

Relative risk (per unit increase in variable) of Down's syndrome for age, parity, gravidity, and previous miscarriage, 1986-95 and 1986-90, South Australia

| Variable                      | Births and terminations                                |         |   |         | Births only  |         |   |         |
|-------------------------------|--|---------|---|---------|--|---------|---|---------|
|                               | 1986-95 (284 cases of Down's syndrome, 197 912 births) |         | 1986-90 (128 cases of Down's syndrome, 98 561 births) |         | 1986-95 (171 cases of Down's syndrome, 197 912 births) |         | 1986-90 (100 cases of Down's syndrome, 98 561 births) |         |
|                               | Relative risk (95% CI)                                 | P value | Relative risk (95% CI)                                | P value | Relative risk (95% CI)                                 | P value | Relative risk (95% CI)                                | P value |
| <b>Univariate analysis</b>    |  |         |   |         |  |         |   |         |
| Age                           | 1.202 (1.142 to 1.266)                                 | 0.0001  | 1.170 (1.097 to 1.247)                                | 0.0001  | 1.129 (1.103 to 1.155)                                 | 0.0001  | 1.131 (1.099 to 1.165)                                | 0.0001  |
| Parity                        | 1.256 (0.997 to 1.581)                                 | 0.0769  | 1.260 (0.946 to 1.677)                                | 0.1461  | 1.235 (1.105 to 1.380)                                 | 0.0006  | 1.245 (1.078 to 1.438)                                | 0.0059  |
| Gravidity                     | 1.176 (0.988 to 1.398)                                 | 0.0931  | 1.168 (0.940 to 1.452)                                | 0.1944  | 1.131 (1.036 to 1.235)                                 | 0.0099  | 1.107 (0.977 to 1.254)                                | 0.1269  |
| Previous miscarriage          | 1.148 (0.769 to 1.715)                                 | 0.5307  | 1.066 (0.599 to 1.896)                                | 0.8338  | 1.078 (0.849 to 1.370)                                 | 0.5526  | 0.883 (0.559 to 1.394)                                | 0.5751  |
| <b>Multivariate analysis</b>  |  |         |   |         |  |         |   |         |
| Parity and age:               |  |         |   |         |  |         |   |         |
| Parity                        | 0.964 (0.777 to 1.196)                                 | 0.7378  | 0.990 (0.751 to 1.306)                                | 0.9442  | 1.038 (0.942 to 1.145)                                 | 0.4554  | 1.032 (0.912 to 1.168)                                | 0.6215  |
| Age                           | 1.206 (1.142 to 1.273)                                 | 0.0001  | 1.171 (1.093 to 1.254)                                | 0.0001  | 1.125 (1.098 to 1.153)                                 | 0.0001  | 1.128 (1.094 to 1.163)                                | 0.0001  |
| Gravidity and age:            |  |         |   |         |  |         |   |         |
| Gravidity                     | 0.961 (0.810 to 1.141)                                 | 0.6463  | 0.972 (0.778 to 1.215)                                | 0.8006  | 0.987 (0.909 to 1.071)                                 | 0.7541  | 0.949 (0.846 to 1.065)                                | 0.3637  |
| Age                           | 1.208 (1.143 to 1.276)                                 | 0.0001  | 1.173 (1.095 to 1.258)                                | 0.0001  | 1.130 (1.102 to 1.159)                                 | 0.0001  | 1.138 (1.100 to 1.177)                                | 0.0001  |
| Previous miscarriage and age: |  |         |   |         |  |         |   |         |
| Previous miscarriage          | 0.929 (0.642 to 1.344)                                 | 0.6865  | 0.875 (0.516 to 1.483)                                | 0.6003  | 0.933 (0.777 to 1.121)                                 | 0.4480  | 0.743 (0.529 to 1.044)                                | 0.0584  |
| Age                           | 1.205 (1.142 to 1.270)                                 | 0.0001  | 1.173 (1.098 to 1.254)                                | 0.0001  | 1.131 (1.103 to 1.159)                                 | 0.0001  | 1.138 (1.098 to 1.179)                                | 0.0001  |

syndrome need to be based on population data that include births and terminations of pregnancy.

