Associations between prenatal alcohol exposure and sleep disturbances: An ABCD Study

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We recognise and pay respect to the Elders and communities – past, present, and emerging – of the lands that the University of Sydney's campuses stand on. For thousands of years they have shared and exchanges knowledges across innumerable generations for the benefit of all.

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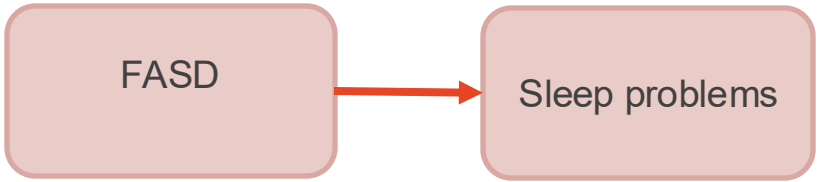
BACKGROUND

BACKGROUND

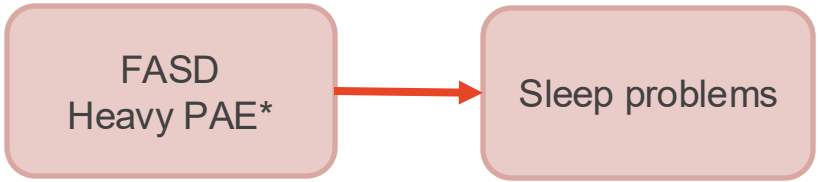
Sleep problems

BACKGROUND



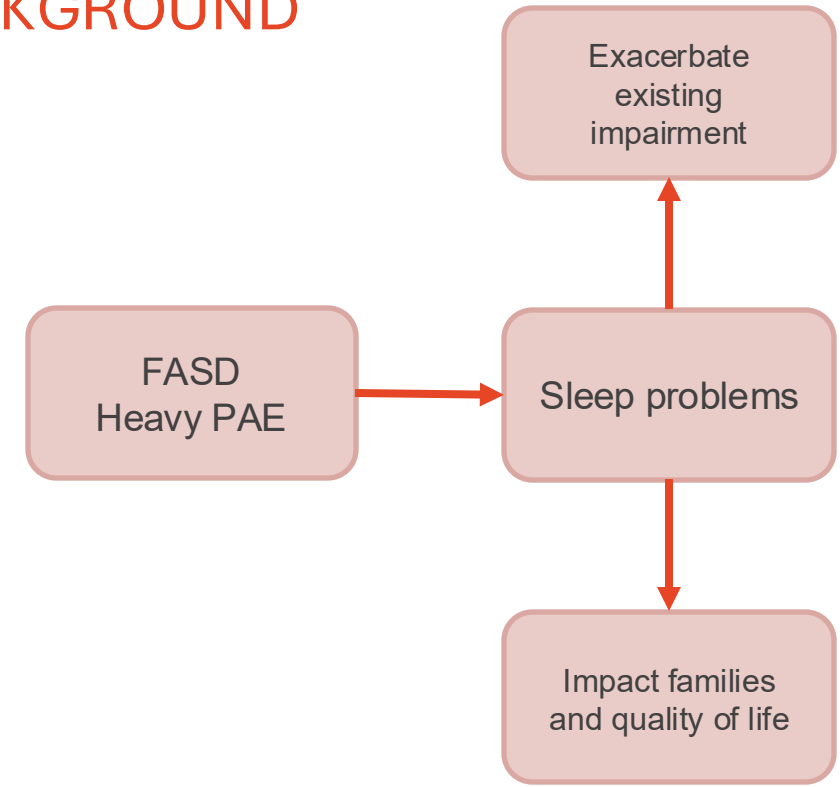
O’Rourke et al., 2024

BACKGROUND



*prenatal alcohol exposure

BACKGROUND


Exacerbate existing impairment
FASD Heavy PAE
Sleep problems
Impact families and quality of life

