Effects of phthalate exposure and health disparities on reproductive health outcomes at midlife

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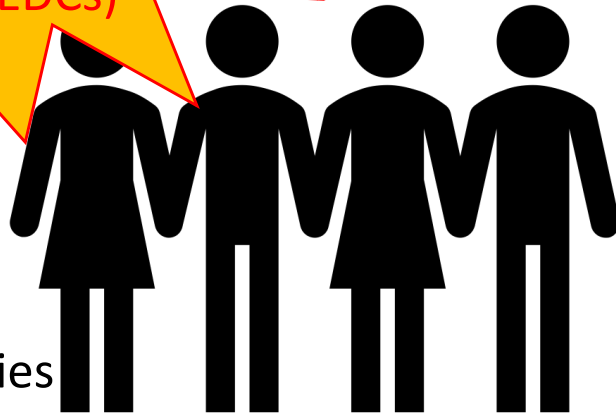
Young EDC Scientist Showcase (YESS)

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Midlife is a critical and understudied period in life

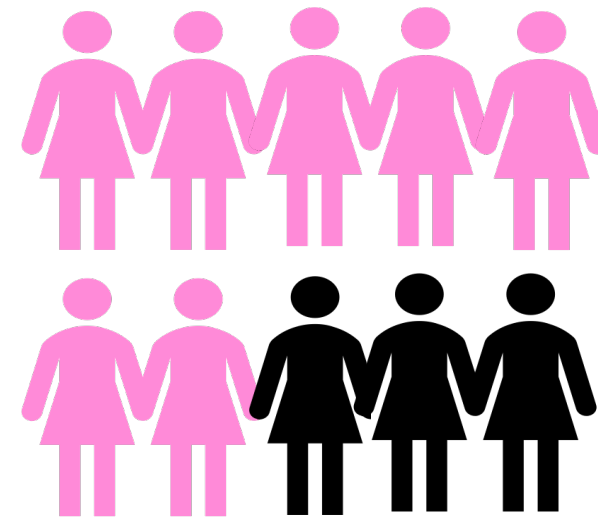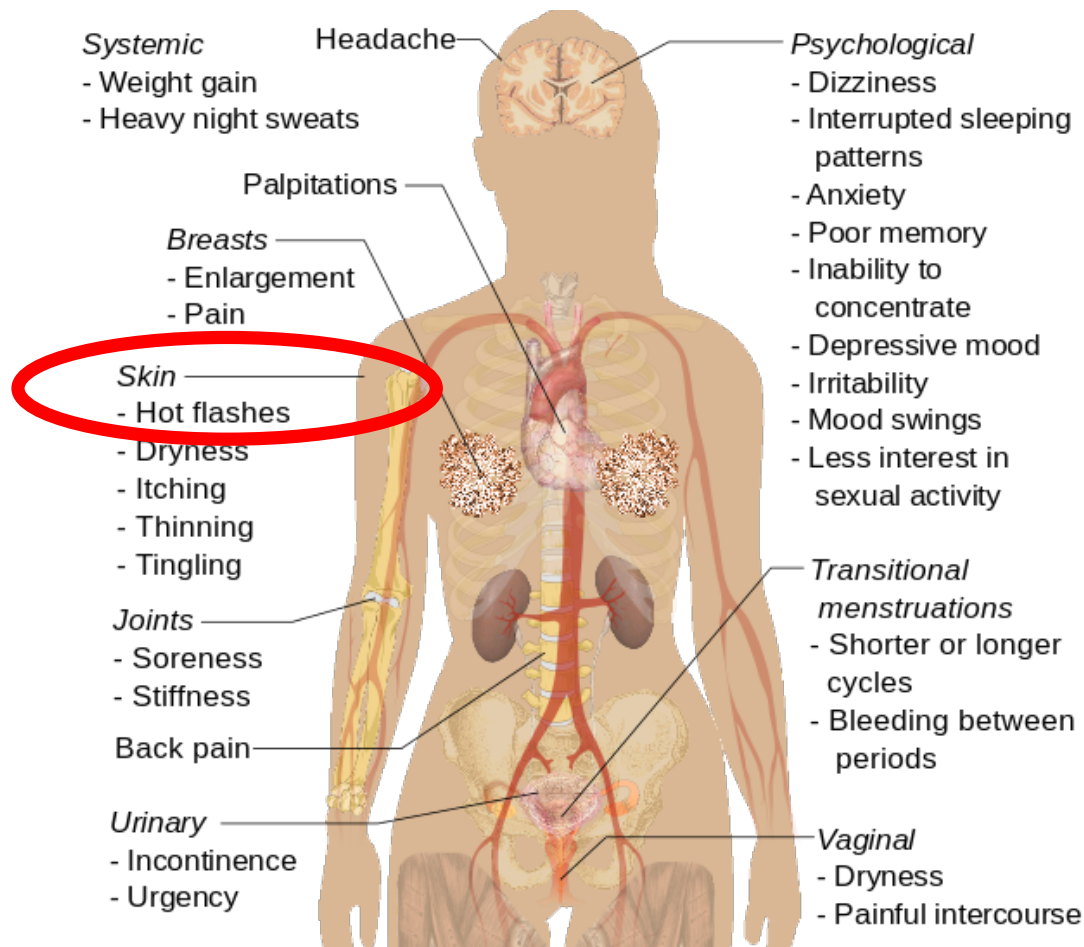Endocrine Disrupting Chemicals (EDCs)

