



# Adverse Childhood Experience's Impact on Pregnancy-Related Outcomes

*ECHO: OUD in Pregnancy*

Nick Bormann, MD

# Disclosures

Nothing to disclose, no conflicts of interest



# Outline

1. History behind ACE's
2. Relation to subsequent SUD
3. Relation to pregnancy-related outcomes
4. Attachment theory primer (if time)





## SECTION 1

# ACE Study – Felitti, 1998

Showed cumulative impact of childhood traumatic experiences were significantly associated with multiple leading causes of death in adulthood

# Original Study Design

1. **Retrospective** patient recall
2. Kaiser Permanente's San Diego clinic, HMO
3. 13,494 medical evaluations, 7 months over 2 years
4. Mailed the ACE study, **70.5% completion rate**
5. "While you were growing up during your first 18 years of life . . ."



## Original ACE's Measured (prevalence)

1. Physical abuse (11%)
2. Sexual abuse (22%)
3. Emotional abuse (11%)
4. Exposure to domestic violence (13%)
5. Divorce/separation
6. Incarceration (3%)
7. Mental illness (19%)
8. Substance use (26%)

In 1 or both parents



**Table 6.** Relationship between number of categories of childhood exposure and number of risk factors for the leading causes of death<sup>a</sup>

Number of categories	Sample size	% with number of risk factors				
		0	1	2	3	4
0	3,861	56	29	10	4	1
1	2,009	42	33	16	6	2
2	1,051	31	33	20	10	4
3	590	24	33	20	13	7
≥4	545	14	26	28	17	7
Total	8,056	44	31	15	7	3

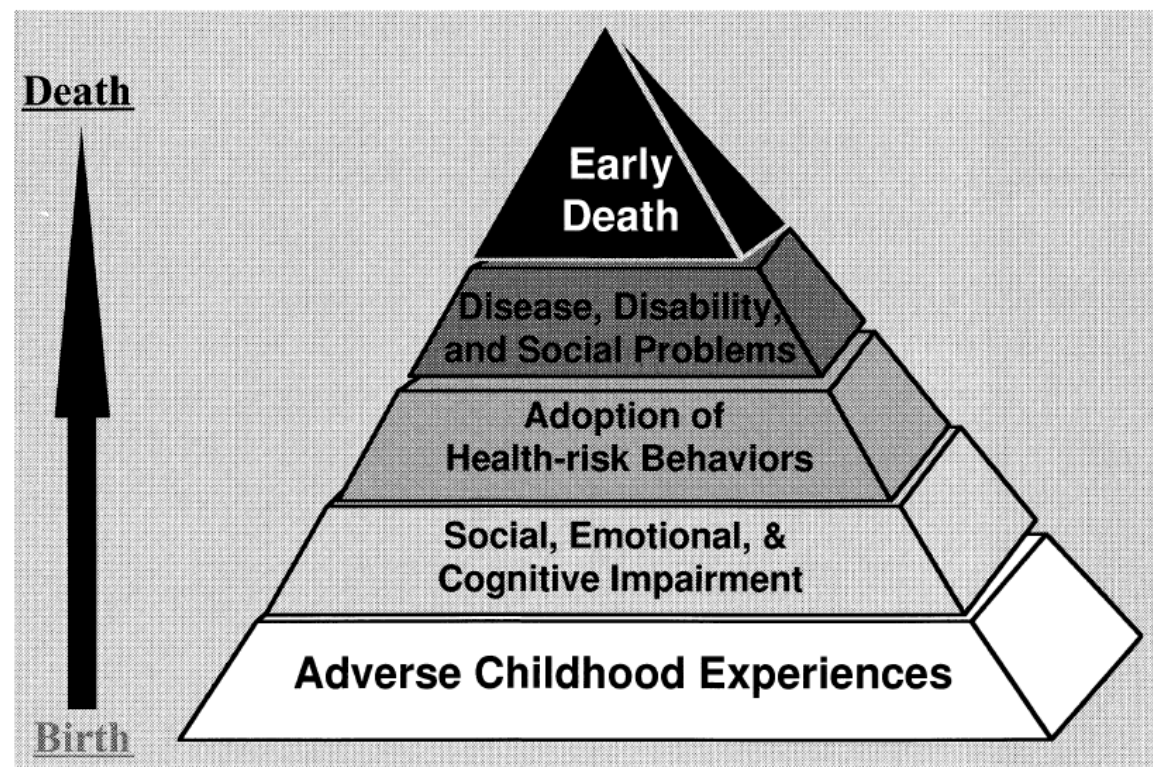
<sup>a</sup>Risk factors include: smoking, severe obesity, physical inactivity, depressed mood, suicide attempt, alcoholism, any drug use, injected drug use, ≥50 lifetime sexual partners, and history of a sexually transmitted disease.



