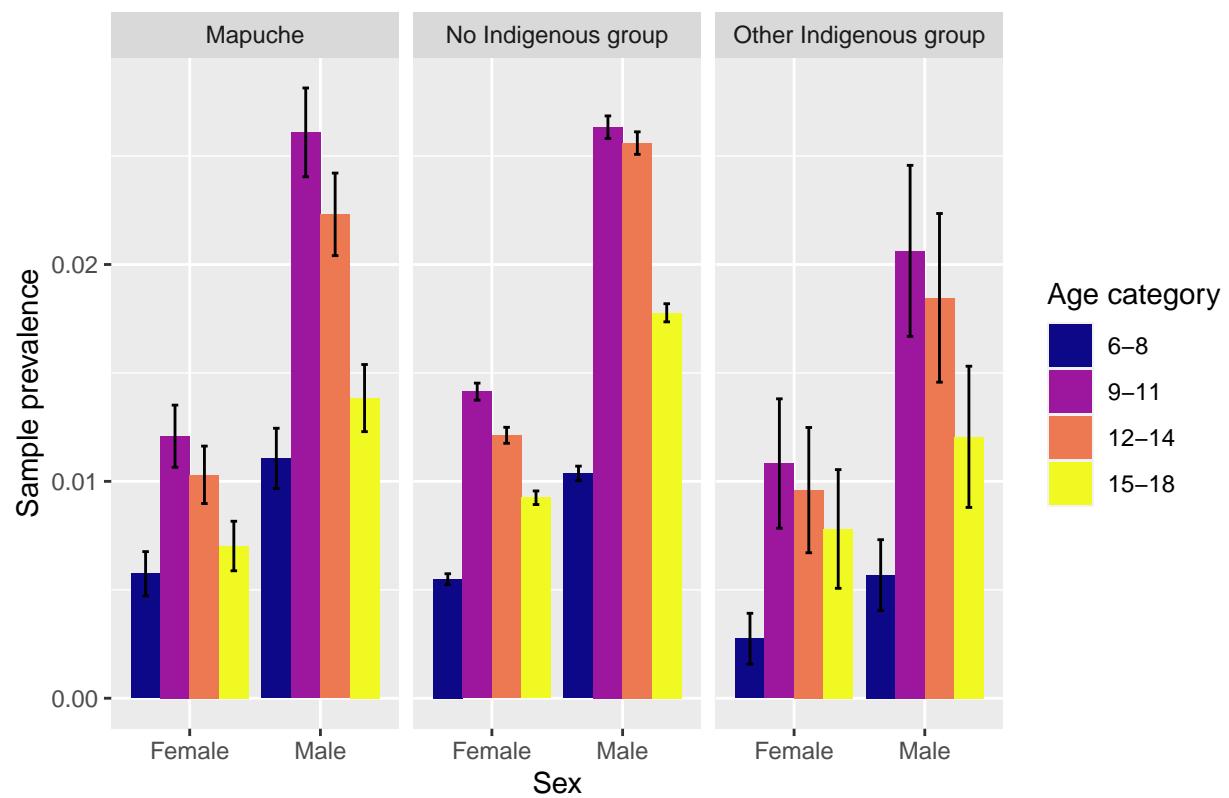


Figure 21: Sample prevalence of ADHD by ethnicity, age band and sex. Bars show 95% normal confidence intervals.

ADHD prevalence by ethnicity

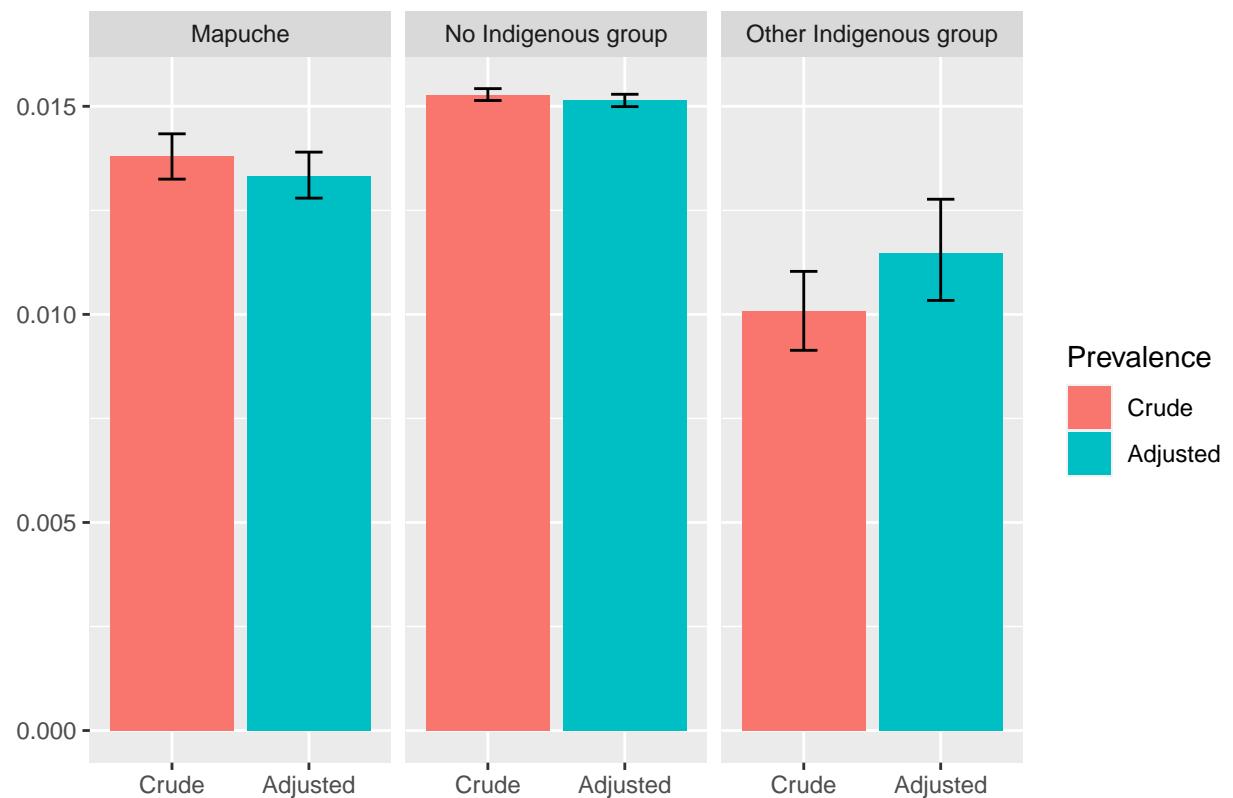


Figure 22: Crude and age- and sex-adjusted sample prevalences of ADHD by ethnicity. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

5.4.5 Autism and ADHD prevalence by rurality

```
## # A tibble: 2 x 7
##   school_rurality crude_ci_lower crude_rate crude_ci_u~1 adjus~2 adjus~3 adjus~4
##   <chr>           <dbl>       <dbl>       <dbl>       <dbl>       <dbl>
## 1 Rural            0.00629    0.00662    0.00694  0.00541  0.00573  0.0061
## 2 Urban            0.00452    0.0046     0.00468  0.00447  0.00455  0.00463
## # ... with abbreviated variable names 1: crude_ci_upper, 2: adjusted_ci_lower,
## #   3: adjusted_rate, 4: adjusted_ci_upper
```

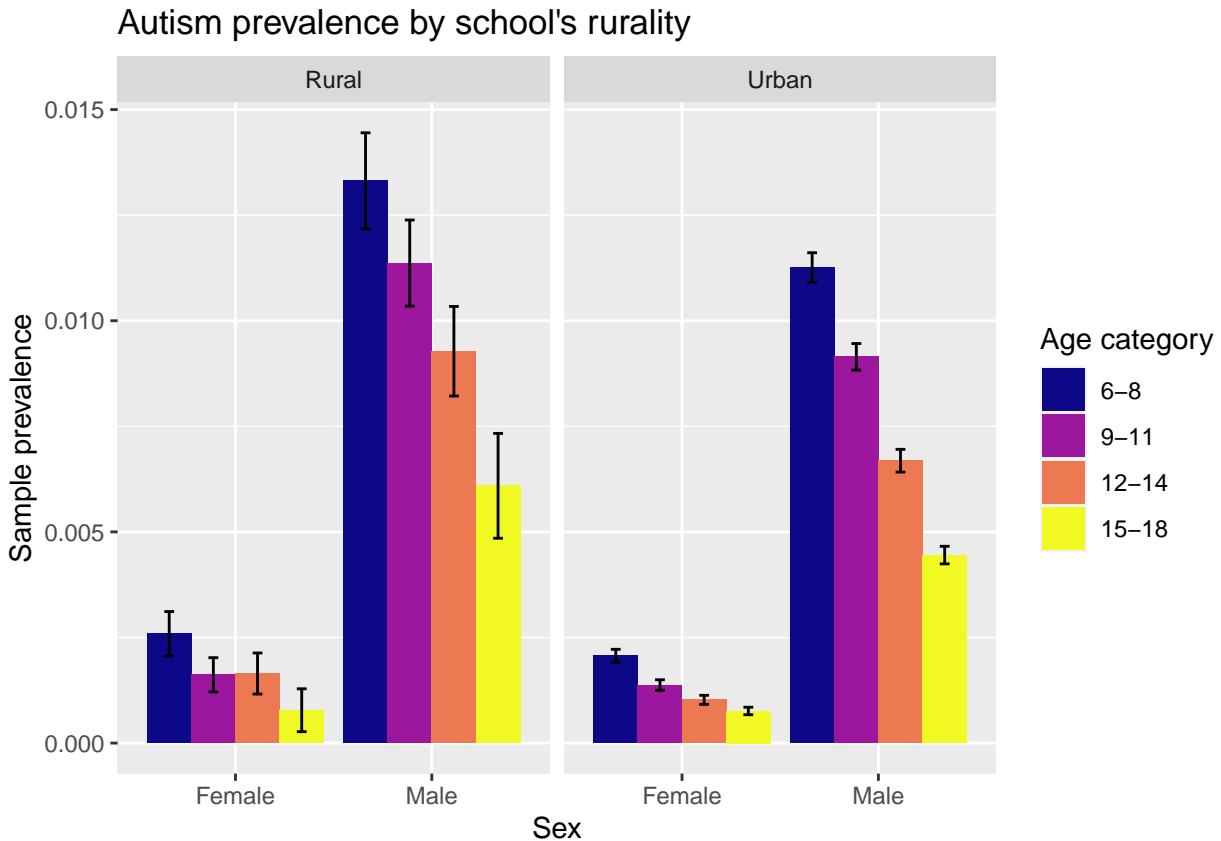


Figure 23: Sample prevalence of autism by school's rurality, age band and sex. Bars show 95% normal confidence intervals.

```
## # A tibble: 2 x 7
##   school_rurality crude_ci_lower crude_rate crude_ci_u~1 adjus~2 adjus~3 adjus~4
##   <chr>           <dbl>       <dbl>       <dbl>       <dbl>       <dbl>
## 1 Rural            0.0172     0.0177     0.0182     0.0161     0.0167    0.0174
## 2 Urban            0.0148     0.0149     0.0150     0.0147     0.0148    0.0150
## # ... with abbreviated variable names 1: crude_ci_upper, 2: adjusted_ci_lower,
## #   3: adjusted_rate, 4: adjusted_ci_upper
```

Autism prevalence by school's rurality

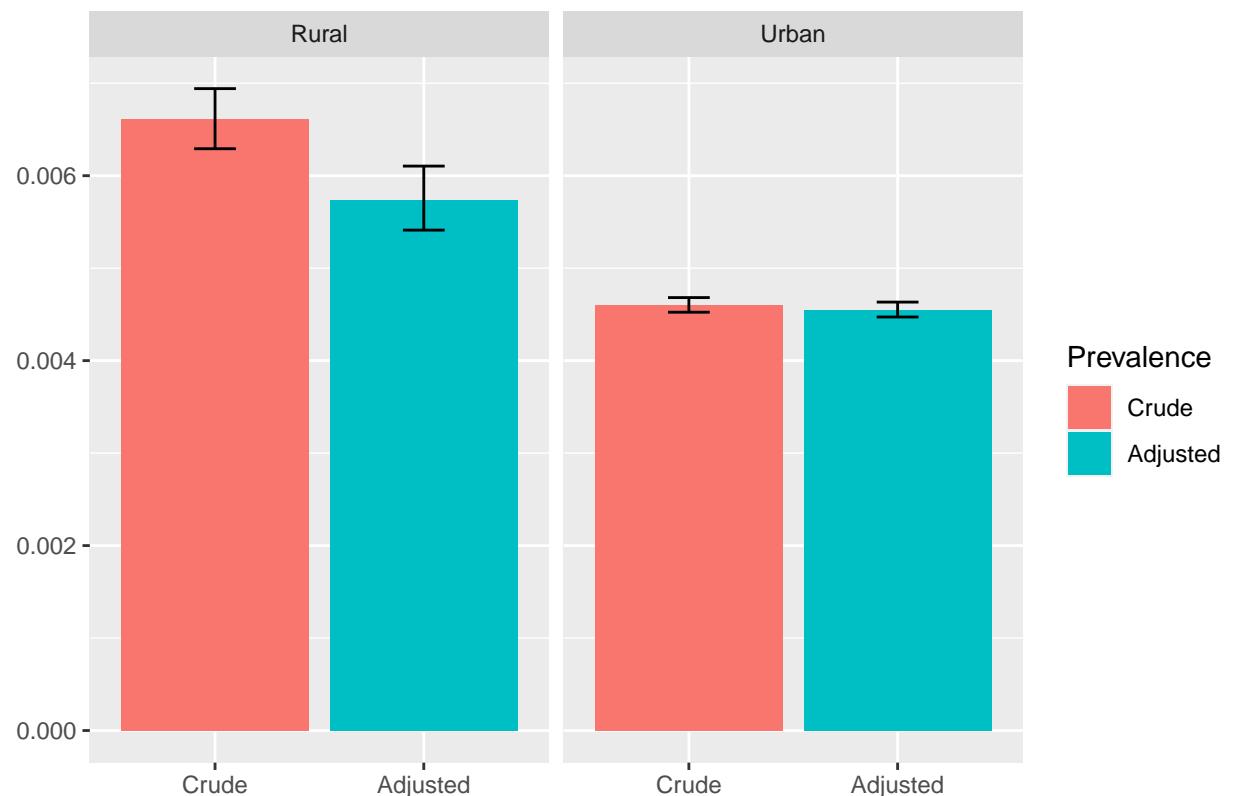


Figure 24: Crude and age- and sex-adjusted sample prevalences of autism by school's rurality. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

ADHD prevalence by school's rurality

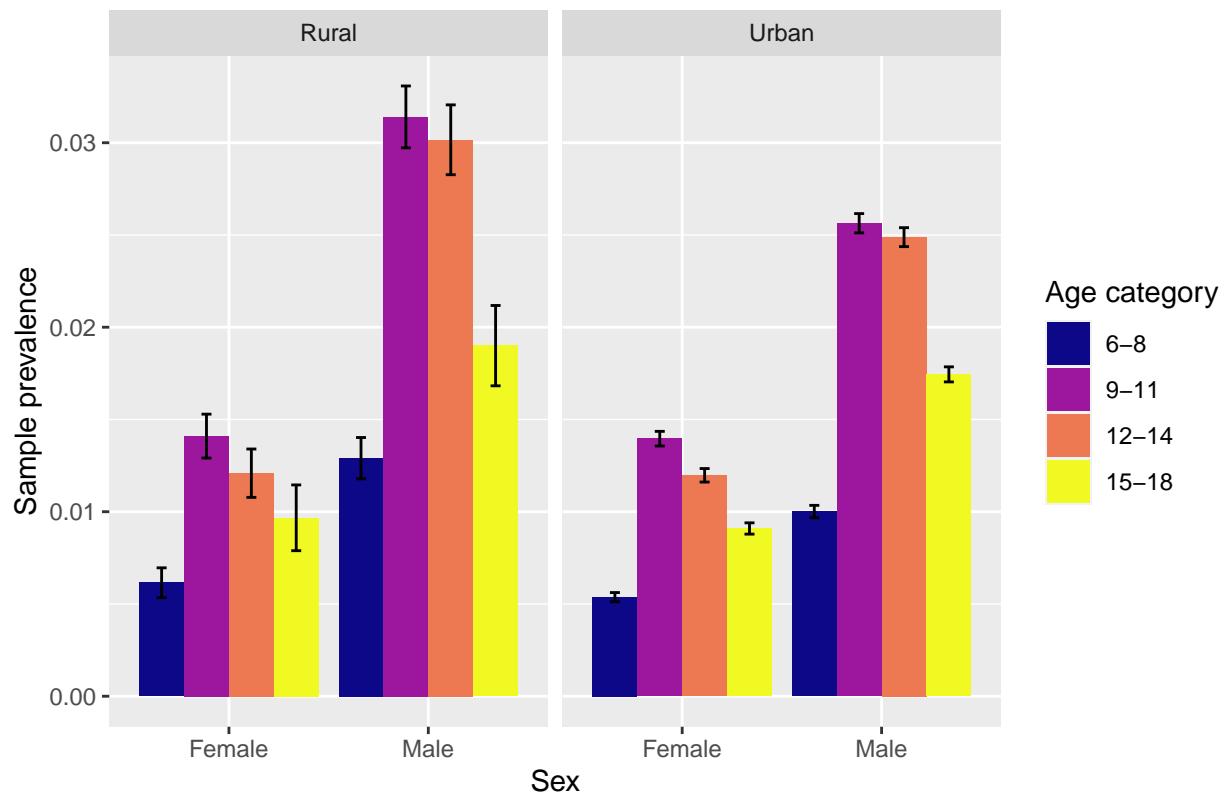


Figure 25: Sample prevalence of ADHD by school's rurality, age band and sex. Bars show 95% normal confidence intervals.

ADHD prevalence by rurality

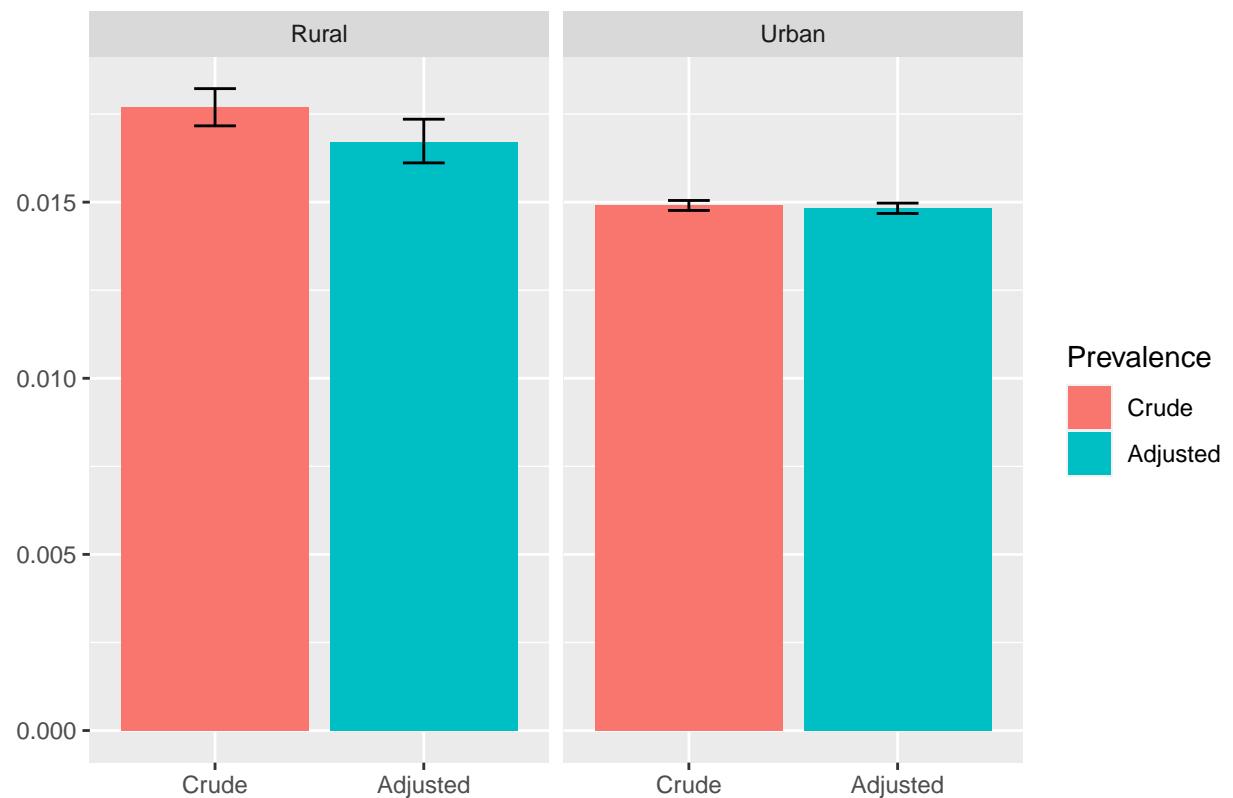


Figure 26: Crude and age- and sex-adjusted sample prevalences of ADHD by school's rurality. Bars for crude prevalence show 95% normal confidence intervals and bars for adjusted prevalence show 95% gamma confidence intervals.

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

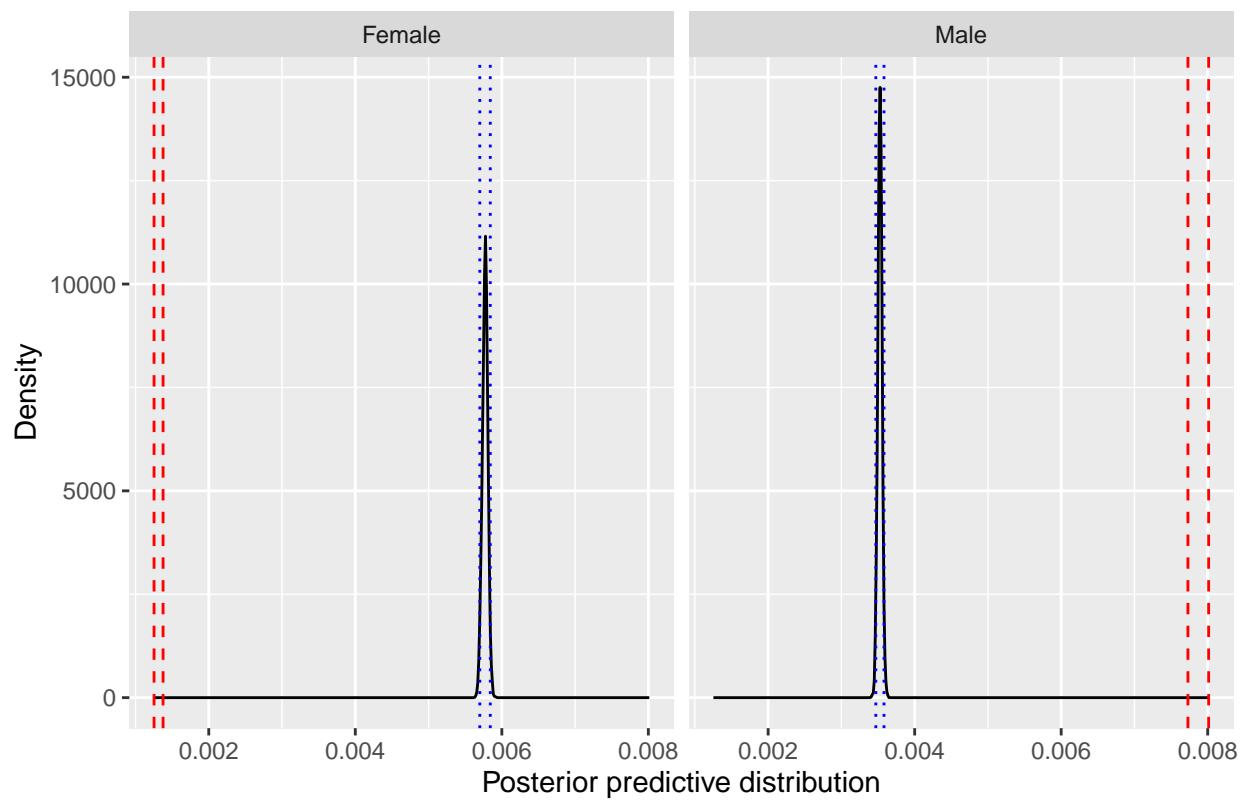


Figure 27: Posterior predictive distribution for autism with a random effect on sex, and with age- and sex-adjusted global prevalence prior.

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

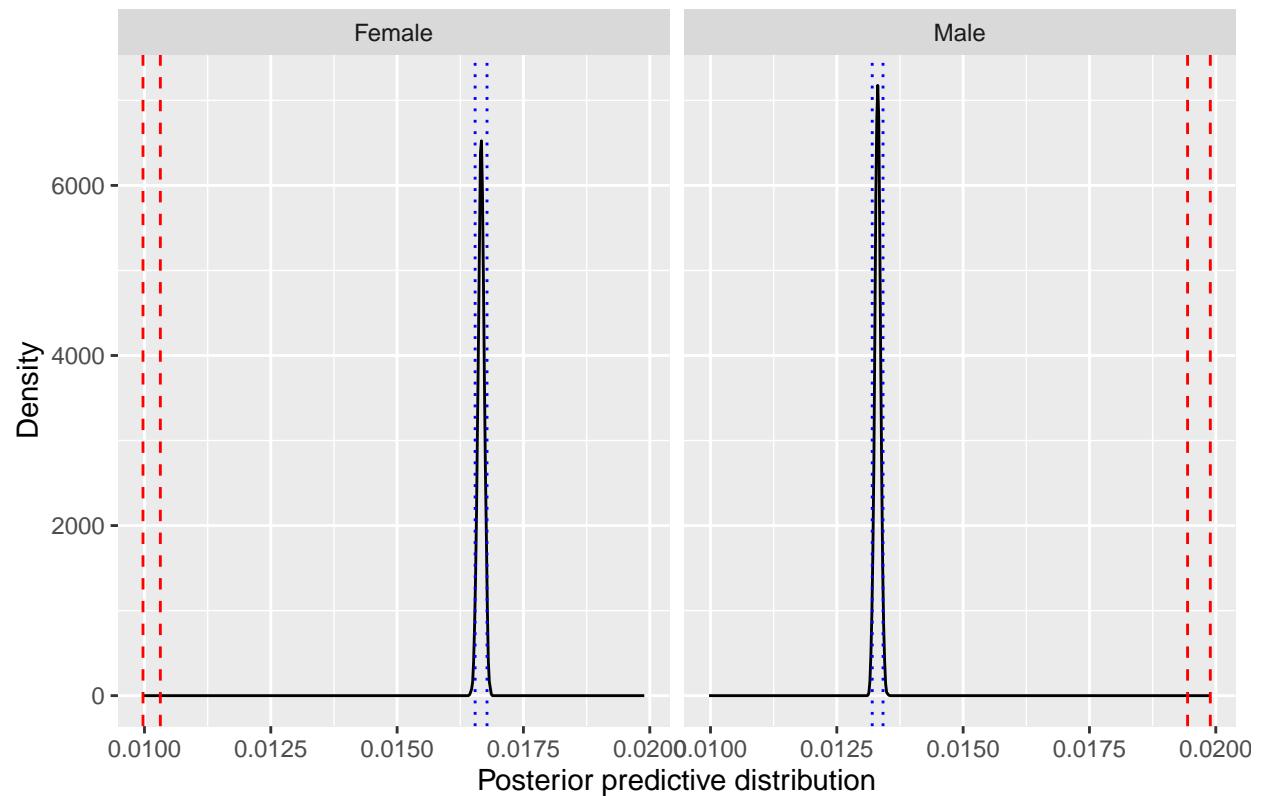


Figure 28: Posterior predictive distribution for ADHD with a random effect on sex, and with age- and sex-adjusted global prevalence prior.