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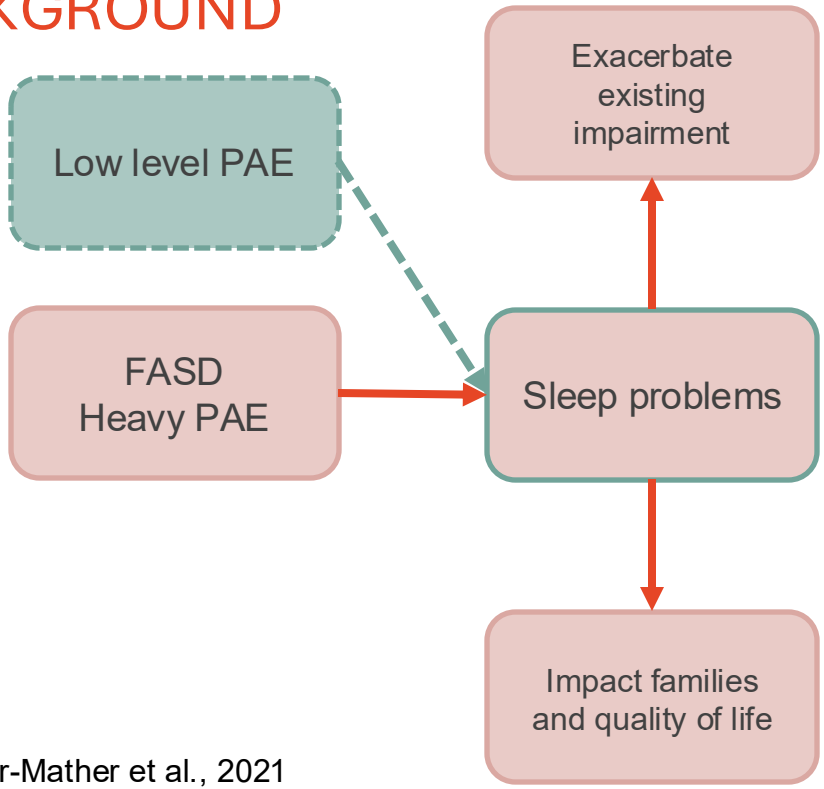
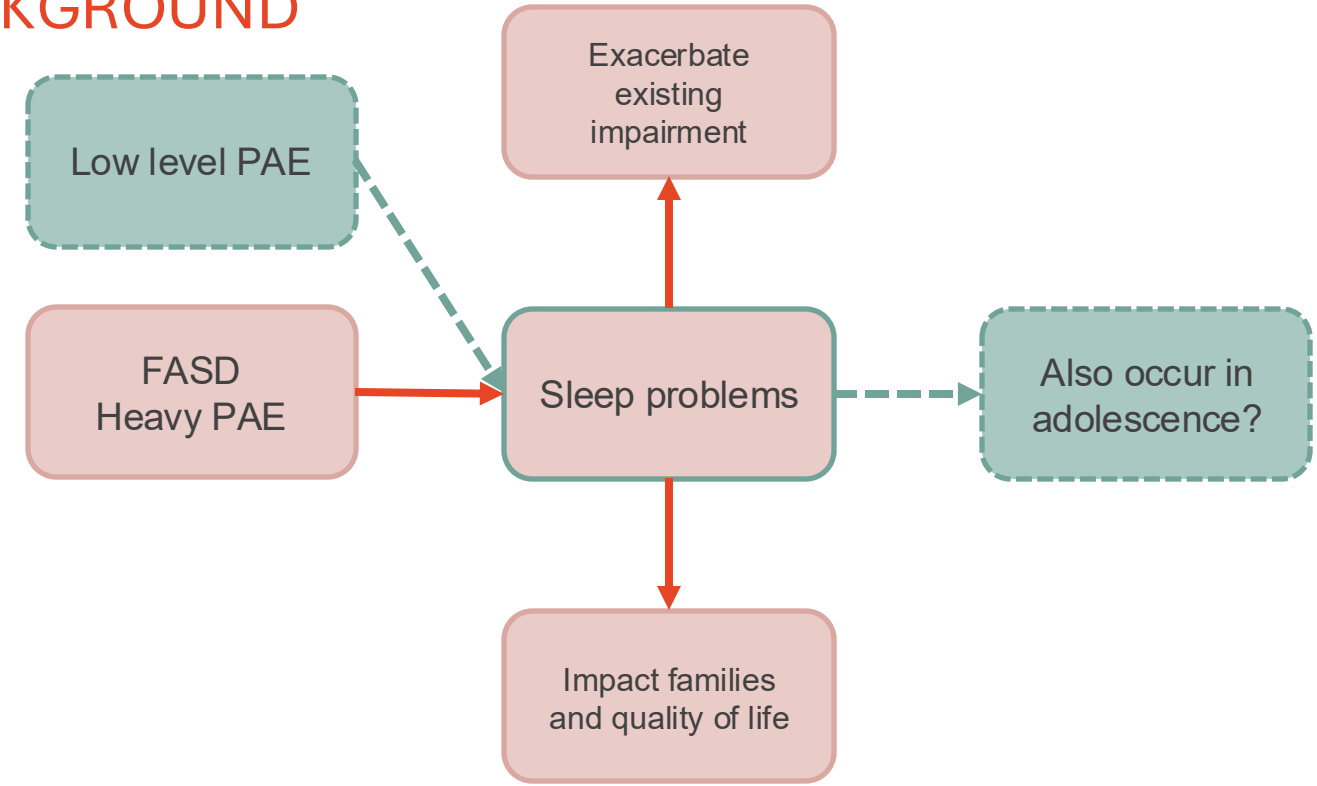


