

Table 1. Social Communication Questionnaire (SCQ) scores at 11 years.

SCQ Scores*	n	Classmates		Extremely preterm			Mean difference (95% CI)	Mean difference adjusted for IQ** (95% CI)
		Mean (SD)	Median (IQR)	n	Mean (SD)	Median (IQR)		
Total SCQ score	137	3.2 (3.4)	2 (1 to 4)	183	7.8 (7.4)	6 (2 to 11)	4.6 (3.4 to 5.8)	1.9 (0.6 to 3.1)
Social interaction	138	1.0 (1.5)	0 (0 to 1)	185	2.8 (3.4)	1 (0 to 4)	1.8 (1.3 to 2.4)	0.7 (0.1 to 1.3)
Communication	139	1.7 (1.7)	1 (0 to 3)	186	3.4 (2.7)	3 (1 to 5)	1.7 (1.2 to 2.2)	0.8 (0.3 to 1.3)
Repetitive behaviour	139	0.4 (0.9)	0 (0 to 0)	186	1.3 (1.9)	0 (0 to 2)	0.9 (0.6 to 1.2)	0.3 (-0.0 to 0.6)

*Total SCQ scores range 0-39; Social interaction 0-15; Communication 0-13; Repetitive behaviour 0-8.

** Two extremely preterm children did not have IQ scores and are not included in the results for this column. IQ refers to Mental Processing Composite (MPC) scores of the Kaufman Assessment Battery for Children (K-ABC).

Table 2. Univariate associations with Total SCQ scores and autism spectrum disorder (ASD) diagnoses in extremely preterm children at 11 years.

Neonatal variables	Total SCQ scores (n=183)				ASD diagnoses (n=16)			
	(n)	Coefficient	(95% CI)	p	(n)	OR	95% CI	p
Male	(183)	3.2	(1.0 to 5.4)	0.005	(201)	3.85	(1.20 to 12.39)	0.024
Gestational age (≤ 24 weeks)	(183)	2.58	(0.3 to 4.8)	0.025	(201)	1.43	(0.52 to 4.00)	0.49
Birthweight (per 100g)	(183)	-0.5	(-1.5 to 0.5)	0.32	(201)	2.42	(0.03 to 199)	0.67
Head circumference (per cm)	(125)	-0.0	(-1.0 to 1.0)	0.99	(139)	1.25	(0.85 to 1.85)	0.25
Singleton	(183)	1.6	(-0.6 to 3.8)	0.16	(201)	0.81	(0.27 to 2.46)	0.72
White ethnic origin	(182)	-0.7	(-3.2 to 1.8)	0.57	(200)	1.53	(0.33 to 7.06)	0.59
Any antenatal steroids	(181)	-0.3	(-2.9 to 2.4)	0.83	(199)	0.99	(0.27 to 3.66)	0.99
Preterm premature rupture of membranes	(180)	-2.6	(-4.8 to -0.3)	0.025	(198)	0.63	(0.17 to 2.29)	0.48
Breech delivery	(182)	2.7	(0.1 to 5.4)	0.042	(200)	2.55	(0.90 to 7.3)	0.079
Chorioamnionitis (suspected or proven)	(180)	-2.1	(-4.5 to 0.3)	0.083	(198)	1.18	(0.36 to 3.87)	0.78
Fetal heart rate >100 bpm @ 5mins	(179)	1.6	(-2.0 to 5.1)	0.38	(197)	1.36	(0.17 to 11.0)	0.78
Temperature $<35^{\circ}\text{C}$	(174)	1.8	(-0.8 to 4.4)	0.18	(191)	1.55	(0.50 to 4.77)	0.45
CRIB score (per point)	(182)	0.2	(-0.1 to 0.5)	0.20	(200)	1.03	(0.89 to 1.19)	0.69
Transferred with 24h of birth	(182)	1.9	(-0.9 to 4.7)	0.18	(200)	1.89	(0.50 to 7.21)	0.35
Abnormal cranial ultrasound scan	(182)	3.8	(0.0 to 7.7)	0.049	(200)	2.76	(0.88 to 8.60)	0.079
Necrotising Enterocolitis	(182)	5.3	(-4.5 to 15.0)	0.29	(200)	2.24	(0.26 to 22)	0.44
Any postnatal steroids for CLD	(182)	1.5	(-0.9 to 3.8)	0.22	(200)	0.78	(0.26 to 2.35)	0.65
Postnatal steroids (per week) for CLD	(180)	0.3	(-0.1 to 0.7)	0.17	(197)	1.06	(0.93 to 1.21)	0.36
Bronchopulmonary Dysplasia (02 @ 36w)	(183)	1.0	(-1.5 to 3.4)	0.43	(201)	0.82	(0.27 to 2.46)	0.72
Any breast milk	(181)	-4.4	(-8.6 to -0.3)	0.037	(199)	0.33	(0.10 to 1.04)	0.058
Duration of NICU admission (per week)	(135)	0.3	(0.0 to 0.5)	0.027	(151)	1.07	(0.99 to 1.17)	0.098
Maternal age (per 10 years)	(181)	-0.4	(-2.5 to 1.8)	0.73	(199)	1.39	(0.55 to 3.47)	0.50
Maternal education post-16 years	(170)	0.7	(-2.4 to 3.8)	0.66	(187)	2.35	(0.79 to 7.02)	0.13
Outcome at 2.5 years								
Serious cognitive impairment \ddagger	(169)	8.6	(5.0 to 12.3)	<0.001	(183)	1.83	(0.47 to 7.11)	0.39
Functional disability	(180)	5.3	(3.1 to 7.6)	<0.001	(197)	3.58	(1.10 to 11.7)	0.034
Head circumference (per SDS)	(178)	-0.9	(-1.8 to -0.1)	0.034	(195)	0.82	(0.56 to 1.20)	0.31
Internalising behaviour problems*	(166)	6.0	(1.9 to 10.0)	0.004	(183)	2.86	(0.90 to 9.07)	0.074
Externalising behaviour problems*	(166)	6.0	(2.3 to 9.8)	0.002	(183)	2.08	(0.54 to 8.09)	0.29
Anxious/Depressed* (per category)	(166)	4.8	(1.8 to 7.8)	0.002	(183)	2.15	(0.95 to 4.88)	0.066
Somatic complaints* (per category)	(166)	1.4	(-0.5 to 3.2)	0.15	(183)	1.93	(0.98 to 3.78)	0.056

