Table S1. Studies excluded with reasons

Outcome not (clinical) mental disorder (n = 99)
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Unrelated research topic (n = 12)

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Full-Text could not be obtained (n = 9)

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Screening instrument was not validated (n = 6)

1. Belojević, G., Jakovljević, B., & Aleksić, O. (1997). Subjective reactions to traffic noise with regard to some personality traits. *Environment International*, *23*(2), 221-226. doi: 10.1016/S0160-4120(97)00008-1
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Industry-/ Military Aircraft Noise (n = 4)

1. Hiramatsu, K., Yamamoto, T., Taira, K., Ito, A., & Nakasone, T. (1997). A survey on health effects due to aircraft noise on residents living around Kadena air base in the Ryukyus. *Journal of Sound and Vibration*, *205*(4), 451-460. doi: 10.1006/jsvi.1997.1011
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Population of employees considered (not general population) (n = 3)

1. Akan, Z., Yilmaz, A., Özdemir, O., & Korpinar, M. A. (2012). Noise pollution, psychiatric symptoms and quality of life: noise problem in the east region of Turkey. *Journal of Inonu University Medical Faculty*, *19*(2), 75-81. doi: 10.7247/jiumf.19.2.3
2. Calapaj, G. G., & Bellia, G. (1969). Psychometric studies of subjects exposed to the noise of jet engines. *La Medicina del Lavoro*, *60*(1), 43.
3. Chiovenda, P., Pasqualetti, P., Zappasodi, F., Ercolani, M., Milazzo, D., Tomei, G., ... & Tecchio, F. (2007). Environmental noise-exposed workers: Event-related potentials, neuropsychological and mood assessment. *International Journal of Psychophysiology*, *65*(3), 228-237. doi:10.1016/j.ijpsycho.2007.04.009

Experimental study design (n = 3)

1. Naqvi, F., Haider, S., Perveen, T., & Haleem, D. J. (2012). Sub-chronic exposure to noise affects locomotor activity and produces anxiogenic and depressive like behavior in rats. *Pharmacological Reports*, *64*(1), 64-69. doi: 10.1016/S1734-1140(12)70731-4
2. Granati, *A.,* Angeleri, F., Lenzi, R. (1959). *L'*influenza dei rumori sul sistema nervoso – Folia Medica: XLII (11): 1314-1325.
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Results not usable (see reference for more details) (n = 3)

1. Bodin, T., Albin, M., & Bjork, J. (2013). Road traffic noise and mental health-Preliminary results from a cross-sectional study in southern Sweden. In *INTER-NOISE and NOISE-CON Congress and Conference Proceedings*, 247(2), 5768-5772. Institute of Noise Control Engineering.

   Only descriptive results depicted without numbers; Author did not respond to requests for more information
2. Greiser, E., Greiser, C., & Janhsen, K. (2007). Night-time aircraft noise increases

prevalence of prescriptions of antihypertensive and cardiovascular drugs irrespective of social class—the Cologne-Bonn Airport study. *Journal of Public Health*, *15*(5), 327-337. doi: 10.1007/s10389-007-0137-x

Anxiolytics were evaluated together with blood pressure and heart medications

3. Houthujis, D. J. M. & van Wiechen, C. M. A. G. (2006). Monitoring van gezondheid en beleving rondom de luchthaven Schiphol. RIVM rapport 630100003/2006

Author did not respond to requests for more information

Convenience Sample (n = 2)

1. Dzhambov, A., Tilov, B., Markevych, I., & Dimitrova, D. (2017). Residential road traffic noise and general mental health in youth: the role of noise annoyance, neighborhood restorative quality, physical activity, and social cohesion as potential mediators. *Environment International*, *109*, 1-9. doi: 10.1016/j.envint.2017.09.009.
2. Maschke, C., & Hecht, K. (2005). Tag-Nacht Unterschiede in der multifaktoriellen Genese von lärminduzierten Erkrankungen–Ergebnisse einer epidemiologischen Studie. *Somnologie*, *9*(2), 96-104. doi: 10.1111/j.1439-054X.2005.00046.x

Repeat publication (n = 1)

1. Greiser, E., & Glaeske, G. (2013). Social and economic consequences of night-time aircraft noise in the vicinity of Frankfurt/Main airport. *Gesundheitswesen (Bundesverband der Ärzte des Öffentlichen Gesundheitsdienstes (Germany))*, *75*(3), 127-133.

Outcome not differentiated (n = 1)

1. Wright, D. M., Newell, K., Maguire, A., & O'Reilly, D. (2018). Aircraft noise and self-assessed mental health around a regional urban airport: a population based record linkage study. *Environmental Health*, *17*(1), 74. doi: 10.1186/s12940-018-0418-6.

Table S2. Detailed extraction table of 8 studies (10 publications)

Reference (First author, publication year) **Meta-analysis** (Yes/No)	**Study design**	**Population** **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Outcome** **Disease (ICD-10)** **Prescription** **Questionnaire**	**Exposure** **exposure source**	**exposure assessment**	**exposure levels**	**Results**	**Comments** (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
Belojevic 2012 **No**	Cross-sectional	**Study region:** Belgrade, Serbia **Sample size**: $N_{Schools}$ =8 $N_{children}$= ca. 2000 -> 1150 -> 311 M=146 F=165 $N_{teacher}$= 102 -> 77 **Sample population:** School children in Belgrade **Age:** 7-11 years **Time of recruitment:** September 2008-June 2009	Adapted version of the Attention Deficit Disorder Questionnaire (5 item scale) completed by teachers to measure Executive Functioning (EF)	Road traffic noise (1) children's home: middle of 115 municipal streets in September five (15 min.) measurements per day (8-10 am, 2-4 pm, 6-8 pm and 10-12 pm and midnight -	(1) calculated L_{24h} for each street	home: 40-80 dB	Table 5: Linear regression with executive functioning as dependent variable and predictors: gender, socioeconomic status and 24h-h equivalent noise level at home Multivariate Model 2: **Beta= -0.09** **95% CI -0.17 to -0.01** (Model 3: interaction noise x gender included, P=0,03)	**Study quality** **-** **Conflict of interest** No information **Funding** Serbian Ministry of Science and Technological Development, Contract No. 175 078. (public funding) **Confounding** Gender, socioeconomic status **Strengths/**