Chandler-Mather et al., 2021

BACKGROUND


Exacerbate existing impairment
Low level PAE
FASD Heavy PAE
Sleep problems
Also occur in adolescence?
Impact families and quality of life

RESEARCH QUESTIONS

Is any prenatal alcohol exposure at any time during pregnancy associated with sleep problems?

Is there any evidence of a dose-response relationship between levels of prenatal alcohol exposure and sleep problems?

Is the timing of prenatal alcohol exposure (e.g., early in pregnancy versus throughout pregnancy) associated with sleep problems?

METHODS

PARTICIPANTS

Adolescent Brain Cognitive Development Study

- Multisite (n=21) longitudinal study
- Biological and behavioural development of ~12,000 children through adolescence into early adulthood
- Incredibly well-characterised study
- PAE variables obtained at baseline
- Sleep variables obtained at the fourth assessment wave (ages 12-13, N=10,336)

MEASURES

Prenatal alcohol exposure

Any PAE
Total drinks
Patterns of PAE

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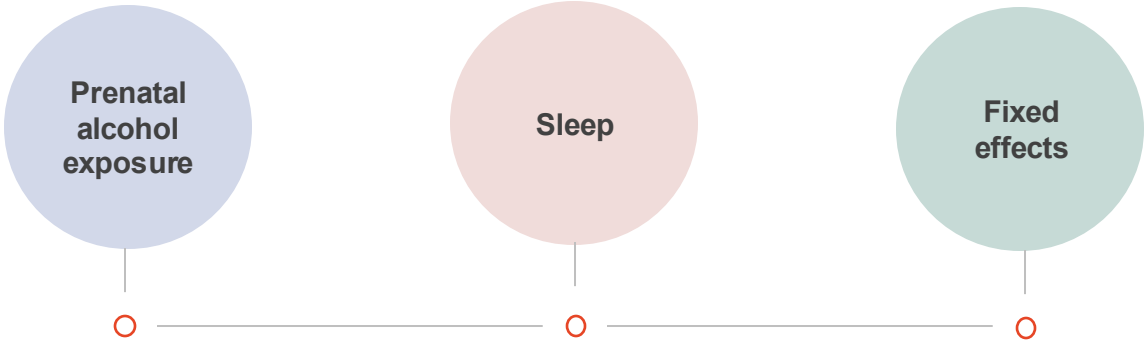
Any PAE
Total drinks
Patterns of PAE

Total sleep problems
Disorder of initiating & maintaining sleep
Sleep breathing disorder
Disorder of arousal
Sleep-wake transition disorder
Disorder of excessive somnolence
Sleep hyperhidrosis

MEASURES



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Total drinks
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Demographic (e.g., sex)
Birth-related (e.g., birth weight)
Parent-related (e.g., anxiety)
Health-related (e.g., asthma)

MEASURES


Prenatal alcohol exposure
Sleep
Fixed effects
Random effects
Any PAE
Total drinks
Patterns of PAE
Total sleep problems
Disorder of initiating & maintaining sleep
Sleep breathing disorder
Disorder of arousal
Sleep-wake transition disorder
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Demographic (e.g., sex)
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Health-related (e.g., asthma)
Family
Data collection site

