Table 1: Characteristics of adverse experiences in childhood, family diversity, socio-demographics.

		Key Stage 1 cohort					Key Stage 2 cohort				
		Total		Not attained KS1		Special Education Need provided at†		Total		Not attained KS2		Special Education Need provided at†
		N=107,479		n=19,508 n (%)		n=27,393 n (%)		N=43,648		n=8,462 n (%)		n=11,910 n (%)
Adverse experiences in childhood												
Common mental disorder GP code for a household member												
before birth of child	No	91926	(85.5)	15987	(17.4)	22431	(24.4)	40602	(93.0)	7770	(19.1)	10897	(26.8)
	Yes	15553	(14.5)	3521	(22.6)	4962	(31.9)	3046	(7.0)	692	(22.7)	1013	(33.3)
birth to Key Stage	No	66222	(61.6)	10735	(16.2)	15290	(23.1)	23001	(52.7)	3898	(16.9)	5657	(24.6)
	Yes	41257	(38.4)	8773	(21.3)	12103	(29.3)	20647	(47.3)	4564	(22.1)	6253	(30.3)
Serious mental illness GP code for a household member												
before birth of child	No	107051	(99.6)	19399	(18.1)	27230	(25.4)	43568	(99.8)	8446	(19.4)	11881	(27.3)
	Yes	428	(0.4)	109	(25.5)	163	(38.1)	80	(0.2)	16	(20.0)	29	(36.3)
birth to Key Stage	No	106550	(99.1)	19247	(18.1)	27052	(25.4)	43074	(98.7)	8308	(19.3)	11703	(27.2)
	Yes	929	(0.9)	261	(28.1)	341	(36.7)	574	(1.3)	154	(26.8)	207	(36.1)
Alcohol problem GP code for a household member												
before birth of child	No	101695	(94.6)	17853	(17.6)	25225	(24.8)	42487	(97.3)	8130	(19.1)	11453	(27.0)
	Yes	5784	(5.4)	1655	(28.6)	2168	(37.5)	1161	(2.7)	332	(28.6)	457	(39.4)
Alcohol problem GP code or alcohol-related hospital admission for a household member												
birth to Key Stage	No	95255	(88.6)	16198	(17.0)	23035	(24.2)	36168	(82.9)	6379	(17.6)	9222	(25.5)
	Yes	12224	(11.4)	3310	(27.1)	4358	(35.7)	7480	(17.1)	2083	(27.8)	2688	(35.9)
Victimisation hospital admission code from birth to Key Stage	No	106407	(99.0)	19095	(17.9)	26847	(25.2)	43284	(99.2)	8316	(19.2)	11730	(27.1)
	Yes	1072	(1.0)	413	(38.5)	546	(50.9)	364	(0.8)	146	(40.1)	180	(49.5)
Household member died from 1 year to Key Stage	No	104015	(96.8)	18726	(18.0)	26312	(25.3)	42223	(96.7)	8107	(19.2)	11431	(27.1)
	Yes	3464	(3.2)	782	(22.6)	1081	(31.2)	1425	(3.3)	355	(24.9)	479	(33.6)
Free school meal in KS1 year	No	87206	(81.1)	12536	(14.4)	18730	(21.5)	36048	(82.6)	5673	(15.7)	8506	(23.6)
	Yes	20273	(18.9)	6972	(34.4)	8663	(42.7)	7600	(17.4)	2789	(36.7)	3404	(44.8)
Free school meal in KS2 year	No	-	-	-	-	-	-	35908	(82.3)	5608	(15.6)	8499	(23.7)
	Yes	-	-	-	-	-	-	7740	(17.7)	2854	(36.9)	3411	(44.1)
Family characteristics												
Ever in a single parent household from birth to 5 or 8 years	No	71828	(66.8)	11878	(16.5)	16929	(23.6)	26664	(61.1)	4591	(17.2)	6643	(24.9)
	Yes	35651	(33.2)	7630	(21.4)	10464	(29.4)	16984	(38.9)	3871	(22.8)	5267	(31.0)

†Any code of school action, school action plus or statemented.