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Contributors: AC initiated and planned the study, reviewed the literature, performed the univariate analysis, participated in the interpretation of data, and wrote the paper. KAM performed the Poisson regression analysis and participated in the planning of the study, the interpretation of data, and writing the paper. RJK participated in the planning of the study, the validation of

some case details, the retrieval and preparation of data for analysis, and editing the manuscript. EAH participated in planning the study, interpreting the data, and editing the manuscript. AC and KAM are guarantors for the paper.

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## Bullying in schools: self reported anxiety, depression, and self esteem in secondary school children

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Evidence exists of considerable problems with bullying and bullied children in secondary schools. In the largest survey in the United Kingdom to date 10% of pupils reported that they had been bullied "sometimes or more often" during that term, with 4% reporting being bullied "at least once a week."<sup>1</sup> The impact of the introduction of policies on bullying throughout a school seems to be limited.<sup>1</sup> The commonest type of bullying is general name calling, followed by being hit, threatened, or having rumours spread about one.<sup>1</sup> Bullying is thought to be more prevalent among boys and the youngest pupils in a school.<sup>2</sup>

We are unaware of any study that has examined the mental health problems of children who are being bullied. We assessed self reported anxiety, depression, and self esteem in bullied children and those who were not bullied and in bullies and those who were not bullies.

### Subjects, methods, and results

Four questionnaires (the Olweus bully/victim,<sup>3</sup> the short mood and feelings,<sup>3</sup> the revised children's manifest anxiety incorporating a lie scale,<sup>4</sup> and the Rosenberg self esteem<sup>5</sup> questionnaires) were anonymously completed by 904 pupils aged 12-17 in years 8-11 in two coeducational secondary schools. School A is a non-selective school in a socially disadvantaged urban area. School B is a rural grant maintained school in an area with a higher than average proportion of high social class households.

Logistic regression models were fitted to the proportions of bullied or bullying children using STATA. Categorical variables were school, school year, and sex. Anxiety, lying, esteem, and depression scores were treated as continuous variables. The table shows the odds ratios of the fitted logistic regression models.

Summary statistics and details of fitted models. Values are numbers of schoolchildren unless stated otherwise