Health Disparities

40-59

Physical and Mental decline

Menopause

Menopause is a natural occurrence in midlife that is associated with several symptoms

Systemic
- Weight gain
- Heavy night sweats

Headache

Palpitations

Breasts
- Enlargement
- Pain

Skin
- Hot flashes
- Dryness
- Itching
- Thinning
- Tingling

Joints
- Soreness
- Stiffness

Back pain

Urinary
- Incontinence
- Urgency

Psychological
- Dizziness
- Interrupted sleeping patterns
- Anxiety
- Poor memory
- Inability to concentrate
- Depressive mood
- Irritability
- Mood swings
- Less interest in sexual activity

Transitional menstruations
- Shorter or longer cycles
- Bleeding between periods

Vaginal
- Dryness
- Painful intercourse

7/10 menopausal women experience hot flashes

Reference:
https://commons.wikimedia.org/wiki/File:Symptoms_of_menopause_(vector).svg

Phthalate Exposure in Midlife

Phthalates

➢ Age at menopause

➢ Sleep

➢ Hot flashes

Disparities in Phthalate Exposure

Phthalates

➢ Increased use of personal care products by black women
➢ Higher exposure to DEHP feminine care products
➢ Increased levels in black pregnant women

Purpose and Significance

Not many studies look at environmental hazards and health disparities

Phthalate exposure is associated with experiencing hot flashes

Black women tend to have a higher burden of phthalate levels

Phthalates are both the exposure and mediator in the health disparity – hot flash model

Conceptual model to describe environmental health disparities.