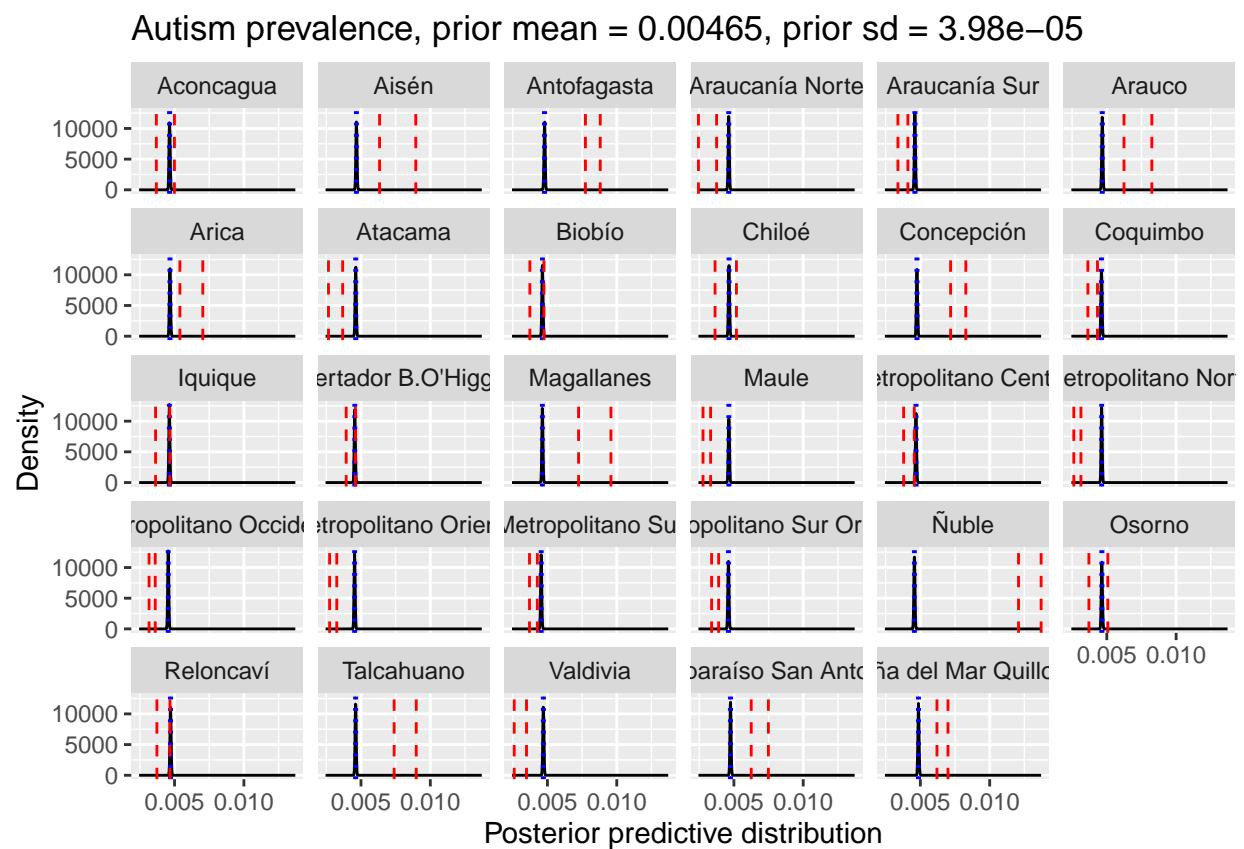


Figure 29: Posterior predictive distribution for autism with a random effect on student's health service, and with age- and sex-adjusted global prevalence prior.

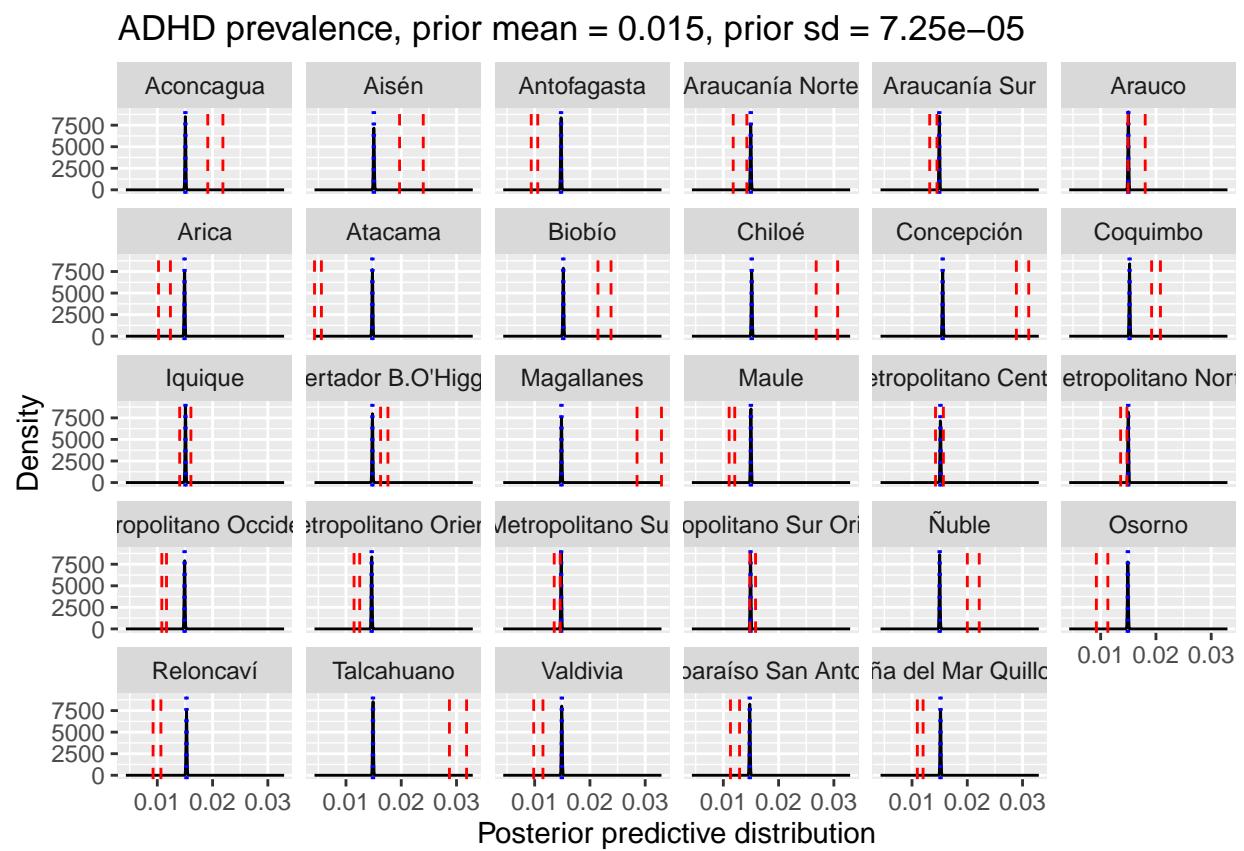


Figure 30: Posterior predictive distribution for ADHD with a random effect on health service, and with age- and sex-adjusted global prevalence prior.

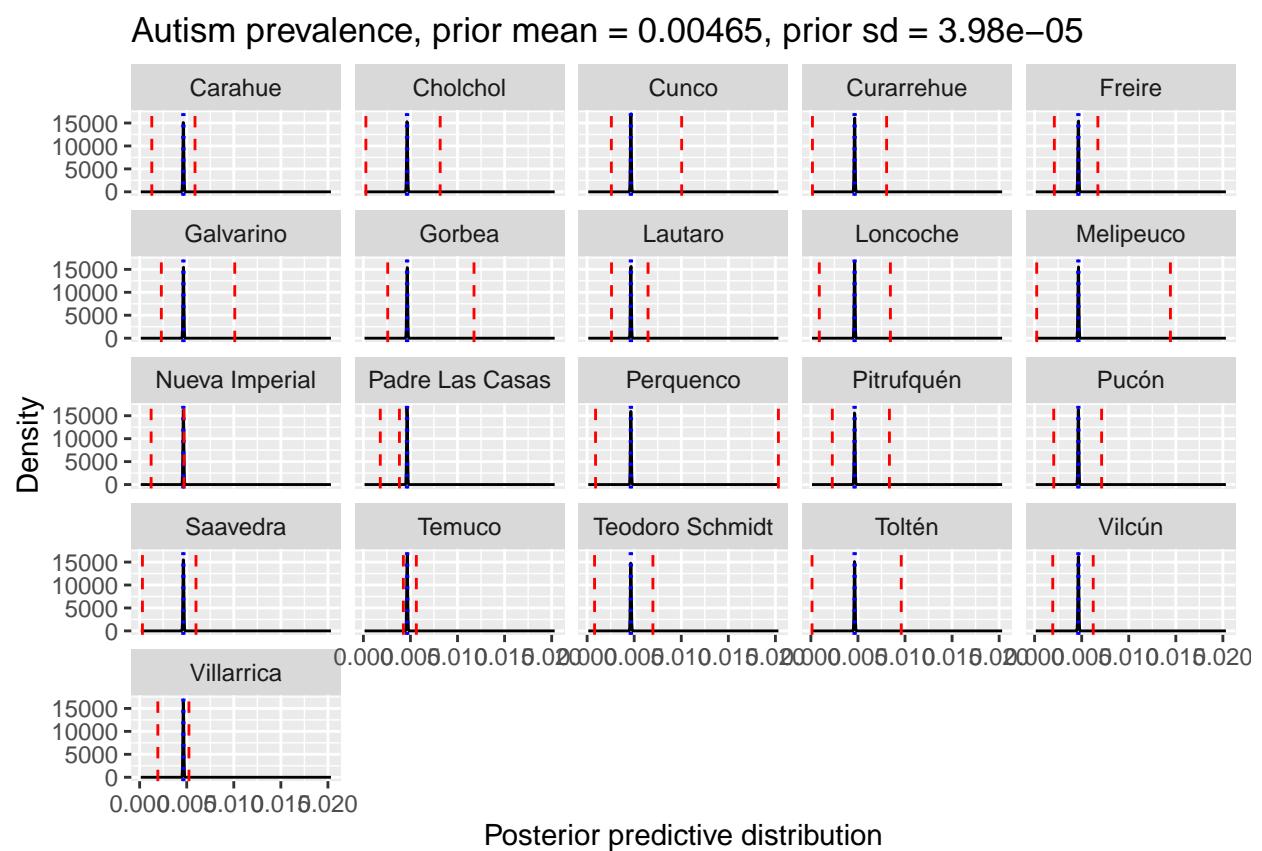


Figure 31: Posterior predictive distribution for autism with a random effect on commune within Araucanía Sur health service, and with age- and sex-adjusted global prevalence prior.

5.5 Bayesian prevalence estimation

5.5.1 Random effect on sex

5.5.2 Random effect on health service

5.5.3 Random effect on commune in Araucanía Sur health service

5.5.4 Random effect on socio-economic status

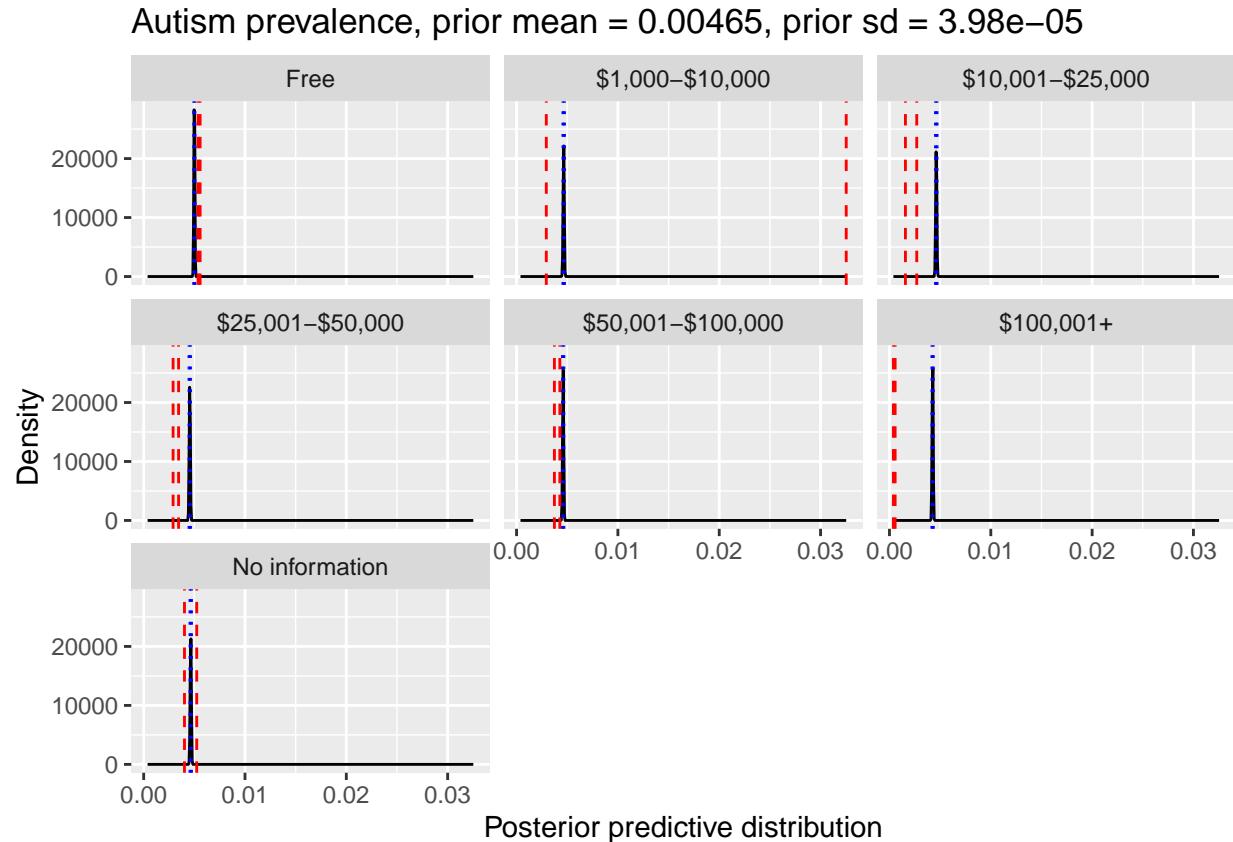


Figure 32: Posterior predictive distribution for autism with a random effect on socio-economic status of student's family, and with age- and sex-adjusted global prevalence prior.

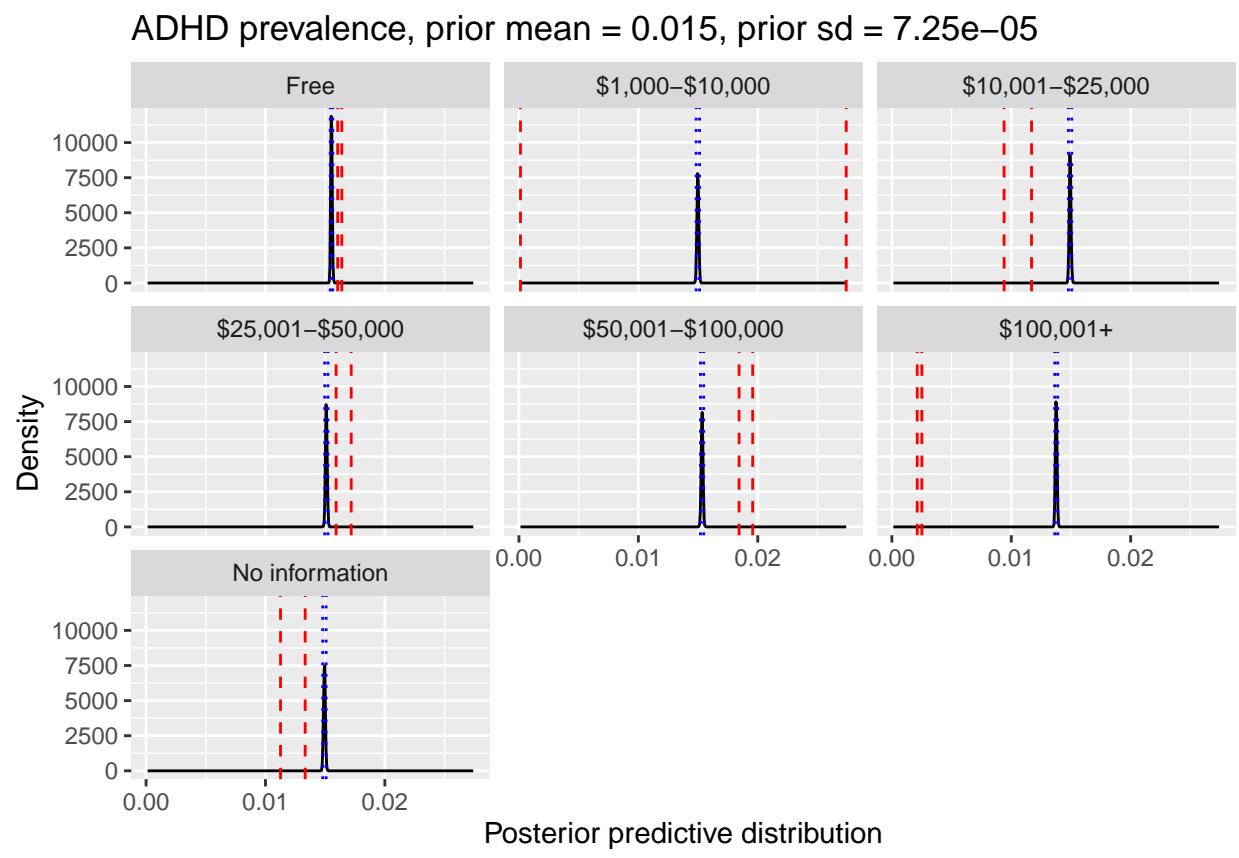


Figure 33: Posterior predictive distribution for ADHD with a random effect on socio-economic status of student's family, and with age- and sex-adjusted global prevalence prior.

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

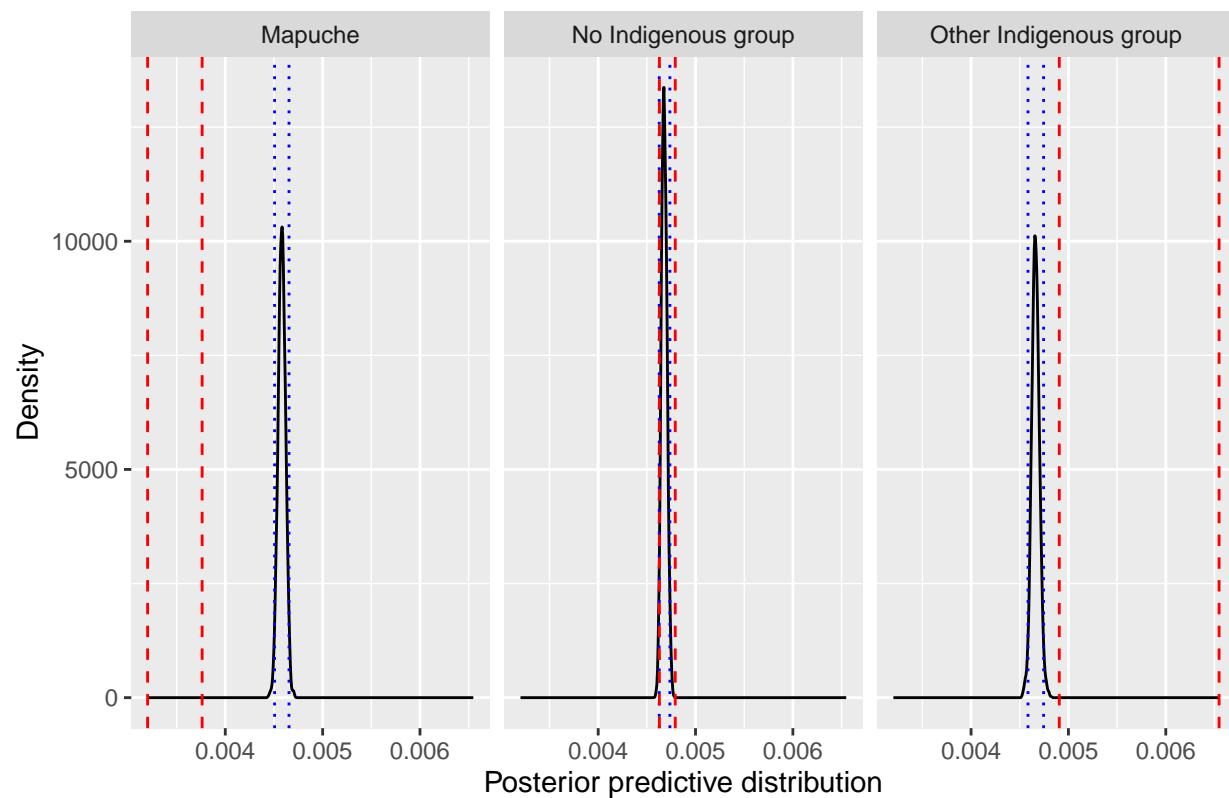


Figure 34: Posterior predictive distribution for autism with a random effect on ethnicity, and with age- and sex-adjusted global prevalence prior.

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

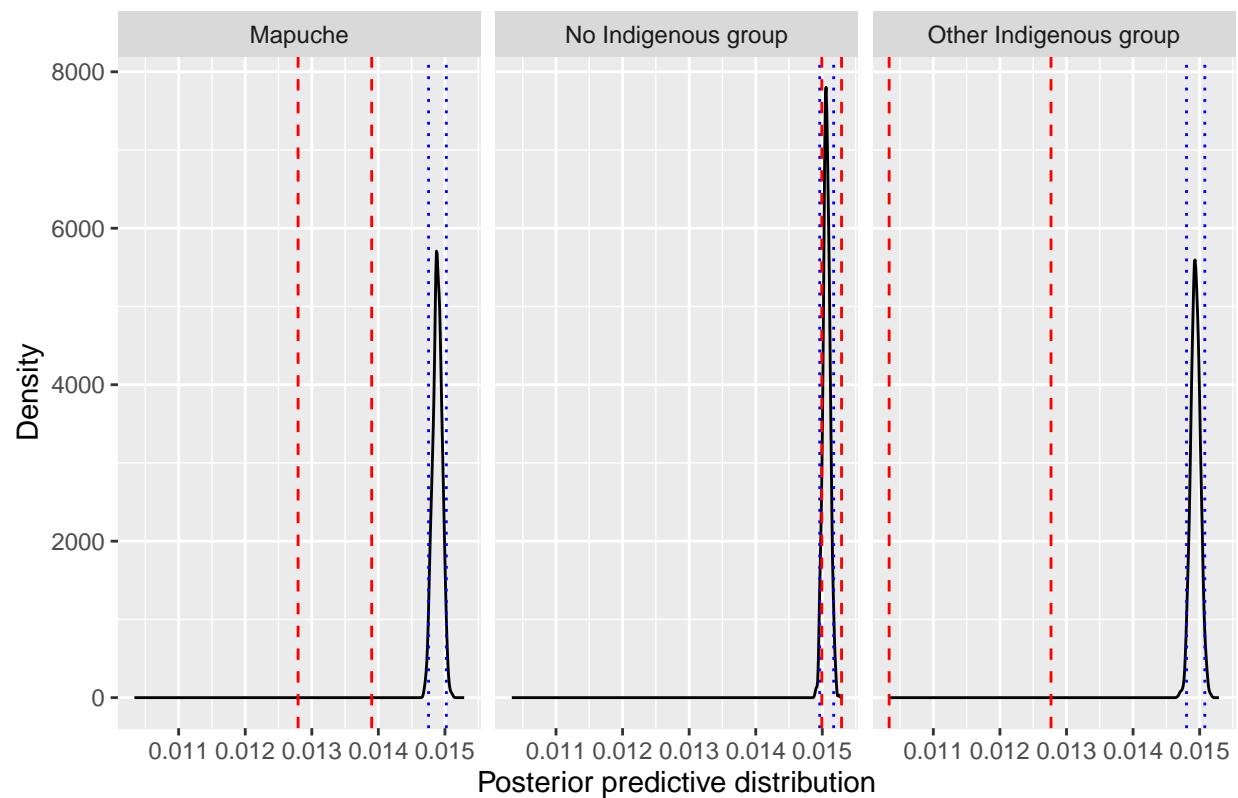


Figure 35: Posterior predictive distribution for ADHD with a random effect on ethnicity, and with age- and sex-adjusted global prevalence prior.