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		Response: 57.5% (parental permission) 75.5% teacher participation		2 am) (2) schools (in front): three daytime intervals (9-11 am, 12-2 pm and 3-5 pm)				**weaknesses:** + ethical clearance - no common exposure measurement - cross-sectional design - no adequate control of cofounders (-) noise exposure at school not considered in multivariate analysis, no correlation between school noise and EF
Clark 2013 **No** (continuous outcome, linear	longitudinal cohort (follow-up) study	**Study region:** West London, United Kingdom **Sample size**: 29 schools Eligible sample: M+F=1,015, Participated:	Mental health according to Strengths and Difficulties Questionnaire (SDQ) - Hyperactivity - Conduct	Aircraft Road traffic	Aircraft: $L_{eq,16h}$ 16-h outdoor dB at school (07-23h). Baseline data: July to September	Analysis with continuous noise data Cumulative	<u>Regression coefficient (β) for a 1 dB increase in noise exposure to a) aircraft noise at primary school, b) aircraft noise at secondary school, and c) cumulative aircraft noise exposure on cognition and health outcomes at follow-up (N = 461), (from Table 4)</u>	**Study quality:** - (to +) **Conflict of interest:** not stated **Funding:** not stated

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results	Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
regression)		M+F=461 M=202, F=259 **Sample population:** RANCH study At baseline, 9-10 year old children in schools around Heathrow airport in West London, followed up to secondary schools **Age:** range 15years,5months-17years,7months **Exposed/unexposed:** not applicable **Time of recruitment/ follow-up:** 2002-2003 / follow-up 2008 **Response:**	Problems - Emotional symptoms - Pro-social behavior - Peer problems - Total psychological distress score (scales added together, excluding pro-social behavior)		1999; Follow up: July to September 2007. (Road traffic only at baseline)	aircraft noise = mean of aircraft noise exposure at primary and secondary schools	(1) Longitudinal = Main analysis (2) Cross-sectional (3) Longitudinal **Psychological distress at follow-up** (1) Aircraft noise primary schools β = 0.006, 95% CI (-0.022, 0.061), p =0.998 (2) Aircraft noise secondary schools β = 0.017, 95% CI (-0.101, 0.135), p =0.781 (3) Cumulative aircraft noise at school β = 0.015, 95% CI (-0.069, 0.100), p =0.718 **Hyperactivity at follow-up** (1) Aircraft noise primary schools β = 0.001, 95% CI (-0.060, 0.033), p =0.688 (2) Aircraft noise secondary schools β = 0.019, 95% CI (-0.034, 0.073), p =0.476 (3) Cumulative aircraft noise at school	**Confounding (adjusted for):** age, gender, parental employment, crowding in the home, home ownership, mother's education, long standing illness, main language spoken at home, parental support, classroom glazing, and road noise at primary school. **Strengths/ weaknesses:** +longitudinal study + Participant-Non-participant analysis + adequate confounder assessment (but air pollution is missing) - Loss-to follow-up: 55%

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		Baseline: no information **Loss-to-follow up**: 55%					β = 0.010, 95% CI (-0.029, 0.002), p =0.613) **Conduct problems at follow-up** (1) Aircraft noise primary schools β = 0.006, 95% CI (-0.017, 0.029), p =0.616 (2) Aircraft noise secondary schools β = 0.015, 95% CI (-0.031, 0.060), p =0.527 (3) Cumulative aircraft noise at school β = 0.008, 95% CI (-0.024, 0.041), p =0.617 **Emotional symptoms at follow-up** (1) Aircraft noise primary schools β = - 0.008, 95% CI (-0.035, 0.019), p =0.555 (2) Aircraft noise secondary schools β = -0.022, 95% CI (-0.073, 0.029), p =0.394 (3) Cumulative aircraft noise at school β = -0.015, 95% CI (-0.054, 0.023), p	- funding and conflict of interest not stated

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		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
							=0.436	
Crombie 2011 (together with Stansfeld 2005 & Clark 2012) **No** (continuous outcome, linear regression)	Cross-sectional study	**Study region** Heathrow Airport (London, UK), Barajas Airport (Madrid, Spain), Schiphol Airport (Amstedam, The Netherlands) **Sample population:** RANCH project: Students from schools around major airports in three European countries **Sample size:** M+F= 1,900 M=897, F=1,003 **Age** Mean: 10.6 years **Exposed/unexposed:** For each of the 16 noise exposure	Mental health according to the Strengths and Difficulties Questionnaire (SDQ): - Hyperactivity - Conduct Problems - Emotional symptoms - Total score	Aircraft Road traffic	**Aircraft noise:** $L_{eq,16}$ (07h-23h) **Road traffic noise:** - The Netherlands: Modelled data - UK, Spain: combination of modelling the proximity to motorways, major roads, and minor roads, traffic flow data, noise measurements taken at façade of school building	Continuous analysis β per 1-dB increase in aircraft noise Aircraft noise Range: 30-77 dB Road traffic noise Range: 32-71 dB	<u>Effect of aircraft noise on the SDQ measures (from Table 3):</u> **Hyperactivity:** Model 2: Aircraft noise: β= 0.01, 95% CI: 0.00-0.02, **p=0.05** Model 3: Aircraft noise: β= 0.01, 95% CI: 0.00-0.02, **p=0.05** **Emotional problems:** Model 2: Aircraft noise: β= 0.00, 95% CI: -0.01-0.01, p=0.34 Model 3: Aircraft noise: β= 0.00, 95% CI: -0.01-0.01, p=0.97 **Conduct problems:** Model 2:	**Study quality:** - Cross-sectional study design **Conflict of interest:** stated (The authors declare that they have no competing interest) **Funding:** stated (RANCH Study: European Community, UK co-funding by Department of Environment, Food and rural Affairs; Netherlands co-funding by Dutch Ministry of Public