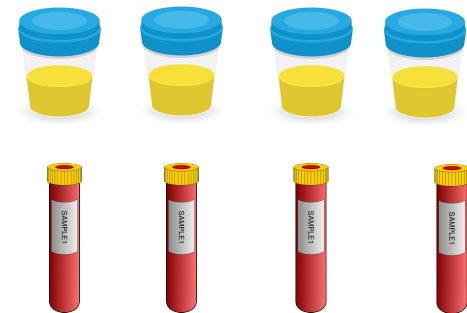Apply methods for dealing with collinearity, E, then apply mediation analysis
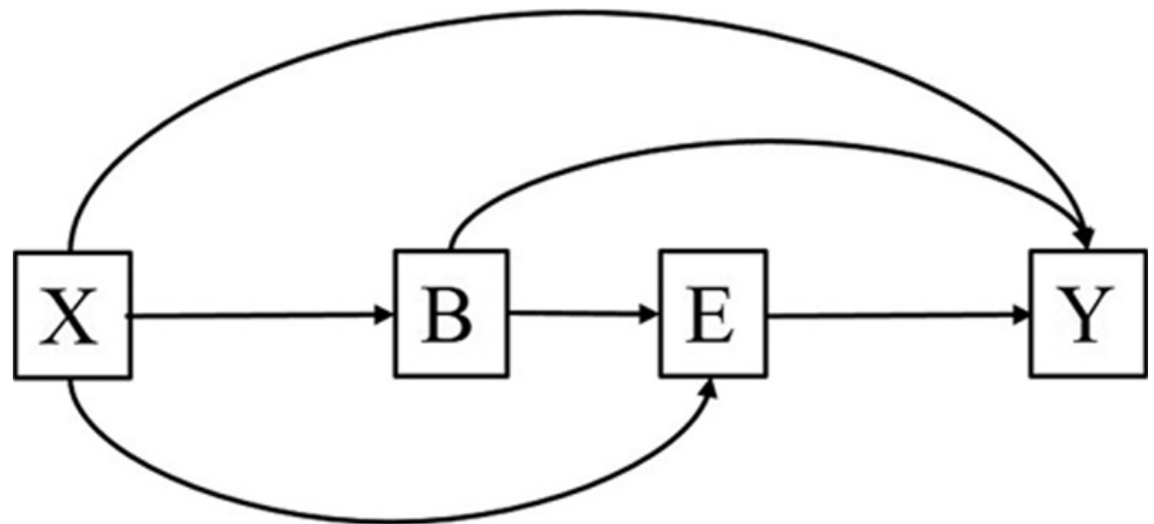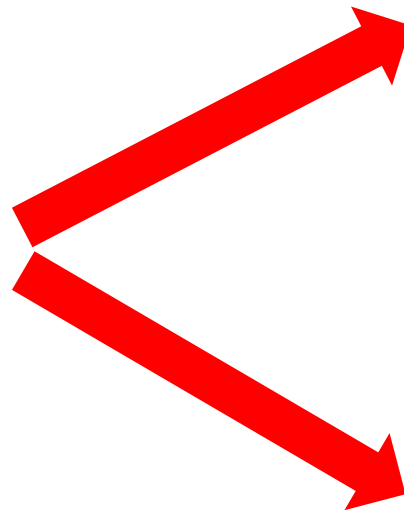
Bellavia et. al., Multiple mediators approach to study environmental chemicals as determinants of health disparities," *Environ. Epidemiol.*
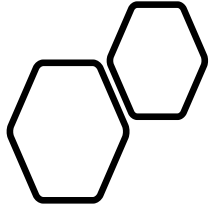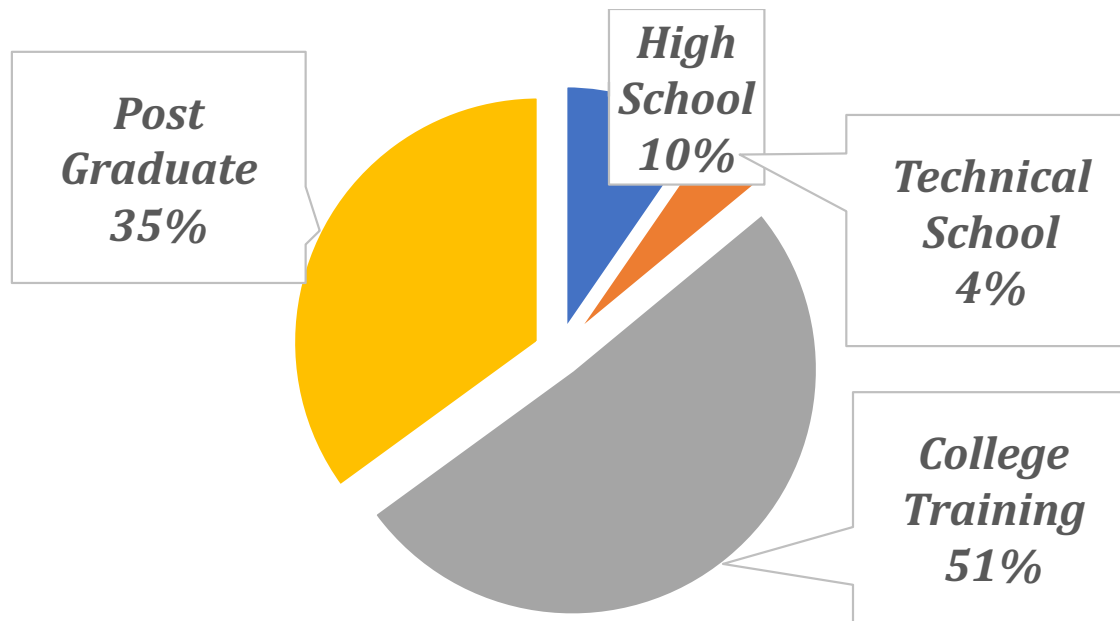
Methods
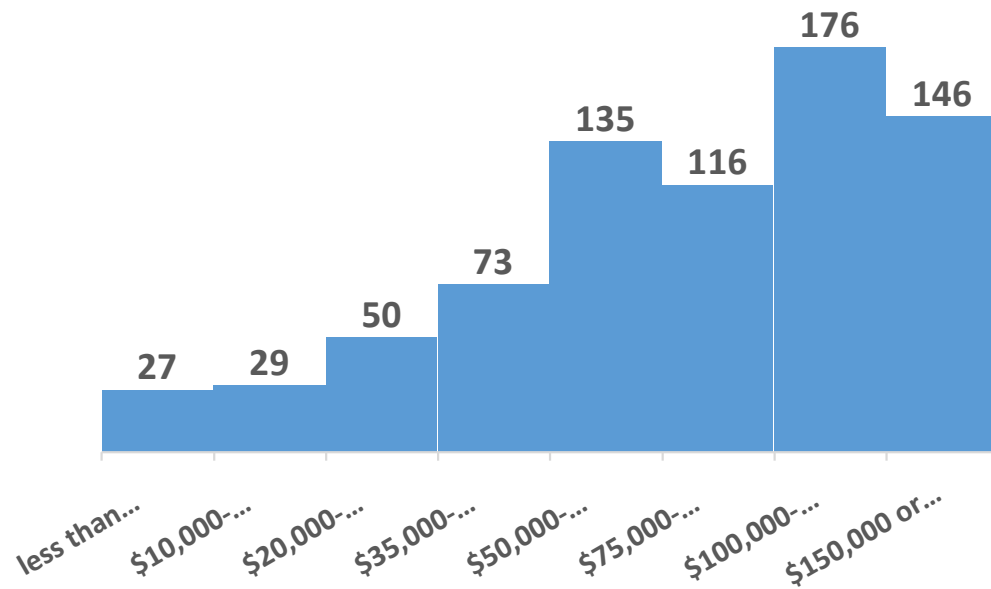
Midlife Women's Health Study (MWHS)
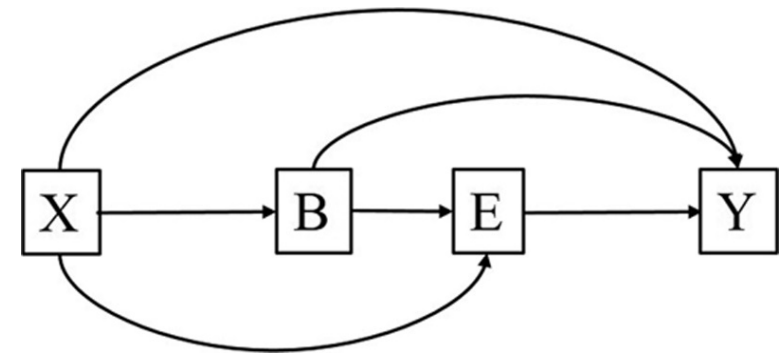
Characteristics of MWHS

