

## Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

## eBox 1: Medline search strategy

1. exp infant, premature, diseases/ or exp gestational age/ or exp infant, low birth weight/ or exp infant, premature/ or exp premature birth/
2. exp infant/ or exp child/ or adolescent/ or young adult/
3. 1 and 2
4. exp animals/ not human/
5. 3 not 4
6. exp psychomotor performance/ or brain damage, chronic/ or brain injury, chronic/ or cerebral palsy/ or nervous system/ or central nervous system/ or neural pathways/ or neurologic manifestations/ or dyskinesias/ or dystonia/ or gait disorders, neurologic/ or neurobehavioral manifestations/ or memory disorders/ or intellectual disability/ or psychomotor disorders/ or seizures/ or neuromuscular diseases/ or muscular disorders, atrophic/ or movement disorders/ or dystonic disorders/ or brain/ab, gd, ph [abnormalities, growth & development, Physiology]
7. (((motor or psycho?motor or neur\* or mobil\* or movement\* or physical\* or brain) adj3 (develop\* or impair\* or disabilit\* or disorder? or defect\* or disease? or dysfunction\* or function\* or retard\* or sever\* or abilit\* or assessment? or skill? or performance? or limitation? or co?ordination\* or problem? or difficult\* or manifestation? or abnormalit\* or competenc\* or capacit\*)) or neuro?development\* or cerebral palsy or gait or dyspraxia).ti,ab.
8. exp auditory diseases, central/ or hearing disorders/ or hearing loss/ or deafness/ or hearing loss, sensorineural/ or refractive errors/ or vision disorders/ or blindness/ or retinopathy of prematurity/
9. (((auditory or hearing or vision or visual or sensorineural or sensory or refract\*) adj3 (impair\* or disabilit\* or disorder? or defect\* or dysfunction\* or function\* or abilit\* or assessment? or limitation? or process\* or problem? or difficult\* or abnormalit\* or capacit\*)) or deaf\* or blindness or "retinopathy of prematurity").ti,ab.
10. mental processes/ or cognition/ or executive function/ or attention/ or learning/ or memory/ or cognition disorders/ or mild cognitive impairment/ or language/ or language development/ or verbal behavior/ or language/ or mental competency/ or intelligence/ or intelligence tests/ or aptitude tests/ or language tests/ or cognition/ or executive function/
11. (((mental\* or cogniti\* or verbal\* or language or intelligen\* or learning or memory or spatial\*) adj3 (outcome? or develop\* or impair\* or disabilit\* or disorder? or defect\* or dysfunction\* or function\* or retard\* or sever\* or abilit\* or aptitude\* or quotient\* or assessment? or status or skill\* or performance? or proficien\* or limitation? or process\* or problem\* or difficult\* or manifestation\* or abnormalit\* or competenc\*)) or phonolog\* or recall\* or "executive function" or "word recognition").ti,ab.
12. neurobehavioral manifestations/ or mental disorders diagnosed in childhood/ or exp "attention deficit and disruptive behavior disorders"/ or behavior/ or child behavior disorders/ or exp child development disorders, pervasive/ or developmental disabilities/ or learning disorders/ or intellectual disability/ or motor skills disorders/ or anxiety disorders/ or depressive disorder/ or exp child behavior/ or mental disorders/ or psychological tests/ or neuropsychological tests/
13. (((behavio?\* or neurobehavio?\* or neuropsycholog\* or psycholog\* or psychiat\* or emotion\* or internali\* or externali\* or adaptive\*) adj3 (outcome? or morbidit\* or symptom? or diagnos\* or develop\* or disorder\* or defect\* or dysfunction\* or function\* or sequelae or sever\* or assessment\* or status or behavio?\* or skill\* or problem\* or difficult\* or manifestation\* or abnormalit\* or health or condit\*)) or attention deficit\* or depress\* or anxiety or autis\*).ti,ab.
14. exp education, special/ or achievement/ or educational status/
15. (((education\* or academic or read\* or writ\* or math? or mathematic?) adj3 (outcome? or abilit\* or aptitude\* or assess\* or skill\* or perform\* or proficien\* or problem? or difficult\* or achieve\* or attain\* or competenc\* or status or develop\* or level? or impact\* or progress\* or capacit\*)) or numeracy or literacy or "special educational needs" or "special needs" or "special education").ti,ab.
16. health status/ or quality of life/ or "outcome assessment (health care)"/ or child health services/ or ("heath status" or "quality of life").ti,ab.
17. child development/ or adolescent development/ or disabled persons/ or disabled children/ or hearing impaired persons/ or mentally disabled persons/ or visually impaired persons/ or morbidity/ or severity of illness index/ or survivors/
18. (development\* adj (impair\* or disabilit\* or disorder? or defect\* or retard\* or sever\* or assessment? or quotient or co?ordination\* or problem? or difficult\* or manifestation? or abnormalit\*)) .ti,ab.
19. or/6-18
20. 5 and 19
21. limit 20 to yr="1990-2014"