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		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
		grid cells: 2 schools from Spain (M+F=559), 2 schools from UK (M+F=783), 1 school the Netherlands (M+F=558) **Time of recruitment / follow-up** April- October 2002 (Stansfeld, 2005) **Response** 89%					Aircraft noise: β= -0.01, 95% CI: -0.01-0.00, p=0.23 Model 3: Aircraft noise: β= -0.01, 95% CI: -0.01-0.00, p=0.17 Model 2: adjusted for all confounding factors Model 3: same as Model 3, but with addition of early biological risk as main effect <u>Table 3: Road traffic on the SDQ measures:</u> **Emotional problems:** Model 2: Road traffic: β= 0.00, 95% CI: -0.01-0.01, p=0.97 Model 3: Road traffic: β= -0.00, 95% CI: -0.01-0.01, p=0.89 **Conduct problems:**	Health, Welfare, and Sports, Dutch Ministry of Spatial Planning, Housing and Environment and Dutch Ministry of Transport, Public Works and Water Management) → public funding **Confounding (adjusted for):** age, sex, country of origin, employment status, crowding at home, educational level of mother, housing tenancy, long-standing illnesses, main language spoken at home, parental support for school work, classroom

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							Model 2: Road traffic: β= -0.01, 95% CI: -0.02-0.00, p=0.04 Model 3: Road traffic: β= -0.01, 95% CI: -0.02-0.00, p=0.03 **Hyperactivity:** Model 2: Road traffic: β= 0.00 (0.01), 95% CI: -0.01-0.01, p=0.96 Model 3: Road traffic: β= -0.00 (0.01), 95% CI: -0.01-0.01, p=0.94 - Moderating effects of early biological risk assessed (dichotomous variable): information on child`s birth weight (<2500 g) and gestation period (<36 weeks) **Mental health/ psychological distress:** from Stansfeld 2005	glazing type **Strengths/ weaknesses:** + high response (89%) + multiple noise sources considered + exposure assessment + adequate list of confounders - air pollution not considered as confounder - selection based on noise exposure at school → may have led to unrepresentative sample - cross-sectional design

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		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
							Table 3: Cognitive and health outcomes and aircraft noise exposure Model 1: β= 0.015, 95% CI: -0.012 to 0.042 Model 2: β= 0.013, 95% CI: -0.012 to 0.038 (fully adjusted) Table 5: Cognitive and health outcomes and exposure to road traffic noise Model 1: β= –0·012, 95% CI –0·045 to 0·021 Model 2: β= –0·018, 95% CI –0·049 to 0·013 (fully adjusted) **Sensitivity analysis considering air pollution in a subset of children (n=634)** from Clark 2012 **SDQ total difficulties** **Aircraft noise:** adjusted model (table 2) β =-0.023, 95% CI: -0.073 to 0.026 additionally adjusted for air pollution and road traffic noise (table 4):	

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							β= -0.028, 95% CI: -0.079 to 0.023 **Road noise:** adjusted model (table 2) β= -0.030, 95% CI: -0.093 to 0.033 additionally adjusted for air pollution and aircraft noise (table 4): β= -0.037, 95% CI: -0.104 to 0.029	
Forns 2016 **No**	Cross-sectional BREATHE project	**Study region:** Barcelona, Spain **Sample size**: $N_{Schools}$=39 N= 2,897 (enrolled) M=1,446 F=1,430 **Sample population:** School children in Barcelona and Sant Cugat del Vallès (3 schools) **Age:**	SDQ (parents) ADHD-DSM-IV list (teacher)	Traffic noise in classroom 3x 10-Min. measurements taken for 2 consecutive days in a single classroom of each school in	L_{eq} (average of two 30-min measurements)	28.8-51.1 dB indoor Continuous analysis (IQR = 7.60dB)	Table 4: SDQ total difficulties score and ADHD symptomatology Elementary carbon (EC) and noise (multiple exposure, indoor EC measurements) SDQ: Mean Ratios (per IQR) 0.98; 95% CI (0.92-1.04) ADHD-Sympt: Mean Ratios (per IQR) **1.29**; 95% CI **1.18-1.43** NO_2 and noise (multiple exposure, indoor NO_2 measurements)	**Study quality** - **Conflict of interest** stated (none declared) **Funding** European Research Council (public funding) **Confounding** child's sex, child's age, maternal education,

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		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
		7-11 years **Time of recruitment:** 2012-2013 **Response:** 59%		the morning before children arrived (before 0900 hours) Air pollution (elemental carbon (EC), and NO_2)			SDQ 1.01 (0.94-1.07) ADHD-Sympt **1.24** **(1.12-1.38)** Multi-exposure models including traffic-related air pollutants (TRAPs) and noise were adjusted for child's sex, child's age, maternal education, urban vulnerability index at home address, air pollution (BC) at home, traffic noise annoyance at home, home tobacco use, urban vulnerability index at school, and type of school.	urban vulnerability index at home address, air pollution (BC) at home, traffic noise annoyance at home, home tobacco use, urban vulnerability index at school, and type of school and air pollution **strengths/ weaknesses:** + air particulate level considered +adequate control for confounders + ethical clearance - no common exposure measurement and no exposure assessment descriptors - cross-sectional design (-) very brief noise

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		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
								measurements
Haines 2001(a) **No** (mean scores as outcome, cannot convert to OR, RR)	Cross-sectional study	**Study region:** Heathrow airport, London, United Kingdom **Sample population:** Children in state primary schools around Heathrow Airport in West London **Sample size:** **Overall** M+F=340 M=170, F=170 **Age:** mean: 9years, 8 month range: 8years, 7month-10years,10month **Exposed/unexposed**	**Depression:** Child Depression Inventory (CDI) **Anxiety:** Revised Child Manifest Anxiety Scale (CMAS) **Psychological morbidity:** Strength and Difficulties Questionnaire (SDQ) - Hyperactivity - Psychosocial behavior - Conduct Problems - Emotional	Aircraft	$L_{eq,16h}$ from 1991 Civil Aviation Authority (92 days) contour map	Schools categorized by Low noise (LN): $L_{eq,\ 16h} \leq 57$ dB vs High noise (HN) $L_{eq,\ 16h} > 63$ dB	<u>Mental health outcome mean scores (from Table 2)</u> **Outcome** / **HN (4)** / **LN (4)** / **LN (3)** / **p (8)** / **p (7)** Depression / 5.24 / 4.56 / 4.53 / 0.17 / 0.179 Anxiety / 12.6 / 11.9 / 11.96 / 0.399 / 0.328 Hyperactivity / 3.44 / 3.49 / 3.38 / 0.871 / 0.764 Psychosocial behaviour / 8.22 / 8.11 / 8.02 / 0.65 / 0.314 Emot / 1.95 / 2.13 / 2.02 / 0.49 / 0.971	**Study quality:** - Cross-sectional study design **Conflict of interest:** not mentioned **Funding:** stated (local authorities and health agencies around Heathrow airport) → public funding **Confounding (matching for):** household deprivation (Townsend´s Scale: income, crowding, home ownership, unemployment), age

