

# Supplemental Information

## COMPLETE SEARCH STRATEGY

### Prenatal Search Strategy

(“Heart Defects, Congenital”[Mesh] OR (congenital\*[tiab] AND (heart disease\*[tiab] OR heart defect\*[tiab])) OR heart abnormalit\*[tiab] OR heart malformation\*[tiab] OR cardiac abnormalit\*[tiab] OR cardiac malformation\*[tiab] OR cardiac diseas\*[tiab])

AND

(“Fetus”[Mesh:NoExp] OR “Fetal Heart”[Mesh] OR “Fetal Blood”[Mesh] OR “Prenatal Diagnosis”[Mesh] OR “*Fetal Diseases*”[Mesh] OR “Prenatal Injuries”[Mesh] OR prenatal\*[tiab] OR antenatal\*[tiab] OR fetus\*[tiab] OR foetus\*[tiab] OR fetal\*[tiab] OR foetal\*[tiab] OR embryopath\*[tiab])

AND

(“Head”[Mesh:NoExp] OR “Cerebrovascular Circulation”[Mesh] OR “Brain/blood supply”[Mesh] OR “Brain/embryology”[Mesh] OR “Brain/abnormalities”[Mesh] OR “Brain/pathology”[Mesh] OR “Brain/physiopathology”[Mesh] OR “Cerebral Arteries”[Mesh] OR hypoxi\*[tiab] OR ischemi\*[tiab] OR brain\*[tiab] OR cerebr\*[tiab] OR transcranial[tiab])

AND

(“Ultrasonography, Doppler”[Mesh] OR “Magnetic Resonance Imaging”[Mesh] OR “Imaging, Three-Dimensional”[Mesh] OR “Oxygen Consumption”[Mesh] OR “Ultrasonography, Prenatal”[Mesh] OR “ultrasonography” [Subheading] OR Doppler\*[tiab] OR MRI[tiab] OR magnetic resonance[tiab]

OR MR imaging[tiab] OR MR tomograph\*[tiab] OR 3d ultraso\*[tiab] OR three-dimensional ultraso\*[tiab] OR 3d imag\*[tiab] OR three-dimensional imag\*[tiab] OR ultraso\*[tiab] OR sonograph\*[tiab] OR echograph\*[tiab] OR imaging[tiab] OR echocardi\*[tiab])

Articles: 305

### Postnatal Search Strategy

(“Heart Defects, Congenital”[Mesh] OR (congenital\*[tiab] AND (heart disease\*[tiab] OR heart defect\*[tiab])) OR heart abnormalit\*[tiab] OR heart malformation\*[tiab] OR cardiac abnormalit\*[tiab] OR cardiac malformation\*[tiab] OR cardiac diseas\*[tiab] or CHD[tiab])

AND

(“Infant, Newborn”[Mesh] OR infant\*[tiab] OR newborn\*[tiab] OR neonat\*[tiab])

AND

(“Head”[Mesh:NoExp] OR “Cerebrovascular Circulation”[Mesh] OR “Brain/blood supply”[Mesh] OR “Brain/embryology”[Mesh] OR “Brain/abnormalities”[Mesh] OR “Brain/pathology”[Mesh] OR “Brain/physiopathology”[Mesh] OR “Cerebral Arteries”[Mesh] OR “Agenesis of Corpus Callosum”[Mesh] OR hypoxi\*[tiab] OR ischemi\*[tiab] OR brain\*[tiab] OR cerebr\*[tiab] OR transcranial[tiab] OR corpus callosum[tiab] OR ML[tiab])

AND

(“Spectroscopy, Near-Infrared”[Mesh] OR “Ultrasonography, Doppler”[Mesh] OR “Magnetic Resonance Imaging”[Mesh] OR “Imaging,