Table 1: Characteristics of household adverse experiences, social disadvantage, socio-demographics (cont).

		Key Stage 1 cohort						Key Stage 2 cohort					
		Total		**Not attained KS1**		**Special Education Need provided at KS1†**		**Total**		**Not attained KS2**		**Special Education Need provided at KS2†**	
		N=107,479		n=19,508 n (%)		n=27,393 n (%)		N=43,648		n=8,462 n (%)		n=11,910 n (%)	
Maternal age at childbirth	<18	3313	(3.1)	1001	(30.2)	1289	(24.1)	1461	(3.3)	431	(29.5)	569	(38.9)
	18-24	30226	(28.1)	7150	(23.7)	9683	(20.3)	11976	(27.4)	2972	(24.8)	3964	(33.1)
	25-29 years old	29782	(27.7)	5014	(16.8)	7169	(22.1)	13017	(29.8)	2397	(18.4)	3378	(26.0)
	30-34	29095	(27.1)	4032	(13.9)	5910	(38.9)	11691	(26.8)	1767	(15.1)	2665	(22.8)
	35+	14998	(14.0)	2289	(15.3)	3318	(32.0)	5470	(12.5)	881	(16.1)	1321	(24.1)
	Missing data	65	(0.1)	22	(33.8)	24	(36.9)	33	(0.1)	14	(42.4)	13	(39.4)
Maternal cigarette smoking at booking in	No	24634	(22.9)	3646	(14.8)	5625	(22.8)	6375	(14.6)	991	(15.5)	1555	(24.4)
	Yes	8163	(7.6)	2203	(27.0)	3004	(36.8)	2366	(5.4)	627	(26.5)	904	(38.2)
	Missing data	74682	(69.5)	13659	(18.3)	18764	(25.1)	34907	(80.0)	6844	(19.6)	9451	(27.1)
Parity	No	46311	(43.1)	7150	(15.4)	10347	(22.3)	18660	(42.8)	3164	(17.0)	4560	(24.4)
	Yes	60935	(56.7)	12318	(20.2)	16972	(27.9)	24920	(57.1)	5287	(21.2)	7331	(29.4)
	Missing data	233	(0.2)	40	(17.2)	74	(31.8)	68	(0.2)	11	(16.2)	19	(27.9)
Area level measure of social deprivation													
Townsend deprivation quintile at birth or first 4 months	1 - least deprived	18383	(17.1)	1869	(10.2)	3027	(16.5)	7180	(16.4)	811	(11.3)	1257	(17.5)
	2	19475	(18.1)	2723	(14.0)	3983	(20.5)	7912	(18.1)	1233	(15.6)	1908	(24.1)
	3	21090	(19.6)	3681	(17.5)	5217	(24.7)	8582	(19.7)	1549	(18.0)	2319	(27.0)
	4	22126	(20.6)	4418	(20.0)	6246	(28.2)	8932	(20.5)	1922	(21.5)	2665	(29.8)
	5 - Most deprived	26078	(24.3)	6762	(25.9)	8851	(33.9)	10820	(24.8)	2900	(26.8)	3705	(34.2)
	Missing data	327	(0.3)	55	(16.8)	69	(21.1)	222	(0.5)	47	(21.2)	56	(25.2)

†Any code of school action, school action plus or statemented.

Table 1: Characteristics of birth (cont).

