# Supplementary table 2: Study and participant characteristics

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| **Reference, country** | **Study type, population type** | **Group: N1** | **Diagnostic criteria** | **Eye measures reported** |
| **FASD:** |  |  |  |  |
| Hanson 1976, USA | Cohort, Clinic | FAS: 41 | NR | Strabismus, Ptosis, Epicanthus, PFL, Microphthalmos |
| Steinhausen 1982, Germany | Case control (but only FAS group eye data presented); Clinic & Foster homes | FAS: 71  Control: 28 | Majewski 1978 & maternal drinking history | Strabismus, Ptosis, Blepharophimosis, Epicanthus, Anterior/posterior eye segment malformation |
| Strömland 1982, Finland & Sweden | Cohort; Clinic | FAS: 30 | NR | Optic nerve atrophy, Small optic discs, Optic nerve hypoplasia, Optic nerve atrophy, Malformations of the total fundus, Vascular abnormalities, Refraction |
| Beattie 1983, Scotland | Cohort; Clinic | FAS: 40 | NR | Nystagmus, Epicanthus, Optic nerve hypoplasia |
| Strömland 1985, Sweden | Case control; Clinic | FAS: 30  Non-exposed: 22  IGR: 11 | Fetal alcohol study group (Rosett 1980) | Esotropia, Exotropia, Strabismus, Hyperopia, Myopia, Visual acuity, Impaired fixation ability, Ptosis, Blepharophimosis, Double ring sign, Optic disc area, Small optic discs, Optic disc or nerve head hypoplasia, Retinal tortuosity, Tortuosity index, Vascular abnormalities, Cataract/fundus lesions, Combined abnormalities including vascular anomalies, Refraction |
| Church & Gerkin 1988, USA | Cohort; Clinic (ENT) | FAS: 13 | Fetal alcohol study group (Rosett 1980) | Focusing & scleral defects, Glaucoma, Strabismus, Hyperopia, Astigmatism, Photophobia, Amblyopia, Nystagmus, Epicanthus, PFL, Microphthalmos, Clouded corneae, Glaucoma, Hypertelorism |
| Carones 1992, Italy | Case control; Clinic | FAS: 8  Control (healthy): 80 | Minimal criteria proposed by Rosett 1980 | Glaucoma, Strabismus, Visual acuity, Ptosis, Telecanthus, PFL, Microcornea, Optic nerve hypoplasia, Retinal tortuosity, Glaucoma, Mean corneal endothelial cell density, Polymegathism, Pleomorphism, Mesenchymal dysgenesis |
| Spohr 1993 & Spohr 1994, Germany | Cohort; High-risk (from paediatric clinics, foster homes, institutions) | 1993 paper:  FAS: 60  1994 paper:  FAS: 44 | RSA 1989 | Strabismus, Ptosis, Epicanthus, PFL |
| \*Strömland 1996, Sweden | Cohort; Clinic | FAS: 25 | RSA 1989 | Cataract, Phthisis, Esotropia, Exotropia, Exophoria, Strabismus, Visual acuity, Nystagmus, Epicanthus, PFL, Microphthalmos, Coloboma, Microcornea, Persistent hyperplasic primary vitreous, Optic nerve hypoplasia, Retinal tortuosity, Buphthalmus, Refraction |
| *\*Hellström 1997b, Sweden* | Case control; Clinic | FASD3: 16  Control (healthy): 16 | RSA 1989 | Visual acuity, Blepharoptosis, Optic disc area, Tortuosity index, Vascular abnormalities, Refraction |
| *Hellström 1997a, Sweden* | Case control; Clinic | FASD3: 16  Control 1 (healthy; no hx of ocular disorders or malformations; reference data): 92  Control 2 (healthy; non-surgical with axial length measures; also included within Control 1): 11 | RSA 1989 | Phthisis, Visual acuity, Microphthalmos, Buphthalmus, Refraction |
| Egeland 1998, USA (Alaska) | Cohort; clinic | FAS: 145 | 1) FAS suspected/diagnosed by physician; 2) PAE/maternal history of alcohol abuse; 3) FAS facial features; 4) Growth deficiency; & 5) CNS impairment | Strabismus, PFL |
| *\*Hellström 1999, Sweden* | Case control; Clinic | FAS: 16  Control (healthy; ref data): 100 | RSA 1989 | Visual acuity, Vascular abnormalities, Retinal tortuosity, Refraction |