$$\text{Odds Ratio} = \frac{\text{Odds of disease in exposed group}}{\text{Odds of disease in unexposed group}}$$

Health Problem	aOR ACE 4 : ACE 0	Health Problem	aOR ACE 4 : ACE 0
Smoking	2.2 (1.7-2.9)	IV drug use	10.3 (4.9-21.4)
BMI 35+	1.6 (1.2-2.1)	Heart Disease	2.2 (1.3-3.7)
Suicide Attempt	12.2 (8.5-17.5)	Stroke	2.4 (1.3-4.3)
Alcohol	7.4 (5.4-10.2)	Emphysema	3.9 (2.6-5.8)





**Figure 2.** Potential influences throughout the lifespan of ACE's.

SECTION 2

**ACE → SUD?**

# Current Evidence

1. Scoping review (12 papers)<sup>1</sup>
  - + association between ACE and later SUD diagnosis
  - Higher prevalence of ACE in those with SUD
2. Felitti<sup>2</sup> → elevated aOR for **smoking** and **EtOH**



# Mechanism?

1. ACE's may sensitize for later psychopathology<sup>1</sup>
2. Likely surrounded by **risk factors**<sup>1</sup>
  - Instability, parental dysfunction (substances, crimes, illness)
3. **Elevated cortisol**, disruption of neuroendocrine and immune system<sup>2</sup>



SECTION 3

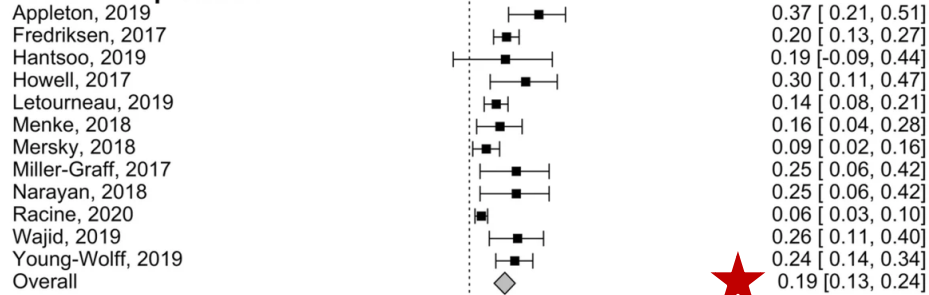
# ACE → Pregnancy-related outcomes

Study

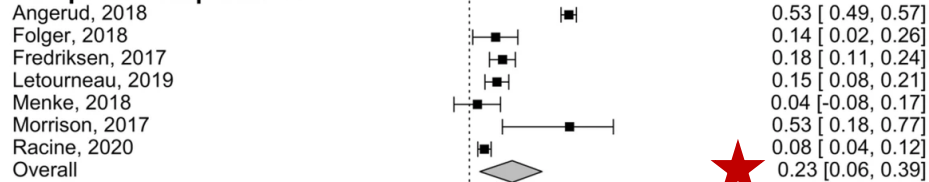
r [95% CI]