		Key Stage 1 cohort						Key Stage 2 cohort					
		Total		**Not attained KS1**		**Special Education Need provided at KS1†**		**Total**		**Not attained KS2**		**Special Education Need provided at KS2†**	
				n=19,508		n=27,393				n=8,462		n=11,910	
		N=107,479		n	(%)	n	(%)	N=43,648		n	(%)	n	(%)
Birth characteristics													
Sex	Male	55234	(51.4)	12423	(22.5)	17815	(32.3)	22249	(51.0)	5199	(23.4)	7615	(34.2)
	Female	52245	(48.6)	7085	(13.6)	9578	(18.3)	21399	(49.0)	3263	(15.2)	4295	(20.1)
Gestational age at birth	24 - < 28 weeks: extremely preterm	263	(0.2)	117	(44.5)	152	(57.8)	104	(0.2)	49	(47.1)	56	(53.8)
	28 - < 33 weeks: v preterm	1379	(1.3)	407	(29.5)	561	(40.7)	549	(1.3)	163	(29.7)	226	(41.2)
	33 - < 37 weeks: moderately preterm	6060	(5.6)	1393	(23.0)	1907	(31.5)	2370	(5.4)	555	(23.4)	769	(32.4)
	37+ weeks: term	93817	(87.3)	16403	(17.5)	23225	(24.8)	37832	(86.7)	7132	(18.9)	10107	(26.7)
	Missing data	5960	(5.5)	1188	(19.9)	1548	(26.0)	2793	(6.4)	563	(20.2)	752	(26.9)
Small for gestational age	No	91145	(84.8)	15706	(17.2)	22467	(24.6)	36646	(84.0)	6799	(18.6)	9643	(26.3)
	Yes	9836	(9.2)	2491	(25.3)	3206	(32.6)	3960	(9.1)	1053	(26.6)	1436	(36.3)
	Missing data	6498	(6.0)	1311	(20.2)	1720	(26.5)	3042	(7.0)	610	(20.1)	831	(27.3)
Breastfeeding at birth or 6-8 weeks	No	40191	(37.4)	9043	(22.5)	12295	(30.6)	13064	(29.9)	3111	(23.8)	4083	(31.3)
	Yes	43664	(40.6)	6136	(14.1)	9177	(21.0)	12173	(27.9)	1841	(15.1)	2835	(23.3)
	Missing data	23624	(22.0)	4329	(18.3)	5921	(25.1)	18411	(42.2)	3510	(19.1)	4992	(27.1)
Congenital anomalies	None	102339	(95.2)	18087	(17.7)	25406	(24.8)	41514	(95.1)	7861	(18.9)	11056	(26.6)
	Major/minor	5140	(4.8)	1421	(27.7)	1987	(38.7)	2134	(4.9)	601	(28.2)	854	(40.9)
Academic season of birth	Sept-Dec	33044	(30.7)	4379	(13.3)	6837	(20.7)	11659	(26.7)	1730	(14.8)	2833	(24.3)
	Jan-April	36522	(34.0)	6485	(17.8)	9050	(24.8)	15953	(36.5)	3108	(19.5)	4331	(27.1)
	May-August	37913	(35.3)	8644	(22.8)	11506	(30.3)	16036	(36.7)	3624	(22.6)	4746	(29.6)

†Any code of school action, school action plus or statemented.

Table 1: Characteristics at school (cont).