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

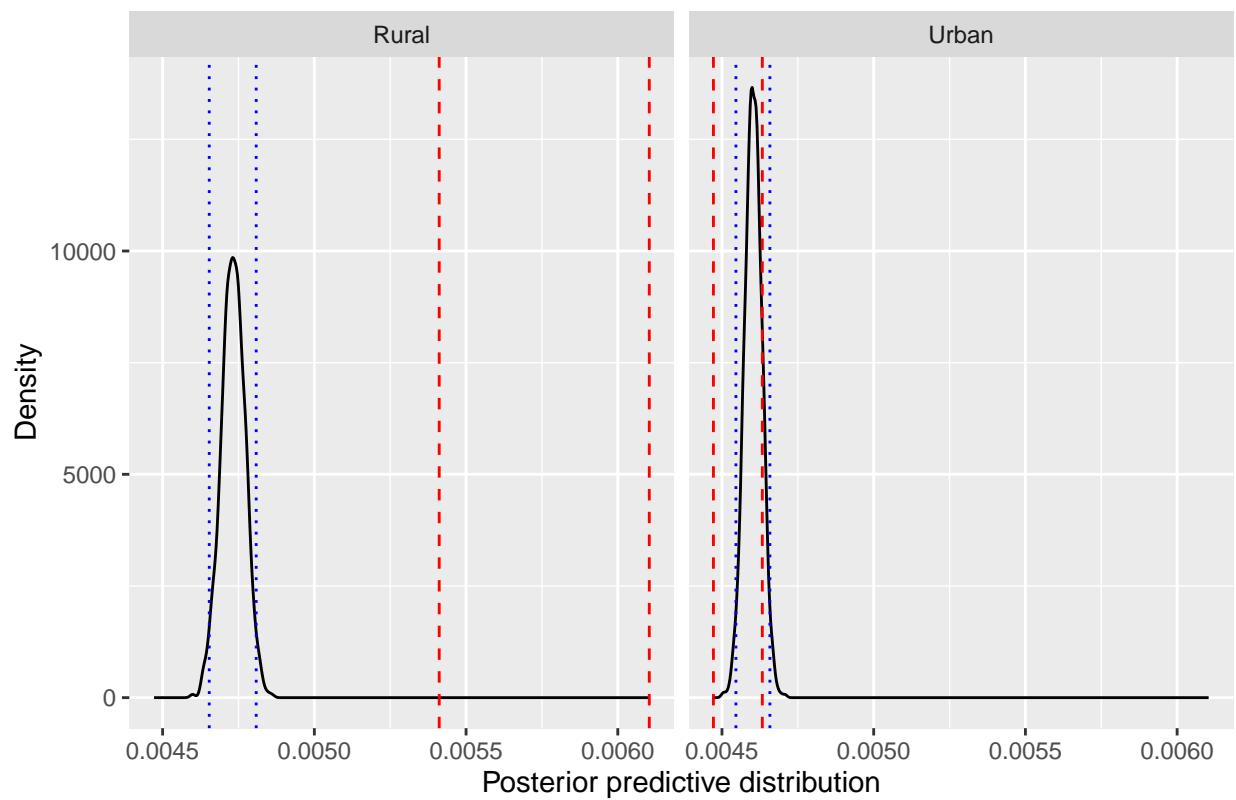


Figure 36: Posterior predictive distribution for autism with a random effect on school's rurality, and with age- and sex-adjusted global prevalence prior.

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

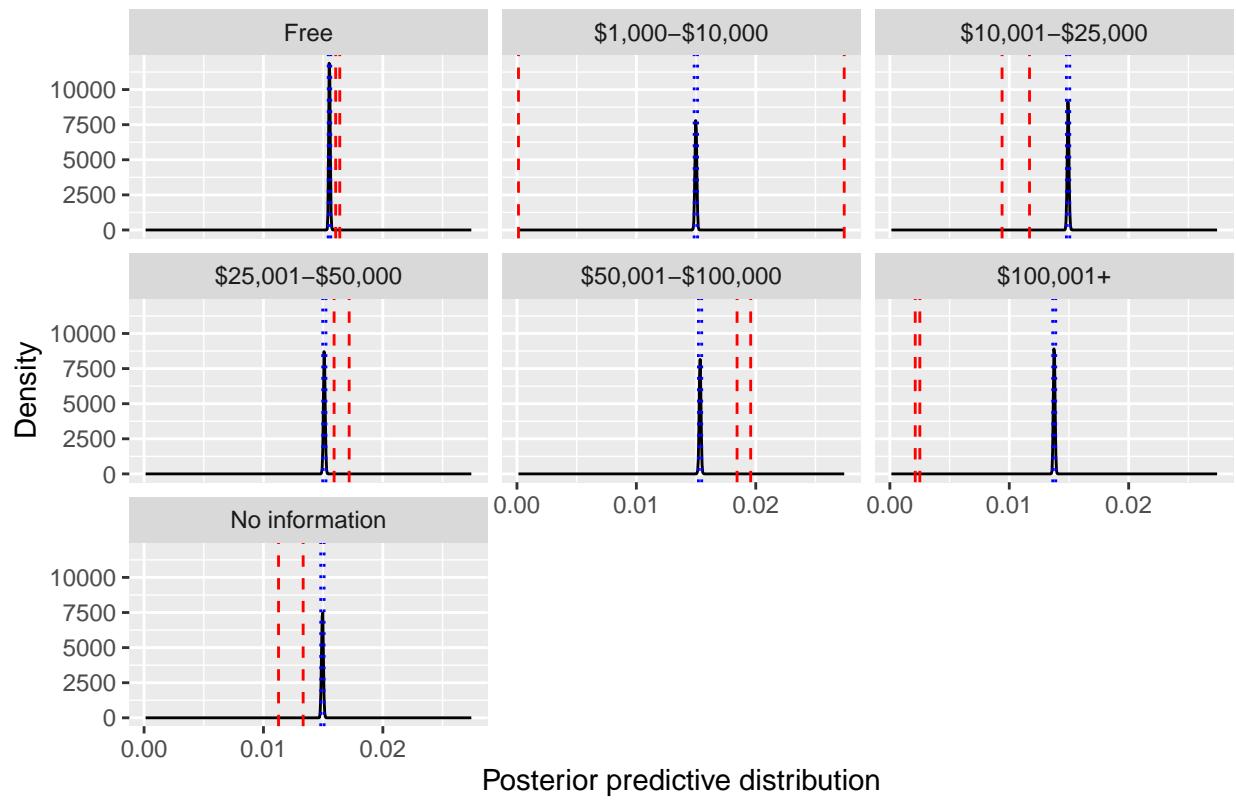
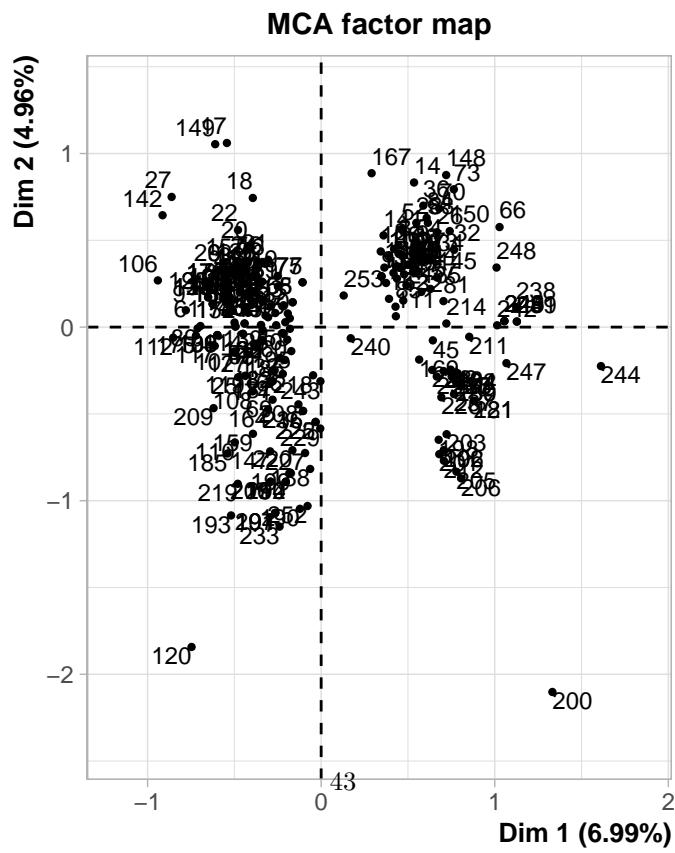
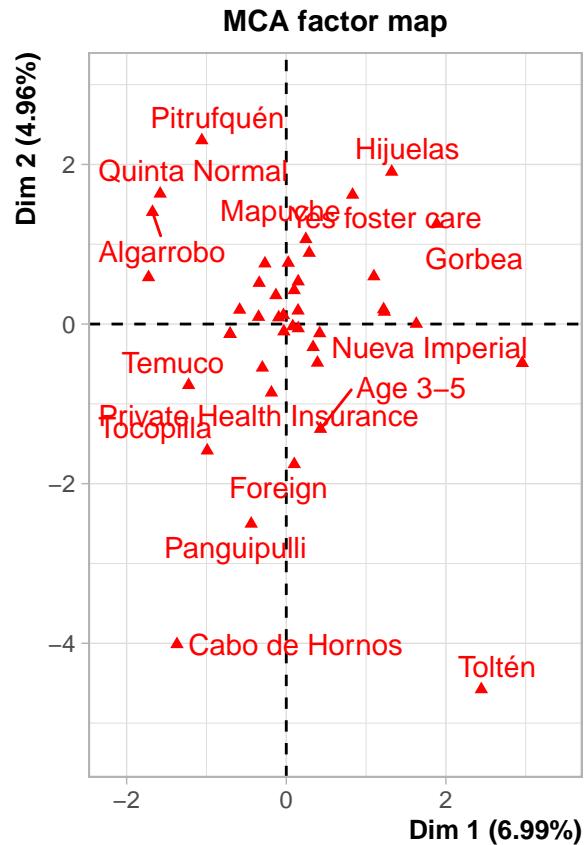


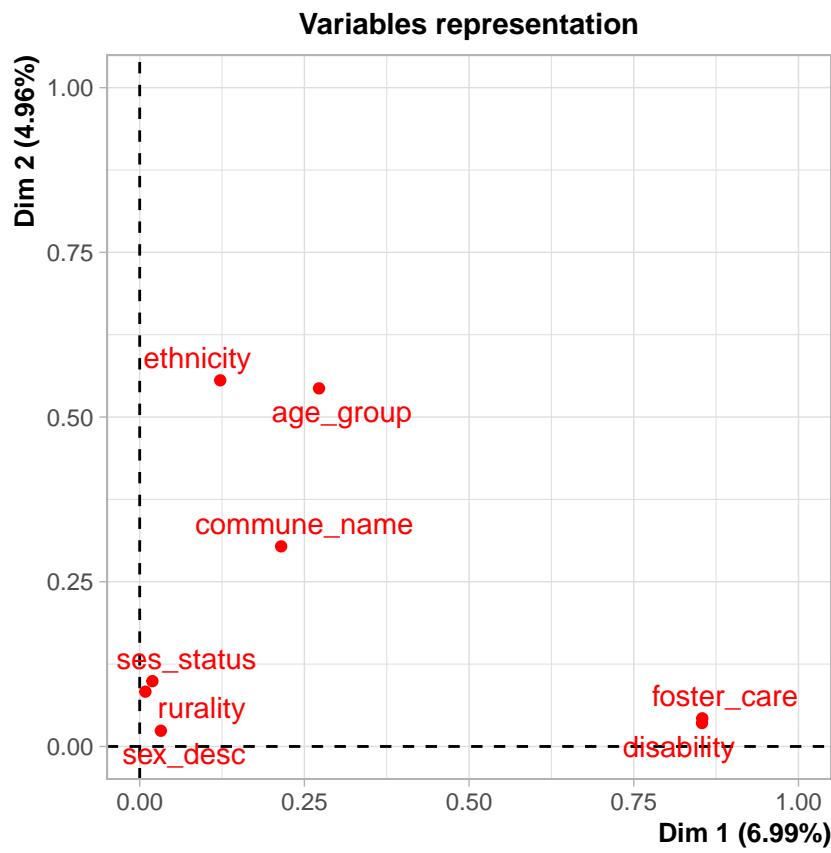
Figure 37: Posterior predictive distribution for ADHD with a random effect on school's rurality, and with age- and sex-adjusted global prevalence prior.

5.5.5 Random effect on ethnicity

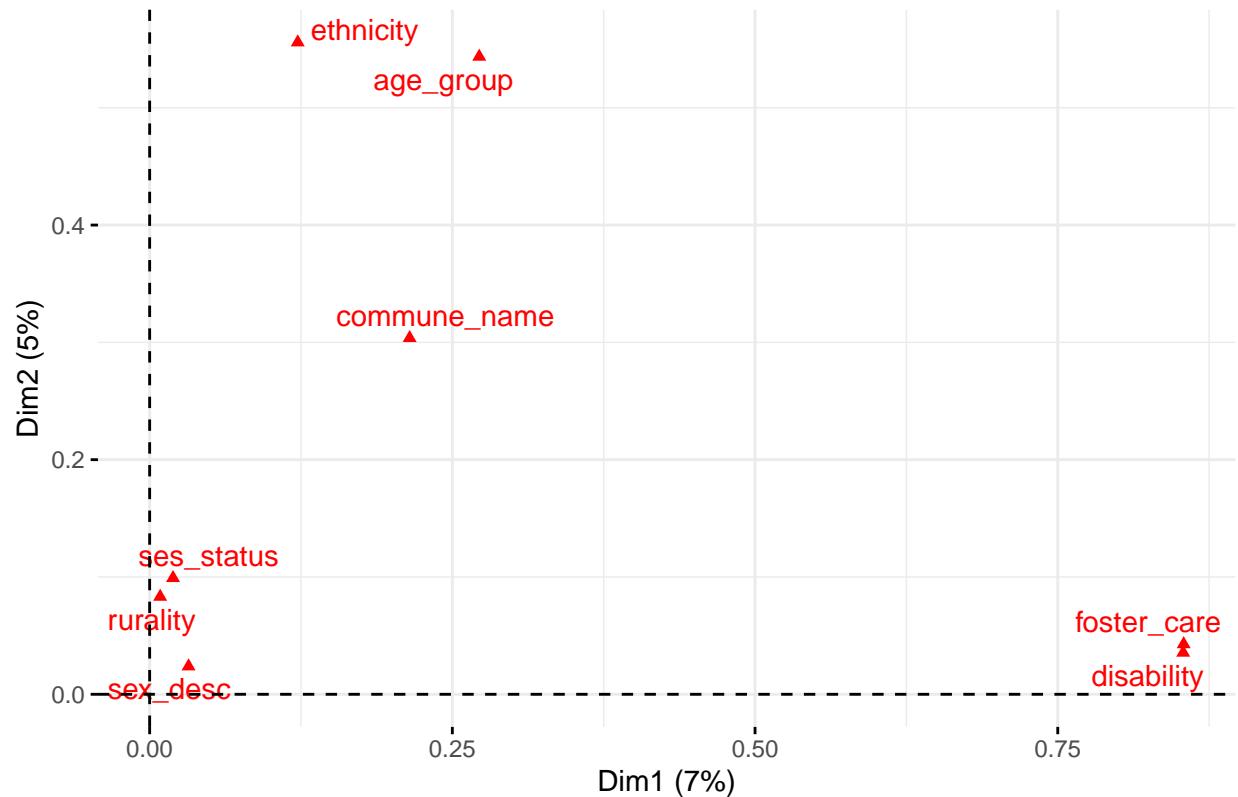
5.5.6 Random effect on school's rurality