| Steinhausen 2003, Germany | Case control (but only FASD group eye data presented); Clinic (FASD), General historic (Control) | FASD: 38 (Mild FAS/FAE: 26; Mod-to-severe FAS: 12)  Control: 15 | RSA 1989 | Strabismus, Blepharophimosis |
| \*Kvigne 2004, USA (Northern Plains American Indian children) | Case control; Clinic | FAS: 43  Control: 86 | CDC 1994 | Ptosis, Epicanthus, PFL, Microphthalmos |
| Carter 2005, South Africa | Cohort (but eye measure presented for FAS and Non-FAS); General | FAS: 22  Non-FAS: 107 | 1) 3 FAS facial features; 2) growth retardation; 3) CNS dysfunction | Resolution acuity |
| Viljoen 2005, South Africa | Case control; General | FAS: 64  Control: 146 | IOM 2005 | Strabismus, Ptosis, Epicanthus, PFL |
| May 2007 (Different wave of Viljoen 2005 study), South Africa | Case control; General | FAS: 55  PFAS: 18  Control: 145 | IOM 2005 | Strabismus, Ptosis, Epicanthus, PFL |
| Elgen 2007, Norway | Cohort; Clinic | FAS: 25  FASD (not meeting all 3 FAS criteria): 22 | CDC 2004 | Myopia, Hypoplastic optic discs |
| Ervalahti 2007, Finland | Cohort; Clinic | FASD: 48 (FAS: 30; PFAS: 13; ARND: 5; ARBD: 0) | IOM 2005 | Strabismus, Ptosis, Epicanthus, PFL |
| Moore 2007, Multi-site (Cape Town, South Africa; Helsinki, Finland; Buffalo, New York; and San Diego, California) | Case control; population type: unclear – recruited as part of CISFASD or for participation in another study | FAS2: NAC: 19; AA: 11; FC: 45; CC: 49  Control (no FAS, but any alcohol exposure NR): NAC: 31; AA: 13; FC: 54; CC: 54 | IOM 1996 | PFL, Inner-canthal width, Outer-canthal width |
| Ribeiro 2007, Portugal | Cohort with 1 case-control measure; Clinic | FAS: 32  Control (healthy, referred to clinic but cleared of ophthalmologic issues): 25 | RSA 1989 | Cataract, Choroidopathy, Esotropia, Exophoria, Strabismus, Hypermetropia, Myopia, Astigmatism, Anisometropia, Visual acuity, Nystagmus, Blepharoptosis, Blepharophimosis, Epicanthus, Telecanthus, PFL, Microphthalmos, Anterior segment abnormalities, Double ring sign, Small optic discs, Optic disc or nerve head hypoplasia, Retinal tortuosity, Other severe ocular abnormality, Corneal opacities, Peters anomaly, Posterior embryotoxon, Axenfeld-Rieger syndrome, Shallow anterior chamber, DM/DD ratio, Persistent hyaloids, Macular ectopia, Intermittent exotropia with strabismus, Refraction |
| Elliott 2008, Australia | Cohort; Clinic | FASD: 92 (FAS: 25; PFAS: 65; suspected FAS: 2) | IOM 1996 | Refractory error, Visual impairment, Nystagmus, PFL |
| Andersson Grönlund 2010, Sweden | Case control; Adoptees from Eastern Europe | FAS: 15  Control (no-FAS adoptees from Eastern Europe): 45-47 depending on measure | 4-DDC 2004 | Stereoacuity, Visual acuity, PFL, Optic disc area |
| Landgren 2010, Sweden | Cohort; Adoptees to Sweden | FAS: 21 | IOM 1996 | Strabismus, History of [unspecified] visual perception problems, Ptosis, PFL, Optic nerve hypoplasia |
| May 2011 (incl. May 2006 participants), Italy | Case control; General (1st grade students from 2 health districts) | FASD (FAS (8); PFAS (36))  Control (some with PAE but no congenital anomalies): 116 | IOM 2005 | Strabismus, Ptosis, Epicanthus, PFL, Inner-canthal distance |
| Vernescu 2012, Canada (North, rural communities) | Case control; Clinic (FAS/PFAS), general population (Control) | FASD (FAS (2), PFAS (19)): 21  Control (non-exposed, typically-developing): 21 | Canadian 2005 | Esotropia, Colour vision, Stereoacuity, Visual acuity, Small angle exotropia, Mean spherical refractive error (hyperopia), Mean cylindrical refractive error, Contrast sensitivity |