22. (journal article or review or meta analysis or systematic reviews or technical report).pt. or (meta?analys\* or "systematic review").ti,ab.
23. (addresses or autobiography or bibliography or biography or case reports or clinical conference or comment or congresses or dictionary or directory or editorial or festschrift or in vitro or interactive tutorial or interview or lectures or legal cases or legislation or letter or news or newspaper article or overall or patient education handout or periodical index or portraits or published erratum or "scientific integrity review" or video-audio media).pt.
24. (21 and 22) not 23

## eBox 2: Embase search strategy

1. exp prematurity/ or exp immaturity/ or exp premature labor/ or exp low birth weight/ or exp gestational age/
2. exp child/ or exp infant/ or newborn/ or child development/ or adolescent development/ or adolescent/ or adult\$.mp.
3. 1 and 2
4. exp animals/ not human/
5. 3 not 4
6. nervous system development/ or developmental coordination disorder/ or mental disease/ or neuromuscular function/ or chronic brain disease/ or cerebral palsy/ or functional disease/ or neurologic disease/ or central nervous system disease/ or physical disability/ or walking difficulty/ or motor dysfunction/ or gait disorder/ or motor retardation/ or motor performance/ or psychomotor retardation/ or psychomotor disorder/ or psychomotor development/
7. (((motor or psycho?motor or neur\* or mobil\* or movement\* or physical\* or brain) adj3 (develop\* or impair\* or disabilit\* or disorder? or defect\* or disease? or dysfunction\* or function\* or retard\* or sever\* or abilit\* or assessment? or skill? or performance? or limitation? or co?ordination\* or problem? or difficult\* or manifestation? or abnormalit\* or competenc\* or capacit\*)) or neuro?development\* or cerebral palsy or gait or dyspraxia).ti,ab.
8. hearing impairment/ or hearing disorder/ or visual disorder/ or visual impairment/ or retinopathy of prematurity/
9. (((auditory or hearing or vision or visual or sensorineural or sensory or refract\*) adj3 (impair\* or disabilit\* or disorder? or defect\* or dysfunction\* or function\* or abilit\* or assessment? or limitation? or process\* or problem? or difficult\* or abnormalit\* or capacit\*)) or deaf\* or blindness or "retinopathy of prematurity").ti,ab.
10. language/ or language development/ or language disability/ or intelligence/ or intelligence quotient/ or intelligence test/ or cognitive defect/ or learning disorder/ or mental function/ or mental deficiency/ or intellectual impairment/ or cognition/ or attention/ or executive function/ or learning/ or memory/ or mental capacity/ or mental development/
11. (((mental\* or cogniti\* or verbal\* or language or intelligen\* or learning or memory or spatial\*) adj3 (outcome? or develop\* or impair\* or disabilit\* or disorder? or defect\* or dysfunction\* or function\* or retard\* or sever\* or abilit\* or aptitude\* or quotient or assessment? or status or skill\* or performance? or proficien\* or limitation? or process\* or problem\* or difficult\* or manifestation\* or abnormalit\* or competenc\*)) or phonolog\* or recall\* or "executive function" or "word recognition").ti,ab.
12. psychiatric diagnosis/ or psychological aspect/ or psychologic test/ or psychosocial development/ or attention deficit disorder/ or child psychiatry/ or child behavior/ or behavior/ or anxiety disorder/ or autism/ or behavior disorder/ or emotional disorder/ or psychosocial environment/ or hyperactivity/
13. (((behavio?r\* or neurobehavio?r\* or neuropsycholog\* or psycholog\* or psychiat\* or emotion\* or internal\* or external\* or adaptive\*) adj3 (outcome? or morbidit\* or symptom? or diagnos\* or develop\* or disorder\* or defect\* or dysfunction\* or function\* or sequelae or sever\* or assessment\* or status or behavio?r\* or skill\* or problem\* or difficult\* or manifestation\* or abnormalit\* or health or condit\*)) or attention deficit\* or depress\* or anxiety or autis\*).ti,ab.
14. special education/ or reading/ or educational status/ or ability/ or achievement/ or academic achievement/
15. (((education\* or academic or read\* or writ\* or math? or mathematic?) adj3 (outcome? or abilit\* or aptitude\* or assess\* or skill\* or perform\* or proficien\* or problem? or difficult\* or achieve\* or attain\* or competenc\* or status or develop\* or level? or impact\* or progress\* or capacit\*)) or numeracy or literacy or "special educational needs" or "special needs" or "special education").ti,ab.
16. quality of life/ or health status/ or ("heath status" or "quality of life").ti,ab.
17. child development/ or developmental disorder/ or development/ or handicapped child/ or disability/ or disability severity/ or morbidity/ or newborn morbidity/ or perinatal morbidity/ or survivor/