5.6 MCA

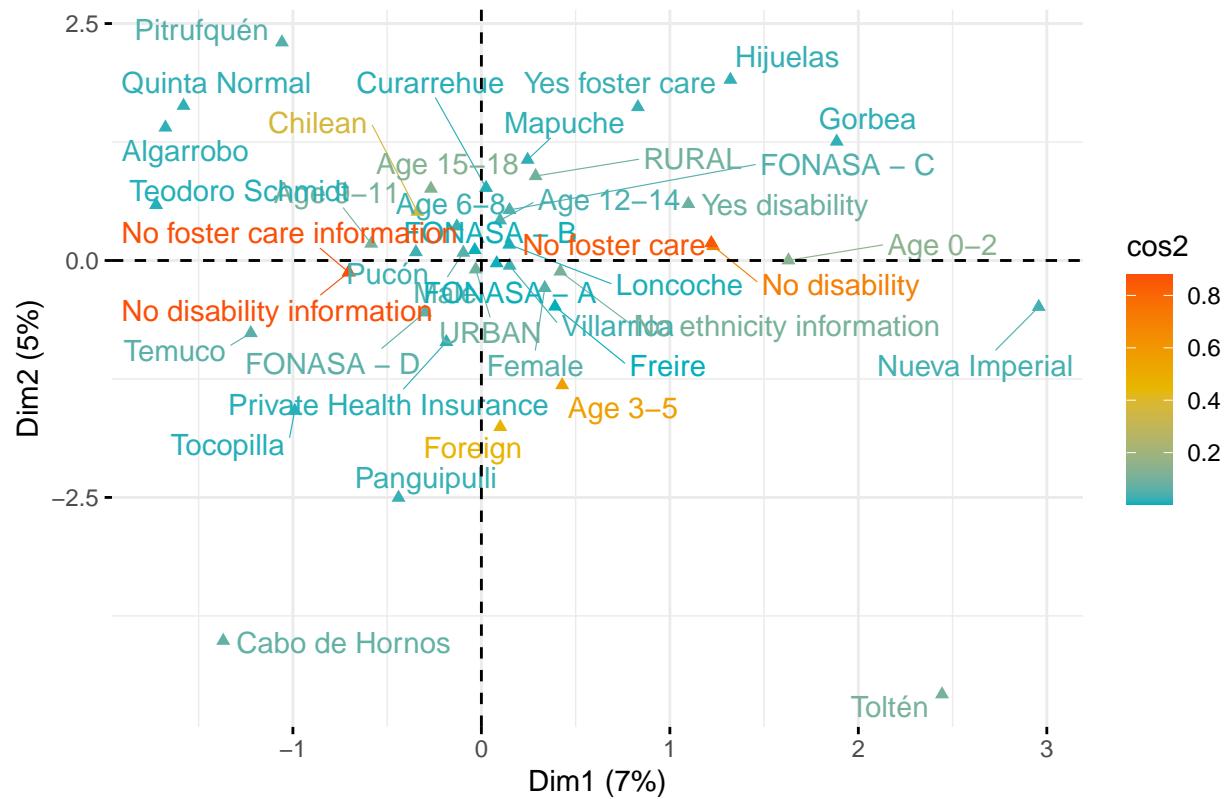




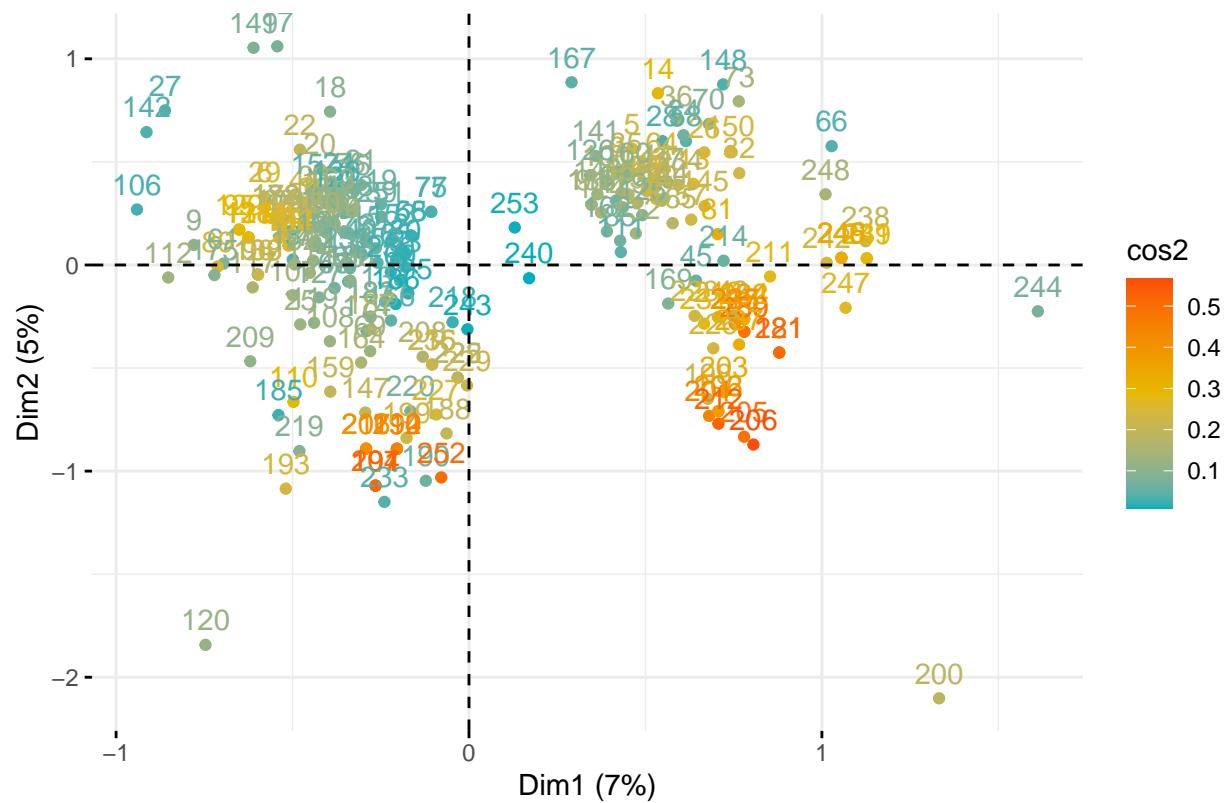
Variables – MCA



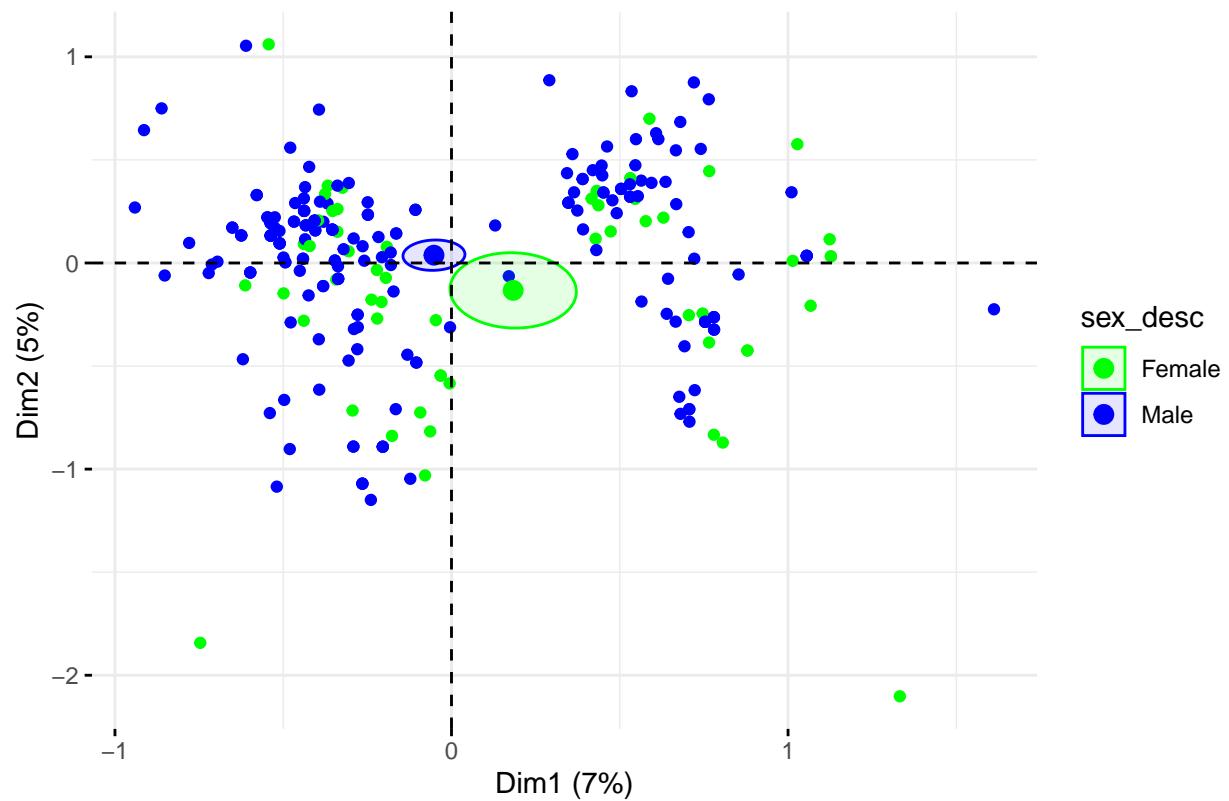
Variable categories – MCA



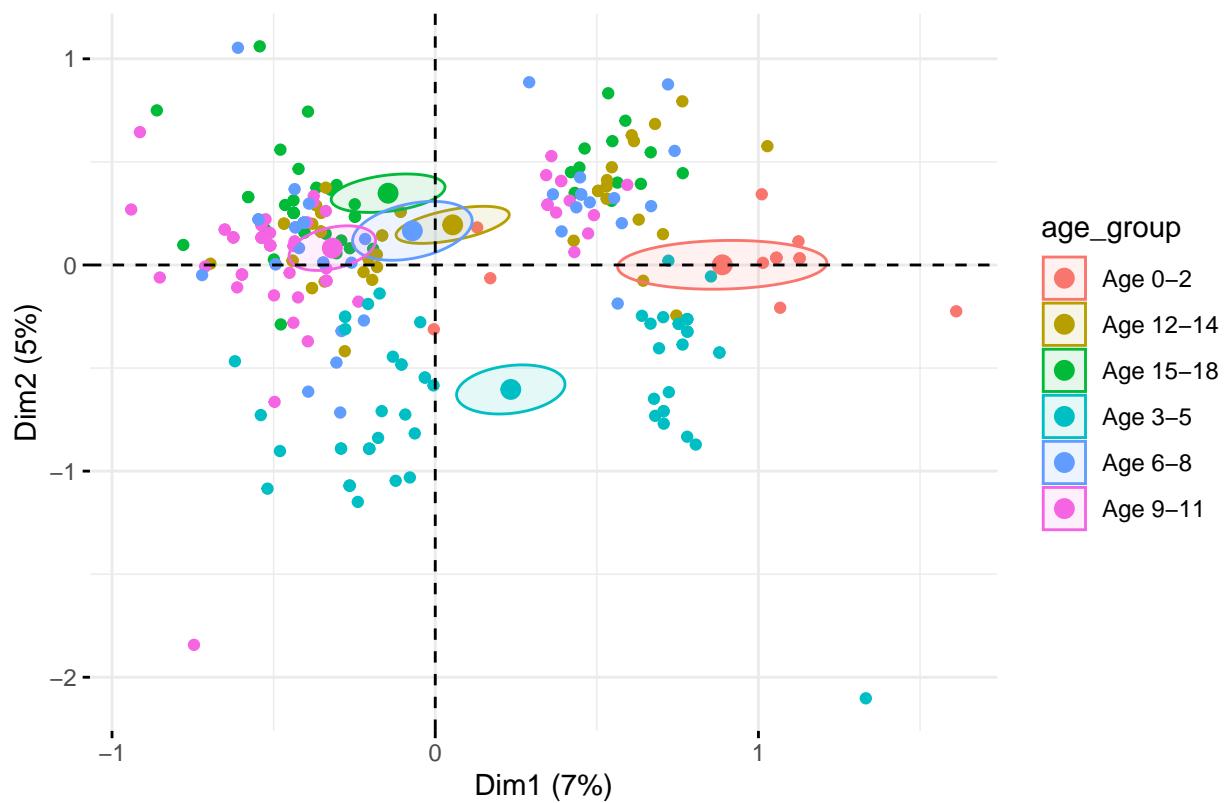
Individuals – MCA



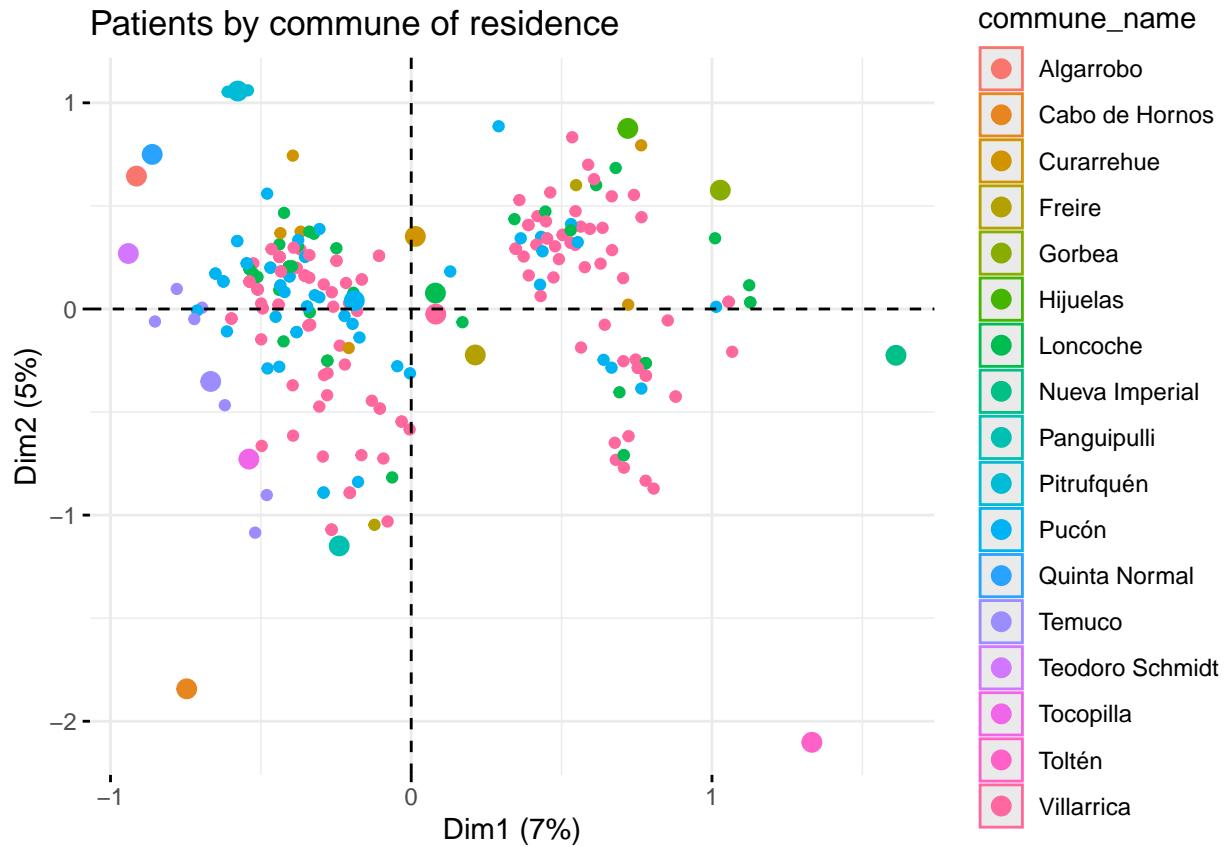
Patients by sex



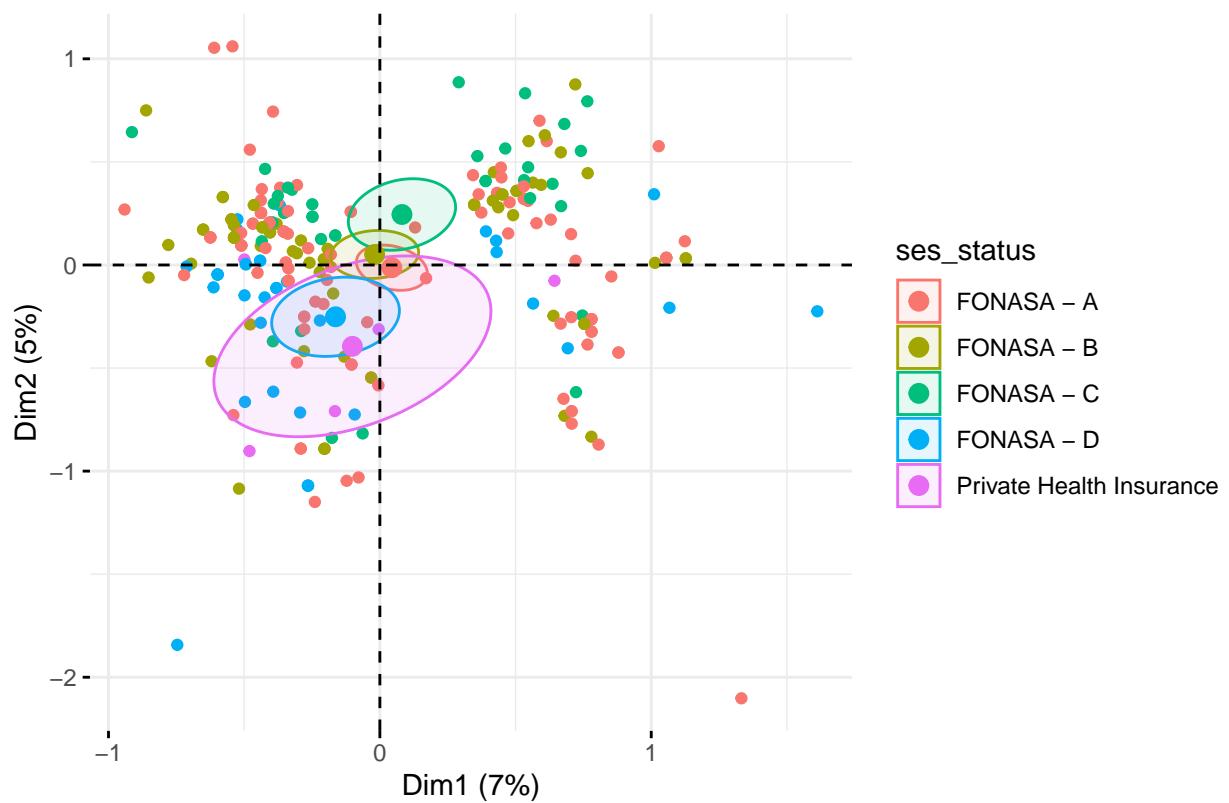
Patients by age



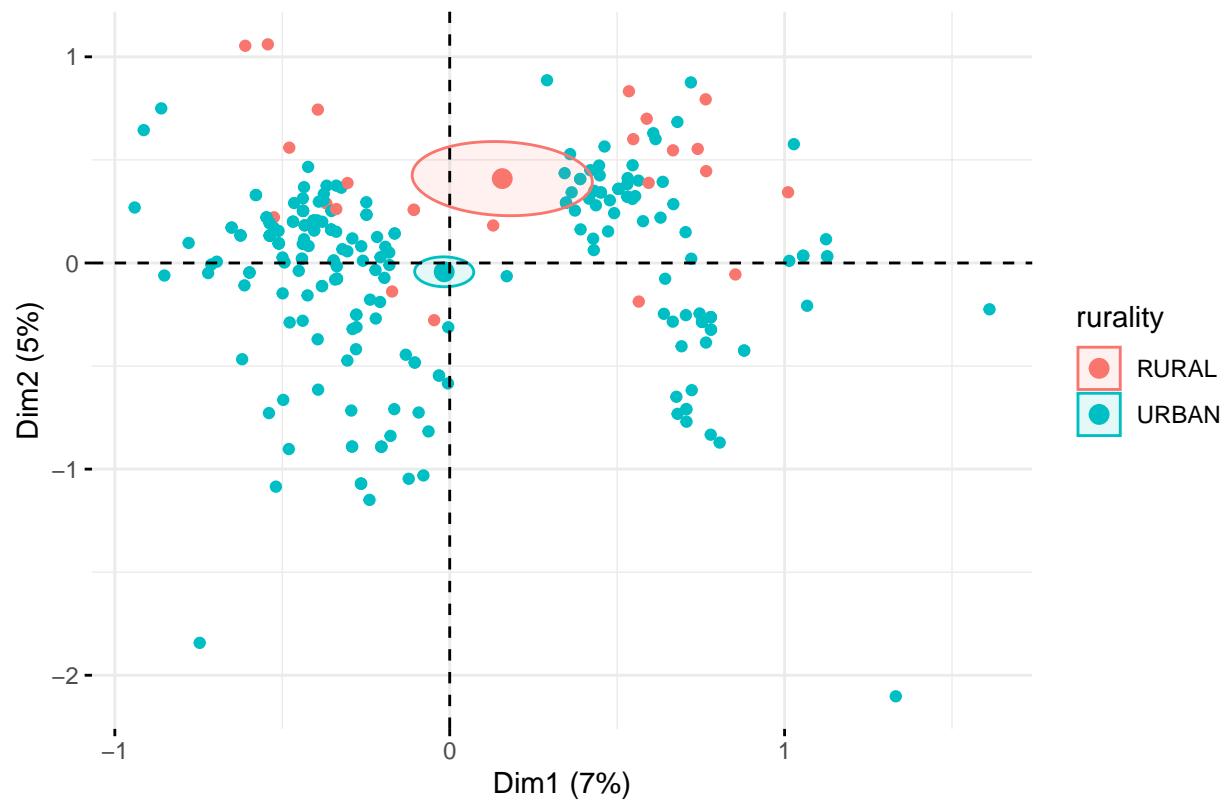
Patients by commune of residence



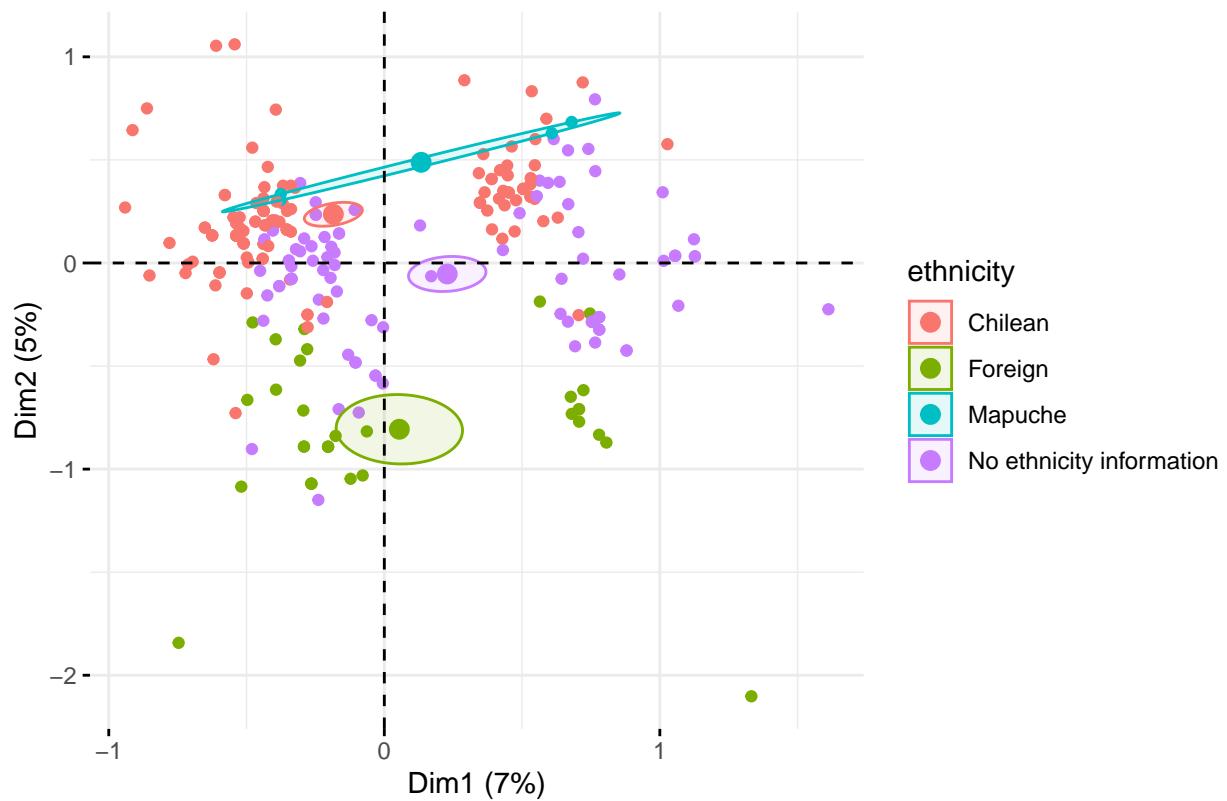
Patients by SES status



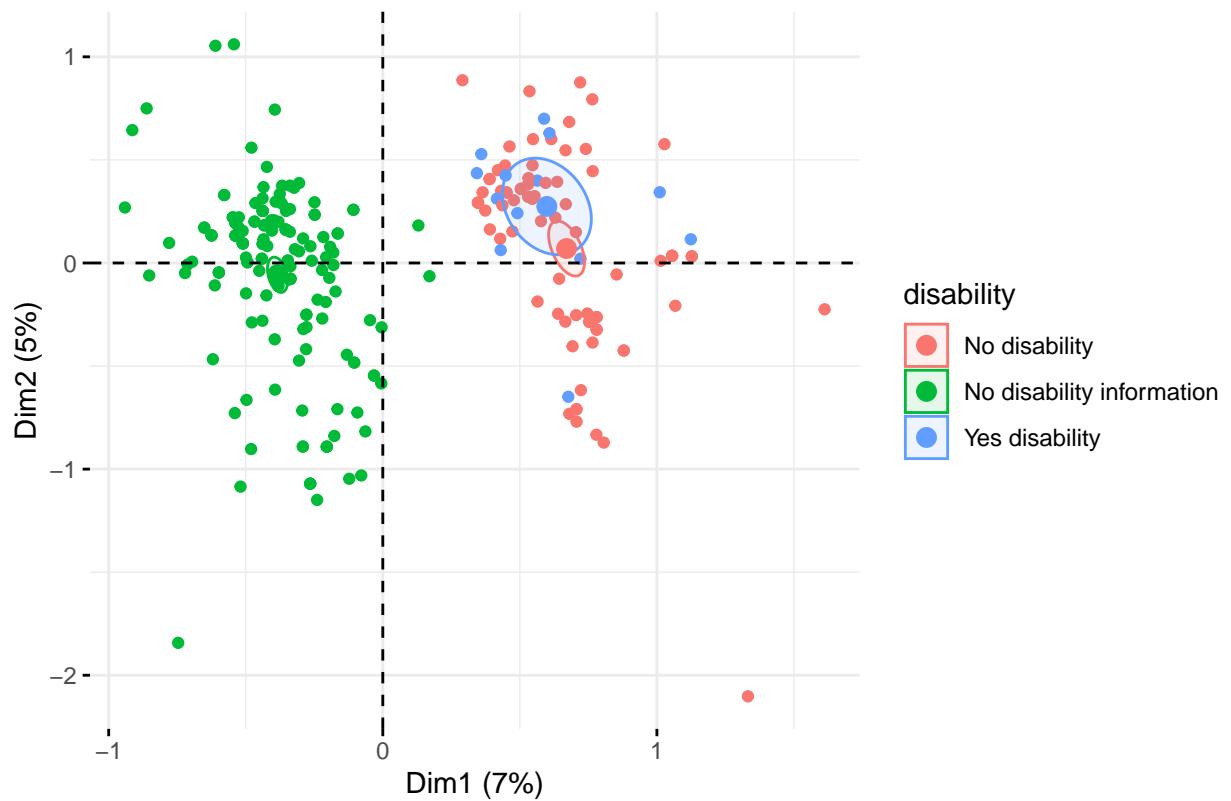
Patients by rurality



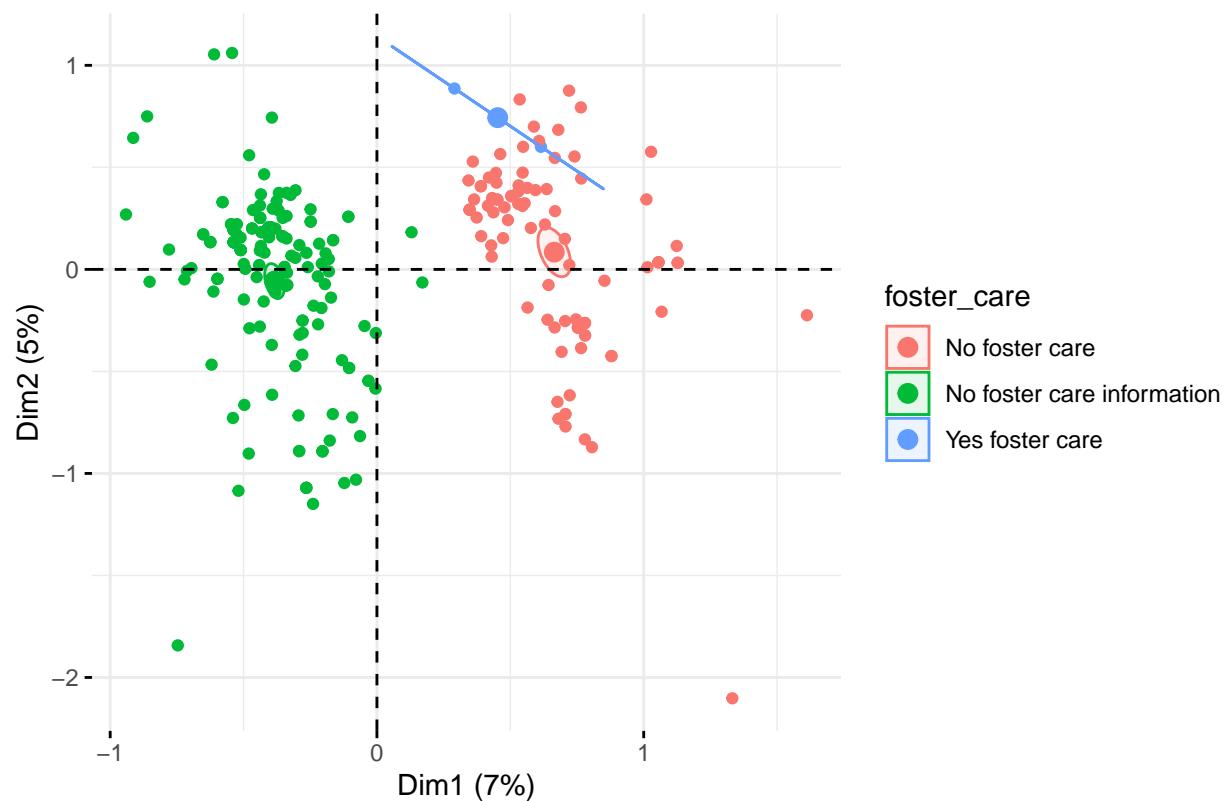
Patients by ethnicity



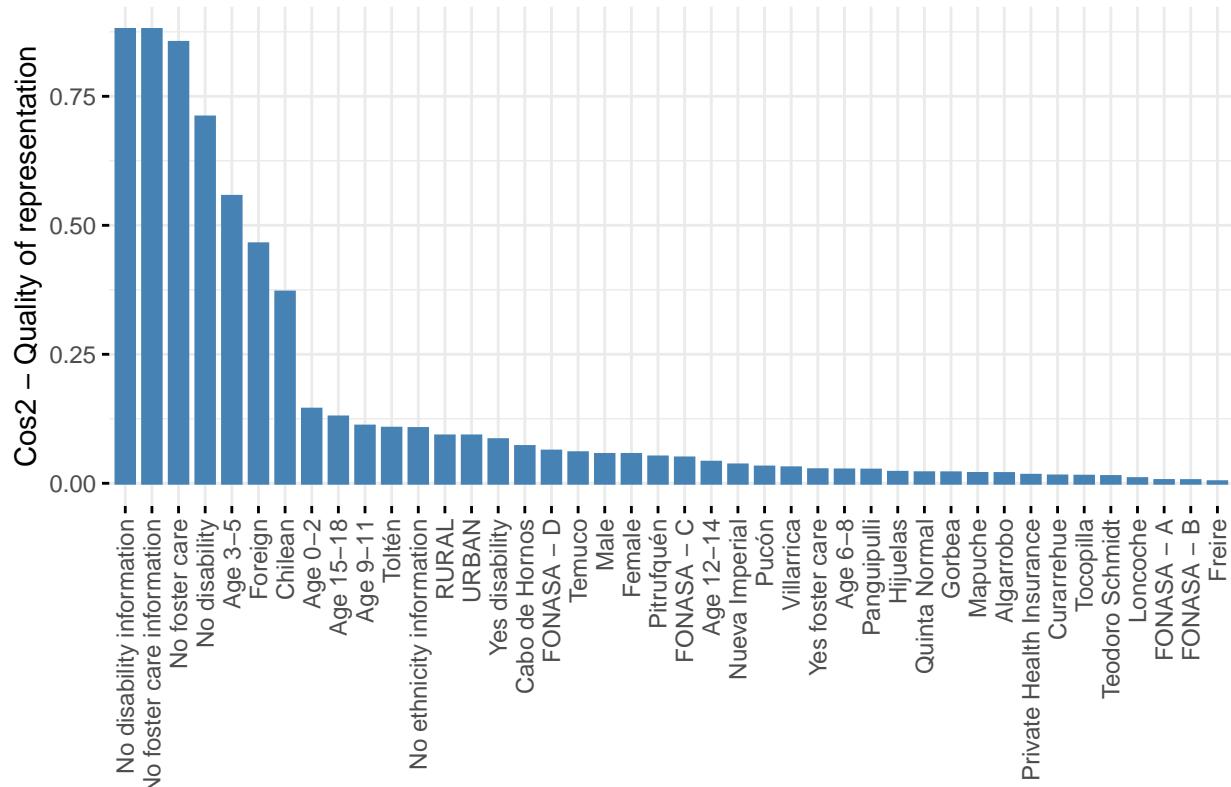
Patients by disability status



Patients by foster care status



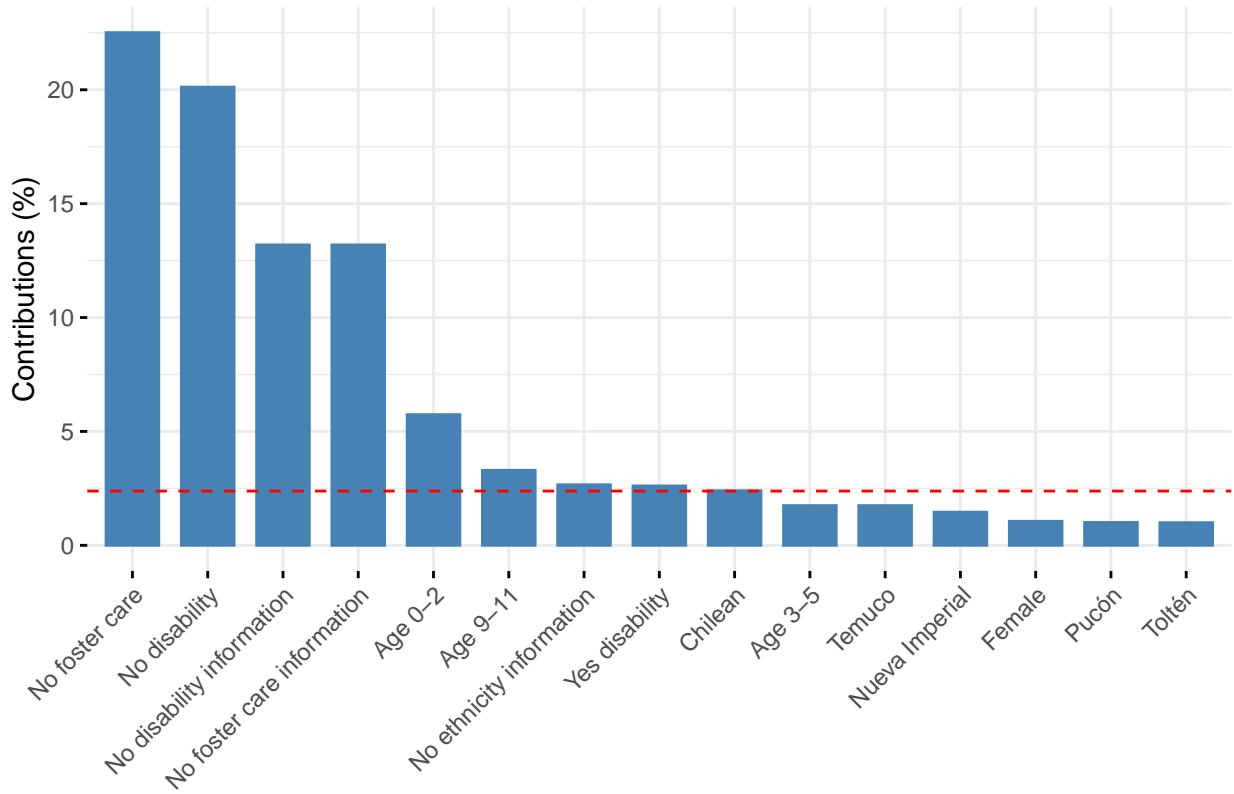
Cos2 of variables to Dim-1–2



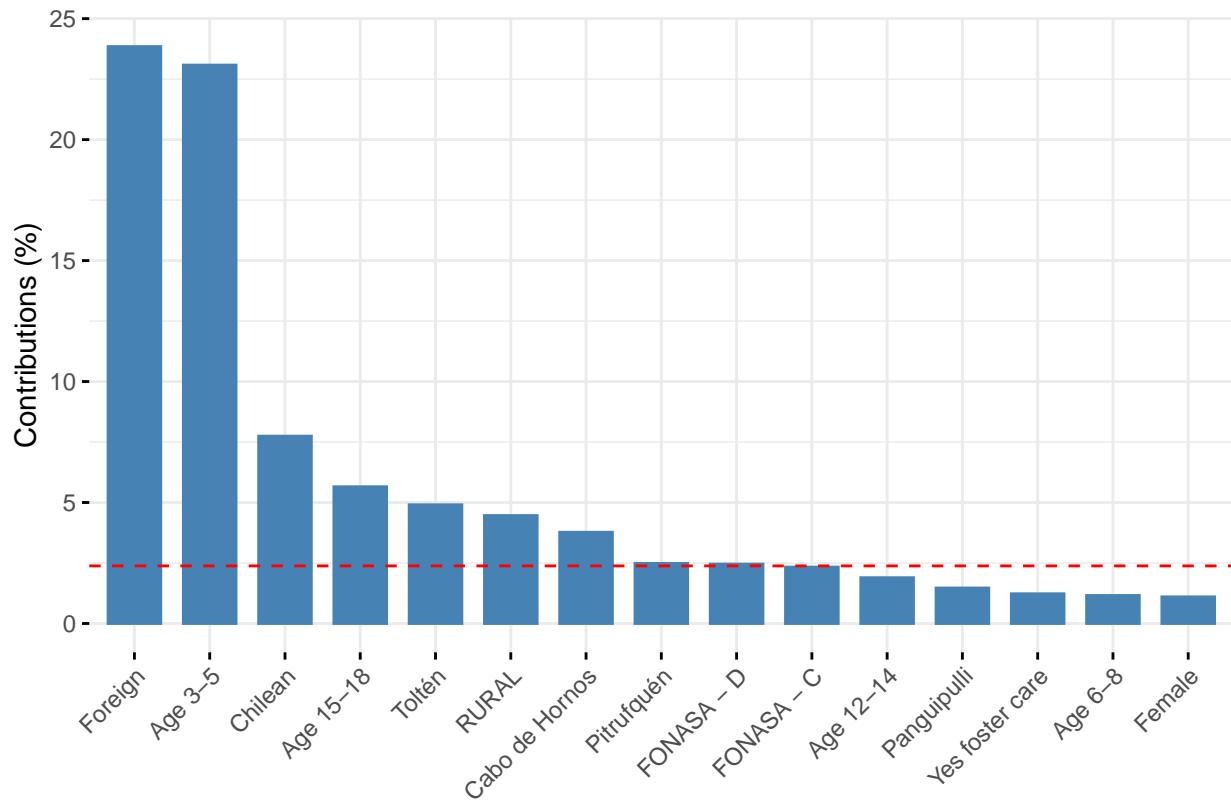
	Dim 1	Dim 2	Dim 3	Dim 4	Dim 5	Dim 6	Dim 7	Dim 8
## Female	1.05	1.10	0.39	0.07	11.72	0.07	0.70	7.99
## Male	0.30	0.31	0.11	0.02	3.33	0.02	0.20	2.27
## Age 0–2	5.74	0.00	6.31	20.11	0.42	0.82	0.08	0.49
## Age 12–14	0.07	1.89	1.40	0.23	0.00	5.23	3.75	2.39
## Age 15–18	0.50	5.65	7.07	3.18	0.20	0.74	0.62	8.76
## Age 3–5	1.74	23.08	1.40	3.97	0.52	1.64	1.35	0.20
## Age 6–8	0.11	1.16	1.71	1.74	0.02	0.65	11.77	12.92
## Age 9–11	3.29	0.43	6.36	4.08	1.54	2.17	7.81	0.04
## Algarrobo	0.47	0.46	1.95	0.19	0.19	0.38	0.42	0.43
## Cabo de Hornos	0.31	3.77	1.10	1.16	7.46	3.79	0.35	2.05
## Curarrehue	0.00	0.83	4.45	1.81	2.83	0.56	1.71	0.46
## Freire	0.05	0.11	1.17	4.87	0.02	1.60	0.37	0.65
## Gorbea	0.59	0.37	0.40	0.32	1.66	1.68	0.92	0.61
## Hijuelas	0.29	0.85	1.91	1.55	1.80	1.95	2.39	5.06
## Loncoche	0.14	0.26	0.01	3.28	0.34	8.47	4.81	1.66
## Nueva Imperial	1.45	0.06	0.74	11.91	0.17	3.87	2.37	2.14
## Panguipulli	0.03	1.47	1.51	0.00	0.27	2.33	0.47	2.21
## Pitrufquén	0.37	2.48	7.82	3.09	6.29	1.63	1.13	1.34
## Pucón	1.00	0.09	1.48	1.23	0.01	2.25	9.10	4.45
## Quinta Normal	0.42	0.62	0.16	0.62	1.83	1.05	0.41	4.04
## Temuco	1.74	0.96	0.03	0.64	14.20	0.08	0.08	0.03
## Teodoro Schmidt	0.50	0.08	0.18	0.08	0.24	0.03	2.55	4.58
## Tocopilla	0.16	0.59	0.20	0.52	0.01	1.24	0.88	5.20
## Toltén	0.99	4.91	0.05	2.70	2.14	0.41	0.01	0.35
## Villarrica	0.51	0.10	2.41	0.52	0.15	4.67	0.14	0.01

## FONASA - A	0.12	0.02	4.06	1.04	3.13	5.55	1.86	8.56
## FONASA - B	0.01	0.20	0.50	1.06	12.05	5.96	0.33	4.96
## FONASA - C	0.13	2.33	4.45	0.01	0.72	5.64	1.05	5.92
## FONASA - D	0.52	2.45	1.00	8.65	5.25	10.43	3.78	0.56
## Private Health Insurance	0.03	0.87	2.44	1.27	11.64	0.31	0.36	0.45
## RURAL	0.33	4.46	14.95	1.94	4.11	4.80	0.20	0.30
## URBAN	0.03	0.47	1.57	0.20	0.43	0.50	0.02	0.03
## Chilean	2.39	7.74	2.29	1.76	0.20	0.53	0.07	1.83
## Foreign	0.06	23.85	1.81	3.98	1.62	0.70	0.20	0.50
## Mapuche	0.04	1.06	3.08	1.88	0.51	4.94	5.68	4.48
## No ethnicity information	2.66	0.29	8.72	6.11	2.05	0.79	0.30	0.52
## No disability	20.12	0.44	1.41	1.56	0.23	0.01	2.05	0.00
## No disability information	13.19	0.58	0.79	0.28	0.01	0.13	0.10	0.01
## Yes disability	2.61	1.08	0.03	1.53	0.62	2.23	21.53	0.11
## No foster care	22.51	0.72	1.11	0.52	0.02	0.86	0.66	0.00
## No foster care information	13.19	0.58	0.79	0.28	0.01	0.13	0.10	0.01
## Yes foster care	0.23	1.23	0.70	0.01	0.03	9.15	7.31	1.44

