

PRENATAL EXPOSURE TO AIR POLLUTANTS AND ATTENTIONAL DEFICIT HYPERACTIVITY DISORDER DEVELOPMENT IN CHILDREN: A SYSTEMATIC REVIEW

Supplementary Table S1: PECOS criteria for inclusion and exclusion of studies

Detailed PECOS (population, exposure, comparison, outcome, study type) table for the systematic review on air pollutants and ADHD.

	Population	Exposure	Comparison	Outcome	Type of study
Included	Pregnant women/Child population	Air pollutants PM, NO _x , SO ₂ , O ₃ , PAH	Not applicable	ADHD/hyperactivity	Observational studies (cohort, case-control and cross sectional)
Excluded	Adults, in vitro and animal studies	Any other pollutants (e.g. bisphenol A)	Not applicable	Other neurodevelopmental disorder (e.g. autism)	Controlled trials Letters to the editor Reviews Case report Interventional studies Abstracts

Supplementary Table S2: Newcastle-Ottawa Scale (NOS) quality and World Health Organization (WHO) Risk of Bias Assessment

1. Perera et al., 2012		
Design	Cohort study	
Participants	Children, aged 6-7 years	
Exposure	PAH	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Low
Outcome measurement		Low
Missing data		Low
Selective reporting		Low

2. Gong et al., 2014		
Design	Cohort study	
Participants	Children, aged 9-12 years	
Exposure	PM ₁₀ , NO _x	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	*
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Moderate
Outcome measurement		Moderate
Missing data		Moderate
Selective reporting		Low

3. Perera et al., 2014		
Design	Cohort study	
Participants	Children, aged 9 years	
Exposure	PAH	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Low
Outcome measurement		Low
Missing data		Low
Selective reporting		Low

4. Fuertes et al., 2016		
Design	Cohort study	
Participants	Children, aged 10-15 years	
Exposure	PM ₁₀ , PM _{2.5} mass, PM _{2.5} absorbance and NO ₂	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	*
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Low
Outcome measurement		Moderate
Missing data		Moderate
Selective reporting		Low

5. Yorifuji et al., 2016		
Design	Cohort study	
Participants	Children, aged 2.5 - 5.5 years	
Exposure	SPM, NO ₂ , SO ₂	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Low
Outcome measurement		Moderate
Missing data		Low
Selective reporting		Low

6. Yorifuji et al., 2017		
Design	Cohort study	
Participants	Children, aged 8 years	
Exposure	SPM, NO ₂ , SO ₂	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Low
Outcome measurement		Low
Missing data		Low
Selective reporting		Low

7. Forns et al., 2018		
Design	Cohort study	
Participants	Children, aged 3-10 years	
Exposure	PM ₁₀ , PM _{2.5} , PM _{coarse} and PM _{absorbance}	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	*
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Low
Outcome measurement		Moderate
Missing data		Moderate
Selective reporting		Low

8. Perera et al., 2018		
Design	Cohort study	
Participants	Children, aged 9 years	
Exposure	PAH	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Low
Outcome measurement		Low
Missing data		Low
Selective reporting		Low

9. Oudin et al., 2019		
Design	Cohort study	
Participants	Children born between 1999 - 2009	
Exposure	NO _x	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	*
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	*
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Moderate
Outcome measurement		Low
Missing data		Low
Selective reporting		Low

10. Pagliaccio et al., 2020		
Design	Cohort study	
Participants	Children born between 1998 - 2006	
Exposure	PAH	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Moderate
Selection Bias		Moderate
Exposure Assessment		Low
Outcome measurement		Moderate
Missing data		High
Selective reporting		Low

11. McGuinn et al., 2020		
Design	Cohort study	
Participants	Children – mother pair	
Exposure	PM _{2.5}	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Moderate
Exposure Assessment		Moderate
Outcome measurement		Low
Missing data		High
Selective reporting		Low

12. Shih et al., 2020		
Design	Cohort study	
Participants	Children, aged 8 years	
Exposure	NO _x , NO ₂ , SO ₂ , PM ₁₀ or less	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	*
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	*
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Low
Outcome measurement		High
Missing data		Moderate
Selective reporting		Low

13. Peterson et al., 2022		
Design	Cohort study	
Participants	Children, aged 6-14 years	
Exposure	PM _{2.5} , PAH	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	*
Outcome	Assessment of outcome	*
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Moderate
Outcome measurement		Low
Missing data		Low
Selective reporting		Low

14. Chang et al., 2022		
Design	Cohort study	
Participants	Children, aged 5 years	
Exposure	PM _{2.5}	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	*
	Was follow-up long enough for outcome to occur	*
	Adequate of follow up of cohorts	*
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Low
Outcome measurement		Moderate
Missing data		Low
Selective reporting		Low

15. Liu et al., 2022		
Design	Cohort study	
Participants	Pregnancy	
Exposure	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , O ₃ , CO	
Outcomes	Attention-Deficit/Hyperactivity Disorder	
Quality Assessment		
Newcastle-Ottawa Quality Assessment Scale-Case Cohort Study		Author's judgement
Selection	Representative of the exposed cohort	*
	Selection of the non-exposed cohort	*
	Ascertainment of exposure	*
	Demonstration that outcome of interest was not present at start of study	*
Comparability	Comparability of cohorts on the basis of the design of analysis	**
Outcome	Assessment of outcome	
	Was follow-up long enough for outcome to occur	
	Adequate of follow up of cohorts	*
World Health Organization - Risk of Bias Assessment		
Domain		Author's judgement
Confounding		Low
Selection Bias		Low
Exposure Assessment		Low
Outcome measurement		Moderate
Missing data		Low
Selective reporting		Low