ANALYSIS

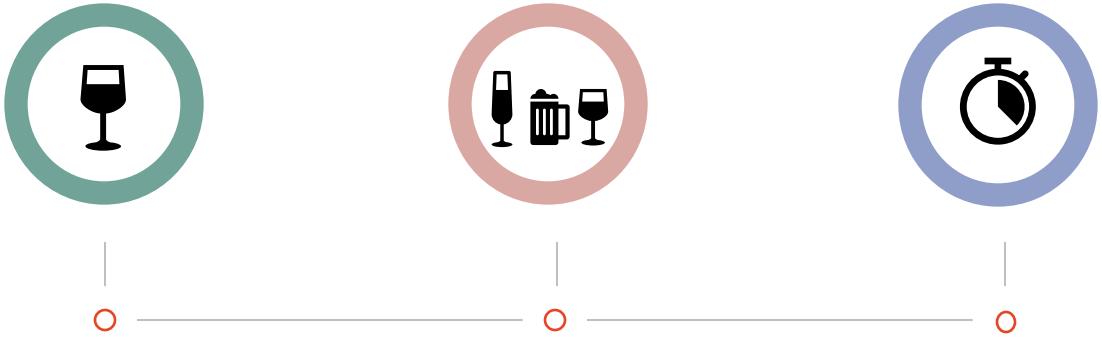
FINDINGS

PARTICIPANTS

10,336 adolescents

12.91 years

47.5% female



2,582 adolescents with PAE

7,550 adolescents without PAE

204 missing data

Average number of drinks consumed across pregnancy was 26.47

Range = 0 to 116

Abstinent = 7,172

Light stable use = 94 (M=48.30 drinks)

Light reducing use = 1,278 (M=15.65 drinks)

Heavy reducing use = 787 (M=39.66 drinks)

Any prenatal alcohol exposure

Parent-reported sleep variables	β	95% CI	p	pFDR
Total sleep disorder score	**0.517**	**0.127 – 0.906**	**0.009****	**0.021***
Disorder of initiating and maintaining sleep	0.062	-0.131 – 0.255	0.527	0.604
Sleep breathing disorder	0.027	-0.026 – 0.080	0.316	0.442
Disorder of arousal	0.017	-0.016 – 0.051	0.304	0.442
Sleep-wake transition disorder	**0.210**	**0.101 – 0.318**	**<0.001*****	**0.001****
Disorder of excessive somnolence	**0.200**	**0.069 – 0.331**	**0.003****	**0.011***
Sleep hyperhidrosis	0.012	-0.033 – 0.057	0.604	0.604

Parent-reported sleep variables	aOR	95% CI	p	pFDR
Sleep breathing disorder	**1.160**	**1.048-1.285**	**0.004**	**0.012****
Disorder of arousal	1.093	0.960-1.244	0.180	0.180
Sleep hyperhidrosis	1.109	0.963-1.277	0.151	0.180

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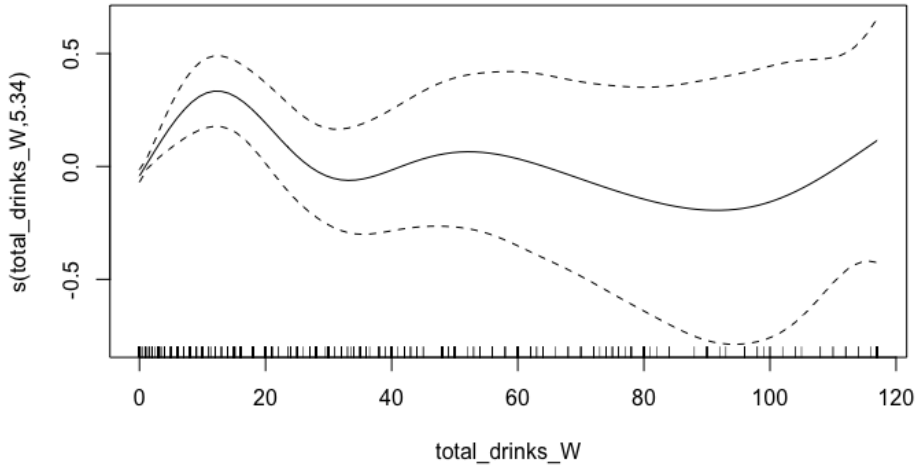
Small effect sizes

Dose of prenatal alcohol exposure

Parent-reported sleep variables	EDF	F Value	p	pFDR
Total sleep disorder score	4.275	1.512	0.180	0.420
Disorder of initiating and maintaining sleep	1.000	3.313	0.068	0.238
Sleep breathing disorder	1.565	0.296	0.750	0.750
Disorder of arousal	3.789	1.033	0.450	0.583
Sleep-wake transition disorder	**5.337**	**3.047**	**0.005****	**0.035***
Disorder of excessive somnolence	4.056	1.109	0.395	0.583
Sleep hyperhidrosis	1.628	1.685	0.500	0.583