18. (development\* adj (impair\* or disabilit\* or disorder? or defect\* or retard\* or sever\* or assessment? or quotient or co?ordination\* or problem? or difficult\* or manifestation? or abnormalit\*)),ti,ab.
19. or/6-18
20. 5 and 19
21. limit 20 to yr="1990-2014"
22. limit 21 to (meta analysis or "systematic review")
23. (article or report or review).pt. or (meta?analys\* or "systematic review").ti,ab.
24. (book or book series or conference abstract or conference paper or conference proceeding or "conference review" or editorial or erratum or letter or note).pt.
25. (21 and 23) not 24
26. 22 or 25

### eBox 3: Psycinfo search strategy

1. premature birth/ or low birth weight/ or gestation/ or gestational outcomes/ or low birth weight.mp. or prematur\*.mp. or preterm\*.mp. or gestation\*.mp.
2. exp animals/ not human/
3. 1 not 2
4. limit 3 to (100 childhood or 120 neonatal or 140 infancy or 160 preschool age or 180 school age or 200 adolescence or 320 young adulthood )
5. motor development/ or nervous system disorders/ or central nervous system disorders/ or dyspraxia/ or movement disorders/ or motor performance/ or motor coordination/ or motor skills/ or physical mobility/ or physically handicapped/ or gait/ or cerebral palsy/ or neurodevelopmental disorders/ or neuromuscular disorders/ or brain development/ or physical disabilities/ or neural development/
6. (((motor or psycho?motor or neur\* or mobil\* or movement\* or physical\* or brain) adj3 (develop\* or impair\* or disabilit\* or disorder? or defect\* or disease? or dysfunction\* or function\* or retard\* or sever\* or abilit\* or assessment? or skill? or performance? or limitation? or co?ordination\* or problem? or difficult\* or manifestation? or abnormalit\* or competenc\* or capacit\*)) or neuro?development\* or cerebral palsy or gait or dyspraxia).ti,ab,id.
7. sensory system disorders/ or hearing disorders/ or vision disorders/ or refraction errors/
8. (((auditory or hearing or vision or visual or sensorineural or sensory or refract\*) adj3 (impair\* or disabilit\* or disorder? or defect\* or dysfunction\* or function\* or abilit\* or assessment? or limitation? or process\* or problem? or difficult\* or abnormalit\* or capacit\*)) or deaf\* or blindness or "retinopathy of prematurity").ti,ab,id.
9. cognitive ability/ or cognitive impairment/ or cognition/ or intelligence/ or intelligence quotient/ or intellectual development disorder/ or attention/ or language/ or language delay/ or language development/ or language disorders/ or intellectual development disorder/ or memory/ or memory disorders/ or learning disabilities/ or learning disorders/ or executive function/ or spatial memory/ or "recall (learning)"/
10. (((mental\* or cogniti\* or verbal\* or language or intelligen\* or learning or memory or spatial\*) adj3 (outcome? or develop\* or impair\* or disabilit\* or disorder? or defect\* or dysfunction\* or function\* or retard\* or sever\* or abilit\* or aptitude\* or quotient or assessment? or status or skill\* or performance? or proficien\* or limitation? or process\* or problem\* or difficult\* or manifestation\* or abnormalit\* or competenc\*)) or phonolog\* or recall\* or "executive function" or "word recognition").ti,ab,id.
11. emotional development/ or emotional disturbances/ or attention deficit disorder/ or attention deficit disorder with hyperactivity/ or autism/ or anxiety/ or anxiety disorders/ or behavior disorders/ or behavior problems/ or behavior/ or depression/ or emotional development/ or psychosocial development/ or psychological development/ or externalizing problems/ or internalizing problems/ or "resilience (psychological)"/ or psychiatric symptoms/ or psychiatric disorders/ or child psychiatry/ or adaptive behavior/
12. (((behavio?r\* or neurobehavio?r\* or neuropsycholog\* or psycholog\* or psychiatr\* or emotion\* or internal\* or external\* or adaptive\*) adj3 (outcome? or morbidit\* or symptom? or diagnos\* or develop\* or disorder\* or defect\* or dysfunction\* or function\* or sequelae or sever\* or assessment\* or status or behavio?r\* or skill\* or problem\* or difficult\* or manifestation\* or abnormalit\* or health or condit\*)) or attention deficit\* or depress\* or anxiety or autis\*).ti,ab,id.