ACE → Pregnancy-related outcomes

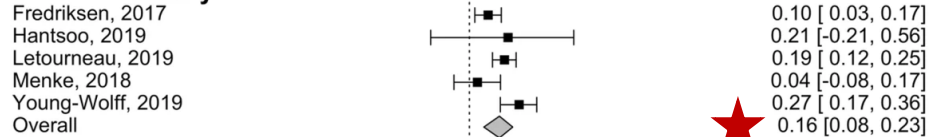
**Prenatal Depression**



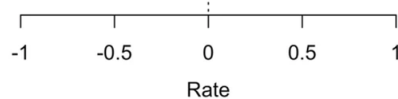
**Postpartum Depression**



**Prenatal Anxiety**



**Postnatal Anxiety**



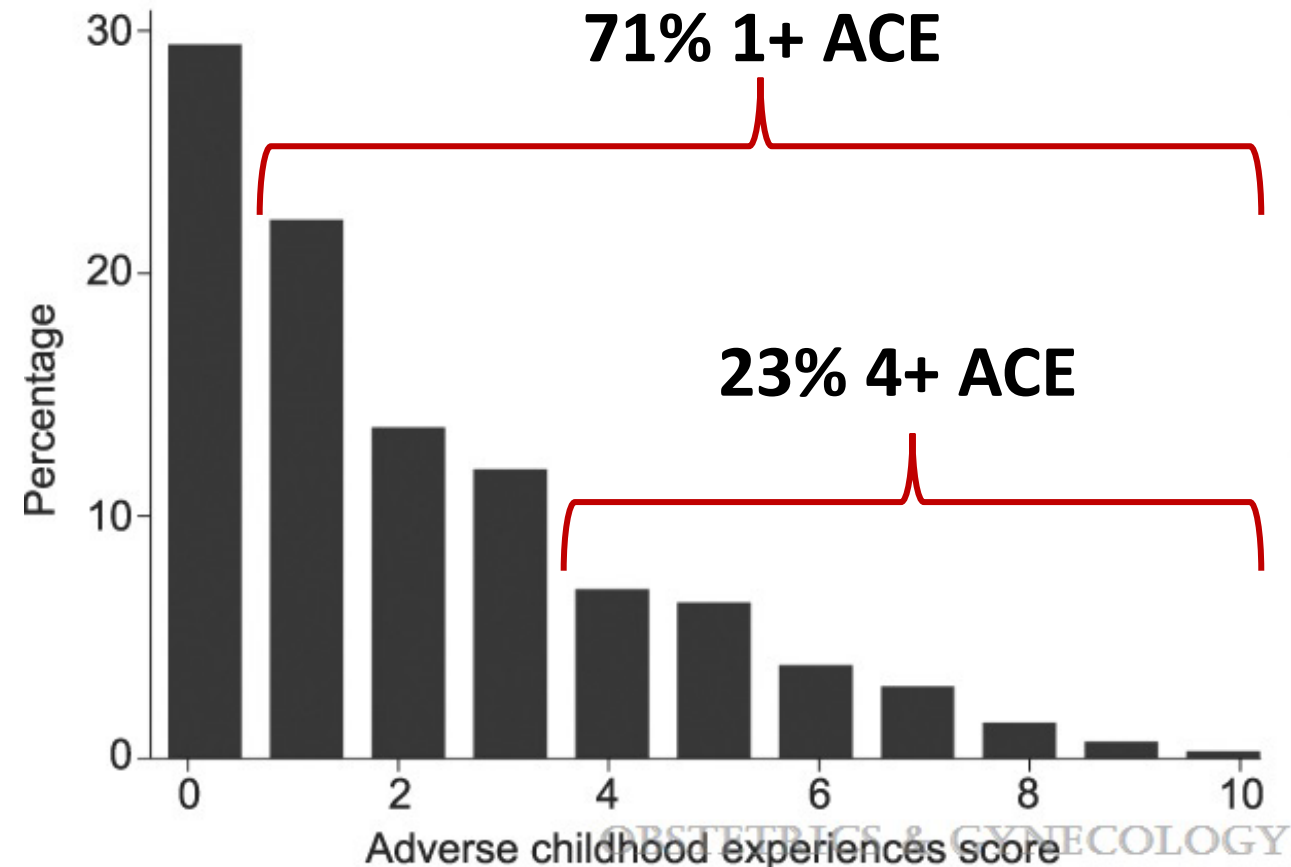
1. Meta-analysis, 15 studies, 7,788 women, 1998 – 2019
2. There is **SOMETHING** there for **affective** symptoms, albeit small effect

**Figure 2.** Forest plot of effect sizes for maternal ACEs and mental health in pregnancy and the postpartum



# Miller et al, 2021

- 1,247 pregnant women
- Northwestern University
- 4+ ACE group
  - ↑ Public insurance
  - ↑ BMI > 30
  - + Medical comorbidity
  - + Previous preterm birth