		Key Stage 1 cohort						Key Stage 2 cohort					
		Total		Not attained KS1 n=19,508		Special Education Need provided at n=27,393		Total		Not attained KS2 n=8,462		Special Education Need provided at n=11,910	
		N=107,479		n	(%)	n	(%)	N=43,648		n	(%)	n	(%)
School factors													
School moves start school to Key Stage 1	0	101580	(94.5)	17743	(17.5)	25383	(25.0)	41532	(95.2)	7812	(18.8)	11095	(26.7)
	1+	5899	(5.5)	1765	(29.9)	2010	(34.1)	2116	(4.8)	650	(30.7)	815	(38.5)
School moves from KS1 to KS2	0	-	-	-	-	-	-	31554	(72.3)	5447	(17.3)	8144	(25.8)
	1	-	-	-	-	-	-	8883	(20.4)	2203	(24.8)	2776	(31.3)
	2	-	-	-	-	-	-	3003	(6.9)	732	(24.4)	905	(30.1)
	3+	-	-	-	-	-	-	208	(0.5)	80	(38.5)	85	(40.9)
School average size at Key Stage^	> 0 - 100 pupils	10150	(9.4)	2076	(20.5)	2425	(23.9)	3967	(9.1)	793	(20.0)	1222	(30.8)
	> 100 - 150 pupils	12175	(11.3)	2679	(22.0)	3589	(29.5)	4584	(10.5)	1039	(22.7)	1453	(31.7)
	>150 - 200 pupils	18875	(17.6)	3632	(19.2)	4975	(26.4)	7310	(16.7)	1526	(20.9)	2120	(29.0)
	> 200 - 300 pupils	32621	(30.4)	5816	(17.8)	8674	(26.6)	12956	(29.7)	2561	(19.8)	3502	(27.0)
	> 300 pupils	33658	(31.3)	5305	(15.8)	7730	(23.0)	14831	(34.0)	2543	(17.1)	3613	(24.4)
School mean percent of children eligible for free school meal at Key Stage^	<=5%	16316	(15.2)	1630	(10.0)	2531	(15.5)	5808	(13.3)	649	(11.2)	1109	(19.1)
	>5-10	21668	(20.2)	2752	(12.7)	4110	(19.0)	7860	(18.0)	1106	(14.1)	1714	(21.8)
	>10-15	19312	(18.0)	3163	(16.4)	4277	(22.1)	6960	(15.9)	1182	(17.0)	1731	(24.9)
	>15-20	15647	(14.6)	***	(18.1)	4165	(26.6)	6427	(14.7)	1161	(18.1)	1698	(26.4)
	>20-30	18799	(17.5)	4117	(21.9)	6018	(32.0)	8409	(19.3)	1828	(21.7)	2501	(29.7)
	>30	15728	(14.6)	5013	(31.9)	6287	(40.0)	8183	(18.7)	2535	(31.0)	3156	(38.6)
	Missing data	9	(0.01)	<5	(33.3)	5	(55.6)	-	-	-	-	-	-
Year take Key Stage	2005	8174	(7.6)	1702	(20.8)	2110	(25.8)	-	-	-	-	-	-
	2006	12475	(11.6)	2351	(18.9)	3019	(24.2)	-	-	-	-	-	-
	2007	12841	(12.0)	2439	(19.0)	3248	(25.3)	-	-	-	-	-	-
	2008	13742	(12.8)	2558	(18.6)	3645	(26.5)	-	-	-	-	-	-
	2009	14236	(13.3)	2518	(17.7)	3662	(25.7)	7641	(17.5)	1806	(23.6)	2068	(27.1)
	2010	14666	(13.7)	2552	(17.4)	3705	(25.3)	11523	(26.4)	2377	(20.6)	3075	(26.7)
	2011	14980	(14.0)	2376	(15.9)	3750	(25.0)	11827	(27.1)	2235	(18.9)	3211	(27.2)
	2012	16365	(15.2)	3012	(18.4)	4254	(26.0)	12657	(29.0)	2044	(16.2)	3556	(28.1)

†Any of school action, school action plus, statemented; ^For years take Key Stage in cohorts; ***raw count not shown for to prevent identifiability for category with less than 5 counts.

Table 2: Multilevel logistic regressions of adverse experiences in childhood and education performance at age 6-7 years in Key Stage 1 attainment, and Special Educational Need provision.