13. academic achievement/ or achievement/ or academic aptitude/ or performance/ or ability/ or special education/ or special needs/ or reading skills/ or reading ability/ or reading development/ or mathematical ability/ or verbal ability/ or verbal fluency/ or language proficiency/ or school readiness/
14. (((education\* or academic or read\* or writ\* or math? or mathematic?) adj3 (outcome? or abilit\* or aptitude\* or assess\* or skill\* or perform\* or proficien\* or problem? or difficult\* or achieve\* or attain\* or competenc\* or status or develop\* or level? or impact\* or progress\* or capacit\*)) or numeracy or literacy or "special educational needs" or "special needs" or "special education\*").ti,ab,id.
15. quality of life/ or ("heath status" or "quality of life").ti,ab,id.
16. development/ or neonatal development/ or infant development/ or early childhood development/ or childhood development/ or adolescent development/ or delayed development/ or developmental disabilities/ or morbidity/ or disorders/ or neonatal disorders/ or disabilities/ or survivors/
17. (development\* adj (impair\* or disabilit\* or disorder? or defect\* or retard\* or sever\* or assessment? or quotient or co?ordination\* or problem? or difficult\* or manifestation? or abnormalit\*)).ti,ab.
18. or/5-17
19. 4 and 18
20. limit 19 to yr="1990-2014"
21. limit 20 to (journal article or reviews)
22. (abstract collection or bibliography or chapter or "column/opinion" or "comment/reply" or dissertation or editorial or encyclopedia entry or "erratum/correction" or letter or obituary or poetry or publication information or reprint or review-book or review-media or review-software & other).dt.
23. 21 not 22

eTable 1: Risk of bias assessment using a modified version of the QUIPS tool<sup>14</sup>

RISK OF BIAS ASSESSMENT					
Potential bias (circle one)			Items considered for assessment of potential opportunity for bias	Yes response	No response
<b>Study population</b> The study sample represents the population of interest on key characteristics sufficient to limit potential bias to the results.	The source population or population of interest is adequately described for key characteristics and the study setting supports the applicability of results. Eligibility criteria and recruitment are adequately described and the inclusion/exclusion criteria applied uniformly to all screened for eligibility. There is adequate participation in the study by eligible participants, and was sufficient information given about those who did not participate. The baseline characteristics of participants included in the study sample is adequately described for key characteristics and representative of the population of interest. Cases and controls drawn from same population and participation rate similar in both groups.			Prospective cohort of all live births AND multicentre (3 or more) AND sample size alive at discharge >200 AND no major exclusions (unless focus of study is children free of major disability) AND sufficient information provided about flow of participants from recruitment to discharge.	Single centre NICU. OR sample size alive at discharge <50 OR major exclusions (unless focus of study is children free of major disability).
<b>Study attrition</b> Loss to follow-up (from sample to study population) is not associated with key characteristics (i.e. the study data adequately represent the sample), sufficient to limit potential bias.	Study design was prospective. The completeness of follow-up was sufficiently high. Attempts to collect information on participants lost to follow-up are described. Reasons on lost to follow-up are provided. Participants lost to follow-up are adequately described for key characteristics. There are no important differences between key characteristics and outcomes in participants who completed follow-up and those who did not. If the risk of bias due to study attrition was moderate or high, measures taken to address this in the analysis, e.g. multiple imputation.			Number seen at assessment: >80% (up to 5 years) or >70% (over 5 years) AND reasons lost to follow-up reported with numbers AND comparison of lost versus not lost to follow-up with no important differences if response rate <90%, OR if importance differences found addressed in the analysis.	Number seen at assessment: <65% (up to 5 years) or <50% (over 5 years). Attrition/denominators not reported.
<b>Prognostic factor measurement</b> The prognostic factors of interest are adequately measured in study participants to sufficiently limit potential bias.	Clear definitions of the prognostic factors were provided and measurements described in sufficient detail to allow replication. Prognostic factors measured prior to outcomes occurring. Continuous variables are treated appropriately and rationale provided for cut-off values if analysed as categorical. Methods of measurement were accurate, valid, consistent and reliable, e.g. blinded or objective assessment, validated scales used, not prone to recall bias. Adequate proportion of the study sample has complete data for prognostic factors. Appropriate methods were used to account for missing prognostic data in the analysis.			Data collection is prospective and risk factors recorded prior to outcome AND clear definition of risk factors provided AND clear rationale for candidate risk factors, or a very wide coverage AND method of measurement a validated scale or strict diagnostic criteria AND continuous variables left as continuous or rational provided for cut-offs AND number in final model with complete data on risk factors reported.	Definition of risk factors not clear OR use of non-validated scales OR diagnostic criteria not well-defined OR inadequate proportion of those assessed included in final model.
<b>Outcome measurement</b> The outcomes of interest are adequately measured in study participants to sufficiently limit potential bias.	Clear definitions of the outcomes of interest were provided, including duration of follow-up. Methods of measurement were accurate, valid, consistent and reliable, e.g. blinded or objective assessment, validated scales used, strict diagnostic criteria. The method and setting of measurement was the same for all participants.			Evaluated prospectively AND comprehensive well-validated test with suitable norms/reference group or strict diagnostic/standard published criteria used. AND performed by a small number of qualified study paediatricians/neurologists (or if assessed in local centres, all trained according to central protocol) AND blinded to previous medical history.	Mark down if: General or routine clinical exam with no protocol/strict diagnostic criteria with potential for misclassification Short form or brief version of a more comprehensive test Parent report or assessors not blinded Reliability across assessors questionable. NO if 2 or more of the above.
<b>Confounding measurement and account</b> Important potential confounders are appropriately accounted for, limiting potential bias with respect to the prognostic factor of interest.	Important potential confounders are accounted for in the study design (e.g. matching, stratification) or in the analysis (adjustment). All important confounders, including treatments are measured. Clear definitions of the important confounders measured are provided. Methods of measurement were accurate, valid, consistent and reliable, e.g. blinded or objective assessment, validated scales used, not prone to recall bias. The method and setting of measurement was the same for all participants. Appropriate methods were used to account for missing confounder data in the analysis.			List of candidate factors includes: 1) Gestational age or birth weight, 2) Sex, 3) Multiple pregnancy, 4) Socio-economic status or education.  Mark down if: One or more of these factors is not considered (unless multiples are excluded or very restricted GA/BW population) Population is from an RCT and trial arm is not adjusted for.	None of these factors are considered as candidate factors, or if they are considered, are eliminated without statistical testing.
<b>Analysis and reporting</b> The statistical analysis is appropriate for the design of the study, limiting potential for presentation of invalid results.	There is sufficient presentation of the data to assess the adequacy of the analysis. The strategy for model building was reported and acceptable. The analysis is appropriate for the design of the study. There is no selective reporting of results. Confidence intervals were provided for estimates of association.			Statistical model used appropriate for the study design and type of data AND a model building strategy used, e.g. stepwise, forward, backward selection AND strategy and results clearly reported AND completeness of reporting of results in final multivariable model with point estimates and measures of variance.	Mark down if: Statistical model not appropriate No model building strategy, e.g. all candidates included without screening Unclear reporting of strategy or results Selective reporting of results.  NO if 2 or more of the above.