Three-Dimensional”[Mesh] OR “Oxygen Consumption”[Mesh] OR “Ultrasonography, Prenatal”[Mesh] OR “ultrasonography” [Subheading] OR Doppler\*[tiab] OR MRI[tiab] OR magnetic resonance[tiab] OR MR imaging[tiab] OR MR tomograph\*[tiab] OR 3d ultraso\*[tiab] OR three-dimensional ultraso\*[tiab] OR 3d imag\*[tiab] OR three-dimensional imag\*[tiab] OR ultraso\*[tiab] OR sonograph\*[tiab] OR echograph\*[tiab] OR imaging[tiab] OR echocardi\*[tiab] OR NIRS[tiab] OR near infrared spectro\*[tiab] OR NIR spectro\*[tiab] OR (cerebral[tiab] AND angiograph\*[tiab]) OR cerebral oxygen saturation[tiab] OR amplitude integrated electroencephalo\*[tiab] OR aEEG[tiab] OR EEG[tiab] OR electroencephalo\*[tiab] or diffusion tensor imag\*[tiab] OR DTI[tiab])

Articles: 918

### Outcome

(“Heart Defects, Congenital”[Mesh] OR (congenital\*[tiab] AND (heart disease\*[tiab] OR heart defect\*[tiab])) OR heart abnormalit\*[tiab] OR heart malformation\*[tiab] OR cardiac abnormalit\*[tiab] OR cardiac malformation\*[tiab] OR cardiac diseas\*[tiab])

AND

(“Head”[Mesh:NoExp] OR “Cerebrovascular Circulation”[Mesh] OR “Brain/blood supply”[Mesh] OR “Brain/embryology”[Mesh] OR “Brain/abnormalities”[Mesh] OR “Brain/pathology”[Mesh] OR “Brain/physiopathology”[Mesh] OR “Cerebral Arteries”[Mesh] OR hypoxi\*[tiab] OR ischemi\*[tiab] OR

brain\*[tiab] OR cerebr\*[tiab] OR transcranial[tiab])

AND

("Cognition"[Mesh] OR "Intelligence"[Mesh] OR "Intelligence Tests"[Mesh] OR "Cognition Disorders"[Mesh:NoExp] OR "Neuropsychological Tests"[Mesh] OR "Child Development"[Mesh] OR "Psychomotor Performance"[Mesh] OR "Neurodevelopmental Disorders"[Mesh] OR cognition[tiab] OR cognitive[tiab] OR ((neurodevelopment\*[tiab] OR neurologic\*[tiab] OR development\*[tiab ] AND (outcome\*[tiab] OR delay\*[tiab] OR chang\*[tiab] OR disabil\*[tiab] OR functioning[tiab] OR assess\*[tiab] OR test[tiab] OR tests[tiab] OR testing[tiab])) OR (neurologic\*[tiab] AND development\*[tiab]) OR intelligen\*[tiab] OR IQ[tiab] OR neurocognit\*[tiab] OR bayley[tiab])

AND

("Epidemiologic Studies"[Mesh] OR cohort\*[tiab] OR prospective[tiab] OR longitudinal\*[tiab] OR longterm[tiab] OR follow-up[tiab] OR followup[tiab] OR long-term[tiab] OR case-control[tiab])

AND

("Child"[Mesh] OR "Infant"[Mesh] OR "Adolescent"[Mesh] OR child\*[tiab] OR infant\*[tiab] OR adolescen\*[tiab] OR pediatri\*[tiab] OR paediatr\*[tiab] OR teen\*[tiab] OR youth[tiab] OR kids[tiab])NOT

("Case Reports" [Publication Type])

Articles: 437

## Embase Search

### Prenatal Search

('Congenital heart disease\*':ab, ti OR 'congenital heart defect\*':ab, ti OR 'heart'/exp OR heart AND abnormalit\*':ab,ti OR 'heart'/exp OR heart AND malformation\*':ab,ti OR cardiac AND abnormalit\*':ab,ti OR cardiac AND malformation\*':ab,ti OR cardiac AND diseas\*':ab,ti)

AND

(Fetus\*':ab,ti OR 'fetal heart\*':ab,ti OR 'fetal blood\*':ab,ti OR 'prenatal diagnosis\*':ab,ti OR antenatal\*':ab, ti OR foetus\*':ab,ti OR fetal\*':ab,ti OR foetal\*':ab,ti OR embryopath\*':ab,ti)

AND

('MRI:ab,ti OR MRI:ab,ti OR 'magnetic resonance' OR 'MR imaging\*':ab,ti OR 'MR tomograph\*':ab,ti OR '3d ultraso\*':ab,ti OR 'three-dimensional ultraso\*':ab,ti OR '3d imag\*':ab,ti OR 'three-dimensional imag\*':ab,ti OR ultraso\*':ab,ti OR sonograph\*':ab, ti OR echograph:ab,ti OR imaging:ab, ti OR echocardio\*':ab,ti OR 'oxygen consumption\*':ab,ti)