		Key Stage 1 cohort (N=107,479)										
		Not attained KS1						Special Education Need provided KS1†					
		Univariable OR (95% CI)			Multivariable OR (95% CI)*			Univariable OR (95% CI)			Multivariable OR (95% CI)*		
Adverse experiences in the household													
Common mental disorder GP code for a household member before birth of child	No	1.00			1.00			1.00			1.00		
	Yes	1.35	1.29	1.41	1.08	1.03	1.14	1.40	1.35	1.45	1.11	1.06	1.16
Common mental disorder GP code for a household member from birth to Key Stage	No	1.00			1.00			1.00			1.00		
	Yes	1.32	1.28	1.37	1.13	1.09	1.17	1.32	1.28	1.36	1.14	1.10	1.18
Serious mental illness GP code for a household member before birth of child	No	1.00			1.00			1.00			1.00		
	Yes	1.41	1.13	1.77	0.92	0.72	1.18	1.74	1.42	2.13	1.15	0.92	1.44
Serious mental illness GP code for a household member from birth to Key Stage	No	1.00			1.00			1.00			1.00		
	Yes	1.66	1.42	1.93	1.21	1.02	1.42	1.62	1.41	1.86	1.20	1.03	1.40
Alcohol problem GP code for a household member before birth of child	No	1.00			1.00			1.00			1.00		
	Yes	1.70	1.60	1.81	1.17	1.09	1.25	1.67	1.58	1.77	1.14	1.07	1.22
Alcohol problem GP code or alcohol-related hospital admission for a household member from birth to Key Stage	No	1.00			1.00			1.00			1.00		
	Yes	1.63	1.56	1.71	1.16	1.10	1.22	1.57	1.51	1.64	1.18	1.12	1.23
Victimisation hospital admission code from birth to Key Stage	No	1.00			1.00			1.00			1.00		
	Yes	2.49	2.18	2.84	1.58	1.37	1.82	2.78	2.45	3.16	1.90	1.66	2.17
Household member died from 1 year to Key Stage	No	1.00			1.00			1.00			1.00		
	Yes	1.27	1.17	1.39	1.14	1.04	1.25	1.32	1.23	1.43	1.21	1.11	1.31
Free school meal in year when take KS1	No	1.00			1.00			1.00			1.00		
	Yes	2.70	2.60	2.81	1.92	1.84	2.01	2.41	2.32	2.49	1.77	1.70	1.84
Family characteristics													
Ever in a single parent household from birth to 5 or 8 years	No	1.00			1.00			1.00			1.00		
	Yes	1.26	1.22	1.31	1.05	1.01	1.09	1.25	1.21	1.29	1.07	1.04	1.11
Maternal age at childbirth	<18	1.84	1.69	2.00	1.56	1.42	1.72	1.72	1.59	1.86	1.52	1.39	1.66
	18-24	1.40	1.34	1.46	1.23	1.18	1.29	1.36	1.31	1.42	1.22	1.18	1.28
	25-29 years old	1.00			1.00			1.00			1.00		
	30-34	0.84	0.80	0.88	0.90	0.86	0.95	0.84	0.81	0.88	0.88	0.85	0.92
	35+	0.95	0.90	1.00	1.00	0.95	1.06	0.96	0.92	1.01	0.99	0.94	1.04
Maternal cigarette smoking at booking in	No	1.00			1.00			1.00			1.00		
	Yes	1.93	1.79	2.08	1.34	1.22	1.47	1.65	1.57	1.74	1.19	1.11	1.28
Parity	No	1.00			1.00			1.00			1.00		
	Yes	1.35	1.31	1.40	1.47	1.41	1.53	1.32	1.28	1.36	1.44	1.40	1.49

*adjusted for variables in the table significant in univariable regression at the 5% level and confounders visualised in DAGs, sex, gestational age at birth, small for gestational age (<10th centile), parity, congenital anomalies, academic season of birth, school moves from start school to KS1, school

average size at Key Stage, school mean percent of children eligible for free school meals at Key Stage, Year take Key Stage; OR=odds ratio;
†Any of school action (SA), SA plus, statemented.

Table 2: Multilevel logistic regressions of adverse experiences in childhood and education performance at age 6-7 years in Key Stage 1 attainment, and Special Educational Need provision (cont).