**eTable 2: Summary of studies reporting risk factor analyses for language impairment in children born very preterm or with very low birth weight**

Study reference [identifier]	Country and recruitment period	Age of assessment (years)	GA (weeks)/ birth weight (grams)	Design and participants	Number (%) of survivors assessed <sup>a</sup>	Outcome measure (continuous (cts) unless otherwise specified)	Method for dealing with untestable children	Significant risk factors for poorer outcome (p<0.05) in final model
<b>Age of assessment &lt;5 years</b>								
Adams-Chapman (2013) <sup>22 b</sup> [C]	United States 2006-2008	1.5-1.8	<1000g	PC of infants admitted to the NICU of 20 centres participating in the multi-centre NICHD NRN routine FUP.	1477 (91%)	Language Composite, Receptive Language and Expressive Language from BSID-III. Blinded assessment.	Assigned a Language Composite score of 46 if severely delayed (n=39).	Black ethnicity, Feeding problems, GMFCS ≥2 at 18-22m, hearing impairment, male sex, lower maternal education, multiple pregnancy, MV days, non-English speaking, no private insurance.
Charkaluk (2010) <sup>40</sup> [U]	France 1997	2	<33w	PC of all live births in 1 French region (Nord-Pas-de-Calais, EPIPAGE Study).	347 (64%)	Language domain of Brunet-Lezine scale (revised). <sup>73</sup>	Excluded children with CP or severe neurosensory impairment (n=45).	Lower GA, intubation days, male sex, lower parental education, lower parental occupation, SGA.
Sansavini (2011) <sup>41 c</sup> [V]	Italy 2003-2008	2	<33w	PC study of Infants admitted to a single centre NICU (Bologna).	150 (Not known)	Lexical delay <10th centile and absence of word combination from MB-CDI. Parent report.	Excluded children with major cerebral damage, hearing or visual impairment and if bilingual (n not reported).	<b>Lexical delay:</b> BPD, male sex. <b>Word combination:</b> Male sex.
Toome (2013) <sup>25</sup> [F]	Estonia 2007	2	<32w	PC of all live births in Estonia enrolled in the national neonatal research routine FUP.	155 (99%)	Language Composite from BSID-III (<70 vs. ≥70).	Assigned a score of -4SD below the mean (n not reported).	IVH 3-4/PVL 2-4, male sex.
Marston (2007) <sup>42</sup> [W]	UK, Republic of Ireland & Australia 1998-2001	1.8-3	<29	Infants requiring endotracheal intubation from birth and enrolled in a multicentre high-frequency ventilation RCT.	288 (49%)	Number of words spoken from 100 word checklist from MB-CDI (short form). Parent report.	N/A.	Any disability, male sex, longer neonatal hospital stay, lower weight SDS at 12m.
<b>Age of assessment ≥5 years</b>								
Howard (2011) <sup>43 d</sup> [X]	Australia 2001-2003	5	<30w or <1250g	PC study of Infants admitted to a single centre NICU and enrolled in Victorian Infant Brain Studies (Melbourne).	187 (83% of enrolled)	Expressive and Receptive Language Skills Standard Scores from KSEALS. Blinded assessment.	Excluded if significant medical issue, CP or neurosensory impairment. (n=12)	<b>Expressive Language:</b> Lower BW, poorer communication skills at 24m, lower parental education, WMA. <b>Receptive Language:</b> Poorer communication skills at 24m, lower parental education.
Orchinik (2011) <sup>34 e</sup> [O]	United States 2001-2003	5	<28w or <1000g	PC of Infants admitted to a single centre NICU (Ohio) participating in the multicentre NICHD NRN routine FUP.	142 (72%)	Word knowledge from WJ-III COG Verbal Comprehension subtest <10th centile. Blinded assessment.	Assigned a score of 40 if too low functioning to comply with test demands.	IVH 3-4/PVL/ VD, neurosensory disorder and/or MDI<70 at 20m.
Taylor (2006) <sup>37 f</sup> [R]	United States 1992-1995	8	<1000g	PC of infants admitted to a single centre NICU (Ohio) participating in the multicentre NICHD NRN routine FUP.	204 (91%)	Picture Vocabulary from the WJ-III (cts and <1SD below mean of control group). Blinded assessment.	Excluded if untestable due to severe developmental impairments (n=10).	<b>Model 1 (cts score):</b> Longer neonatal hospital stay, outborn. <b>Model 2 (&lt;70 vs. ≥70):</b> Outborn.