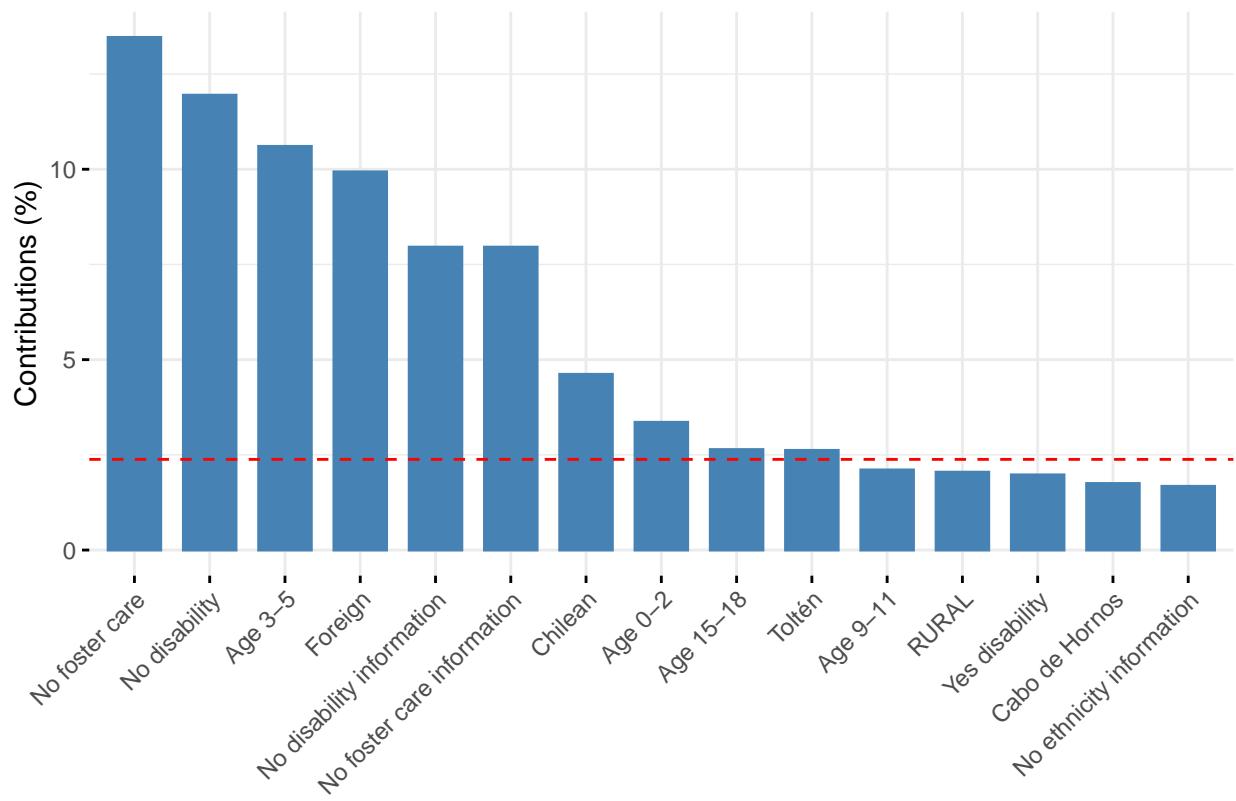
Contribution of variables to Dim-1

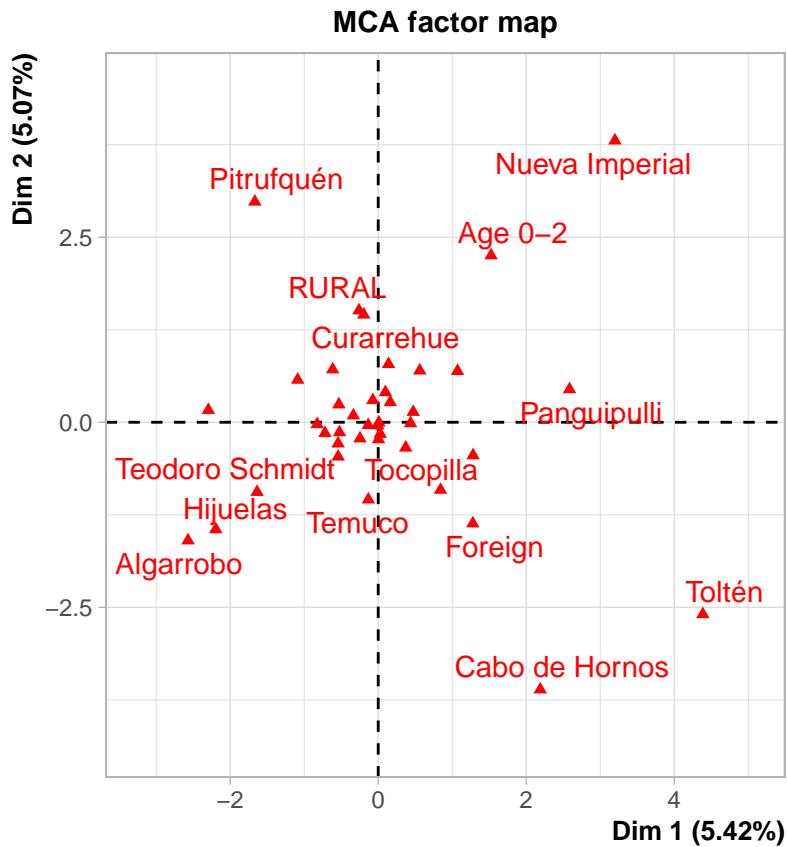


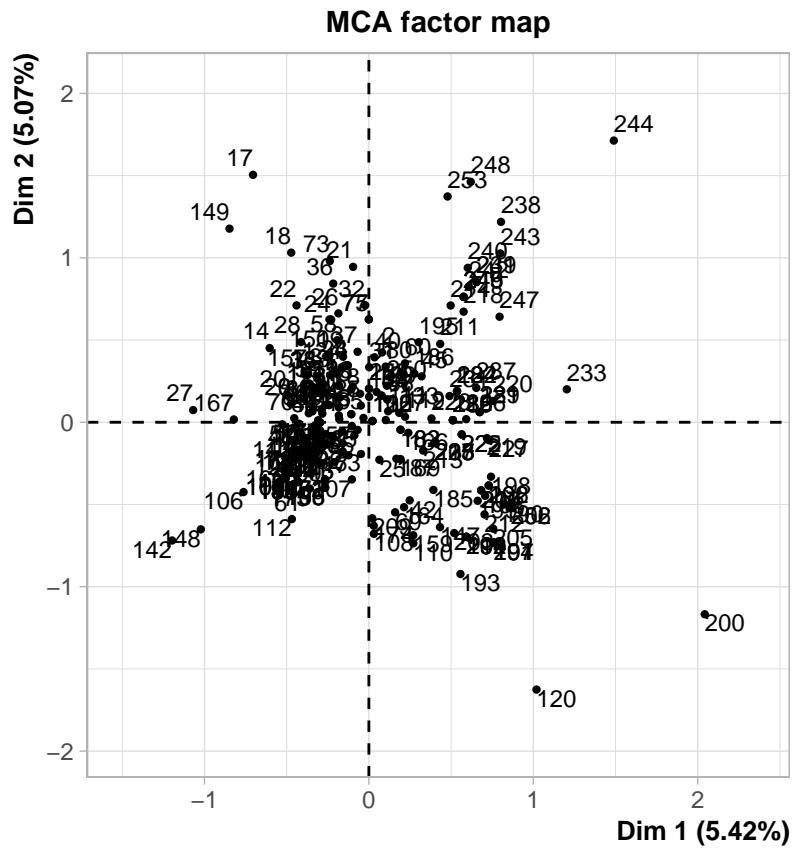
Contribution of variables to Dim-2

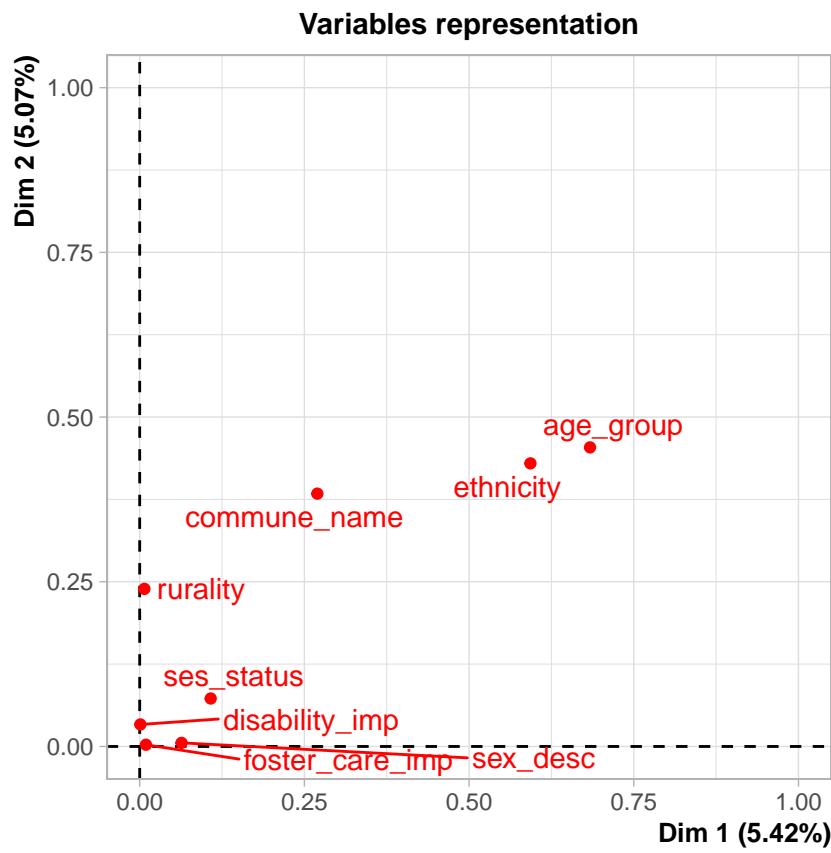


Contribution of variables to Dim-1–2

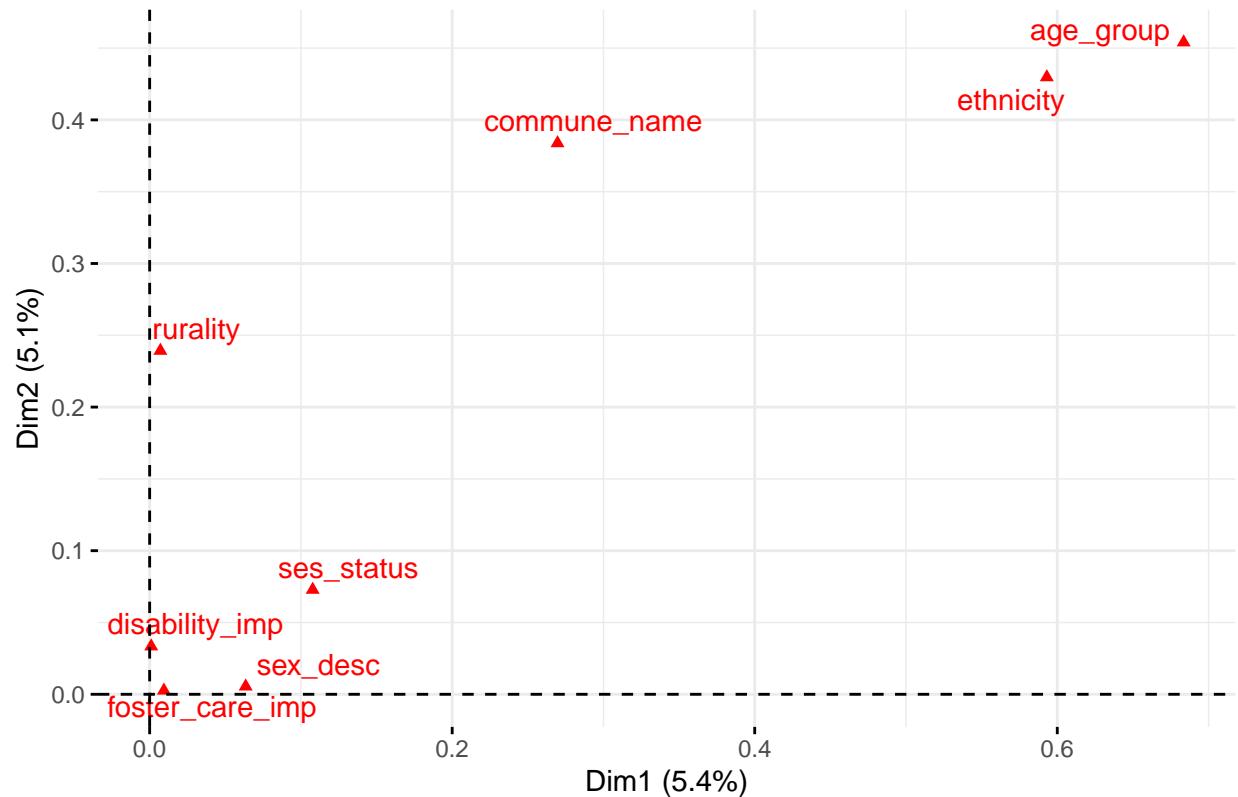




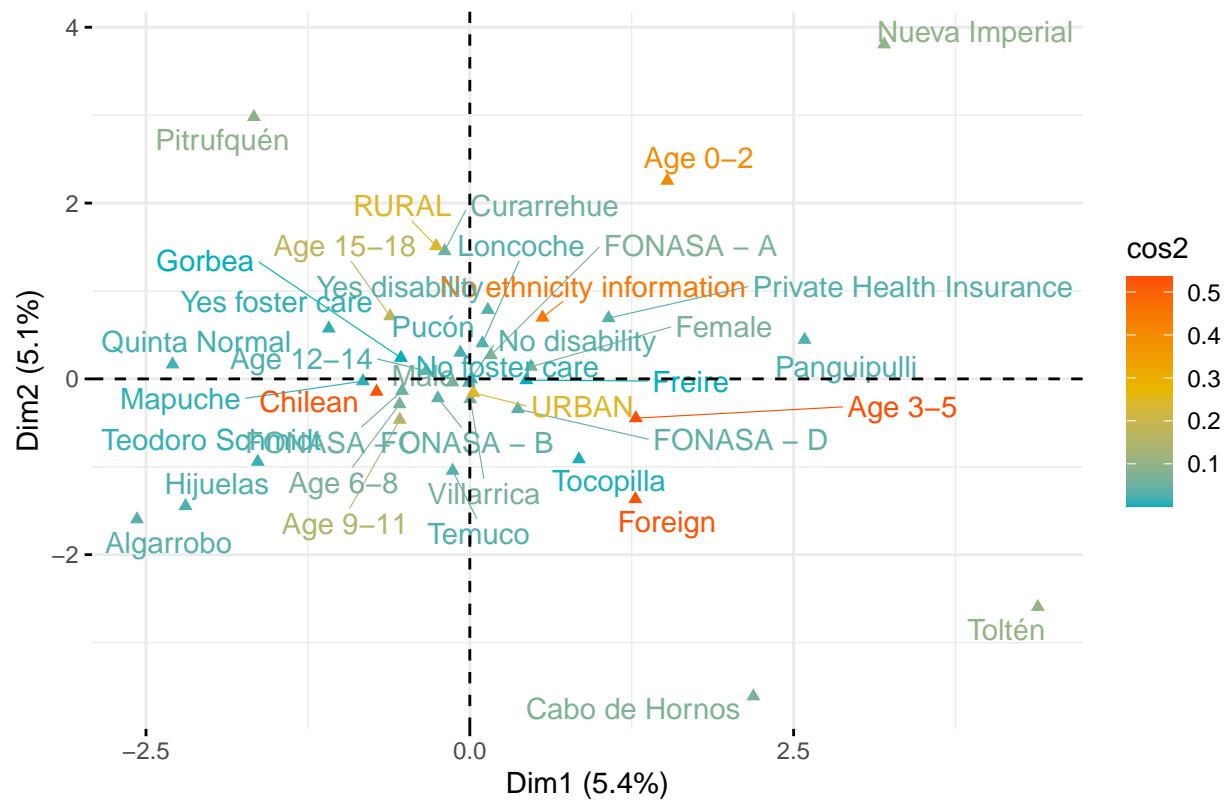




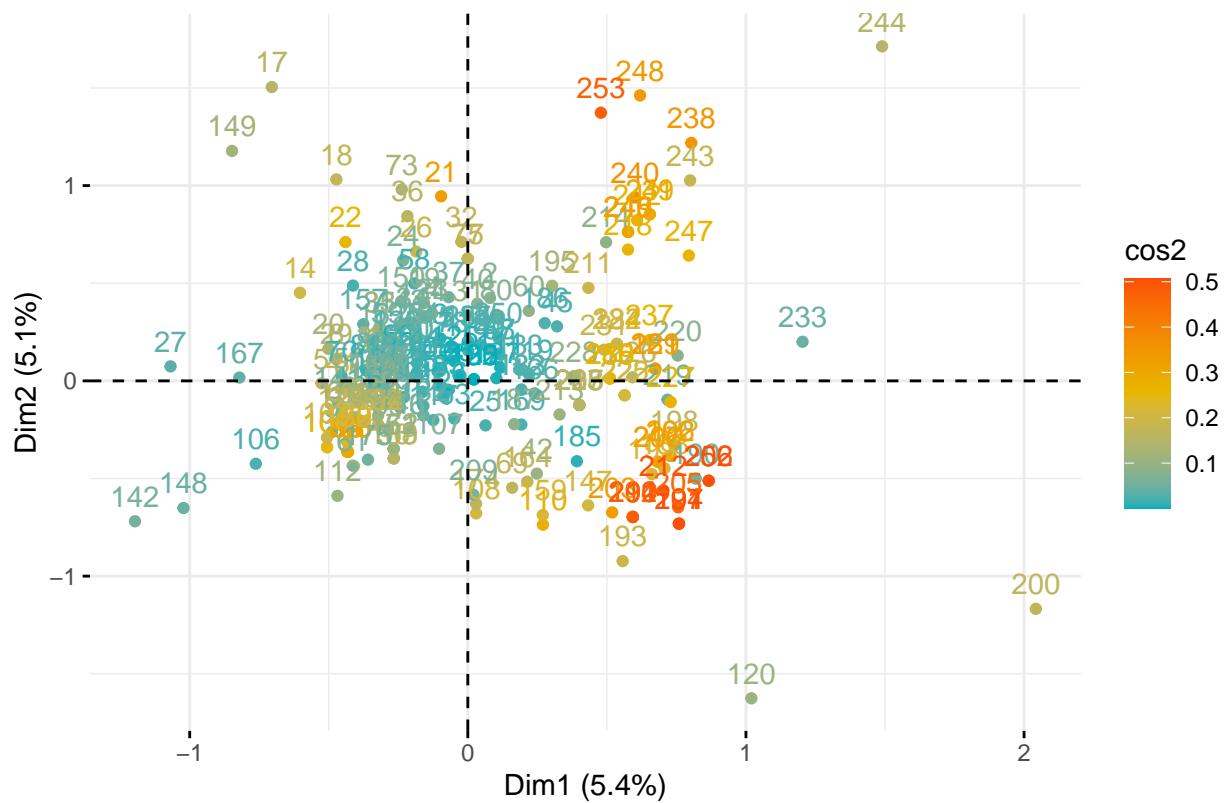
Variables – MCA



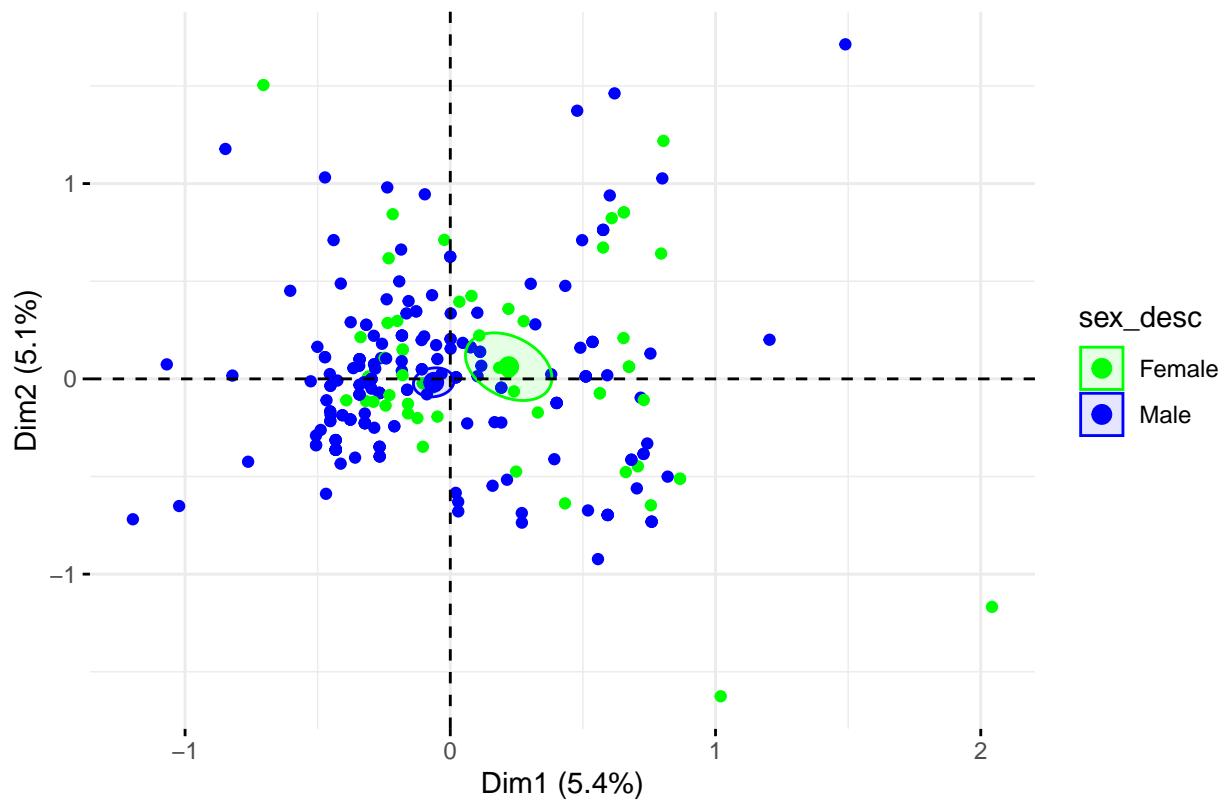
Variable categories – MCA



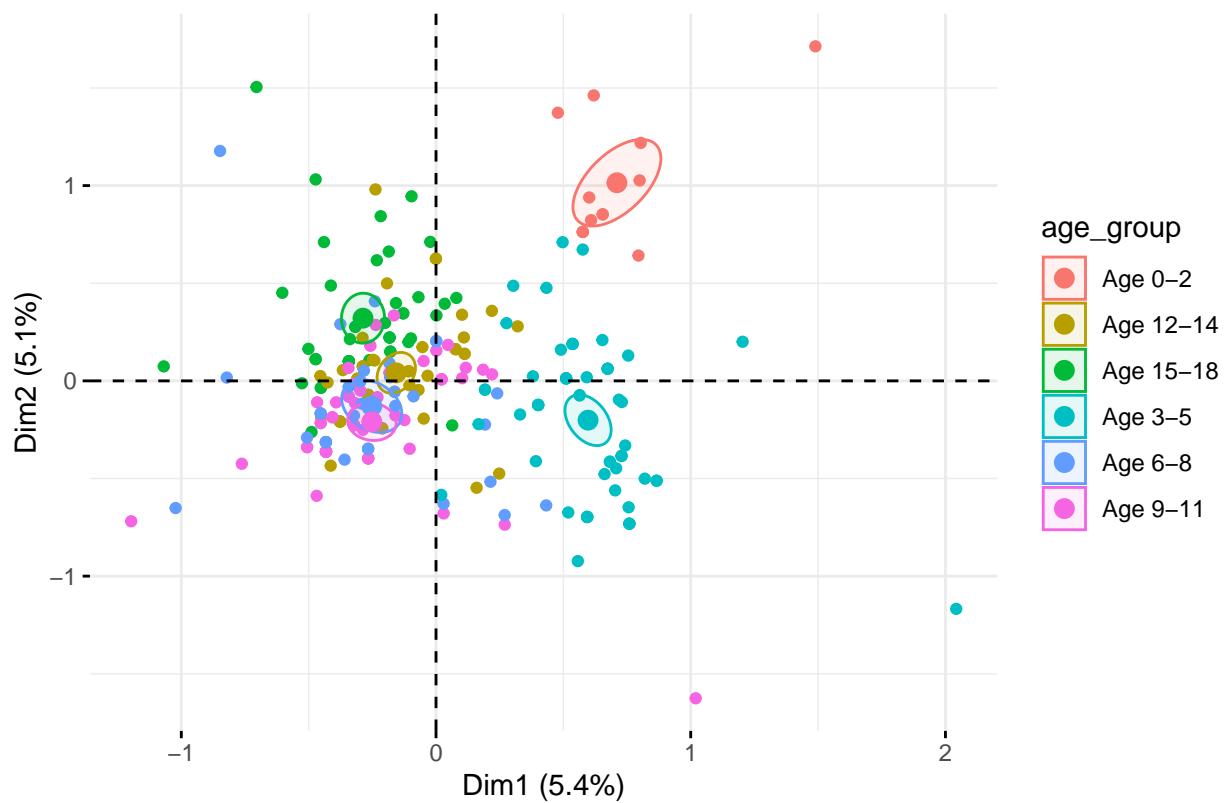
Individuals – MCA



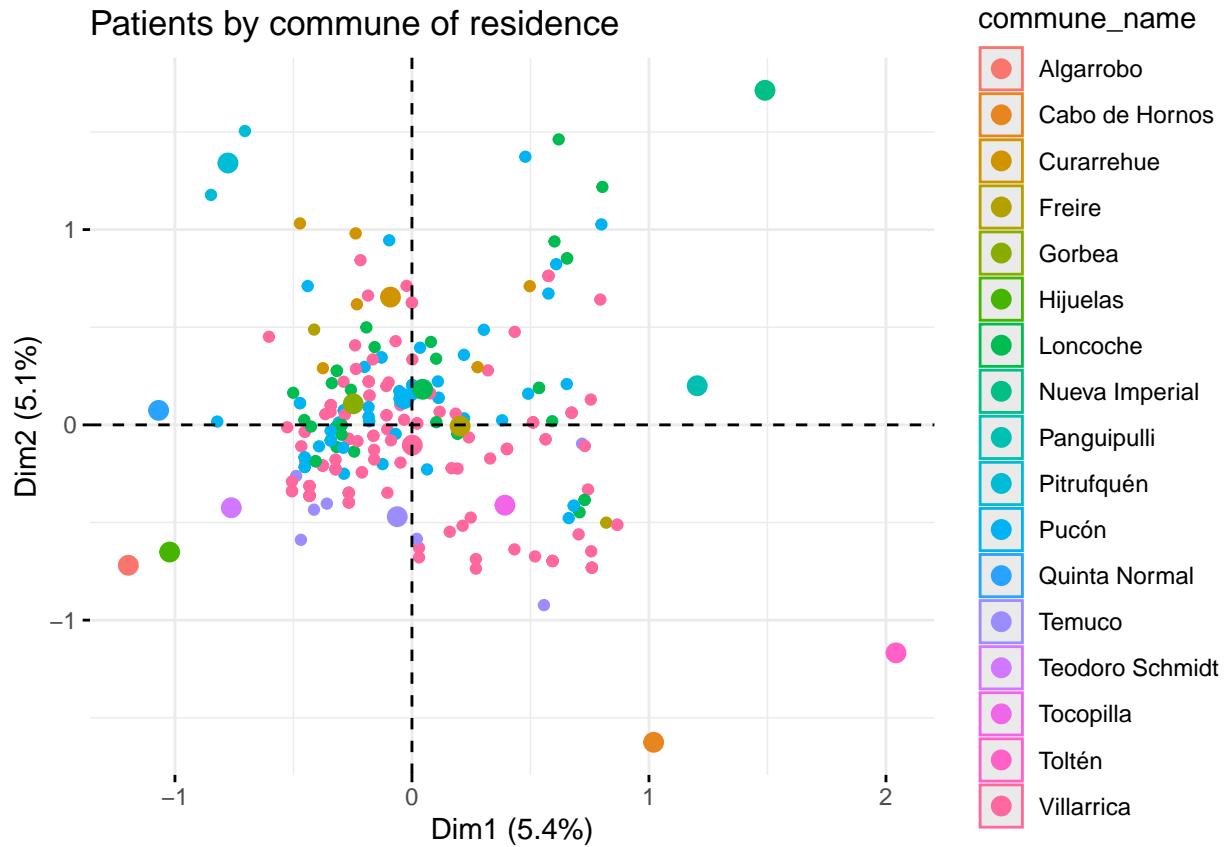
Patients by sex



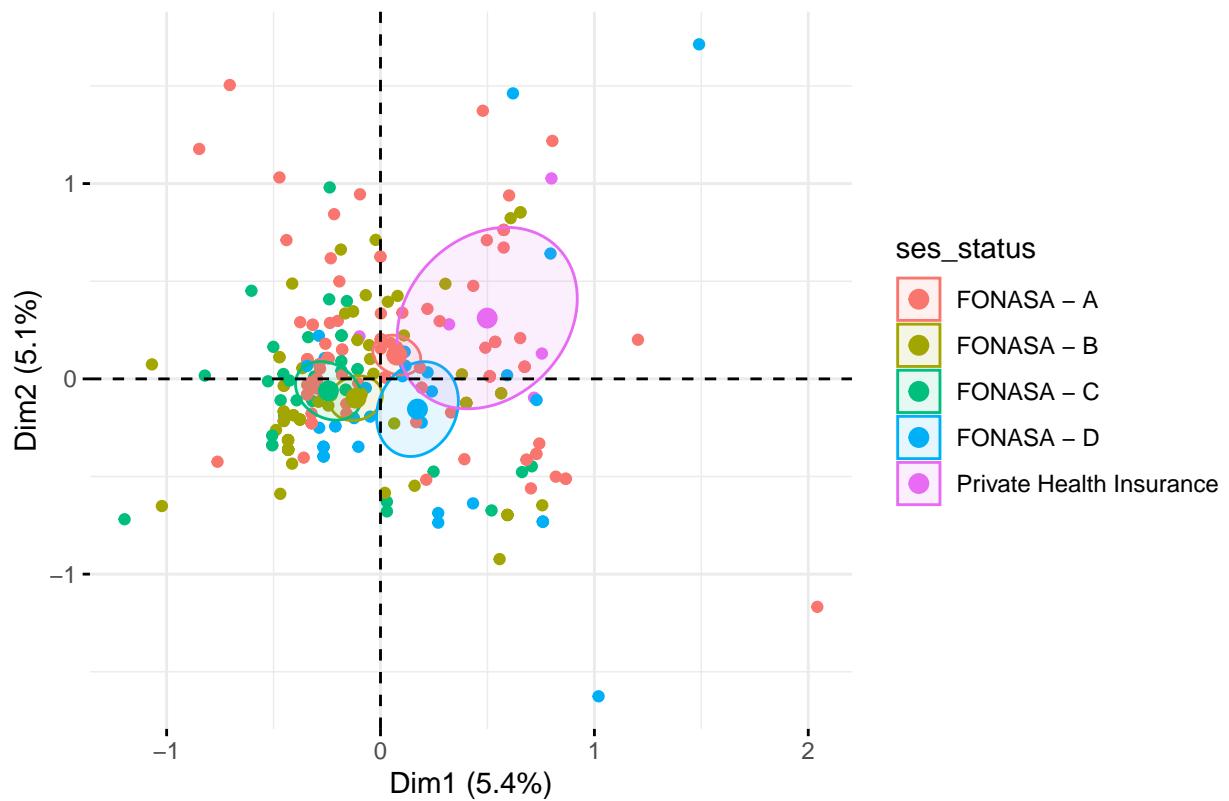
Patients by age



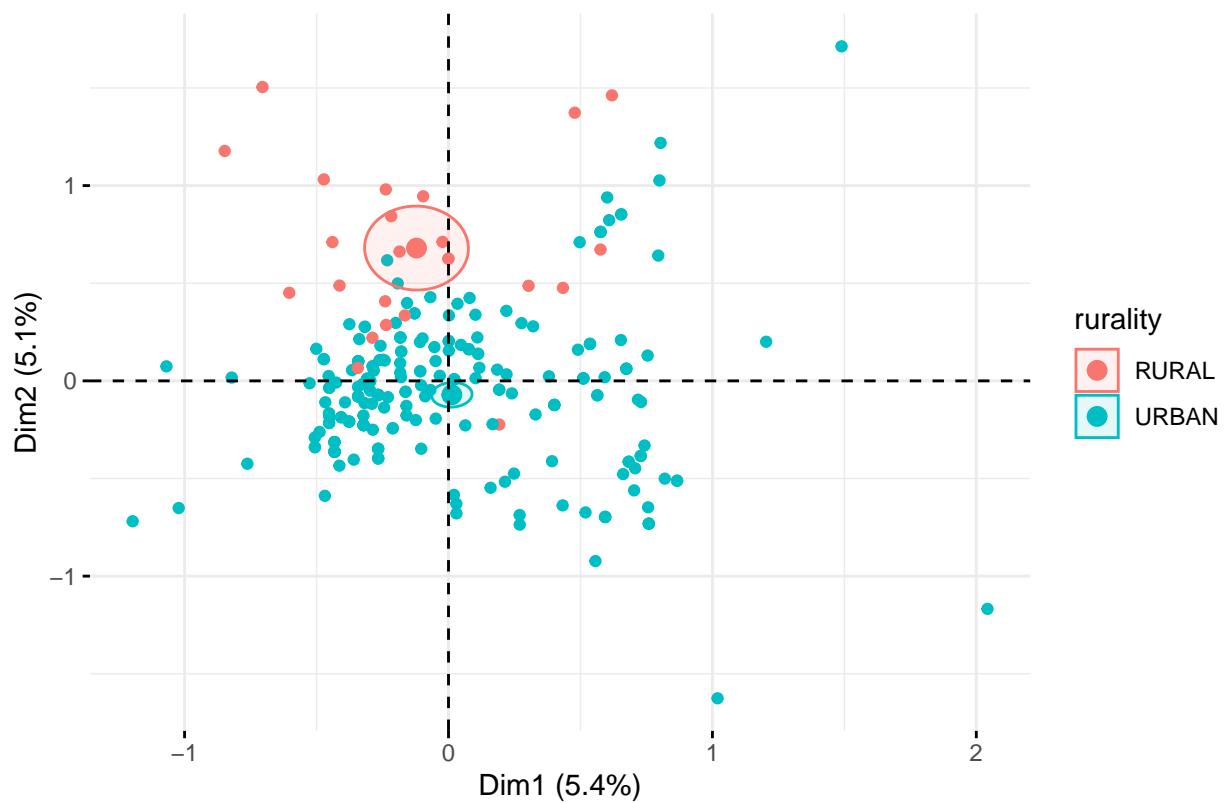
Patients by commune of residence



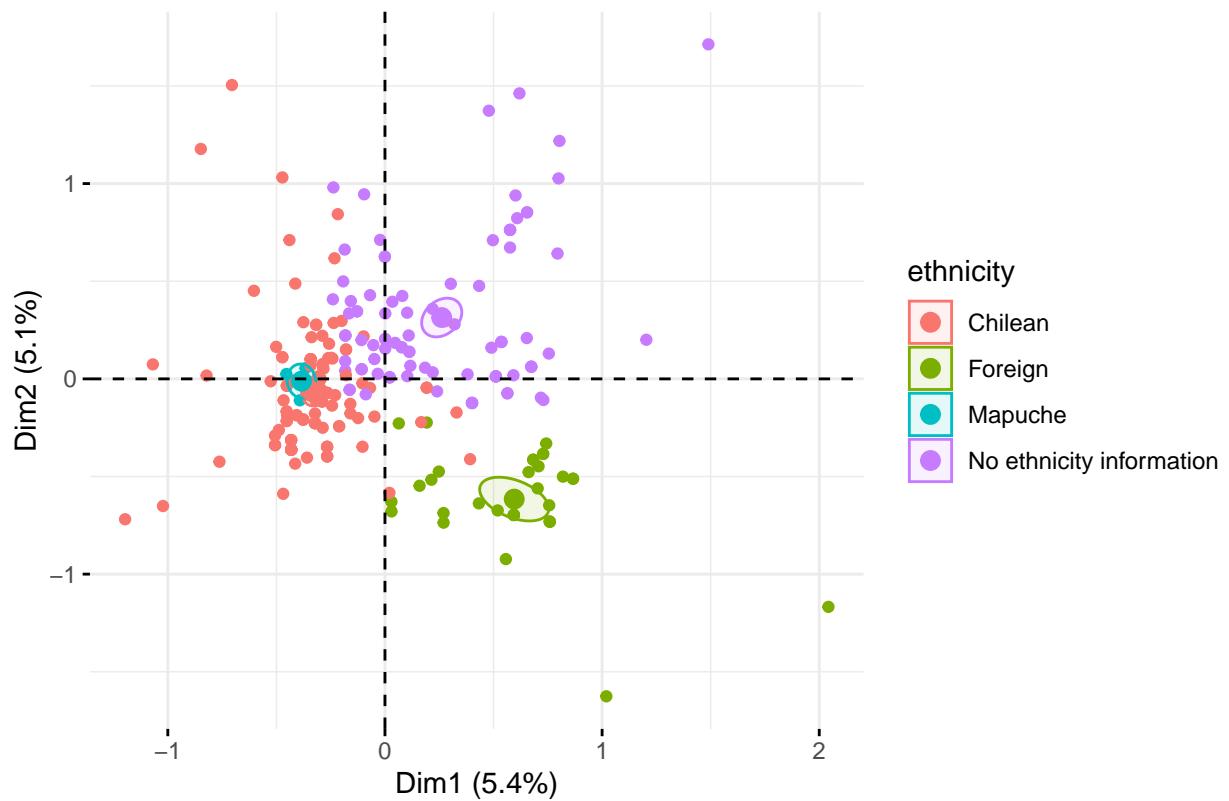
Patients by SES status



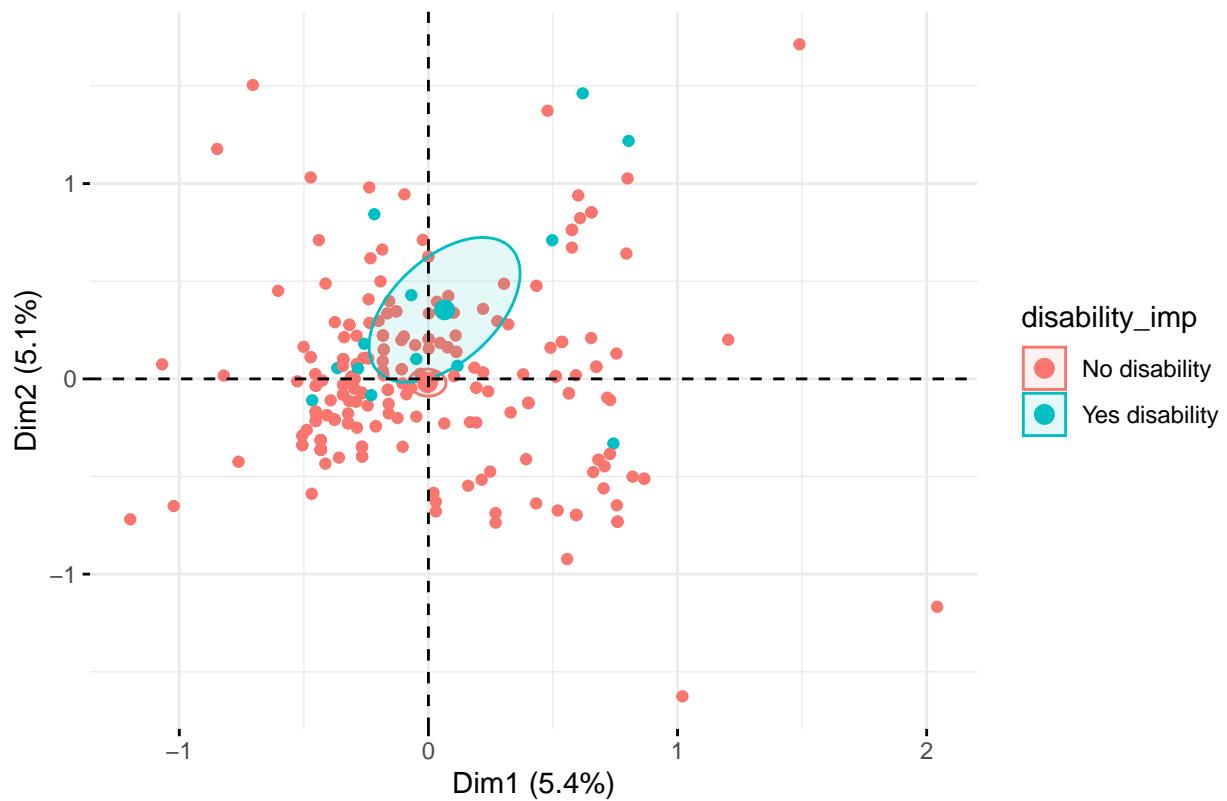
Patients by rurality



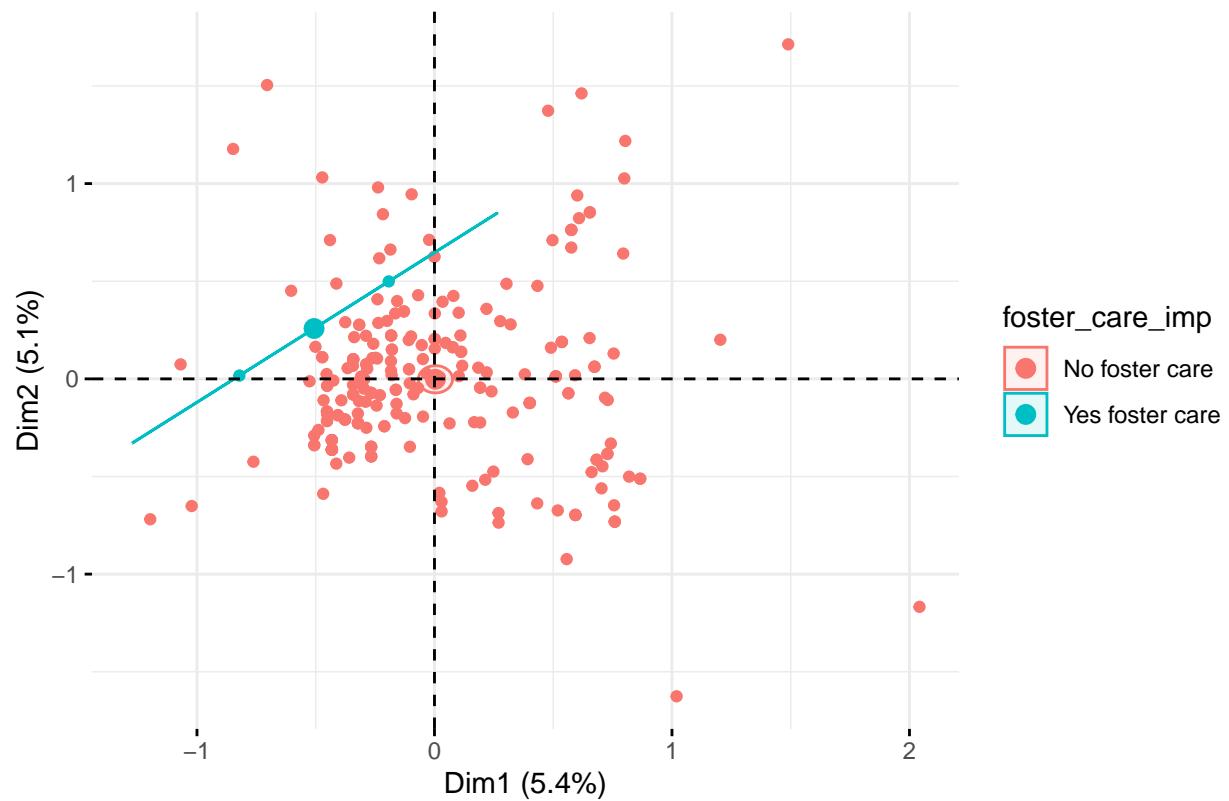
Patients by ethnicity



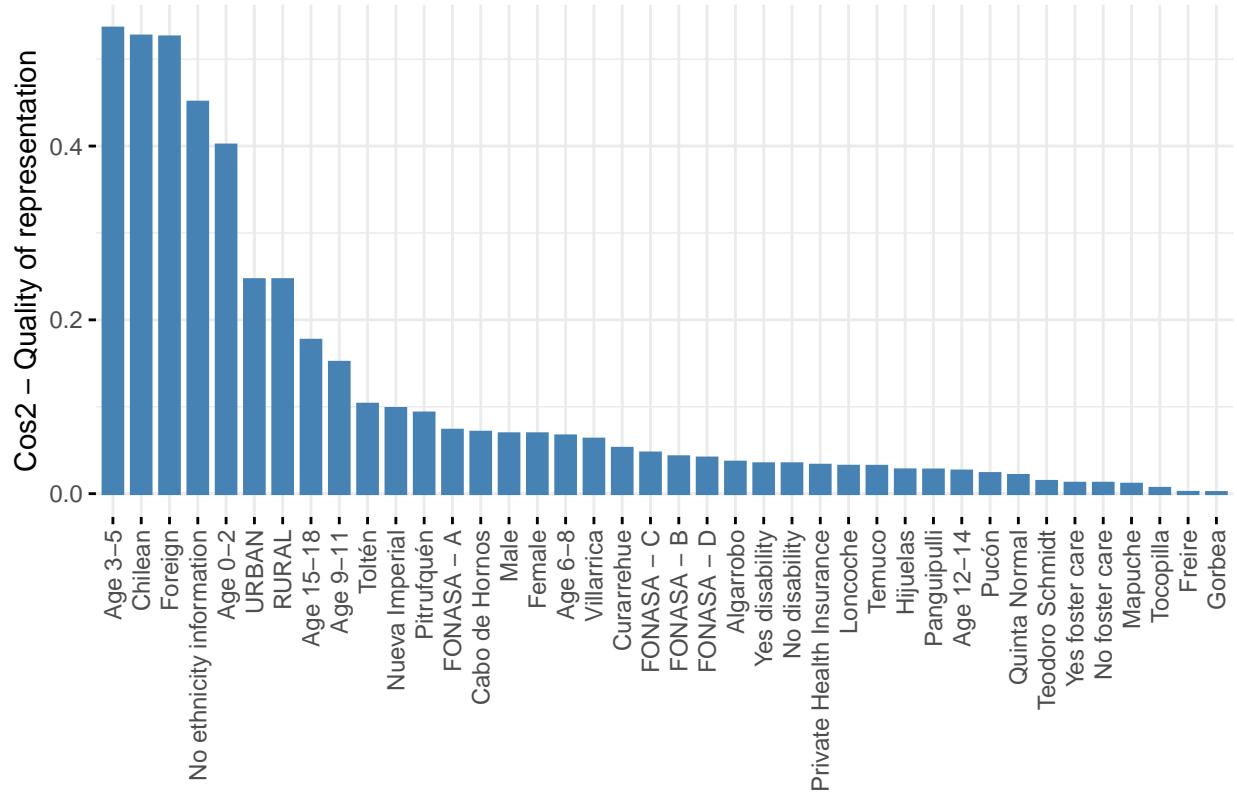
Patients by disability status



Patients by foster care status



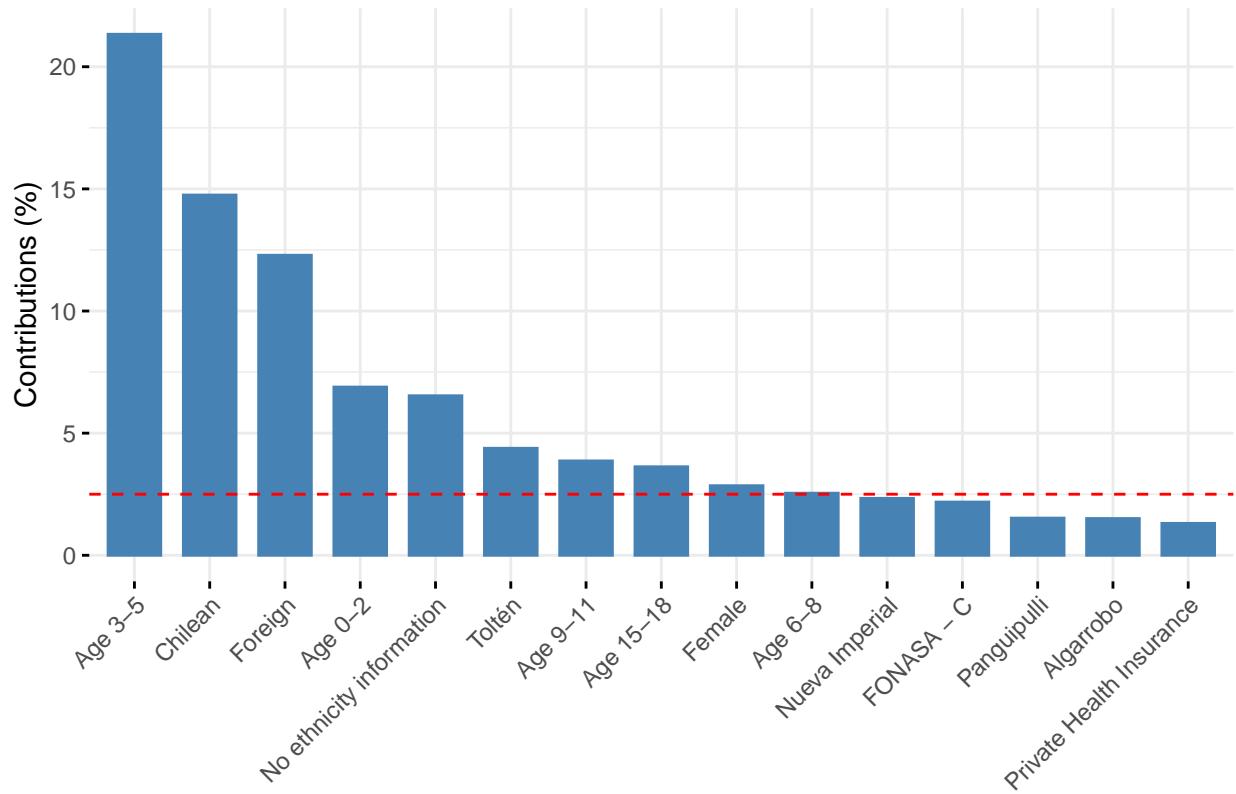
Cos2 of variables to Dim-1–2



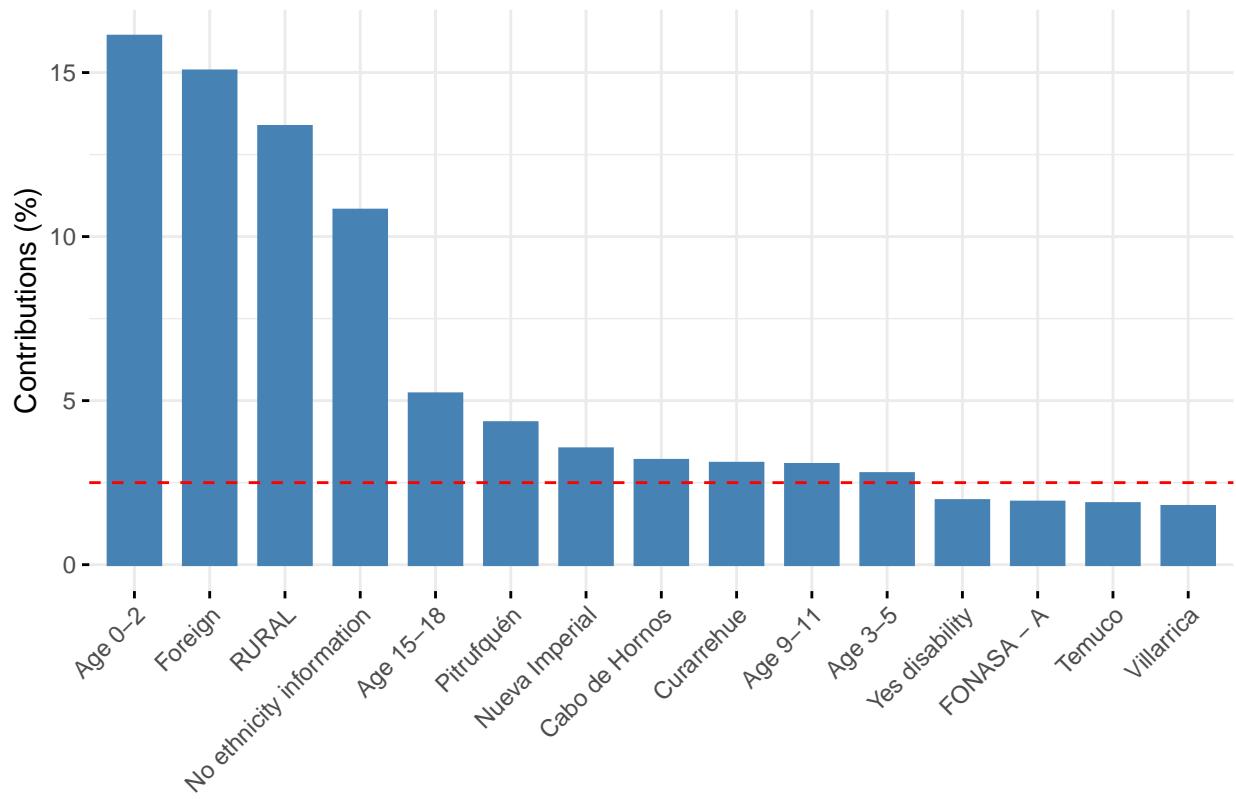
	Dim 1	Dim 2	Dim 3	Dim 4	Dim 5	Dim 6	Dim 7	Dim 8