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		Four public schools in high aircraft noise areas (HN) M+F=169, M=83, F=86 Four matched control public schools (one excluded later) in low aircraft areas (LN) M+F=171, M=85, F=86 One school excluded later – biased sample (M+F=26) **Time of recruitment/ follow-up** 1996 (testings: 3 days, each a week apart **Response:** children: 77 % parents: 84% teachers: 100%	symptoms - Peer problems - Total score Completed at home by parents				ional symptoms 1 Conduct problems 1.5 1.42 1.27 0.769 0.246 Peer problems 1.89 1.82 1.68 0.73 0.238 SDQ total 8.77 8.86 8.33 0.902 0.45 Adjusted for age, deprivation and main language spoken in the four HN schools, the four LN schools and the three LN schools (excluding the procedural error school)	main language spoken at home **Strengths/ weaknesses:** +high noise selected schools were matched with low noise control schools (matched for age of the children, sound level from non-aircraft noise, noise protection in the schools, socio-economic group distribution and unemployment rate, ethnic group) + high response (and did not differ between HN and LN) + Study introduced as a Health and Environment Study →

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								did not focus on noise to avoid response bias +appropriate noise measurement - no information on recruitment process -cross-sectional design - post hoc exclusion of one of the four control schools (since there were classes with lower ability rather than the requested representative children) → but results provided for both situations (without and with exclusion of the school) - small difference in exposure between chronic noise exposure in low and high noise

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		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
								areas - no other noise exposure considered - air particulate level not considered
Haines 2001(b) **No** (mean scores as outcome, cannot convert to OR, RR) (together with Haines 2001(a))	Longitudinal study	**Study region:** Heathrow airport, London, United Kingdom **Sample population:** Children in state primary schools around Heathrow Airport in West London **Sample size**: Baseline: M+F=340 Follow up: M+F= 275 M= 132, F=143	**Depression:** Child Depression Inventory (CDI) **Anxiety:** Revised Child Manifest Anxiety Scale (CMAS)	Aircraft	$L_{eq,16h}$ outdoor from 1991 Civil Aviation Authority Leq 16h (92 days) contour map	HN schools: $L_{eq,16h} \geq 66$ dB LN schools: $L_{eq,16h} \leq 57$ dB	<u>Difference in mental health scores at follow-up (low noise mean minus high-noise mean), HN=4 schools, LN=3 schools (from Table 2)</u> Outcome / HN / LN / Difference score (95% CI) / p Depression (CDI) / 4.50 / 4.58 / 0.08 (-1.27, 1.42) / 0.92 Anxiety (CMAS) / 10.94 / 11.12 / 0.18 (-2.05,	**Study quality:** + Longitudinal study design **Conflict of interest:** not mentioned **Funding:** local authorities and health agencies around Heathrow airport) → public funding **Confounding (adjusted for):** household deprivation

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		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
		Age mean: 10 years, 8 months **Exposed/unexposed** Four public schools (1 excluded later) in high aircraft noise areas (HN) N=148 (M:74, F:74) Initially four (one excluded later→ three left) matched control public schools in low aircraft areas (LN) M+F=127, M=: 58, F=69 **Time of recruitment / follow-up**: Baseline: 1996, Follow-up: 1997 **Response**: Response at baseline: NA Loss to follow-up: 19%					2.38) Adjusted for age, deprivation and main language spoken	(Townsend´s Scale), age, main language spoken at home **Strengths/ weaknesses:** +high noise selected schools were matched with low noise control schools (matching for age, sound level from non-aircraft noise, noise protection, socio-economic group, ethnic group) + longitudinal study + acceptable time for follow up (1 year) + high response (see Haines-study (945) and low lost to follow-up + appropriate noise measurement (Leq)

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		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
								- small difference in exposure between chronic noise exposure in low and high noise areas - no other noise exposure considered - air particulate level not considered
Haines 2001(c) **No** (mean scores as outcome, cannot convert to OR, RR) (togethe	Cross-sectional study	**Study region:** Heathrow airport, London, United Kingdom **Sample population:** Fourth-grade pupils in schools around Heathrow Airport in West London **Sample size:** M+F= 451 M=229, F=222	**Psychological morbidity:** Strength and Difficulties Questionnaire (SDQ) - Hyperactivity - Prosocial behavior - Conduct Problems - Emotional	Aircraft	$L_{eq,16h}$ outdoor 1997 Civil Aviation Authority contour map (92 days)	HN schools: $L_{eq,16h} \geq 66$ dB LN schools: $L_{eq,16h} \leq 57$ dB	<u>Mental health outcome scores for 10 high noise schools and 10 low noise scores (from Table 3)</u> Outcome (Model 1, 2) / HN (mean, (SE)) / LN (mean, (SE)) / Difference score= LN-HN (95% CI) / P-value hyperactivi / 4.81 (0.14) / 4.14 (0.14) / -0.66 (-1.07, / **0.0001**	**Study quality:** - Cross sectional study design **Conflict of interest:** not mentioned **Funding:** Department of Health and Department of Environment and Transport and the

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results					Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**						
r with Haines 2001(a & b))		**Age**: mean: 8 years, 8 month range: 8 years,1 month- 9 years,8 months **Exposed/unexposed** Ten schools in high aircraft noise areas (HN) M+F=236, M=117, F=119 Ten matched control schools in low aircraft areas (LN) M+F=215, M=112, F=103) **Time of recruitment / follow-up:** 1997 **Response:** 82 % (HN= 83%, LN= 81%)	symptoms - Peer problems - Total score (hyperactivity, emotional, conduct and peer problems)				ty			-0.262)		Region→ public funding **Confounding (adjusted for):** Model 1: age Model 2: age, main language spoken at home, household deprivation (Townsend´s Scale) **Strengths/ weaknesses:** +high noise selected schools were matched with low noise control schools (matching for age, sex, sound level from non-aircraft noise, noise protection in schools, socio-economic group, language spoken at
								4.80 (0.14)	4.15 (0.14)	-0.65 (-1.06, -0.25)	**0.0001**	
							Conduct problems	1.99 (0.14)	1.81 (0.14)	-0.19 (-0.56, 0.19)	0.33	
								1.20 (0.13)	1.80 (0.13)	-0.19 (-0.56, 0.18)	0.30	
							Peer problems	2.15 (0.14)	2.01 (0.14)	-0.14 (-0.53, 0.25)	0.48	
								2.13 (0.14)	2.03 (0.14)	-0.11 (-0.49, 0.27)	0.58	
							Emotional symp	2.61 (0.16)	2.43 (0.16)	-0.18 (-0.63, 0.27)	0.43	