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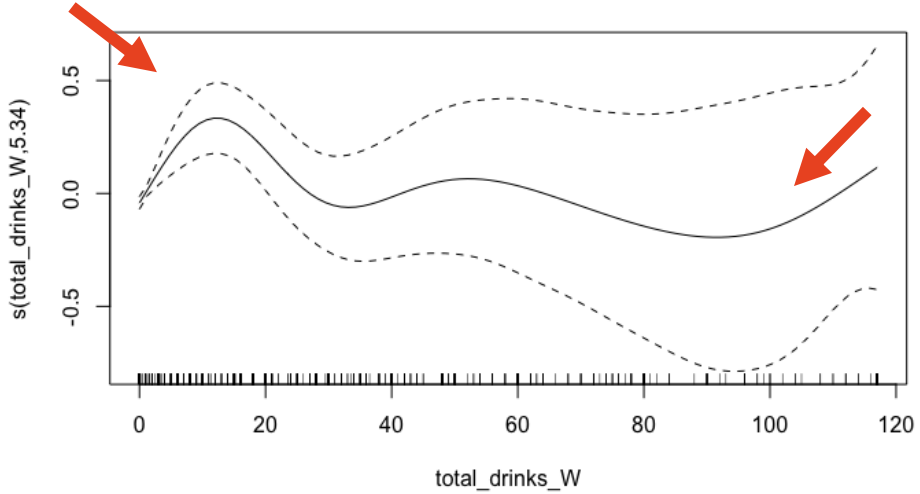

Timing of prenatal alcohol exposure

Parent-reported sleep variables	Exposure group	β	95% CI	p	pFDR
Total sleep problems	Light stable	1.912	-0.035 – 3.859	0.054	0.126
	Light reducers	0.801	0.285 – 1.317	0.002**	0.021*
	Heavy reducers	0.956	0.130 – 1.782	0.024*	0.087
Disorders of initiating and maintaining sleep	Light stable	0.483	-0.404 – 1.370	0.284	0.351
	Light reducers	0.160	-0.093 – 0.413	0.214	0.284
	Heavy reducers	0.279	-0.125 – 0.683	0.175	0.284
Sleep breathing disorders	Light stable	0.014	-0.225 – 0.252	0.909	0.909
	Light reducers	0.074	0.002 – 0.146	0.044*	0.112
	Heavy reducers	0.058	-0.056 – 0.173	0.314	0.366
Disorders of arousal	Light stable	0.039	-0.102 – 0.181	0.584	0.613
	Light reducers	0.030	-0.016 – 0.075	0.199	0.284
	Heavy reducers	0.033	-0.041 – 0.106	0.380	0.420
Sleep-wake transition disorders	Light stable	0.426	-0.165 – 1.017	0.153	0.284
	Light reducers	0.296	0.152 – 0.439	<0.001***	0.002**
	Heavy reducers	0.252	0.031 – 0.473	0.025*	0.088
Disorders of excessive somnolence	Light stable	0.770	0.181 – 1.359	0.011*	0.077
	Light reducers	0.212	0.030 – 0.394	0.023*	0.088
	Heavy reducers	0.300	0.009 – 0.591	0.044*	0.112
Sleep hyperhidrosis	Light stable	0.183	-0.023 – 0.389	0.081	0.168
	Light reducers	0.037	-0.021 – 0.096	0.209	0.284
	Heavy reducers	0.058	-0.034 – 0.150	0.216	0.284

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KEY TAKEAWAYS

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PRENATAL ALCOHOL EXPOSURE

- Impact of low-levels prenatal alcohol exposure on sleep is more localised, compared to heavy PAE.
- Sleep-wake transitions, excessive somnolence, and sleep breathing disorders are the domains most impacted.

DOSE OF PRENATAL ALCOHOL EXPOSURE

- For low levels of prenatal alcohol exposure, we did not find strong evidence supporting a dose response effect between prenatal alcohol exposure and adolescent sleep disturbances.

TIMING OF PRENATAL ALCOHOL EXPOSURE

- There is some initial evidence that early prenatal alcohol exposure (i.e. before knowledge of pregnancy) may confer the greatest risk on adolescent sleep, but further research is needed.

CONSIDERATIONS

Strengths include:

- Large, representative, and well-characterized sample
- Ability to examine dose and timing of PAE
- Robust statistical analysis

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Limitations include:

- Reliability of parent-reported sleep problems in adolescence
- Recall bias and reporting bias associated with our prenatal alcohol exposure measure

WHERE TO NEXT

Adolescent Brain Cognitive Development®
Teen Brains. Today's Science. Brighter Future.

Baby teeth collected as part of the ABCD Study

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HBCD
HEALthy Brain and Child Development
Babies · Brains · Bright Futures

Follows mothers prospectively asking them to recall past week alcohol use

WHERE TO NEXT

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Learning with FASD universal school-based prevention program

Thank you!

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