		Key Stage 1 cohort (N=107,479)											
		Not attained KS1						Special Education Need provided KS1†					
		Univariable OR (95% CI)			Multivariable OR (95% CI)*			Univariable OR (95% CI)			Multivariable OR (95% CI)*		
Area/School measures of social deprivation													
Townsend deprivation quintile at birth or first 4 months	1 - least deprived	1.00			1.00			1.00			1.00		
	2	1.28	1.19	1.37	1.13	1.05	1.21	1.21	1.14	1.28	1.10	1.04	1.17
	3	1.56	1.46	1.66	1.22	1.14	1.31	1.46	1.38	1.54	1.20	1.13	1.27
	4	1.84	1.72	1.96	1.32	1.23	1.41	1.72	1.63	1.82	1.31	1.23	1.39
	5 - Most deprived	2.37	2.23	2.53	1.43	1.33	1.53	2.11	1.99	2.22	1.35	1.27	1.43
School mean concentration of children eligible for fresh school meanls at KS1	≤5%	1.00			1.00			1.00			1.00		
	>5-10	1.21	1.10	1.35	1.10	0.99	1.23	1.32	1.20	1.45	1.16	1.05	1.29
	>10-15	1.63	1.48	1.81	1.30	1.17	1.45	1.62	1.48	1.79	1.28	1.15	1.42
	>15-20	1.89	1.70	2.10	1.33	1.19	1.48	1.97	1.79	2.18	1.40	1.26	1.56
	>20-30	2.27	2.05	2.51	1.40	1.26	1.55	2.65	2.42	2.90	1.71	1.54	1.89
	>30	4.09	3.71	4.51	1.93	1.73	2.15	4.11	3.75	4.51	2.09	1.88	2.32

*adjusted for variables in the table significant in univariable regression at the 5% level and confounders visualised in DAGs, sex, gestational age at birth, small for gestational age (<10th centile), parity, congenital anomalies, academic season of birth, school moves from start school to KS1, school average size at Key Stage, Year take Key Stage; OR=odds ratio;
†Any of school action (SA), SA plus,statemented.

Table 3: Multilevel logistic regression of adverse experiences in childhood and education performance at age 10-11 years in Key Stage 2 attainment, and Special Educational Need provision.

		Key Stage 2 cohort (N=43,648)										
		Not attained KS2						Special Education Need provided KS2†					
		Univariable OR (95% CI)			Multivariable OR (95% CI)*			Univariable OR (95% CI)			Multivariable OR (95% CI)*		
Adverse experiences in the household													
Common mental disorder GP code for a household member before birth of child	No	1.00			1.00			1.00			1.00		
	Yes	1.19	1.09	1.31	0.99	0.89	1.09	1.33	1.23	1.45	1.02	0.94	1.12
Common mental disorder GP code for a household member from birth to Key Stage	No	1.00			1.00			1.00			1.00		
	Yes	1.34	1.27	1.41	1.13	1.07	1.19	1.29	1.23	1.35	1.11	1.06	1.16
Serious mental illness GP code for a household member before birth of child	No	1.00			1.00			1.00			1.00		
	Yes	1.02	0.58	1.81	0.79	0.43	1.45	1.51	0.94	2.43	1.06	0.63	1.76
Serious mental illness GP code for a household member from birth to Key Stage	No	1.00			1.00			1.00			1.00		
	Yes	1.36	1.12	1.66	0.97	0.79	1.19	1.39	1.16	1.67	1.05	0.87	1.27
Alcohol problem GP code for a household member before birth of child	No	1.00			1.00			1.00			1.00		
	Yes	1.54	1.34	1.77	1.13	0.97	1.31	1.65	1.46	1.88	1.13	0.98	1.29
Alcohol problem GP code or alcohol-related hospital admission for a household member from birth to Key Stage	No	1.00			1.00			1.00			1.00		
	Yes	1.65	1.55	1.75	1.16	1.09	1.24	1.52	1.44	1.61	1.11	1.05	1.19
Victimisation hospital admission code from birth to Key Stage	No	1.00			1.00			1.00			1.00		
	Yes	2.79	2.29	3.41	1.88	1.52	2.33	2.39	1.92	2.97	1.79	1.46	2.20
Household member died from 1 year to Key Stage	No	1.00			1.00			1.00			1.00		
	Yes	1.32	1.20	1.45	1.13	1.03	1.25	1.30	1.15	1.46	1.13	1.03	1.24
Free school meal in year when take KS1	No	1.00			1.00			1.00			1.00		
	Yes	2.78	2.62	2.95	1.51	1.40	1.63	2.41	2.28	2.55	1.50	1.40	1.62
Free school meal in year when take KS2	No	1.00			1.00			1.00			1.00		
	Yes	2.82	2.66	2.99	1.65	1.53	1.78	2.33	2.20	2.46	1.40	1.30	1.51
Family characteristics													
Ever in a single parent household from birth to 5 or 8 years	No	1.00			1.00			1.00			1.00		
	Yes	1.32	1.26	1.39	1.04	0.99	1.10	1.26	1.20	1.32	1.05	1.00	1.11
Maternal age at childbirth	<18	1.62	1.43	1.84	1.30	1.13	1.49	1.64	1.46	1.85	1.42	1.24	1.61
	18-24	1.36	1.27	1.45	1.18	1.10	1.26	1.34	1.26	1.42	1.20	1.12	1.27
	25-29 years	1.00			1.00			1.00			1.00		
	30-34	0.83	0.77	0.89	0.90	0.83	0.97	0.88	0.83	0.94	0.93	0.87	0.99
	35+	0.89	0.82	0.98	0.95	0.86	1.04	0.95	0.88	1.02	0.96	0.89	1.05
Maternal cigarette smoking at booking in	No	1.00			1.00			1.00			1.00		
	Yes	1.73	1.62	1.85	1.18	1.09	1.28	1.81	1.63	2.01	1.32	1.13	1.55
Parity	No	1.00			1.00			1.00			1.00		
	Yes	1.29	1.23	1.36	1.37	1.29	1.46	1.26	1.21	1.32	1.36	1.29	1.43