Withdrawn* (per category)	(166)	6.5	(3.8 to 9.2)	<0.001	(183)	2.09	(0.95 to 4.61)	0.066
Sleep problems* (per category)	(166)	1.5	(-0.7 to 3.8)	0.18	(183)	2.07	(0.98 to 4.37)	0.057
Aggressive behaviour* (per category)	(166)	4.5	(2.1 to 6.8)	<0.001	(183)	2.23	(1.05 to 4.76)	0.037
Total behaviour problems*	(166)	6.7	(2.1 to 5.5)	<0.001	(183)	4.19	(1.41 to 12.48)	0.010

Outcome at 6 years

Serious cognitive impairment#	(171)	6.5	(3.9 to 9.1)	<0.001	(189)	6.27	(1.94 to 20.31)	0.002
Serious functional disability	(171)	5.5	(3.0 to 7.9)	<0.001	(189)	4.75	(1.47 to 15.33)	0.009
Head circumference (per SDS)	(171)	-0.8	(-1.8 to 0.2)	0.14	(188)	0.95	(0.63 to 1.43)	0.82
Pervasive emotional problems†	(149)	2.0	(-1.2 to 5.3)	0.22	(158)	0.96	(0.20 to 4.64)	0.96
Pervasive conduct problems†	(148)	4.9	(0.1 to 9.8)	0.047	(157)	1.46	(0.30 to 7.16)	0.65
Pervasive attentional problems†	(151)	6.1	(3.1 to 9.2)	<0.001	(161)	6.08	(1.77 to 20.83)	0.004
Pervasive peer problems†	(149)	7.5	(4.1 to 10.9)	<0.001	(158)	7.95	(2.30 to 27.50)	0.001
Pervasive total behaviour problems†	(147)	6.8	(2.8 to 10.8)	0.001	(156)	4.47	(1.38 to 14.53)	0.013

CRIB: Clinical Risk Index for Babies; NICU: Neonatal Intensive Care Unit; SDS: Standard Deviation Score. CLD: Chronic Lung Disease † Bayley

Scales of Infant Development 2nd Edition, Mental Development Index score -2SD (scores <70). * Assessed with Child Behaviour Checklist

(CBCL). Regression for internalising & externalising problems is for risk of clinically significant behaviour problems. Regression for sub-scales

are for 3 categories: none, borderline, clinically significant problems defined using published cut-offs. # IQ -2SD of classmates (scores <82).

† Assessed with Strengths and Difficulties Questionnaire (SDQ). P values in bold denote significance at 0.05 level.

Table 3: Factors independently associated with Total Social Communication Questionnaire (SCQ) scores in extremely preterm children at 11 years (n=183) in stepwise multiple regression.