| Strömland 2015, Brazil | Cohort; Orphanage population | FASD (FAS (3), PFAS (6), ARND (6)): 15  Control (non-FASD orphans): 78 (12 with ophthalmic findings reported) | IOM 2005 | Esotropia, Exotropia, Nystagmus, Ptosis, PFL, Optic nerve hypoplasia |
| Blanck-Lubarsch 2019, Germany | Case control; Clinic | FAS: 28  Control (non-exposed): 30 | German diagnostic guideline (Landgraf 2013) | PFL |
| **PAE:** |  |  |  |  |
| Majewski 1981, Germany | Cohort; Clinic | 108 | NA; children diagnosed with alcohol embryopathy | Ptosis, Downslanting palpebral fissures, Blepharophimosis, Epicanthus |
| Flanigan 2008, Chile | Case control; NICHD study (clinic) | PAE: 43  Control (non-exposed): 55 | NA | Positive kappa angle, Hypermetropia, Myopia, Astigmatism, Amblyopia, Visual acuity, Ptosis, Lateral ectropion, Epicanthus, PFL, Microcornea, Optic nerve hypoplasia, Retinal tortuosity, Glaucoma, Lateral ectropion, Corneal opacities, Peters anomaly, Axenfeld-Rieger syndrome, Shallow anterior chamber, Tilted optic disc, Persistent hyaloids, Refraction |
| Biyik 2019, The Netherlands | Cohort; General | Stopped drinking: 98  Ongoing drinking: 379  No PAE: 307 | NA | Mean choroidal thickness |
| **FASD or PAE (without FASD):** | | | | |
| \*Astley 2010, USA | Case control; patients of FASD diagnostic clinics | FASD: 1,270 (FAS/PFAS: 1,270; SE/AE: 394; ND/AE: 722)  PAE (normal CNS): 130 | 4-DDC 2004 | Vision problems, PFL |
| Suttie 2013, South Africa | Case control, General (antenatal clinics, siblings, a school) | FAS: 22  PFAS: 26  HE: 75  Control: 69 | IOM 2005 | PFL |

1N reported reflects the number of participants for whom eye data was reported, if different to the total number within a study (and if reported). Groups without eye data are not reported; 2FASD and control groups divided into North American Caucasian (NAC), African American (AA), Finish Caucasian (FC), and Cape Coloured (CC)—children of fixed ancestry; 3FASD groups consist of the same children in both papers, but were both included because each paper reported on different eye variables and had different comparison groups; \* = age range extended beyond 18y

*Italicised* papers appear to have overlapping participants and the same recruitment process, although different Control and/or FAS participants and measures were used so are reported in separate rows as appropriate.

4-DDC = University of Washington’s 4-Digit Diagnostic Code (Astley & Clarren 2004); ARBD = alcohol-related birth defects; ARND = alcohol-related neurodevelopmental disorder; CDC = Centers for Disease Control; CIFASD = Collaborative Initiative on Fetal Alcohol Spectrum Disorders; CNS = central nervous system; DM/DD = distance from the disc centre to the fovea: disc diameter; ENT = ears, nose, throat clinic; FAE = fetal alcohol effects; FAS = Fetal alcohol syndrome; FASD = Fetal alcohol spectrum disorder; HE = non-syndromal heavily exposed to alcohol; hx = history; IGR = Intrauterine growth retardation of unknown etiology; IOM = Institute of Medicine; NA = not applicable; ND/AE = neurodevelopmental disorder/alcohol-exposed; NICHD = National Institute of Child Health and Human Development, National Institutes of Health- University of Chile Alcohol in Pregnancy Study; NR = Not reported; ; PAE = Prenatal alcohol exposure; PFAS = partial fetal alcohol syndrome; PFL = palpebral fissure length; ref = reference; RSA = Research Society of Alcoholism; SE/AE = static encephalopathy/alcohol-exposed.