<sup>a</sup> Percentage of survivors assessed for outcome measure specified.

<sup>b</sup> The results for the Language Composite are reported, which is comprised of the Receptive and Expressive subscales.

<sup>c</sup> 2 models for language delay reported. Risk factors included in Figure 4a as significant if p<0.05 in both models and non-significant if p≥0.05 in both models, else not included.

<sup>d</sup> 2 models for reported, one for Expressive Skills and one for Receptive Skills. Risk factors included in Figure 4b as significant if p<0.05 in both models and non-significant if p≥0.05 in both models, else not included.

<sup>e</sup> Each risk factor was fitted separately and adjusted for sex, ethnicity, parental SES and months in school at testing (the article did not report results for the adjustment factors).

<sup>f</sup> Each risk factor was fitted separately and adjusted for sex, ethnicity, parental SES, family stressors and family resources (the article did not report results for the adjustment factors). 2 models for cognitive function reported; one based on dichotomous outcome and one based on continuous outcome. Risk factors included in Figure 4b as significant if p<0.05 in both models and non-significant if p≥0.05 in both models, else not included.

Abbreviations: BPD bronchopulmonary dysplasia; BSID Bayley Scales of Infant Development;<sup>52</sup> BW birth weight; CP cerebral palsy; EPIPAGE Etude Epidemiologique sur les Petits Ages Gestationnels; GA gestational age; GMFCS Gross Motor Functional Classification System;<sup>68</sup> IVH intraventricular hemorrhage; KSEALS Kaufman Survey of Early Academic and Language Skills;<sup>74</sup> MB-CDI MacArthur-Bates Communicative Development Inventories;<sup>75</sup> MDI Mental Developmental Index from the BSID; MV mechanical ventilation; N/A not applicable; NICU neonatal intensive care unit; NICHD NRN National Institutes of Child Health and Human Development Neonatal Research Network; PC prospective cohort; PVL periventricular leukomalacia; SGA small for gestational age; SD standard deviation; SDS standard deviation score; VD ventricular dilatation; WJ-III Woodcock Johnson Tests of Achievement, 3rd edition;<sup>76</sup> WJ-III COG Woodcock Johnson Tests of Cognitive Abilities, 3rd edition;<sup>72</sup> WMA white matter abnormality.

**eTable 3: Summary of studies reporting risk factor analyses for poor executive function in children born very preterm or with very low birth weight**

