Supplementary table 5: Prevalence of eye abnormalities (Chapter VII of ICD-10: Diseases of the eye and adnexa) reported in children with FASD/PAE

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| **ICD-10 code** | **Reported abnormality** | **Reported prevalence in children with FAS/FASD** | **Reported prevalence in children with PAE or FASD+PAE** | **Estimated prevalence or pooled prevalence, OR or mean difference (95%CI)** |
| *H15.9 Disorder of sclera, unspecified* | “Focusing & scleral defects” | *Church & Gerkin 1988:*  \*FAS: 7.7% | - | *FAS:*  Prevalence: 7.7 (1.1 to 39.1)% |
| H26.0 Infantile, juvenile & presenile cataract | Cataract  Unilateral anterior polar cataract | *Strömland 1996:*  \*FAS: 8.0%  *Ribeiro 2007:*  \*FAS: 3.1% | *Flanigan 2008:*  \*PAE: 0; Control: 3.6% (*p*=0.65) | *FAS:*  Pooled prevalence: 5.8 (1.9 to 16.6)% |
| *H31.1 Choroidal degeneration* | Myopic choroidosis (now known as choroidopathy) | *Ribeiro 2007:*  \*FAS: 5.0% bilateral | - | *FAS:*  Prevalence: 5.0 (0.7 to 28.2)% |
| *H31.8 Other specified disorders of choroid* | Mean choroidal thickness of right eye, measured using swept-source optical coherence tomography | - | *Biyik 2019:*  \*PAE (ceased upon pregnancy recognition; n=98): 286±61µm  \*PAE (throughout pregnancy; n=379): 291±60µm  \*No PAE (n=307): 287±56µm  No associations with PAE and choroidal thickness in multivariate regression analyses controlling for age, sex, axial length, ethnicity, height, and birthweight (*p*>0.05) |  |
| H40.9 Glaucoma, unspecified | Glaucoma | *Church 1988:*  \*FAS: 7.7%  *Carones 1992:*  \*FAS: 0 | - | *FAS:*  Pooled prevalence: 6.9 (1.4 to 28.0)% |
| H44.5 Degenerated conditions of the globe – Phthisis | Phthisis | *Strömland 1996:*  \*FAS: 4.0%  *Hellström 1997a:*  \*FAS: 6.3%; Control: 0 | - | *FAS:*  Pooled prevalence: 5.0 (1.3 to 17.9)% |
| *H47.2 Optic atrophy* | Optic nerve atrophy | *Strömland 1982:*  FAS: 13.3% | - | *FAS:*  Prevalence: 13.3 (5.1 to 30.6)% |
| H50.0 Convergent concomitant strabismus – Esotropia | Esotropia | *Strömland 1985:*  FAS: 57.1%; Control 1 (some PAE): 0; Control 2 (intrauterine growth retardation): 9.1%  *Strömland 1996:*  FAS: 40.0%  *Ribeiro 2007:*  FAS: 9.4%  *Strömland 2015:*  FASD: 6.3%; Control (orphans): 6.4%  *Vernescu 2012:*  Small angle esotropia (unilateral):  FASD (FAS/PFAS):0; Control: 4.8% | - | *FAS/FASD:*  OR: 3.95 (0.45 to 34.84; *p*=0.216) (I2=62.08; Q=7.91; *p*=0.048)  Pooled prevalence: 20.9 (7.3 to 46.9)% |
| H50.1 Divergent concomitant strabismus – Exotropia  &  H51.1 Convergence insufficiency & excess | Exotropia | *Strömland 1985:*  FAS: 4.8%; Control 1 (some with PAE): 0; Control 2 (intrauterine growth retardation): 27.3%  *Strömland 1996:*  FAS: 8.0%  *Strömland 2015:*  FASD: 0; Control (orphans): 1.3% | - | *FAS/FASD:*  OR: 1.31 (0.23 to 7.51; *p*=0.766) (I2=15.47; Q=3.55; *p*=0.314)  Pooled prevalence (incl. intermittent & small angle exotropia): 8.2 (4.2 to 15.2)% |