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results	Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
							toms 2.58 (0.16) 2.46 (0.16) -0.13 (-0.57, 0.32) 0.58 SDQ total 11.56 (0.42) 10.39 (0.42) -1.17 (-2.32, -0.08) **0.04** * 11.51 (0.40) 10.43 (0.40) -1.08 (-2.20, 0.04) 0.06 Model 1: adjusted for age Model 2: adjusted for age, main language spoken at home, household deprivation	school) + multilevel modelling + high response (and did not differ between HN and LN) + appropriate noise measurement - no information on recruitment process - only little differences between the chronic exposure in low and high noise areas - no other noise exposure considered - air particulate level not considered
Hjortebjerg 2016 **Yes**	Longitudinal study	**Study region:** Denmark **Sample population:** Children from Danish National Birth Cohort	**Psychological morbidity:** Strength and Difficulties Questionnaire	Road traffic and railway traffic	**Road traffic:** L_{DEN} L_N (22-07h) <40 dB were set	As categorical values >50 dB 50-55 dB	Monotonic increase in OR (per 10dB(A)) until 60-65dB for abnormal total difficulties scores and abnormal hyperactivity/inattention subscales	**Study quality:** + (to ++) **Conflict of interest:** stated

Reference (First author, publication year) **Meta-analysis** (Yes/No)	**Study design**	**Population** **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Outcome** **Disease (ICD-10)** **Prescription** **Questionnaire**	**Exposure** **exposure source**	**exposure assessment**	**exposure levels**	**Results**	**Comments** (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Sample size: M+F= 46,940 **Age:** 7 years **Exposed/unexposed:** NA **Time of recruitment/ follow-up:** 1996-2002 (pregnancy)/ follow-up when child was 7 years **Response:** no information (Jacobsen, T. N., Nohr, E. A., & Frydenberg, M. (2010). Selection by socioeconomic factors into the Danish National Birth Cohort. *European Journal of Epidemiology*, *25*(5), 349-355.: response 31%)	(SDQ) - Hyperactivity/ inattention - Conduct Problems - Emotional symptoms - Peer problems - Total score (hyperactivity, emotional, conduct and peer problems) Divided into categories normal, borderline or abnormal (Niclasen et al 2012, Youth*in*Mind 2015)		to 40 dB **Railway noise** - L_{DEN} < 20 dB was set to 0 Both rail and road traffic noise from 1995, 2000, 2005, and 2010 for all present and historical addresses with SoundPLAN Air pollution - NO_x	55-60 dB 60-65 dB ≥ 65 dB for road traffic noise >60 dB, >60 dB for railway noise and Conti-nuous analysis (per 10dB) for road and railway	<u>Associations between exposure to noise (L_{DEN}, per 10-dB increase) during pregnancy and early childhood and child behavioral borderline or abnormal scores (from Table 2)</u> **Road traffic noise (L_{DEN}) during pregnancy: adjusted model** SDQ-Score / OR (95% CI) / n Emotional symptoms: Normal 1.00 40,245; Borderline 1.00 (0.95,1.06) 3,099; Abnormal 0.97 (0.92,1.03) 3,596 Conduct problems: Normal 1.00 40,374; Borderline 0.99 (0.94, 1.05 4,045; Abnorm 0.98 2,521	**Funding:** European Research Council Danish National Birth Cohort is a result of a major grant from Danish Epidemiology Science Centre. Additional support: Pharmacy Foundation, Egmont Foundation, March of Dimes Birth Defects Foundation, Augustinus Foundation and Health Foundation. +7-year follow-up supported from the Lundbeck Foundation and the Danish Medical Research Council.

Reference (First author, publication year) Meta-analysis (Yes/No)	Study design	Population	Outcome	Exposure			Results				Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**					
								al	(0.92, 1.05)		**Confounding (adjusted for):** sex, age at SDQ, gestational age, birth weight, maternal age at delivery, parity, educational level, disposable income, smoking and alcohol consumption during 1st trimester, railway and airport noise at birth (for exposure during pregnancy) and at 7 years of age, and self-reported maternal mental health problems during 1st trimester (yes/no). NO_x
							Hyperactivity/ inattention	Normal	1.00	37,799	
								Borderline	1.01 (0.96, 1.05)	6,097	
								Abnormal	1.01 (0.96, 1.08)	3,044	
							Peer relationship problems	Normal	1.00	37,690	
								Borderline	1.01 (0.97, 1.06)	5,243	
								Abnormal	0.99 (0.94, 1.04)	4,007	
							Road traffic noise (L_{DEN}) from birth to 7 years of age				
							SDQ	SDQ-Score	OR (95% CI)	n	**strengths/ weaknesses:** + longitudinal study

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results				Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**					
							Emotional symptoms	Normal	1.00	40,245	+ adequate control for confounding (including adjustment for NOx in a sensitivity analysis) + number of participants + appropriate noise exposure measurement + two noise exposures taken into account
								Borderline	1.03 (0.96, 1.10)	3,099	
								Abnormal	0.98 (0.92, 1.05)	3,596	
							Conduct problems	Normal	1.00	40,374	
								Borderline	1.01 (0.96, 1.07)	4,045	
								Abnormal	1.05 (0.98, 1.14)	2,521	
							Hyperactivity/ inattention	Normal	1.00	37,799	
								Borderline	**1.05 (1.00, 1.10)**	6,097	
								Abnormal	**1.10 (1.03, 1.18)**	3,044	

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results	Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		

Peer relationship problems	Normal	1.00	37,690
	Borderline	1.05 (0.99, 1.10)	5,243
	Abnormal	1.06 (0.99, 1.12)	4,007

<u>Associations between exposure to railway noise at time of birth and at SDQ (7 years), and abnormal scores on the total difficulties score and subscales (Table 3)</u>

Railway noise (L_{DEN}) at time of birth and abnormal scores

SDQ subscale	Noise exposure (dB)	OR (95% CI)	n
Emotional symptoms	Unexposed	1.00	2,957
	≤ 60	**1.11 (1.00, 1.23)**	509