Study reference	Country and recruitment period	Age of assessment (years)	GA (weeks)/ birth weight (grams)	Design and participants	Number (%) of survivors assessed <sup>a</sup>	Outcome measure (continuous (cts) unless otherwise specified)	Method for dealing with untestable children	Significant risk factors for poorer outcome (p<0.05) in any of the final models.
Lowe (2009) <sup>44</sup>	United States 2001-2003	1.5-1.8	<1000g	Infants mechanically ventilated (12-48 hrs) and enrolled in a multicentre hydrocortisone therapy RCT. Excluded multiple births.	233 (80%)	Object permanence measured using 3 items from the BSID-II MDI scale.	Not specified.	Male sex, lower emotional regulation from the BSID-II MDI scale.
Orchinik (2011) <sup>34 b</sup>	United States 2001-2003	5	<28w or <1000g	PC of Infants admitted to a single centre NICU (Ohio) participating in the multicentre NICHD NRN routine FUP.	148 (75%)	13 tests of executive function from a variety of scales. Blinded assessment.	Assigned a score of 40 for WJ-III-COG tests and lowest possible raw score for other tests if too low functioning to comply with test demands.	BW <750g, GA<25w, IVH 3-4/PVL/VD, neurosensory disorder and/or MDI<70 at 20m.
Potharst (2012) <sup>32 c</sup>	Netherlands 2002-2004	5	<30w or <1000g	PC study of Infants admitted to a single centre NICU (Amsterdam).	102 (68%)	VIQ, PIQ and PSQ domains from WPPSI-R Dutch version.	Excluded if too disabled to be tested (n=4).	IVH 3-4/PVL 2-4/PHH, male sex, lower MDI at 2yrs, lower PDI at 2 yrs, lower parental education, parental foreign country of birth, sepsis or meningitis.
Potharst (2013) <sup>45</sup>	Netherlands 2002-2004	5	<30w or <1000g	PC study of Infants admitted to a single centre NICU (Amsterdam).	102 (68%)	5 tests of executive function from a variety of scales.	Excluded if too disabled to be tested (n=4).	BPD, lower parental education, parental foreign country of birth, SGA.
Taylor (2006) <sup>37 d</sup>	United States 1992-1995	8	<1000g	PC of infants admitted to a single centre NICU (Ohio) participating in the multicentre NICHD NRN routine FUP.	204 (86%)	NEPSY overall score (cts and <1SD below mean of control group). Blinded assessment.	Excluded if untestable due to severe developmental impairments (n=10).	BW <750g, IVH 1-2, IVH 3-4, NEC, longer neonatal hospital stay, NRI>3, PVL, PN steroids, any US abnormality, VD.
Ford (2011) <sup>46</sup>	Australia 1996-2000	7-9	<32w or <1000g	Cross sectional study of infants identified from the routine database of a single centre (Brisbane).	45 (not a PC)	5 tests of executive function from a variety of scales.	Excluded if not attending mainstream school, a physical or neurological disability or GCI ≤85 on the MSCA at 4yrs.	Lower BW, interaction between neonatal risk score and maternal education. <sup>e</sup>
Aarnoudse-Moens (2013) <sup>47</sup>	Netherlands 1996-2004	4-12	<31w	PC study of Infants admitted to a single centre NICU (Rotterdam). Excluded multiple births.	200 (20%)	5 tests of executive function from a variety of scales.	Excluded if severe disabilities requiring physical assistance to perform daily activities.	Absence of NEC 2-3 or meningitis, lower parental education, lower postnatal growth SDS at 6w CA.

<sup>a</sup> Percentage of survivors seen at assessment; some children had missing data for some executive function outcomes/tests.

<sup>b</sup> Each risk factor was fitted separately and adjusted for sex, ethnicity, parental SES, months in school at testing and age at assessment (the article did not report results for the adjustment factors).

<sup>c</sup> 2 models for each domain at 5 years reported; one including 2 year developmental assessments and one including 3 year developmental assessments. The former model is reported as 2 year assessments are more routine in general practice.

<sup>d</sup> Each risk factor was fitted separately and adjusted for sex, ethnicity, parental SES, family stressors and family resources (the article did not report results for the adjustment factors).

<sup>e</sup> Adverse effect of high neonatal risk score ameliorated among children with more highly educated mothers.

Abbreviations: BPD bronchopulmonary dysplasia; BSID Bayley Scales of Infant Development;<sup>51</sup> BW birth weight; CA corrected age; GA gestational age; GCI General Cognitive Index; IVH intraventricular hemorrhage; MSCA McCarthy Scales of Children's Abilities; MDI Mental Developmental Index from the BSID; NEC necrotizing enterocolitis; NEPSY A Developmental NEuroPSYchological Assessment;<sup>77</sup> NICU neonatal intensive care unit; NRI Neonatal Risk Index; NICHD NRN National Institutes of Child Health and Human Development Neonatal Research Network; PC prospective cohort; PHH posthemorrhagic hydrocephalus; PIQ Performance IQ; PN post natal; PSQ Processing Speed Quotient; PVL periventricular leukomalacia; SGA small for gestational age; SD standard deviation; SDS standard deviation score; US ultrasound; VD ventricular dilatation; VIQ Verbal IQ; WJ-III COG Woodcock Johnson Tests of Cognitive Abilities, 3rd edition;<sup>72</sup> WPPSI-R Wechsler's Preschool and Primary Scale of Intelligence-Revised.<sup>54</sup>



**eTable 4: Summary of studies reporting risk factor analyses for poor academic attainment in children born very preterm or with very low birth weight**