Table 3: Multilevel logistic regression of adverse experiences in childhood and education performance at age 10-11 years in Key Stage 2 attainment, and Special Educational Need provision (cont).

		Key Stage 2 cohort (N=43,648)											
		Not attained KS2						Special Education Need provided KS2†					
		Univariable OR (95% CI)			Multivariable OR (95% CI)*			Univariable OR (95% CI)			Multivariable OR (95% CI)*		
Area/School measures of social deprivation													
Townsend deprivation quintile at birth or first 4 months	1 - least deprived	1.00			1.00			1.00			1.00		
	2	1.38	1.24	1.53	1.23	1.11	1.37	1.35	1.23	1.47	1.22	1.11	1.34
	3	1.55	1.40	1.72	1.23	1.11	1.37	1.50	1.37	1.63	1.25	1.14	1.37
	4	1.93	1.75	2.13	1.38	1.25	1.54	1.74	1.60	1.90	1.34	1.22	1.46
	5 - Most deprived	2.40	2.18	2.65	1.45	1.31	1.61	2.03	1.86	2.21	1.35	1.23	1.48
School mean concentration of children eligible for	≤5%	1.00			1.00			1.00			1.00		
	>5-10	1.24	1.06	1.45	1.11	0.94	1.30	1.10	0.96	1.27	1.06	0.91	1.22
	>10-15	1.58	1.35	1.84	1.21	1.03	1.42	1.32	1.14	1.53	1.11	0.96	1.30
	>15-20	1.69	1.44	1.99	1.18	1.00	1.39	1.46	1.26	1.70	1.13	0.97	1.33
	>20-30	2.20	1.90	2.56	1.26	1.07	1.48	1.74	1.52	2.00	1.15	0.99	1.34
	>30	3.89	3.36	4.49	1.69	1.44	1.98	2.79	2.43	3.19	1.44	1.24	1.68

Table 4: Likelihood of poor school performance associated with combinations of exposures and soci-demographic characteristics (based on linear combinations of adjusted model in Tables 2).

Reference category: Least deprived quintile of area-level deprivation, not eligible for free school meals in year preceding KS1 assessment (proxy start date 1st May), never exposed to child adversity measured, maternal age at childbirth between 25-29 years old, ≤5% mean of number of children eligible for free school meals in school when take the Key Stage 1 assessment.	Not attained KS1 at age 6-7 years		Received SEN provision at age 6-7 years	
	OR[a]	(95% CI)	OR[a]	(95% CI)
Household member with common mental disorder[b] AND household member with alcohol problems[b]	1.31	(1.23-1.39)	1.34	(1.27-1.41)
Most deprived quintile at birth/first 4 months AND eligible for free school meals in year preceding KS1 assessment AND household member with common mental disorder[b] AND household member with alcohol problems[b]	3.59	(3.25-3.96)	3.20	(2.94-3.49)
Most deprived quintile at birth/first 4 months AND eligible for free school meals in year preceding KS1 assessment AND household member with common mental disorder[b] AND household member with alcohol problems[b] AND victimisation	5.67	(4.80-6.71)	6.08	(5.19-7.12)

a=Odds ratio; b=between child's birth and age 6-7 years (KS1); KS1=Key Stage 1; SEN=Special Educational Need provision.