Variable	SCQ score	(95% CI)	p
Step 1: Neonatal (n=181) r²=19.7%			
Male	3.4	(1.3 to 5.4)	0.002
Gestational age ≤24w	3.3	(1.2 to 5.3)	0.002
Any breast milk	-4.7	(-8.6 to -0.8)	0.019
Abnormal cranial ultrasound scan	4.2	(0.7 to 7.8)	0.020
Vaginal breech delivery	3.5	(1.0 to 5.9)	0.006
Step 2: Neonatal and Outcome at 2.5 years (n=166) r²= 38.8%†			
Male	2.8	(1.0 to 4.7)	0.003
Gestational age ≤24w	2.3	(0.4 to 4.3)	0.017
Abnormal cranial ultrasound scan	2.9	(0.01 to 5.8)	0.049
Functional disability (per category)	2.1	(1.0 to 3.3)	<0.001
CBCL: Withdrawn (per point)	1.0	(0.6 to 1.3)	<0.001
Step 3: Neonatal and Outcomes at 2.5 & 6 years (n=146) r²=51.5%			
Any breast milk	-4.4	(-7.8 to -1.0)	0.012
CBCL: Withdrawn (per point)	0.9	(0.6 to 1.2)	<0.001
Cognitive impairment at 6y (per category)	1.7	(0.7 to 2.6)	0.001
SDQ: Pervasive hyperactivity/inattention	3.7	(1.6 to 5.8)	0.001
SDQ: Pervasive peer problems	3.6	(1.0 to 6.1)	0.006

Functional disability at 2.5y is for categories: none–other–severe. Cognitive impairment at 6y is for categories: none–mild–moderate–severe. CBCL Child Behaviour Checklist. SDQ Strengths and Difficulties Questionnaire. Regressions were analysed using the robust option in Stata10 to allow for heteroskedasticity and skewness. † Withdrawn behaviour scores at 2½ years alone accounted for 23.9% of the variance.

Table 4. Correlates of Autism Spectrum Disorder diagnoses in extremely preterm children (n=201) at 11 years.

Characteristics	No ASD diagnosis	ASD diagnosis	Odds Ratio	
	(n=185)	(n=16)	(95% CI)	p
	n (%)	n (%)		
Male	81 (44%)	12 (75%)	3.9 (1.2 to 12.4)	0.019
Gestation <25w	76 (41%)	8 (50%)	1.4 (0.5 to 4.0)	0.60
Serious cognitive impairment	69 (37%)	11 (69%)	3.7 (1.2 to 11.1)	0.017
Serious neuromotor impairment	17 (9%)	2 (13%)	1.4 (0.3 to 6.7)	0.65
Serious hearing impairment	2 (1%)	1 (6%)	6.1 (0.5 to 71.2)	0.22
Serious visual impairment	12 (6%)	3 (19%)	3.3 (0.8 to 13.3)	0.10
Serious functional disability*	77 (42%)	12 (75%)	4.2 (1.3 to 13.6)	0.016
Attends special school	18 (10%)	6 (38%)	5.6 (1.8 to 17.2)	0.006
Special Educational Needs (SEN) [#]	107 (59%)	16 (100%)	>11.1 (>1.8 to na)**	0.001
SEN Support	105 (58%)	16 (100%)	>11.6 (>1.9 to na)**	<0.001
Statement of SEN [§]	52 (29%)	13 (93%)	32 (4.1 to 254)	0.001
Difference in means				
	Mean (SD)	Mean (SD)	(95% CI)	p
IQ score	85 (17)	71 (18)	14.7 (5.8 to 24)	0.001
Reading standardised score	82 (20)	68 (21)	13.8 (2.9 to 25)	0.013
Maths standardised score	73 (21)	54 (15)	18.9 (10.7 to 27)	<0.001
Height (z-score)	-0.52 (1.0)	-0.62 (0.97)	0.10 (-0.39 to 0.59)	0.70
Weight (z-score)	-0.40 (1.3)	-0.42 (1.2)	0.02 (-0.59 to 0.63)	0.95
OFC (z-score)	-1.22 (1.2)	-1.44 (1.4)	0.22 (-0.47 to 0.92)	0.53

* Serious functional disability is a composite classification of the most severe impairment in any of the four functional domains in rows above. [#]SEN data were available for 197 children (No ASD n=181; ASD n=16). [§] A statement of SEN is a legal local authority document outlining a child's SEN and mandating provision. Data were available for 195 children (No ASD n=181; ASD n=14). IQ, Reading and Maths scores are standardised test scores (Mean 100; SD 15). OR are for univariate analyses. ** Cornfield approximation, upper limit of CI not defined.