AND

(head:ab,ti OR 'cerebrovascular circulation\*':ab,ti OR brain\*':ab, ti OR 'cerebral arteries\*':ab,ti OR hypoxi\*':ab,ti OR ischemi\*':ab,ti OR cerebr\*':ab,ti OR transcranial\*':ab,ti)

Articles: 200

### Postnatal Search

('Congenital heart disease\*':ab, ti OR 'congenital heart defect\*':ab, ti OR 'heart'/exp OR heart AND abnormalit\*':ab,ti OR 'heart'/exp OR heart AND malformation\*':ab,ti OR cardiac AND abnormalit\*':ab,ti OR cardiac AND malformation\*':ab,ti OR cardiac AND diseas\*':ab,ti)

AND

(infant\*':ab,ti OR neonat\*':ab,ti OR newborn\*':ab,ti)

AND

('MRI\*':ab,ti OR MRI:ab,ti OR 'magnetic resonance' OR 'MR imaging\*':ab,ti OR 'MR tomograph\*':ab,ti OR '3d ultraso\*':ab,ti OR 'three-dimensional ultraso\*':ab,ti OR '3d imag\*':ab,ti OR 'three-dimensional imag\*':ab,ti OR ultraso\*':ab,ti OR sonograph\*':ab, ti OR echograph:ab,ti OR imaging:ab, ti OR echocardio\*':ab,ti OR 'oxygen consumption\*':ab,ti OR NIRS:ab, ti OR 'near infrared spectro\*':ab,ti OR 'NIR spectro\*':ab,ti OR 'cerebral angiograph\*':ab,ti OR 'cerebral

oxygen\*':ab,ti OR 'diffusion tensor imaging\*':ab,ti)

AND

(head:ab,ti OR 'cerebrovascular circulation\*':ab,ti OR brain\*':ab, ti OR 'cerebral arteries\*':ab,ti OR hypoxi\*':ab,ti OR ischemi\*':ab,ti OR cerebr\*':ab,ti OR transcranial\*':ab,ti OR 'corpus callosum\*':ab,ti)

Articles: 429

### Outcome Search

('congenital heart disease\*':ab, ti OR 'congenital heart defect\*':ab, ti OR 'heart'/exp OR heart AND abnormalit\*':ab,ti OR 'heart'/exp OR heart AND malformation\*':ab,ti OR cardiac AND abnormalit\*':ab,ti OR cardiac AND malformation\*':ab,ti OR cardiac AND diseas\*':ab,ti)

AND

(head:ab,ti OR 'cerebrovascular circulation\*':ab,ti OR brain\*':ab, ti OR 'cerebral arteries\*':ab,ti OR hypoxi\*':ab,ti OR ischemi\*':ab,ti OR cerebr\*':ab,ti OR transcranial\*':ab,ti)

AND

(infant\*':ab,ti OR neonat\*':ab,ti OR newborn\*':ab,ti OR fetus\*':ab,ti OR 'fetal heart\*':ab,ti OR 'fetal blood\*':ab, ti OR 'prenatal diagnosis\*':ab,ti OR antenatal\*':ab,ti OR foetus\*':ab,ti OR fetal\*':ab,ti OR foetal\*':ab,ti OR embryopath\*':ab,ti)

AND

(cognition:ab,ti OR intelligence: ab,ti OR 'intelligence tests\*':ab, ti OR 'neuropsychological tests\*':ab,ti OR cognitive:ab, ti OR ((neurodevelopment\*':ab, ti OR neurologic\*':ab,ti OR development\*':ab,ti) AND (outcome\*':ab,ti OR delay\*':ab,ti OR chang\*':ab,ti OR disabil\*':ab,ti OR functioning:ab,ti OR assess\*':ab, ti OR test:ab,ti OR tests:ab,ti OR testing:ab,ti)) OR (neurologic\*':ab, ti AND development\*':ab,ti) OR intelligen\*':ab,ti OR IQ:ab,ti OR neurocognit\*':ab,ti OR bayley:ab,ti)