Appendix: Supplementary tables

Supplementary Table 1: WECC Data sources

Data source	Description
Public Health Birth files from the Office for National Statistics (ONSB) - from 2003	Data on all births in Wales or to mothers who are usually resident in Wales
Public Health Mortality Files from the Office for National Statistics (ONSM) - from 2002	Data on all deaths in Wales or of individuals who are usually resident in Wales
Welsh Demographic Service (previously the National Health Service Administrative Register) – electronic data from 1990	Data from contact with any national health services, demographic details include name, address, date of birth, general practice and NHS number (the maintained list is used to create the Anonymised Linking Field (ALF) and the Residential Anonymised Linking Field (RALF))
National Community Child Health Database (NCCHD) - from 1987	A national database of all children resident in Wales or born in a Welsh hospital, containing data collected at birth such as parity, mode of delivery, gestation, birth weight, gender, breastfeeding, and Apgar Score
Patient Episode Dataset for Wales (PEDW) - from 1998	Demographic and clinical data on all inpatient and day-case admissions in National Health Service Wales hospitals and all Welsh residents treated in other UK countries
Welsh Longitudinal General Practice database (WLGP)	Data on all contacts with a General practice recording symptoms, diagnoses, prescriptions and procedures; includes nurse appointments and hospital referral letters
Congenital Anomaly Register and Information Service (CARIS) -from 1998	A population-based register of any foetus or infant who has a congenital anomaly whose mother is usually resident in Wales at the time of birth; congenital anomalies are defined by the European network of population-based registries for the epidemiologic surveillance of congenital anomalies
Pupil Annual School Census (PLASC) – from 2004	Pupil and school level demographic data provided by all maintained sector (local education authority schools) on primary, middle, secondary, nursery and special schools in January each year (additional demographics recorded in May during statutory assessment years (Key Stages))
National Pupil Database (NPD) – from 2004	Pupil's attainment data relating to both statutory key stage assessments and external examinations such as GCSEs; data is linked to PLASC

Supplementary table 2: Social-demographic data for Wales

	Total	
	n	**(%)**
Townsend Deprivation quintile: from 2003, child's age 0 – 14 years old[a]		
1 - least deprived	-	(19.3)
2	-	(19.3)
3	-	(19.3)
4	-	(20.5)
5 - most deprived	-	(21.7)
Sex: from 2001, child's age 0 – 14 years old[b]		
Male	281767	(51.3)
Female	267437	(48.7)
Breastfeeding at birth: Welsh residents 2011[c]		
No	14469	(40.5)
Yes	18062	(50.6)
no answer	3151	(8.8)
Maternal age at childbirth: Welsh residents 2011[c]		
<16	57	(0.2)
16-19	2409	(6.8)
19-24	8115	(22.7)
25-29 years	10268	(28.8)
30-34	9107	(25.5)
35+	5722	(16.0)
no answer	4	(0.01)
Gestational age at birth: Welsh residents 2011[c]		
20-<32 weeks	443	(1.2)
32-<37 weeks	2094	(5.9)
37-43 weeks	32985	(92.4)
no answer	160	(0.4)
Birthweight: Welsh residents 2011[c]		
Low: < 2500g	2403	(6.7)
Normal: ≥ 2500 - < 4000g	28991	(81.2)
High: ≥ 4000g	4249	(11.9)
no answer	39	(0.1)

[a] Deprivation and health – report for the National Public Health Service for Wales 2004; [b] Welsh data from the UK Census 2001 at https://statswales.gov.wales/; [c] Births in Wales 2001 - 2011: Data from the National Community Child Health Database 2012.