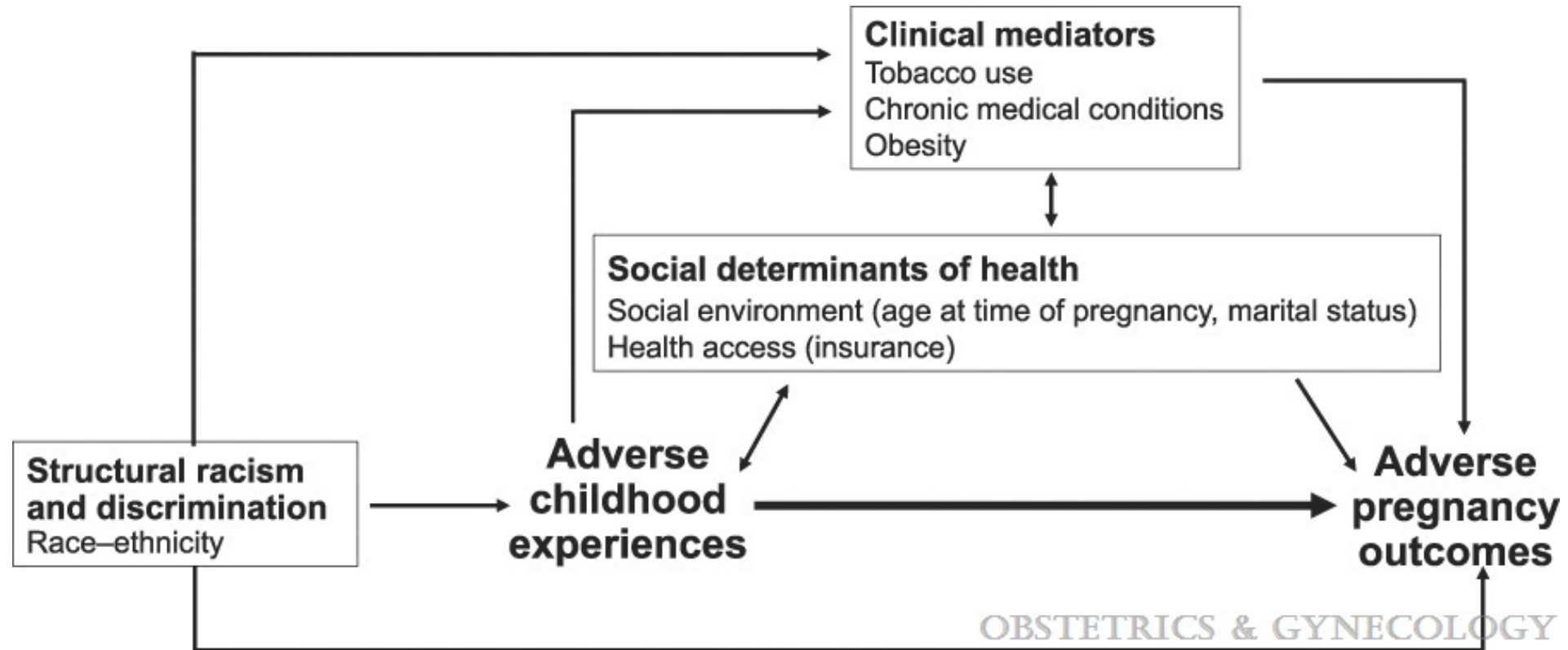


# Miller et al, 2021: Results

Outcome	ACE <4	ACE 4+	aOR
Gestational Diabetes (n = 1,170)	60 (6.7)	20 (7.4)	1.21 (0.70 – 2.11)
Hypertension (n = 1,274)	126 (12.8)	58 (20)	1.55 ★ (1.06 – 2.26)
Preterm Birth (n = 1,271)	120 (12.2)	67 (23.1)	2.03 ★ (1.38 – 2.99)



# Miller et al, 2021: Proposed Mechanism



## Mersky et al, 2019

1. 1,848 low-income women from Wisconsin
2. Participated in a home visiting program
3. Used “Scale of Childhood Experiences Survey”
  - 19-item assessment
  - Groups = 0, 1-2, 3-4 & 5+



ACE Score	Pregnancy Loss (aOR)	Preterm Birth (aOR)	Low Birthweight (aOR)
1-2	0.93 (0.66 - 1.31)	1.22 (0.79 - 1.89)	0.98 (0.62 - 1.56)
3-4	1.27 (0.89 - 1.80)	1.29 (0.82 - 2.02)	1.22 (0.76 - 1.96)
5+	1.80 ★ (1.28 - 2.52)	1.46 (0.95 - 2.26)	1.39 (0.88 - 2.19)
Total Score	1.12 ★ (1.08 - 1.17)	1.07 ★ (1.01 - 1.12)	1.08 ★ (1.03 - 1.15)

## Two Others for Thought...

1. Liming<sup>1</sup>: Higher ACE, less likely for **reunification** from the **foster system**
  - 6-9 ACEs: HR = 0.72, p = 0.24
  - 10 ACEs: HR = 0.58, p < 0.001
2. Testa<sup>2</sup>: n = 1,897; higher ACEs had significant increased risk for “Unwanted Pregnancy”
  - Implications for challenges with family planning





SECTION 4

# Attachment Theory

Drs. John Bowlby and Mary Ainsworth, 1970's

# Take Home Points

1. ACE's are unfortunately common
2. ACE's can have long-ranging effects
3. You don't know if you don't ask
4. Become the "secure base" during treatment