|  | Intermittent exotropia with strabismus | *Ribeiro 2007:*  FAS: 12.5% |  |  |
|  | Small angle exotropia (unilateral) | *Vernescu 2012:*  FASD (FAS/PFAS): 4.8%; Control: 0 |  |  |
|  | Exophoria | *Strömland 1996:*  FAS: 4.0%  *Ribeiro 2007:*  FAS: 3.1% |  | *FAS:*  Pooled prevalence: 3.5 (0.9 to 13.1)% |
| H50.9 Strabismus, unspecified | Strabismus | *Hanson 1976:*  FAS: 4.9 to 12.2% (2-5/41)  *Steinhausen 1982:*  FAS: 26.8%; Control: nr (but FAS > Control)  *Strömland 1985:*  FAS: 43.0%; Control 1 (some with PAE): 0; Control 2 (intrauterine growth retardation): 36.4%  *Church 1988:*  FAS: 30.8%  *Carones 1992:*  FAS: 12.5%  *Spohr 1994:*  FAS: 38.7%  *Strömland 1996:*  FAS: 52.0%  *Egeland 1998:*  FAS: 23.0%  *Steinhausen 2003:*  Mod-severe FAS & mild FAS/FAE: 18.4%; Control: nr  *Viljoen 2005:*  FAS: 3.1%; Control: 0  *Ervalahti 2007:*  FASD: 52.1%  *May 2007:*  FAS: 5.5%; PFAS: 0; Control: 0.7%  *Ribeiro 2007:*  FAS: 28.1%  *Landgren 2010:*  FAS: 42.9%  *May 2011:*  FAS: 12.5%; PFAS: 5.6%; Control: 1.7% | - | *FAS:*  OR: 4.21 (1.23 to 14.47; *p*=0.022) (I2=25.32; Q=4.02; *p*=0.26)  *PFAS:*  OR: 2.83 (0.38 to 21.17; *p*=0.311) (I2=0; Q=0.07; *p*=0.79)  *Combined FAS & PFAS:*  OR: 3.78 (1.32 to 10.82; *p*=0.013) (I2=0; Q=4.19; *p*=0.523)  *Combined FAS & PFAS:*  Pooled prevalence: 22.4 (15.5 to 31.2)% |
|  | Positive kappa angle | - | *Flanigan 2008:*  PAE: 2.3%; Control: 0 | *PAE:*  Prevalence: 2.3 (0.3 to 14.7)% |
| H52.0 Hypermetropia | Hypermetropia | *Ribeiro 2007:*  FAS: 3.2% eyes; Control: nr | *Flanigan 2008:*  PAE: 21.1%; Control: 7.8% (*p*=0.29) | *FAS:*  Prevalence: 3.2 (0.8 to 12.0)%  *PAE:*  Prevalence: 21.1 (10.9 to 36.8)% |
|  | Hyperopia | *Strömland 1985:*  FAS: 3.4%; Control: nr  *Church 1988:*  FAS: 7.7% | - | *FAS:*  Pooled prevalence: 5.1 (1.3 to 18.4)% |
|  | Hyperopia (mean spherical refractive error) | *Vernescu 2012:*  FASD (FAS/PFAS): 1.6 D; Control: 1.4D (no sig diff) | - |  |
| H52.1 Myopia | Myopia | *-* | *Flanigan 2008:*  PAE: 2.6%; Control: 0 | *PAE:*  Prevalence: 2.6 (0.4 to 16.5)% |
|  | Myopia > -5.0 D | *Ribeiro 2007:*  FAS: 9.6% eyes | - | *FAS:*  Pooled prevalence (incl. myopia > -5.0D & severe myopia): 7.9 (4.1 to 14.5)% eyes |
|  | Severe myopia (not defined) | *Strömland 1985:*  FAS: 5.3% eyes  *Elgen 2007:*  FAS: 16.0%; FASD: 4.5% | - | *FAS & FASD:*  Prevalence: 11.1 (3.4 to 30.4)% |
| H52.2 Astigmatism | Astigmatism | *Church 1988:*  FAS: 15.4% | *Flanigan 2008:*  PAE: 2.6%; Control: 2.0% (*p*=1.0) | *FAS:*  Prevalence: 15.4 (3.9 to 45.1)%  *PAE:*  Prevalence: 2.6 (0.4 to 16.5)% |
|  | Astigmatism >1.5D | *Ribeiro 2007:*  FAS: 37.5% eyes; Control: nr | - | *FAS:*  Prevalence: 37.5 (26.6 to 49.9)% eyes |
|  | Mean cylindrical refractive error | *Vernescu 2012:*  FASD (FAS/PFAS): 0.5 D; Control: 0.5 D (normal limits) | - |  |
| *H52.3 Anisometropia & aniseikonia* | Anisometropia > 2D | *Ribeiro 2007:*  FAS: 22.5%  Control: nr | - | *FAS:*  Prevalence: 22.6 (11.2 to 40.4)% |