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	Outcome **Disease (ICD-10)** **Prescription** **Questionnaire**	Exposure **exposure source**	**exposure assessment**	**exposure levels**	Results				Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
								> 60	1.01 (0.83, 1.22)	130	
								Per 10	1.02 (0.94, 1.11)	639	
							Conduct problems	Unexposed	1.00	2,128	
								≤ 60	0.98 (0.87, 1.11)	313	
								> 60	0.90 (0.71, 1.13)	80	
								Per 10	0.94 (0.85, 1.04)	393	
							Hyperactivity/ inattention	Unexposed	1.00	2,570	
								≤ 60	0.94 (0.86, 1.05)	368	
								> 60	0.97 (0.79, 1.19)	106	
								Per 10	0.98 (0.87, 1..07)	474	

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	Outcome **Disease (ICD-10)** **Prescription** **Questionnaire**	Exposure **exposure source**	**exposure assessment**	**exposure levels**	Results	Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])

Peer relationship problems	Unexposed	1.00	3,362
	≤ 60	0.98 (0.89, 1.09)	509
	> 60	0.97 (0.80, 1.16)	136
	Per 10	0.98 (0.90, 1.06)	645

B) Railway noise (<u>LDEN</u>) at 7 years and abnormal scores

SDQ	Noise exposure (dB)	OR (95% CI)	n
Emotional symptoms	Unexposed	1.00	3,085
	≤ 60	1.05 (0.94, 1.16)	439
	> 60	1.10 (0.89, 1.41)	72

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	Outcome **Disease (ICD-10)** **Prescription** **Questionnaire**	Exposure **exposure source**	**exposure assessment**	**exposure levels**	Results				Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
								Per 10	1.00 (0.90, 1.11)	511	
							Conduct problems	Unexposed	1.00	2,174	
								≤ 60	1.05 (0.85, 1.07)	300	
								> 60	1.01 (0.75, 1.37)	47	
								Per 10	0.95 (0.84, 1.07)	347	
							Hyperactivity/ inattention	Unexposed	1.00	2,643	
								≤ 60	0.94 (0.85, 1.07)	341	
								> 60	1.05 (0.80, 1.38)	60	
								Per 10	1.09 (0.97, 1.22)	401	
							Peer relationship	Unexposed	1.00	3,470	

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results	Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
							problems ≤ 60 — 0.96 (0.86, 1.06) — 446 > 60 — **1.27 (1.01, 1.58)** — 91 Per 10 — **1.13 (1.03, 1.25)** — 537 **Adjustment for NOx small increases in estimates (results not shown). ***NOx exposure in itself (in models without adjustment for noise) was not associated with behavioral problems: <u>Modification of associations between time-weighted mean exposure to road traffic noise (L_{DEN}) from birth to 7 years of age (per 10-dB increase) and abnormal scores on total difficulties score and hyperactivity/inattention subscale by railway noise (from Table 4)</u>	

Reference (First author, publication year) **Meta-analysis** (Yes/No)	**Study design**	**Population** **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Outcome** **Disease (ICD-10)** **Prescription** **Questionnaire**	**Exposure** **exposure source**	**exposure assessment**	**exposure levels**	**Results**	**Comments** (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
							Hyperactivity/inattention abnormal scores Railway noise exposure (dB) / Abnormal cases, n / OR (95% CI) Unexposed / 2,643 / **1.07 (1.00, 1.15)** ≤ 60 / 341 / **1.28 (1.06, 1.55)** > 60 / 60 / 1.01 (0.63, 1.63) p-Interaction= 0.23 Total difficulties abnormal scores Railway noise exposure (dB) / Abnormal cases, n / OR (95% CI) Unexposed / 3270 / 1.06 (0.99, 1.13) ≤ 60 / 420 / 1.28 (1.06, 1.35) > 60 / 80 / 0.95 (0.62, 1.45) p-interaction=0.67 Information of effect modification by sex, low birth weight, educational level, income	

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results	Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
							available (Table 4)	
Lim 2018 **Yes**	Cross-sectional	**Study region:** Seoul and Ulsan, South Korea **Sample size**: M+F=918 M= 427, F= 491 **Sample population:** students from four elementary schools and four middle-school schools **Age:** 11.47 ± 1.54 years (range 9-14 years) **Time of recruitment:** June-August 2016 **Response:** Not reported	Child Behavior Checklist Internalizing problems: sum of Anxious/ Depressed, Withdrawn/ Depressed, and Somatic Complaints subscales externalizing problem: sum of Rule-Breaking Behavior and Aggressive Behavior subscales	Road traffic noise (at residential addresses of each individual) Data from 2014	LDN	continuous	Internalizing problems (Table 5): LDN: OR = 1.02 (95% CI, 0.97-1.06) Externalizing problems (Table 6): LDN: OR = 1.03 (95% CI, 0.98-1.08) Total problems (Table 7): **LDN: OR = 1.08 (95% CI, 1.01- 1.15)**	**study quality:** - Cross-sectional analysis **conflict of interest:** stated (none declared) **funding:** stated (Korea Ministry of Environment (MOE) as The Environmental Health Action Program (grant number: 2014001350001) **confounding (controlled for):** sex, age, monthly income, premature birth, maternal age at birth, passive smoking, maternal illness during pregnancy (hypertension and Pre-

Reference (First author, publication year) **Meta-analysis** (Yes/No)	**Study design**	**Population** **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Outcome** **Disease (ICD-10)** **Prescription** **Questionnaire**	**Exposure** **exposure source**	**exposure assessment**	**exposure levels**	**Results**	**Comments** (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
								eclampsia), mental disorders (ADHD, Tic disorder, conduct disorder) **strengths, weaknesses:** -Cross-sectional study, with basic information about chronology between exposition and outcome - Air pollution not considered as confounder - response not reported - no information about selection of participants +adequate control for confounders + adequate exposure assessment (+) adequate outcome assessment but