Study reference	Country and recruitment period	Age of assessment (years)	GA (weeks)/ birth weight (grams)	Design and participants	Number (%) of survivors assessed <sup>a</sup>	Outcome measure (continuous (cts) unless otherwise specified)	Method for dealing with untestable children	Significant risk factors for poorer outcome (p<0.05) in final model
Kiechl-Kohlendorfer (2013) <sup>48</sup>	Austria 2003-2006	5	<32w	PC study of all live births in a single centre NICU (Innsbruck) serving the whole state of Tyrol.	161 (60%)	TEDI-MATH <sup>78</sup> Sum T-score (<40 vs. ≥40).	Excluded if untestable due to severe disabilities (n=10). Imputed score of <40 for children with severe delay in numerical abilities (n=9).	BPD, ICH, smoking in pregnancy.
Taylor (2011) <sup>49 b</sup>	United States 2001-2003	5-6	<28w or <1000g	PC of infants admitted to a single centre NICU (Ohio) participating in the multicentre NICHD NRN routine FUP.	148 (78%)	Letter Word Identification, Spelling, Calculation and Applied Problems subtests from the WJ-III (<85 vs. ≥85). Blinded assessment.	Imputed a score of <85 for children too low functioning to be tested (n≥6).	<b>Letter Word:</b> Abnormal US, neurosensory disorder and/or MDI<70 at 20m. <b>Spelling:</b> Abnormal US, neurosensory disorder and/or MDI<70 at 20m, lower parental SES. <b>Calculation:</b> Neurosensory disorder and/or MDI<70 at 20m. <b>Applied Problems:</b> Abnormal US, neurosensory disorder and/or MDI<70 at 20m, lower parental SES.
Taylor (2006) <sup>37 c</sup>	United States 1992-1995	8	<1000g	PC of infants admitted to a single centre NICU (Ohio) participating in the multicentre NICHD NRN routine FUP.	204 (86%)	Academic Skills Cluster, Letter Word Identification, Spelling and Calculation subtests from the WJ-III. Blinded assessment.	Excluded if untestable due to severe developmental impairments (n=10).	<b>Letter Word:</b> Longer neonatal hospital stay, PVL. <b>Spelling:</b> BPD, PN steroids. <b>Calculation:</b> NEC, Longer neonatal hospital stay, PN steroids. <b>Academic Skills Cluster:</b> BPD, IVH 3-4, NEC, longer neonatal hospital stay, NRI>3, PN steroids, PVL.
Johnson (2011) <sup>50 d</sup>	UK and Republic of Ireland 1995	10-12	<26w	PC of all live births in the UK and Republic of Ireland (EPICure Study).	219 (71%)	Reading and Mathematics Composite Scales from the WIAT-II. Blinded assessment.	Imputed a score of 39 for children with severe cognitive deficit (n=18).	<b>Reading scores:</b> no breast milk received, smaller HC SDS at 30m, lower MDI at 30m, lower parental SES, PROM. <b>Mathematics scores:</b> smaller HC SDS at 30m, lower MDI at 30m, NEC, lower parental SES, lower PDI at 30m.

<sup>a</sup> Percentage of survivors seen at assessment; some children had missing data for some academic tests.

<sup>b</sup> Each risk factor was fitted separately and adjusted for sex, ethnicity and parental SES (the article did not report results for the adjustment factors).

<sup>c</sup> The Academic Skills Cluster is a composite score based on the Letter Word Identification, Spelling and Calculation subtests. 2 models for the composite score and each subtest was reported; one based on continuous outcome and one based on dichotomous outcome (<1SD below mean of control group). Risk factor reported as significant in this table if p<0.05 in both models. Each risk factor was fitted separately and adjusted for sex, ethnicity, parental SES, family stressors and family resources (the article did not report results for the adjustment factors).

<sup>d</sup> 2 models for reading and mathematics scores reported. Models including neonatal and 30m outcomes as risk factors included. Models including 6 year neuropsychological outcomes only as risk factors excluded.

Abbreviations: BPD bronchopulmonary dysplasia; BSID Bayley Scales of Infant Development;<sup>51</sup> GA gestational age; HC head circumference; ICH intracerebral haemorrhage; IVH intraventricular hemorrhage; MDI Mental Developmental Index from the BSID; NEC necrotizing enterocolitis; NICU neonatal intensive care unit; NRI Neonatal Risk Index; NICHD NRN National Institutes of Child Health and Human Development Neonatal Research Network; PC prospective cohort; PDI Psychomotor Developmental Index from the BSID; PN post natal; PROM prolonged rupture of membranes; PVL periventricular leukomalacia; SDS standard deviation score; SES socio-economic status; US cranial ultrasonography; WIAT-II Wechsler Individual Achievement Test, 2nd edition;<sup>79</sup> WJ-III Woodcock Johnson Tests of Achievement, 3rd edition.<sup>76</sup>



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