| H52.7 Disorder of refraction, unspecified | Refraction | *Strömland 1982:*  FAS [n=11]: -13 to +4D  *Strömland 1985:*  -2.0 to +3.5 sph:  FAS: 84.2% eyes (12 eyes emmetropic)  Range:  Control 1 (some with PAE): -0.5 to +3D (50% eyes emmetropic; 50% between -0.5 to +3.0D); Control 2 (intrauterine growth retardation): -2.5 to +4.0 sph (32% eyes emmetropic; 41% between +2.0 to +4.0D)  *Strömland 1996:*  Median:  FAS: 0 (-5 to +4)D  *Hellström 1997a:*  FAS [n=15]: -20.0 to +2.0D; Control [n=11]: -0.25 to +2.0D  *Hellström 1997b:*  FAS: -2 to +4D; Control: -1 to +1D  *Hellström 1999:*  FAS: -2 to +4D; Control: -1 to +1D  *Ribeiro 2007:* [62 eyes]  FAS: -1.75±5.00 sph  FAS (range): -23.0 to +6.5 sph  ≤ -2.0: 1.3% eyes  -2.0 to +3.5: 83.8% eyes  ≥ +3.5: 3.2% eyes | *Flanigan 2008:*  Right eye:  PAE: 0.92±1.74 sph; Control: 1.05±0.61 sph  Left eye:  PAE: 1.17±1.79 sph; Control: 1.07±0.67 sph |  |
|  | Refractory error | *Elliott 2008:*  FAS: 7.6% |  | *FAS:*  Prevalence: 7.6 (3.7 to 15.1)% |
| *H53.1* *Subjective visual disturbance* | Photophobia, assessed in an ear, nose, and throat clinic | *Church 1988:*  FAS: 7.7% (1/13) children | - | *FAS:*  Prevalence: 7.7 (1.1 to 39.1)% |
| *H53.5* *Colour vision deficiencies* | Colour vision, assessed with 24-plate version of standard Ishihara pseudoisochromatic plates (red/green colour deficiency) | *Vernescu 2012:*  FAS/PFAS: 0  Control: 0 | - | *FAS/PFAS:*  Prevalence: 2.3 (0.1 to 27.7)% |
| H53.8 Other visual disturbances | Amblyopia | *Church 1988:*  FAS: 15.4% | *Flanigan 2008:*  PAE: 2.3%; Control: 0 (*p*=0.79) | *FAS:*  Prevalence: 15.4 (3.9 to 45.1)%  *PAE:*  Prevalence: 2.3 (0.3 to 14.7)% |
|  | Stereoacuity | *Andersson Grönlund 2010:*  Subnormal/negative:  FAS: 73.3%; Control: 34.5% (*p*=0.009)  *Vernescu 2012:*  Mean:  FASD (FAS/PFAS): 150 arcsec; Control [n=20]: 45 arcsec (*p*<0.005)  Normal (40-60 arcsec):  FASD (FAS/PFAS): 6.7%  Very poor (>200 arcsec):  FASD (FAS/PFAS): 33.3% | - | *FAS/FASD: subnormal stereoacuity:*  Pooled prevalence: 53.0 (17.6 to 85.7)% |
| *H53.9* *Visual disturbance, unspecified* | History of [unspecified] visual perception problems | *Landgren 2010:*  FAS: 28.6% (6/21) children  Control: nr | - | *FAS:*  Prevalence: 28.6 (13.4 to 50.8)% |
| H54.1-54.3 No, mild, moderate or severe visual impairment, binocular | Visual acuity ≤ 0.2 | *Strömland 1985:*  FAS: 12.0%; Control: 0  *Strömland 1996:*  FAS: 12.5%  *Ribeiro 2007:*  FAS: 3.8% eyes | - | *FAS/FASD: Subnormal visual acuity (<0.8):*  Pooled prevalence: 55.5 (37.0 to 72.5)% |
|  | Visual acuity 0.1- < 0.5 | - | *Flanigan 2008:*  PAE: 2.6%; Control: 2.2% (*p*=1.0) | *PAE: Subnormal visual acuity (<0.8)* [total 2/38]*:*  Prevalence: 5.3 (1.3 to 18.7)% |
|  | Visual acuity 0.5 – 0.7 | - | *Flanigan 2008:*  PAE: 2.6%; Control: 2.2% (*p*=1.0) |  |
|  | Visual acuity < 0.3 or  ≤ 0.33 | *Strömland 1982:*  FAS: 57.1%  *Strömland 2015:*  FASD: 6.7%; Controls (orphans): 9.1% | - |  |