## Female	2.85	0.26	0.00	11.33	0.06	0.61	7.34	8.76
## Male	0.81	0.07	0.00	3.22	0.02	0.17	2.09	2.49
## Age 0-2	6.89	16.11	8.88	1.19	1.96	0.00	0.51	0.17
## Age 12-14	1.15	0.09	1.59	0.15	5.04	5.56	2.22	1.60
## Age 15-18	3.62	5.21	7.54	0.29	0.59	0.89	8.86	0.05
## Age 3-5	21.33	2.78	6.28	0.40	2.17	0.86	0.20	0.23
## Age 6-8	2.54	0.77	0.20	0.13	0.52	12.65	12.30	3.71
## Age 9-11	3.86	3.06	7.09	0.94	2.36	10.24	0.05	0.84
## Algarrobo	1.50	0.62	1.05	0.25	0.39	0.49	0.47	3.85
## Cabo de Hornos	1.09	3.18	1.30	5.83	6.45	0.04	1.85	0.45
## Curarrehue	0.05	3.09	4.06	2.85	0.57	1.28	0.44	0.09
## Freire	0.09	0.00	6.12	0.01	0.92	0.69	0.83	3.23
## Gorbea	0.06	0.01	0.00	2.39	1.67	1.32	0.43	19.92
## Hijuelas	1.10	0.51	0.10	1.18	0.66	2.48	4.55	0.12
## Loncoche	0.08	1.56	3.07	0.43	8.00	4.44	1.63	0.44
## Nueva Imperial	2.33	3.53	7.12	0.63	6.07	1.08	2.13	0.05
## Panguipulli	1.52	0.05	0.46	0.35	1.72	0.28	2.40	0.00
## Pitrufquén	1.27	4.33	7.76	5.42	3.02	0.73	1.39	0.19
## Pucón	0.06	1.08	0.14	0.00	0.39	10.15	3.70	2.90
## Quinta Normal	1.20	0.01	0.95	1.98	0.66	0.69	4.03	0.79
## Temuco	0.03	1.86	1.37	14.89	0.01	0.02	0.01	2.07
## Teodoro Schmidt	0.61	0.22	0.11	0.16	0.00	3.46	5.00	3.54
## Tocopilla	0.16	0.20	0.90	0.01	1.09	0.76	5.53	1.12
## Toltén	4.38	1.64	1.73	2.72	0.57	0.00	0.35	0.73
## Villarrica	0.00	1.78	0.01	0.09	2.43	0.21	0.00	1.66

## FONASA - A	0.65	1.91	2.89	3.33	4.45	1.49	9.13	2.94
## FONASA - B	0.98	0.84	0.53	11.97	2.90	0.48	5.26	0.72
## FONASA - C	2.18	