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results	Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
								parental reporting + approval by the Institutional Review Board of Uslan University Hospital
Stansfeld 2009 **No** (continuous outcome)	Cross-sectional study	**Study region:** Area around Heathrow airport (London), Schiphol Airport (Amsterdam), and Barajas airport (Madrid) **Study population:** RANCH Study Pupils from 89 schools Schools excluded if highly sound insulated or exposed to a different dominant noise source than to aircraft or road traffic noise. Schools classified on a 4x4 grid ranging from low to high for aircraft noise and low to high for	**Psychological morbidity:** Strength and Difficulties Questionnaire (SDQ) - Hyperactivity/ inattention - Conduct Problems - Emotional symptoms - Peer problems - Prosocial behavior - Total score	Aircraft and road traffic noise	Noise exposure assessments at schools Aircraft noise: $L_{eq,16h}$ (07-23h) noise contours Road traffic noise: In UK and Spain estimates of road traffic noise based on simplified CRTN	30-77dB for aircraft noise 32-71dB for road traffic noise Continuous analysis	<u>Exposure to aircraft noise traffic in dB and mental health outcomes (Table 2)</u> **B (95%CI)** / **p-value** **Overall difficulties** Model 2: 0.013 (-0.023, 0.010) / 0.471 **Hyperactivity** Model 2: 0.013 (0.001, 0.024) / 0.032 **Conduct disorder** Model 2: -0.005 (-0.013, 0.003) / 0.220 **Peer Problems** Model 2: 0.004 / 0.296	**Study quality** -(to +) **Conflict of interest** Sponsors had no role in study design, data collection, analysis, interpretation or writing the report **Funding** Public RANCH Study founded by European Community UK co-founding by Department of

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results	Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
		road traffic noise. Two schools/country in each noise exposure grid cell **Sample size:** M+F= 2014 Not separated by gender **Age:** 9-10 years **Exposed/unexposed:** NA **Time of recruitment/follow-up:** Not specified **Response rate (%)** Overall child response rate: 80% Parental response rate: 80%	(hyperactivity, emotional, conduct and peer problems) Parental version		noise prediction method using a combination of proximity to roads. Measurements confirmed these estimates. For Netherlands aircraft and outdoor road traffic noise measurements provided by modelled data lined to school locations by geographical information systems.		(-0.004, 0.012) **Prosocial behavior** Model 2 0.002 0.720 (-0.007, 0.010) **Emotional Problems** Model 2 0.001 0.785 (-0.009, 0.011) Model 2: adjusted for age, gender, country, mother's education, employment status, crowding, homeownership, long-standing illness, main language spoken at home, parental support, classroom glazing and **other noise exposure** <u>Exposure to road noise traffic in dB and mental health outcomes</u> **B (95%CI)** **p-value** **Overall difficulties** Model 2 -0.018 0.275 (-0.049, 0.013) **Hyperactivity**	Environment, Food and Rural Affairs. Netherlands co-founding by the Dutch Ministry of Spatial Planning, Housing and Environment and the Dutch Ministry of Transport, Public Works and Water Management **Confounding** Age, gender, country, mothers education, employment status, crowding, homeownership, illness, main language spoken at home, parental support, classroom glazing

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results	Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
							Model 2 0.0002 (-0.014, 0.014) 0.982 **Conduct disorder** Model 2 -0.010 (-0.020, -0.001) 0.033 **Peer Problems** Model 2 -0.009 (-0.019, 0.001) 0.072 **Prosocial behavior** Model 2 -0.004 (-0.014, 0.007) 0.490 **Emotional Problems** Model 2 0.001 (-0.011, 0.014) 0.828 Model 2: adjusted for age, gender, country, mother's education, employment status, crowding, homeownership, long-standing illness, main language spoken at home, parental support, classroom glazing and other noise exposure	**Strengths/weaknesses:** + Studied both aircraft and road traffic noise + Good noise exposure assessment + Confounder list pretty inclusive, but missing air particulate level + Good response rate + all schools matched according to socio-economic status and ethnicity within each country + study introduced as study on environment and health without explicit mention of noise + multi-country - Only noise exposure at school considered - cross-sectional study

Reference (First author, publication year) **Meta-analysis** (Yes/No)	**Study design**	**Population** **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Outcome** **Disease (ICD-10)** **Prescription** **Questionnaire**	**Exposure** **exposure source**	**exposure assessment**	**exposure levels**	**Results**	**Comments** (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
								- air particulate level not considered - no information on the sampling method (selection)
Tiesler 2013 **Yes**	Cross-sectional study	**Study region:** Munich, Germany **Study population:** population-based, 10 year old children from GINIplus and LISAplus cohort **Sample size:** M+F=872 F=410 M=462 **Age:** 10.1 +/- 0.22 years	**Psychological morbidity** Strength and Difficulties Questionnaire (SDQ) - Hyperactivity/ inattention - Conduct Problems - Emotional symptoms - Total score (hyperactivity, emotional,	Road traffic noise	L_{DEN} L_N (22-06h) Noise modeling based on Munich noise map from 2007	L_{DEN} Most exposed façade= 52.42+/- 7.87 dB range **35.40**-74.70 dB Least exposed= 44.92+/- 6.15 dB range: 24.20-	<u>Association between road traffic noise variables (L_{DEN}) at most and least exposed façade of the children's' home address and behavioral problems (from Table 4) using continuation odds ratio (per IQR)</u> OR 95% CI L_{DEN} at most exposed façade *These estimates were included in the meta-analysis and converted to OR per 10dB* Total difficulties score 1.16 0.95-1.40 Emotional symptoms 1.14 0.95-1.37	**Study quality** - **Conflict of interest** No information **Funding** Federal Ministry for Education, Science, Research and Technology, Helmholtz Zentrum München, Federal Ministry of Environment, Ludwig/Maximilians-

Reference (First author, publication year) **Meta-analysis** (Yes/No)	**Study design**	**Population** **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Outcome** **Disease (ICD-10)** **Prescription** **Questionnaire**	**Exposure** **exposure source**	**exposure assessment**	**exposure levels**	**Results**			**Comments** (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		No. of cases NA **Time of recruitment/follow-up:** Baseline LISAplus: Dec 1997-Jan 1999 Baseline GINIplus Sept 1995-June 1998 Time of current study: 10-year follow-up of both cohorts **Response rate (%)** NA	conduct and peer problems) German version, parent-reported			64.50 dB Ln Most exposed façade= 43.36+/-7.63 dB range **26.90**-65.70dB Least exposed= 35.96+/-6.27dB range: 15.40-55.40dB Risk change	Conduct problems Hyperactivity/ inattention Peer relationship problems Lden at least exposed facade Total difficulties score Emotional symptoms Borderline/abnormal vs normal **Abnormal vs borderline** Conduct problems Hyperactivity/	0.95 **1.28** 0.93 1.16 - 1.18 **2.19** 0.93 1.18	0.76-1.18 **1.03-1.58** 0.72-1.21 0.91-1.46 - 0.92-1.51 **1.32-3.64** 0.72-1.20 0.91-1.52	University Munich (public funding) **Confounding** Study, sex, age, parental educational level, mothers age at birth, television/computer usage, single parent status **Strengths/ weaknesses:** + appropriate exposure measure with 2 noise indicators - not adjusted for other confounders (i.e. air particulate level) -no other noise exposure taken into account