|  | Visual acuity 0.3-0.6 | *Strömland 1985:*  FAS: 46.0%; Control 1 (some with PAE): 0; Control 2 (intrauterine growth retardation): 0  *Strömland 1996:*  FAS: 41.7%  *Ribeiro 2007:*  FAS: 13.5% eyes | - |  |
|  | Visual acuity ≥ 0.3 | *Strömland 1982:*  FAS: 42.9% |  |  |
|  | Visual acuity <0.8 | *Landgren 2010:*  FAS: 61.9%  *Andersson Grönlund 2010:*  FAS: 100% (15/15) *(range reported fell <0.8)* | - |  |
|  | Visual acuity 0.7-1.0 or >0.7 | *Strömland 1985:*  FAS: 42.0%; Control 1 (some with PAE): 100%; Control 2 (intrauterine growth retardation): 100%  *Ribeiro 2007:*  FAS: 82.7% eyes | *Flanigan 2008:*  PAE: 94.7%; Control: 95.6% (*p*=0.95) | *FAS:*  Prevalence: 41.7 (24.1 to 61.7)%  *PAE:*  Prevalence: 94.7 (81.3 to 98.7)% |
|  | Visual acuity | *Carones 1992:*  FAS (mean): 0.47  FAS (median): 0.5 (0.1 to 0.8)  *Hellström 1997a, 1997b, 1999:*  Median:  FAS: 0.7 to 0.8 (0.0 to 1.0); Control: 1.0 (0.8 to 1.3)  *Ribeiro 2007:*  FAS: 0.83  *Andersson Grönlund 2010:*  Median:  FAS: 0.65 (0.2 to 0.65); Control: 0.8 (0.2 to 1.25)  *Vernescu 2012:*  Mean:  FASD: 0.59 (0.31 to 1.0); Control: 0.8 (0.5 to 1.25) | - | *FAS:*  Mean difference: -0.25 (-0.40 to -0.10; *p*=0.001) (I2=52.20; Q=2.09; *p*=0.148) |
|  | Resolution acuity (Teller acuity card) <5th percentile | *Carter 2005:*  FAS: 27.3%; Control: 9.3% (*p*<0.005) | - | *FAS:*  Prevalence: 27.3 (12.8 to 48.9)% |
| H54.9 Unspecified visual impairment (binocular) | Visual impairment | *Elliott 2008:*  FAS: 4.3% | - | *FASD: Visual impairment & vision problems:*  Prevalence: 13.9 (1.5 to 63.7)% |
|  | Vision problems | [Astley 2010 values for FAS/PFAS, SE/AE, ND/AE] | *Astley 2010:*  FAS/PFAS: 37.5%; SE/AE: 33.2%; ND/AE: 25.2%; PAE (normal CNS): 18.5% (*p*=0.00) | *PAE:*  Prevalence: 18.5 (12.3 to 27.0)% |
| H55 Nystagmus & other irregular eye movements | Nystagmus | *Beattie 1983:*  FAS: 2.5%  *Church 1988:*  FAS: 7.7%  *Strömland 1996:*  FAS: 8.0%  *Ribeiro 2007:*  FAS: 3.1%  *Elliott 2008:*  FAS: 2.2%  *Strömland 2015:*  FASD: 6.3% | - | *FAS/FASD:*  Pooled prevalence: 4.3 (2.1 to 8.3)% |
|  | Impaired fixation ability | *Strömland 1985:*  FAS: 33.3% | - | *FAS:*  Prevalence: 33.3 (8.4 to 73.2)% |

95%CI = 95% confidence interval; CNS = central nervous system; FAE = fetal alcohol effects; FAS = fetal alcohol syndrome; FASD = fetal alcohol spectrum disorder; HE = healthy-exposed; ICD-10 = 10th revision of the International Statistical Classification of Diseases and Related Health Problems; ND/AE = neurodevelopmental disorder/alcohol exposed; nr = not reported; OR = odds ratio; PAE = prenatal alcohol exposure; PFAS = partial fetal alcohol syndrome; SE/AE = static encephalopathy/alcohol exposed; sig diff = significantly different.

*Italicised* codes indicate those which were reported in one study (N=8 codes).

Studies including rates (%) were included in pooled prevalence values. Pooled prevalence was not calculated where no cases were reported (n=0). All values relate to % children unless specified as % eyes. Child and eye data were not combined for pooled values.