0.16	1.50	1.70	6.70	1.88	6.58	16.74
## FONASA - D	1.10	1.01	7.62	3.23	15.91	2.13	0.59	0.12
## Private Health Insurance	1.31	0.58	0.00	13.04	0.13	0.64	0.33	0.36
## RURAL	0.37	13.36	7.95	3.20	5.85	0.03	0.39	3.96
## URBAN	0.04	1.40	0.83	0.34	0.61	0.00	0.04	0.41
## Chilean	14.75	0.65	0.23	0.31	0.30	0.18	1.96	3.74
## Foreign	12.28	15.05	2.06	1.86	0.47	0.22	0.64	4.78
## Mapuche	0.62	0.00	5.03	0.87	6.70	4.19	4.84	2.08
## No ethnicity information	6.53	10.81	0.91	2.77	0.27	0.41	0.49	0.42
## No disability	0.00	0.11	0.10	0.03	0.02	1.06	0.00	0.11
## Yes disability	0.06	1.95	1.83	0.47	0.34	19.50	0.02	2.01
## No foster care	0.00	0.00	0.01	0.00	0.06	0.07	0.01	0.02
## Yes foster care	0.54	0.16	0.68	0.05	7.95	8.64	1.42	2.58

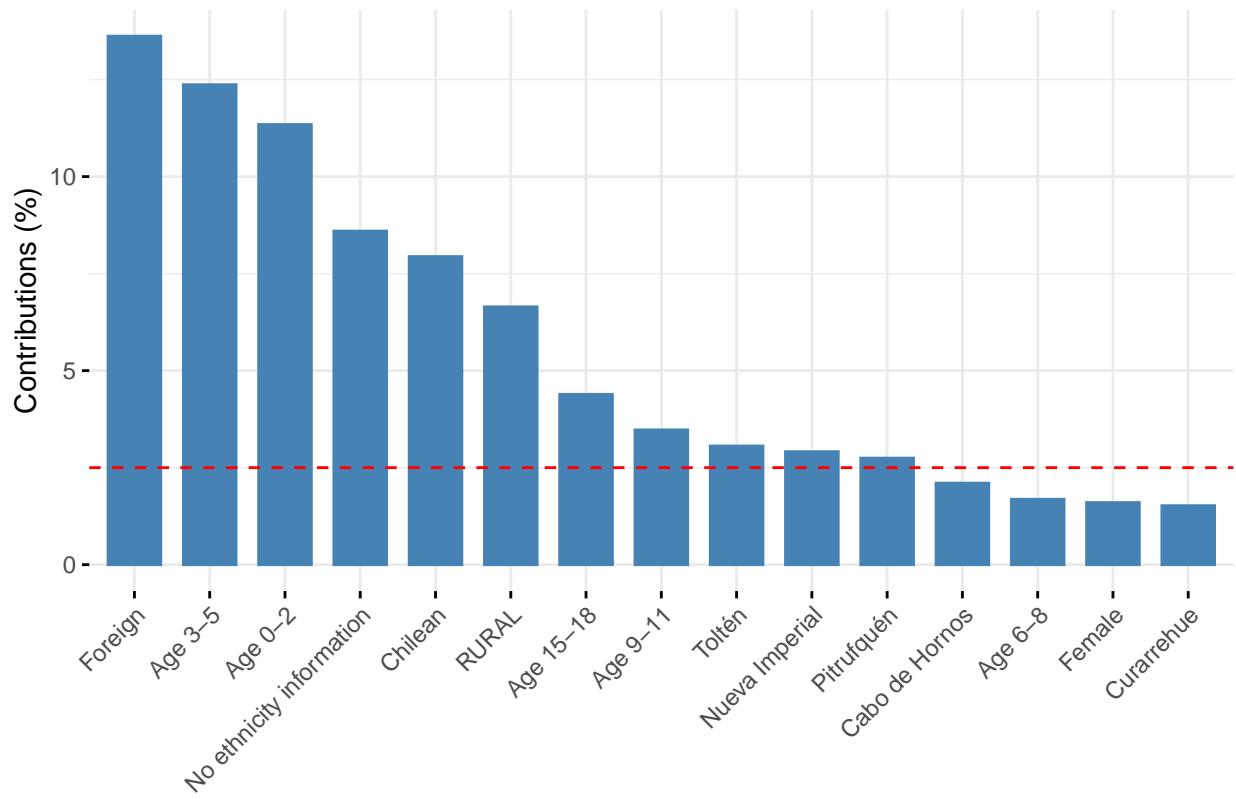
Contribution of variables to Dim-1



Contribution of variables to Dim-2



Contribution of variables to Dim-1–2



6 Supplementary materials

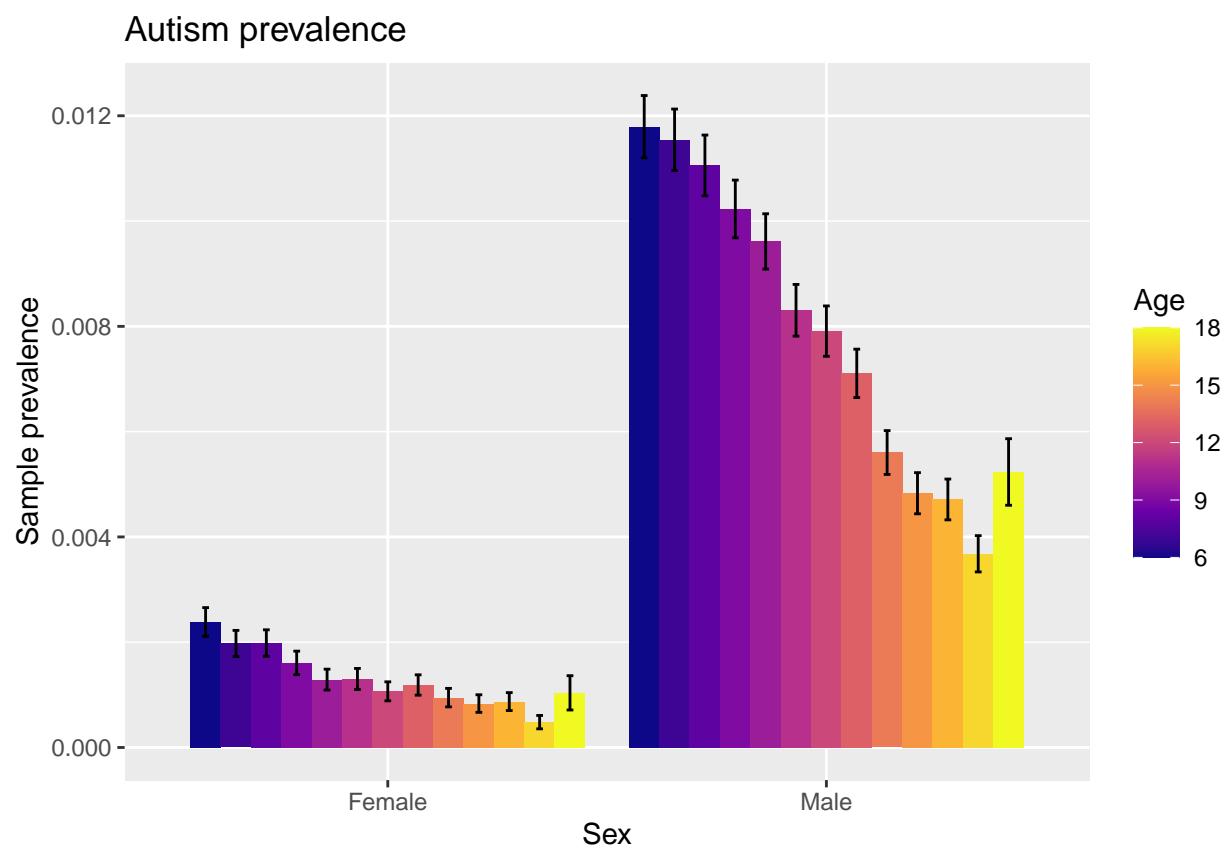


Figure 38: Sample prevalence of autism by age and sex. Bars show 95% normal confidence intervals.

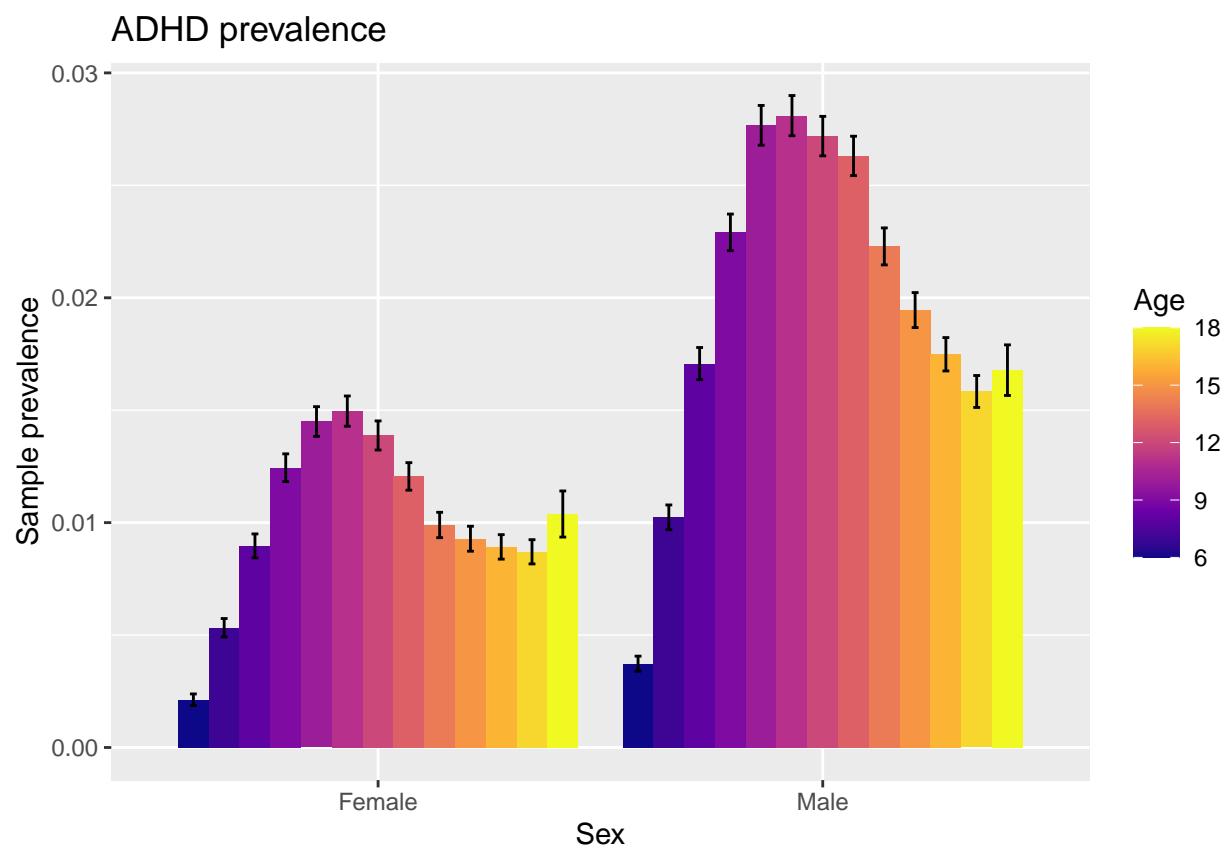


Figure 39: Sample prevalence of ADHD by age and sex. Bars show 95% normal confidence intervals.

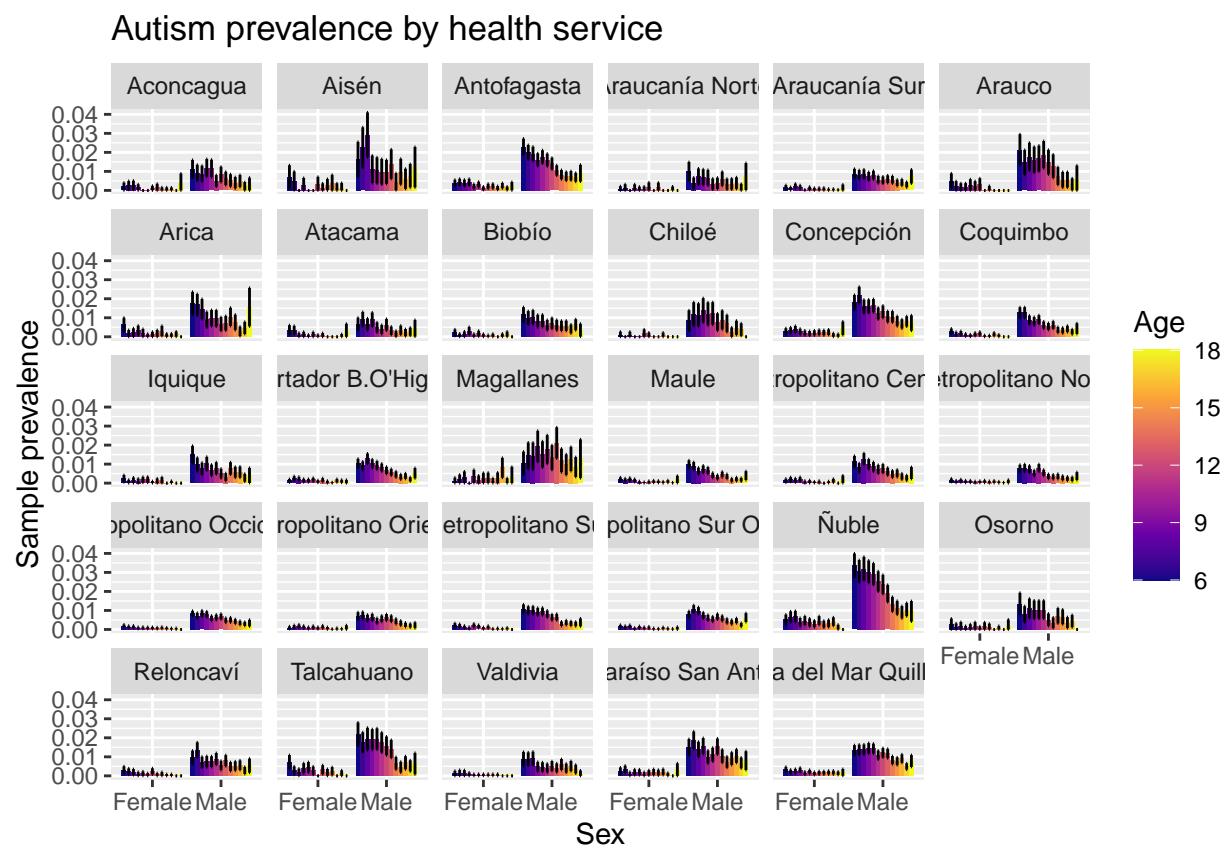


Figure 40: Sample prevalence of autism by health service, age and sex. Bars show 95% normal confidence intervals.