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results			Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**				
						per IQR (equal approx. to 8.2- 9 dB)	inattention Peer relationship problems L_N at most exposed facade Total difficulties score Emotional symptoms Conduct problems **Hyperactivity/ inattention** Peer relationship problems L_N at least exposed facade Total difficulties score Emotional symptoms Borderline/abnor	0.94 1.18 1.17 0.95 **1.32** 0.92 1.17 - 1.19	0.70-1.28 0.97-1.44 0.97-1.41 0.76-1.19 **1.06-1.64** 0.70-1.21 0.92-1.48 - 0.93-1.54	- cross-sectional design - not known response rate

Reference (First author, publication year) **Meta-analysis** (Yes/No)	**Study design**	**Population** **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Outcome** **Disease (ICD-10)** **Prescription** **Questionnaire**	**Exposure** **exposure source**	**exposure assessment**	**exposure levels**	**Results**	**Comments** (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
							mal vs normal **Abnormal vs borderline** **2.29** **1.36-3.85** Conduct problems 0.93 0.72-1.20 Hyperactivity/ inattention 1.19 0.92-1.55 Peer relationship problems Borderline/abnormal vs normal 1.08 0.77-1.53 Abnormal vs borderline 0.49 0.24-1.00 Adjusted by study, sex, age, parental educational level, mothers age at birth, television/computer usage, single parent status	
Weyde 2017	Cohort study	**Study region:** Oslo, Norway	Inattention at age 8 from Rating Scale	Road traffic noise	L_{DEN}	continuous	Table 4: Road traffic noise and inattention score (main model- ANOVA)	**study quality:** +

Reference (First author, publication year) **Meta-analysis** (Yes/No)	**Study design**	**Population** **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Outcome** **Disease (ICD-10)** **Prescription** **Questionnaire**	**Exposure** **exposure source**	**exposure assessment**	**exposure levels**	**Results**	**Comments** (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
No (continuous endpoints)	Norwegian Mother and child cohort study (MoBa)	**Sample size**: N_{Total}=14,032 MoBa participants M+P=1,934 children (pregnancy study sample) N2=1,384 children (postnatal study sample) Males and females about equally distributed (%boys: 47.5-52.5 (distinction between pregnancy sample and postnatal sample and further between different exposure level)) **Sample population:** Children born between 2004 and 2007 **Age:** month: 97.3-97.5 (distinction between pregnancy sample and postnatal sample and further	for Disruptive Behavior ->corresponding to 9 inattention items of ADHD in DSM-IV	At child's residence and mother's residence during pregnancy Input data from 2006 and 2011 Assessment of railway traffic noise and NO_2, NO_x and $PM_{2.5}$ -> confounders			<table><tr><td></td><td>N</td><td>coef</td><td>95%CI</td></tr><tr><td>Pregnancy</td><td>1934</td><td>0.0042</td><td>-0.0013-0.0096</td></tr><tr><td>Postnatal</td><td>1384</td><td>0.0083</td><td>0.0012-0.0154</td></tr><tr><td>5-years average</td><td>1384</td><td>0.0090</td><td>0.0016-0.0164</td></tr></table>Different sensitivity analysis performed: stratified by maternal education, household income, with railway noise, without parents living apart, without premature birth, without low birth weight, with air pollution Sensitivity analysis for postnatal and pregnancy road traffic considering the other noise time (pregnancy, postnatal, 5-year average) as covariates in the model.-> Similar results. Results were not extracted	Cohort study **conflict of interest:** stated (none declared) **funding:** stated (Norwegian Research Council, Environmental Exposures and Health Outcomes (MILPAAHEL), project no.; 228,142. The Norwegian Mother and Child Cohort Study is supported by the Norwegian Ministry of Health and Care Services and the Ministry of Education and Research, NIH/NIEHS (contract no N01-ES-75558), NIH/NINDS (grant no.1 UO1 NS 047537–01 and

Reference (First author, publication year) **Meta-analysis** (Yes/No)	Study design	Population	Outcome	Exposure			Results	Comments (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
		Study region **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Disease (ICD-10)** **Prescription** **Questionnaire**	**exposure source**	**exposure assessment**	**exposure levels**		
		between different exposure level) **Time of recruitment:** 1998-2008 **Response:** 40.6% Participant/ non-participant analysis: slight differences between postnatal sample and non-participants: postnatal sample higher household income and higher % of mothers drinking alcohol during pregnancy						grant no.2 UO1 NS 047537-06A1)) **confounding (controlled for):** age, gender, household income, maternal education, urbanity, ethnicity, maternal alcohol consumption during pregnancy, maternal smoking during pregnancy, low birth weight, prematurity **strengths, weaknesses:** - statistical analysis + participant/ non-participant analysis + adequate control for confounders + adequate exposure assessment +adequate control for

Reference (First author, publication year) **Meta-analysis** (Yes/No)	**Study design**	**Population** **Study region** **Sample population** **Sample size** (M, F, M+F): **Age** (mean, range) **No. of cases / no. of controls or exposed/unexposed** **Time of recruitment / follow-up** (mean, range) **Response (%)** (baseline minus loss to follow-up)	**Outcome** **Disease (ICD-10)** **Prescription** **Questionnaire**	**Exposure** **exposure source**	**exposure assessment**	**exposure levels**	**Results**	**Comments** (study quality [overall assessment according to SIGN/CASP], conflict of interest [stated vs. not stated], funding [financed from public funds vs. financed from industry], confounding, strengths / weaknesses [potential bias, over- or underestimation of potential effects])
								confounders + ethics approval by The Regional Committee for Medical Research Ethics (+) adequate definition and assessment of outcome (but parental reporting) (+) sensitivity analysis for air pollution

IQR Interquartile range