Articles: 445

**SUPPLEMENTAL TABLE 4** Newcastle-Ottawa Quality Assessment Scale for Prenatal Studies, Online

Study (First Author, Journal, Year of Publication)	Selection	Comparability	Exposure (Case-Control Study) or Outcome (Cohort Study)	Total Score (Max 9)
Ruiz et al, <i>Ultrasound Obstet Gynecol</i> , 2016	3	1	2	6
Hahn et al, <i>Ultrasound Obstet Gynecol</i> , 2016	3	1	3	7
Zeng et al, <i>Ultrasound Obstet Gynecol</i> , 2015	3	1	2	6
Zeng et al, <i>Ultrasound Obstet Gynecol</i> , 2015	2	2	1	5
Masoller et al, <i>Ultrasound Obstet Gynecol</i> , 2014	3	1	2	6
Williams et al, <i>Am Heart J</i> , 2013	3	2	3	8
Yamamoto et al, <i>Ultrasound Obstet Gynecol</i> , 2013	3	1	2	6
Szwast et al, <i>Ultrasound Obstet Gynecol</i> , 2012	2	0	2	4
Williams et al <sup>a,b</sup> , <i>Ultrasound Obstet Gynecol</i> , 2012	3	1	3	7
Arduini et al, <i>J Matern Fetal Neonatal Med</i> , 2011	2	1	2	5
Itsukaichi et al, <i>Fetal Diagn Ther</i> , 2011	2	1	2	5
McElhinney et al, <i>Ultrasound Med Biol</i> , 2010	2	1	3	6
Berg et al, <i>Ultrasound Obstet Gynecol</i> , 2009	2	0	2	4
Guorong et al, <i>Fetal Diagn Ther</i> , 2009	3	1	3	7
Chen et al, <i>Am J Perinatol</i> , 2009	3	1	2	6
Modena et al, <i>Am J Obstet Gynecol</i> , 2006	3	1	3	6
Kaltman et al, <i>Ultrasound Obstet Gynecol</i> , 2005	4	0	3	7
Donofrio et al, <i>Pediatr Cardiol</i> , 2003	3	0	2	5
Jouannic et al, <i>Ultrasound Obstet Gynecol</i> , 2002	3	1	2	6
Meise et al, <i>Ultrasound Obstet, Gynecol</i> , 2001	2	1	2	5
Brossard-Racine et al, <i>AJNR Am J Neuroradiol</i> , 2016	3	0	3	6
Brossard-Racine et al, <i>AJNR Am J Neuroradiol</i> , 2014	3	0	2	5
Miczoch et al, <i>Eur J Paediatr Neurol</i> , 2013	2	1	2	5
Schellen et al, <i>Am J Obstet Gynecol</i> , 2015	2	1	2	5
Al Nafisi et al, <i>J Cardiovasc Magn Reson</i> , 2013	2	1	2	5
Sun et al, <i>Circulation</i> , 2015	4	1	2	7
Limperopoulos et al, <i>Circulation</i> , 2010	4	2	2	8
Masoller et al, <i>Fetal Diagn Ther</i> , 2016	4	2	2	8
Masoller et al, <i>Ultrasound Obstet Gynecol</i> , 2016	4	2	2	8
Clouchoux et al, <i>Cereb Cortex</i> , 2013	3	1	2	6

<sup>a</sup> Articles that also address postnatal findings.

<sup>b</sup> Articles that also address neurodevelopmental outcome.