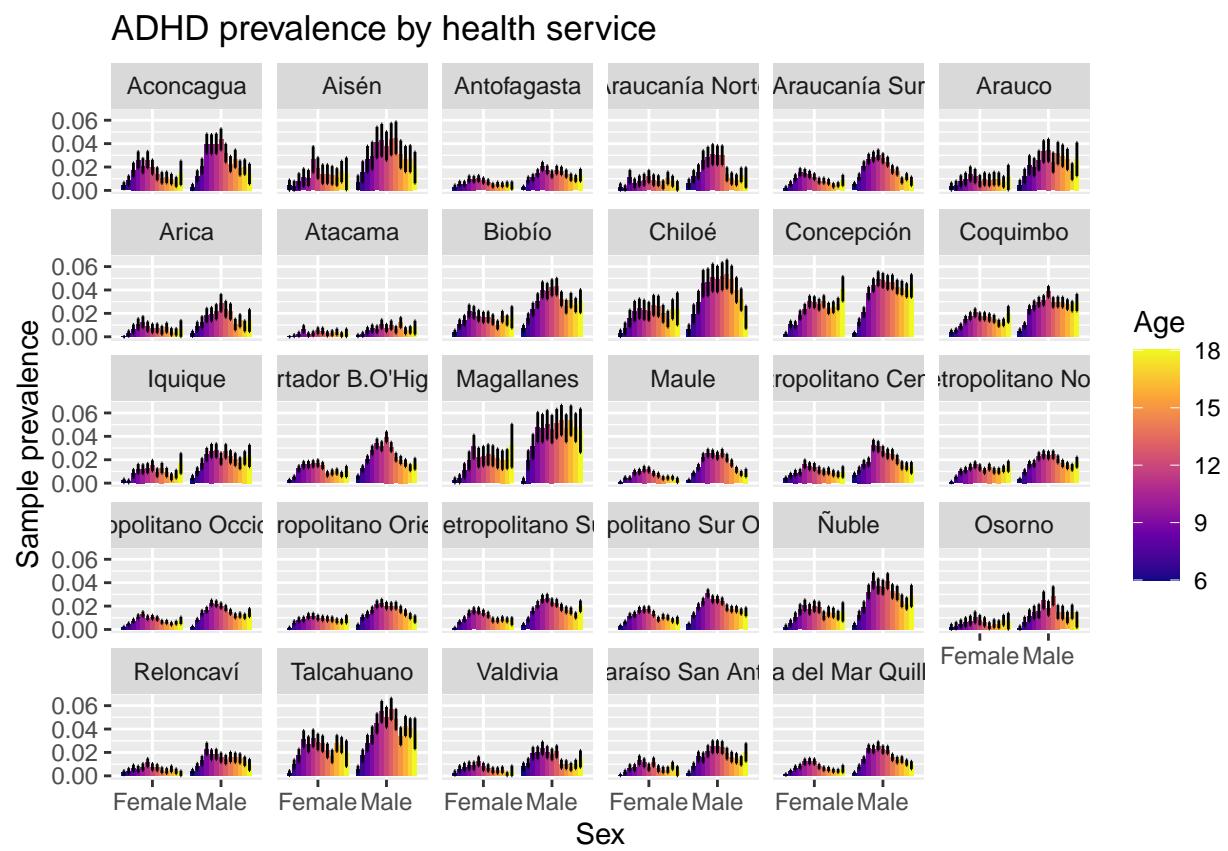


Figure 41: Sample prevalence of ADHD by health service, age and sex. Bars show 95% normal confidence intervals.

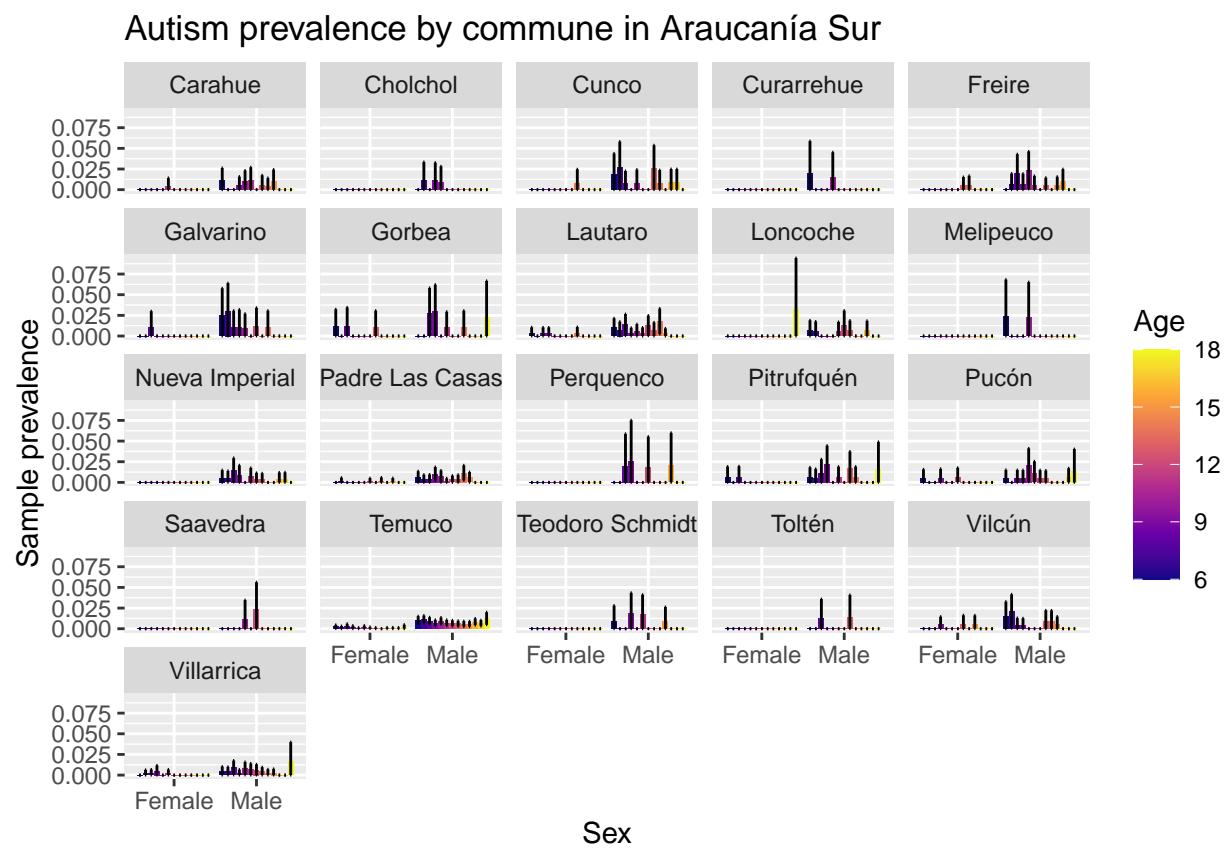


Figure 42: Sample prevalence of autism by commune in Araucanía Sur health service, age and sex. Bars show 95% normal confidence intervals.

Autism prevalence by SES status

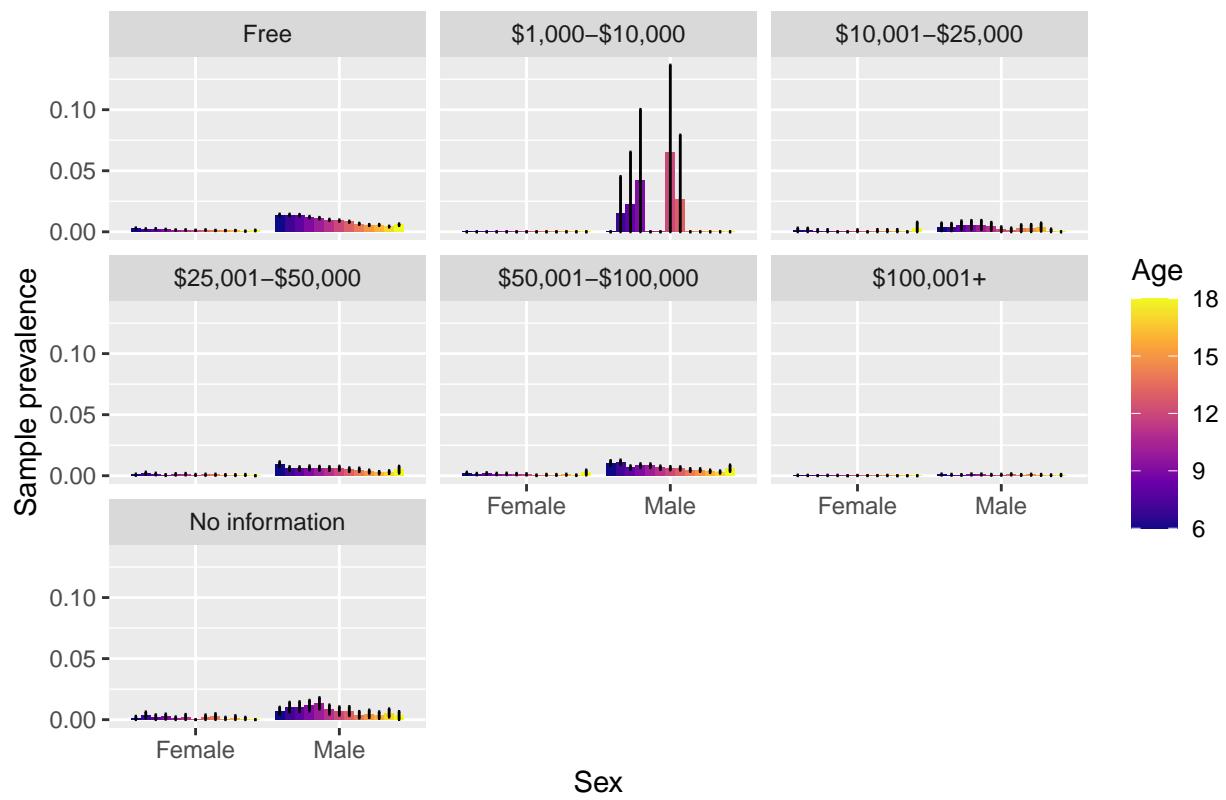


Figure 43: Sample prevalence of autism by socio-economic (SES) status of student's family, age and sex. Bars show 95% normal confidence intervals.

ADHD prevalence by SES status

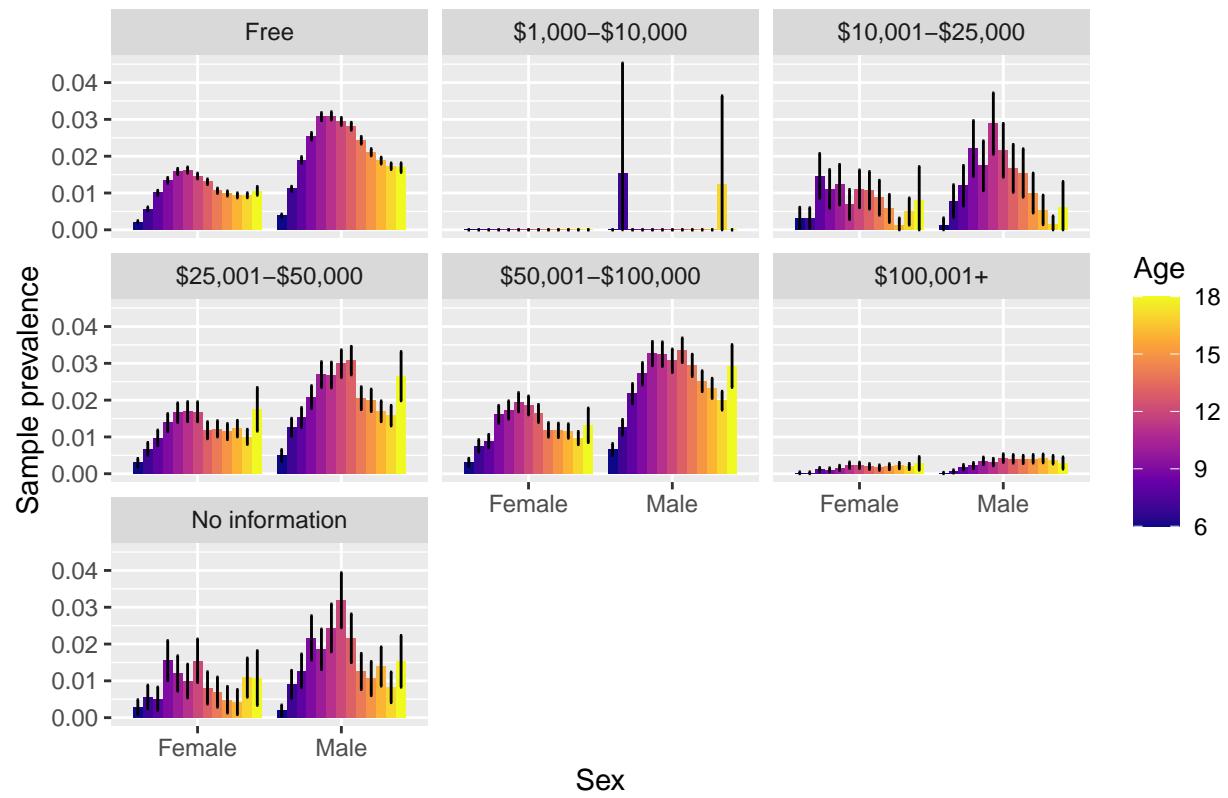


Figure 44: Sample prevalence of ADHD by socio-economic (SES) status of student's family, age and sex. Bars show 95% normal confidence intervals.

Autism prevalence by ethnicity

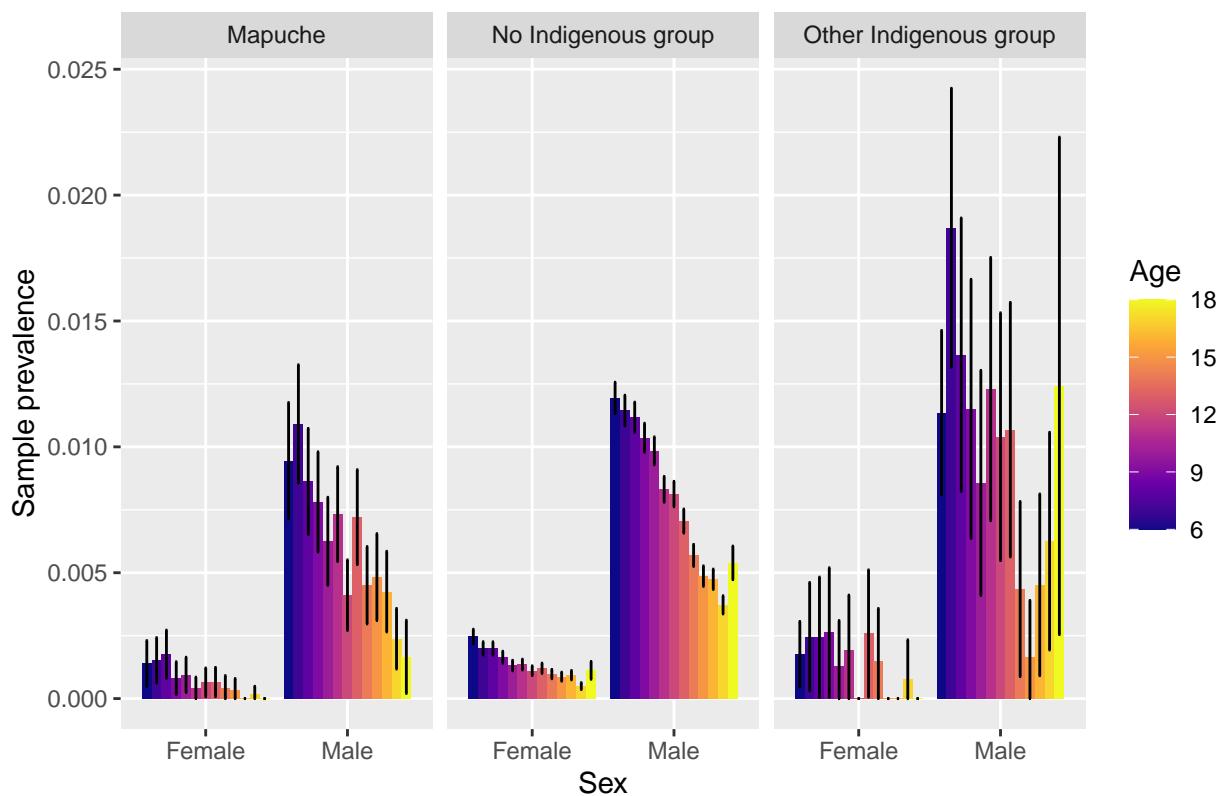


Figure 45: Sample prevalence of autism by ethnicity, age and sex. Bars show 95% normal confidence intervals.

ADHD prevalence by ethnicity

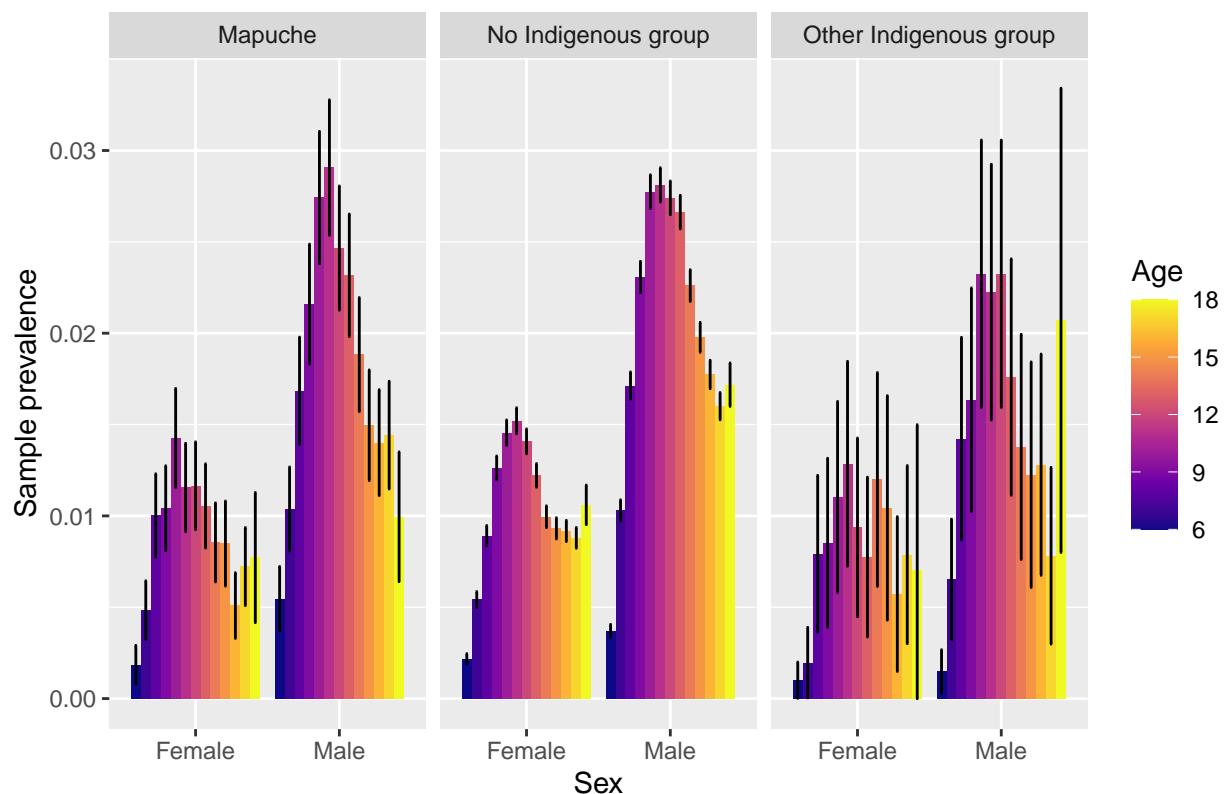


Figure 46: Sample prevalence of ADHD by ethnicity, age and sex. Bars show 95% normal confidence intervals.

Autism prevalence by school's rurality

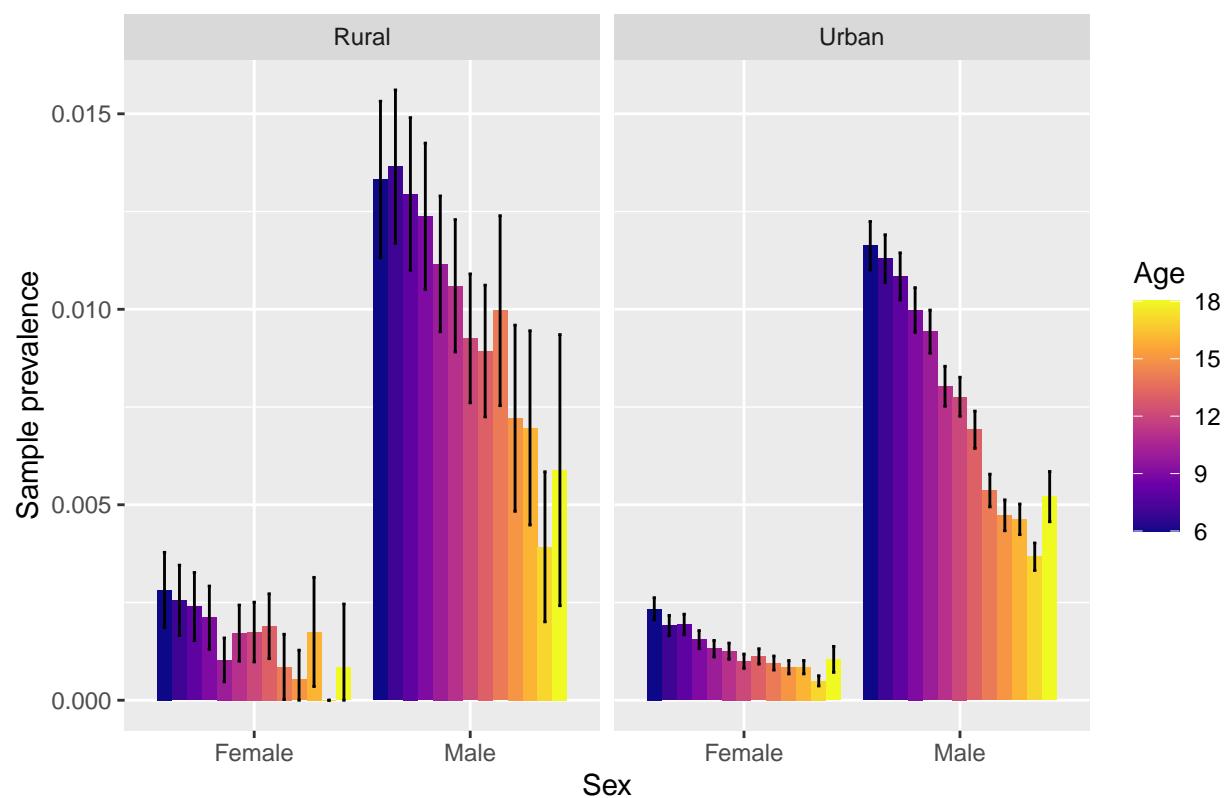


Figure 47: Sample prevalence of autism by school's rurality, age and sex. Bars show 95% normal confidence intervals.

ADHD prevalence by school's rurality

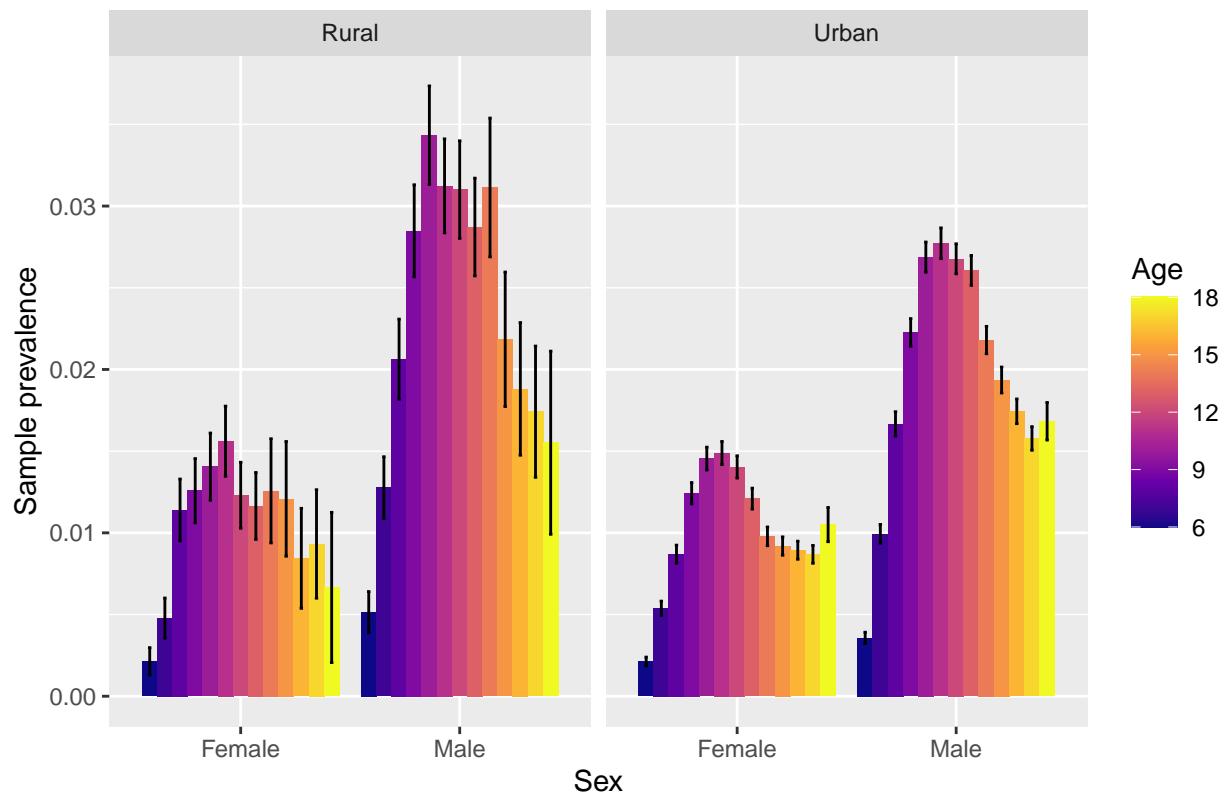


Figure 48: Sample prevalence of ADHD by school's rurality, age and sex. Bars show 95% normal confidence intervals.