| Variable  | Being bullied or bullying |              | Details of fitted logistic regression model |                      |       |         |
|---|---------------------------|--------------|---|----------------------|-------|---------|
|   | No                        | Yes          | Parameter                                   | Odds ratio (95% CI)  | z     | P value |
| <b>Bullied children (mean score for being bullied <math>\geq 2</math>)</b>    |                           |              |   |                      |       |         |
| School:   |                           |              |   |                      |       |         |
| A   | 377                       | 24           | B/A   | 0.37 (0.16 to 0.87)  | -2.29 | 0.022   |
| B   | 489                       | 14           |   |                      |       |         |
| School year:  |                           |              |   |                      |       |         |
| 8   | 224                       | 16           |   |                      |       |         |
| 9   | 237                       | 8            | 9/8   | 0.34 (0.11 to 1.05)  | -1.88 | 0.060   |
| 10  | 194                       | 9            | 10/8  | 0.51 (0.16 to 1.61)  | -1.14 | 0.253   |
| 11  | 211                       | 5            | 11/8  | 0.53 (0.16 to 1.76)  | -1.03 | 0.302   |
| Sex:  |                           |              |   |                      |       |         |
| Male  | 439                       | 23           |   |                      |       |         |
| Female  | 427                       | 15           | Female/male                                 | 0.36 (0.15 to 0.89)  | -2.22 | 0.026   |
| Mean (SD) score:  |                           |              |   |                      |       |         |
| Anxiety   | 9.71 (6.00)               | 17.71 (6.75) | Anxiety                                     | 3.24 (1.78 to 5.91)  | 3.83  | <0.001  |
| Esteem  | 29.27 (4.75)              | 24.97 (6.38) | Esteem                                      | 1.15 (0.66 to 2.00)  | 0.49  | 0.627   |
| Lying   | 2.52 (2.10)               | 3.37 (2.33)  | Lying                                       | 1.96 (1.33 to 2.89)  | 3.39  | 0.001   |
| Depression  | 5.88 (5.13)               | 12.92 (7.95) | Depression                                  | 1.45 (0.83 to 2.54)  | 1.29  | 0.196   |
| <b>Bullying children (mean score for bullying others <math>\geq 2</math>)</b> |                           |              |   |                      |       |         |
| School:   |                           |              |   |                      |       |         |
| A   | 382                       | 19           | B/A   | 0.63 (0.26 to 1.49)  | -1.06 | 0.290   |
| B   | 491                       | 12           |   |                      |       |         |
| School year:  |                           |              |   |                      |       |         |
| 8   | 235                       | 5            |   |                      |       |         |
| 9   | 235                       | 10           | 9/8   | 4.65 (0.95 to 22.84) | 1.89  | 0.058   |
| 10  | 189                       | 14           | 10/8  | 8.37 (1.77 to 39.62) | 2.68  | 0.007   |
| 11  | 214                       | 2            | 11/8  | 1.31 (0.17 to 9.79)  | 0.26  | 0.795   |
| Sex:  |                           |              |   |                      |       |         |
| Male  | 439                       | 23           |   |                      |       |         |
| Female  | 434                       | 8            | Female/male                                 | 0.24 (0.08 to 0.72)  | -2.57 | 0.010   |
| Mean (SD) score:  |                           |              |   |                      |       |         |
| Anxiety   | 10.11 (6.27)              | 8.32 (5.24)  | Anxiety                                     | 0.36 (0.18 to 0.71)  | -2.96 | 0.003   |
| Esteem  | 29.08 (4.8)               | 29.48 (5.93) | Esteem                                      | 1.32 (0.75 to 2.31)  | 0.96  | 0.337   |
| Lying   | 2.59 (2.19)               | 2.13 (1.31)  | Lying                                       | 0.41 (0.23 to 0.76)  | -2.87 | 0.004   |
| Depression  | 6.12 (5.46)               | 7.77 (5.22)  | Depression                                  | 3.29 (1.63 to 6.66)  | 3.32  | 0.001   |

For anxiety, esteem, lying, and depression the odds ratios are for a change of one standard deviation of 6.22, 4.92, 2.13, and 5.44 respectively (pooled SD). The prevalence of being bullied "sometimes or more often" was 4.2%. Significant variables ( $P < 0.05$ ) for being bullied were school, sex, and anxiety and lying scores; school year approached significance ( $P = 0.06$ ). The prevalence of bullying others "sometimes or more often" was 3.4%. Significant variables ( $P < 0.05$ ) for being a bully were school year, sex, and anxiety, lying, and depression scores. The esteem score featured in neither model.

Boys in year 8 in school A with high anxiety and lying scores were most likely to be bullied. Girls in year 9 in school B with low anxiety and lying scores were least likely to be bullied. Boys in year 10 with low anxiety and lying scores and high depression scores were most likely to be bullies. Girls in year 8 with high anxiety and lying scores and low depression scores were least likely to be bullies.

## Comment

Bullied children tend to be in the lower school years. The low prevalence of bullying (4.2%) may reflect the effectiveness of bullying interventions already in place in the two schools. Our data support the idea that bullied children are more anxious and bullies equally or

less anxious than their peers.<sup>2</sup> New findings from the study are the relation between having a high lying score and being bullied and having a high depression score and being a bully. The male to female ratio of bullies (3:1) is lower than that previously reported (4:1).<sup>2</sup> This may indicate that bullying interventions are having more of an impact on the direct bullying characteristic of boys and less on the indirect bullying more common among girls.

Our results should be viewed with caution because our study is small, but they suggest factors that could be important.

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