**SUPPLEMENTAL TABLE 5** Newcastle-Ottawa Quality Assessment Scale for Postnatal Studies, Online

Study (First Author, Journal, Year of Publication)	Selection	Comparability	Exposure (Case-Control Study) or Outcome (Cohort Study)	Total Score (Max 9)
Brossard-Racine et al, <i>AJNR Am J Neuroradiol</i> , 2016	3	0	3	6
McCarthy et al, <i>Pediatr Res</i> , 2015	3	0	3	6
Bertholdt et al, <i>Eur J Cardiothorac Surg</i> , 2014	3	0	2	5
Owen et al <sup>a</sup> , <i>J Pediatr</i> , 2014	2	2	2	6
Goff et al, <i>J Thorac Cardiovasc Surg</i> , 2014	2	2	3	7
Andropoulos et al, <i>Paediatr Anaesth</i> , 2014	3	2	3	8
Beca et al, <i>Circulation</i> , 2013	3	1	3	7
Mulkey et al, <i>Pediatr Cardiol</i> , 2013	2	2	2	6
Ortinou et al, <i>J Pediatr</i> , 2013	3	1	2	6
Glass et al, <i>Cardiol Young</i> , 2011	4	2	3	9
Block et al, <i>J Thorac Cardiovasc Surg</i> , 2010	2	1	3	6
Andropoulos et al, <i>J Thorac Cardiovasc Surg</i> , 2010	2	0	3	5
Beca et al, <i>J Am Coll Cardiol</i> , 2009	2	0	2	4
Petit et al, <i>Circulation</i> , 2009	4	2	3	9
Licht et al, <i>J Thorac Cardiovasc Surg</i> , 2009	2	1	3	6
McQuillen et al, <i>Circulation</i> , 2006	4	0	3	7
Durandy et al, <i>Artif Organs</i> , 2011	2	0	2	4
Tavani et al, <i>Neuroradiology</i> , 2003	2	0	3	5
von Rhein et al, <i>J Pediatr</i> , 2015	3	2	2	7
Ortinou et al, <i>Pediatr Cardiol</i> , 2012	2	0	3	5
Ortinou et al, <i>J Thorac Cardiovasc Surg</i> , 2012	2	2	3	7
Makki et al, <i>AJNR Am J Neuroradiol</i> , 2013	4	1	2	7
Hagmann et al, <i>J Child Neurol</i> , 2016	3	1	2	6
Mulkey et al, <i>Pediatr Neurol</i> , 2015	3	0	3	6
Partridge et al, <i>Ann Neurol</i> , 2006	3	0	3	6
Sethi et al, <i>Pediatr Res</i> , 2013	3	0	2	5
Park et al, <i>Pediatr Cardiol</i> , 2006	2	1	2	5
Miller et al, <i>Ann Thorac Surg</i> , 2004	3	1	3	7
Mahle et al, <i>Circulation</i> , 2002	2	0	3	5
Dimitropoulos et al, <i>Neurology</i> , 2013	2	2	3	7
Shedeed and Elfaytouri, <i>Pediatr Cardiol</i> , 2011	3	2	2	7
Miller et al, <i>N Engl J Med</i> , 2007	4	2	2	8
Nagaraj et al, <i>J Pediatr</i> , 2015	3	2	2	7
Licht et al, <i>J Thorac Cardiovasc Surg</i> , 2004	2	0	3	5
Van der Laan et al, <i>Pediatr Res</i> , 2013	4	1	2	7
Uebing et al, <i>J Thorac Cardiovasc Surg</i> , 2011	2	1	2	5
Kurth et al, <i>Ann Thorac Surg</i> , 2001	2	2	2	6
Latal et al, <i>Dev Med Child Neurol</i> , 2015	3	2	3	8
Gunn et al, <i>Ann Thorac Surg</i> , 2012	3	0	2	5
Gunn et al, <i>Intensive Care Med</i> , 2012	3	0	2	5
Te Pas et al, <i>Acta Paediatr</i> , 2005	2	0	3	5
Sigler et al, <i>Ann Thorac Surg</i> , 2001	2	0	2	4
Mulkey et al, <i>Pediatr Neurol</i> , 2015	3	0	3	6
Dehaes et al, <i>Biomed Opt Express</i> , 2015	2	0	2	4
Jain et al, <i>J Cereb Blood Flow Metab</i> , 2014	2	0	2	4
Lynch et al, <i>J Thorac Cardiovasc Surg</i> , 2014	3	1	3	7
Rios et al, <i>Pediatrics</i> , 2013	2	0	3	5
Andropoulos et al, <i>Ann Thorac Surg</i> , 2012	3	2	3	8
Williams et al, <i>Ultrasound Obstet Gynecol</i> , 2012	3	1	3	7
Ter Horst et al, <i>Early Hum Dev</i> , 2010	2	1	3	6
McQuillen et al, <i>Stroke</i> , 2007	3	1	3	7
Toet et al, <i>Exp Brain Res</i> , 2005	3	1	2	6
Robertson et al, <i>Cardiol Young</i> , 2004	3	0	3	6

<sup>a</sup> Articles that also address neurodevelopmental outcome.