Study Variables

X → B → E → Y (with curved arrows: X→Y, X→E, B→Y)
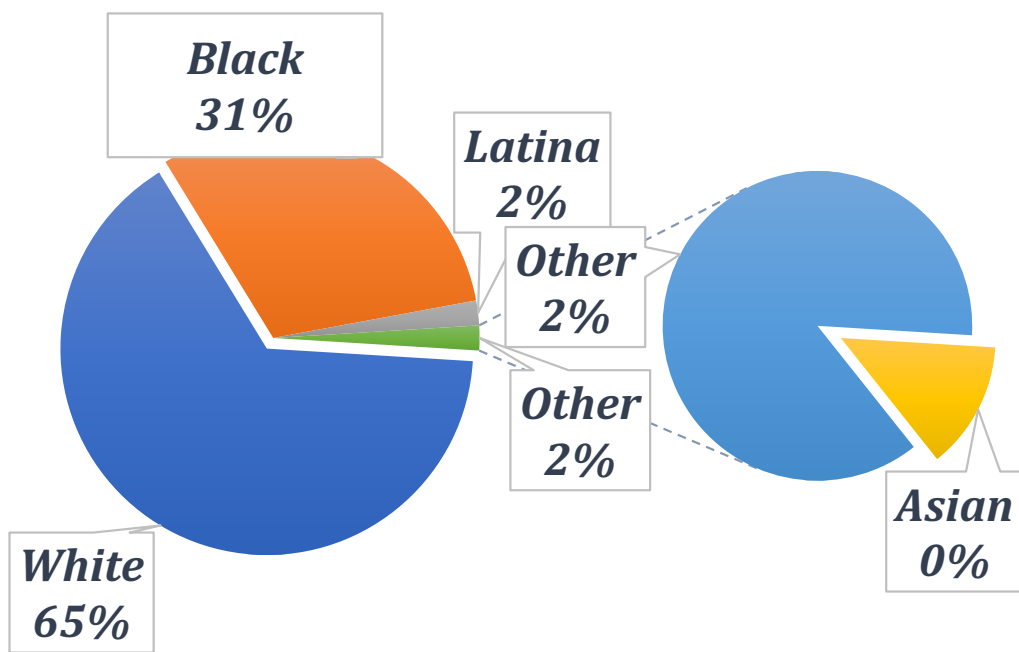
Y: Have you ever experienced hot flashes?
- Yes
- No

X: Race

B: Smoking Status

E: Phthalate Mixtures

Preliminary Results

Smoking and menopause are potential confounding factors

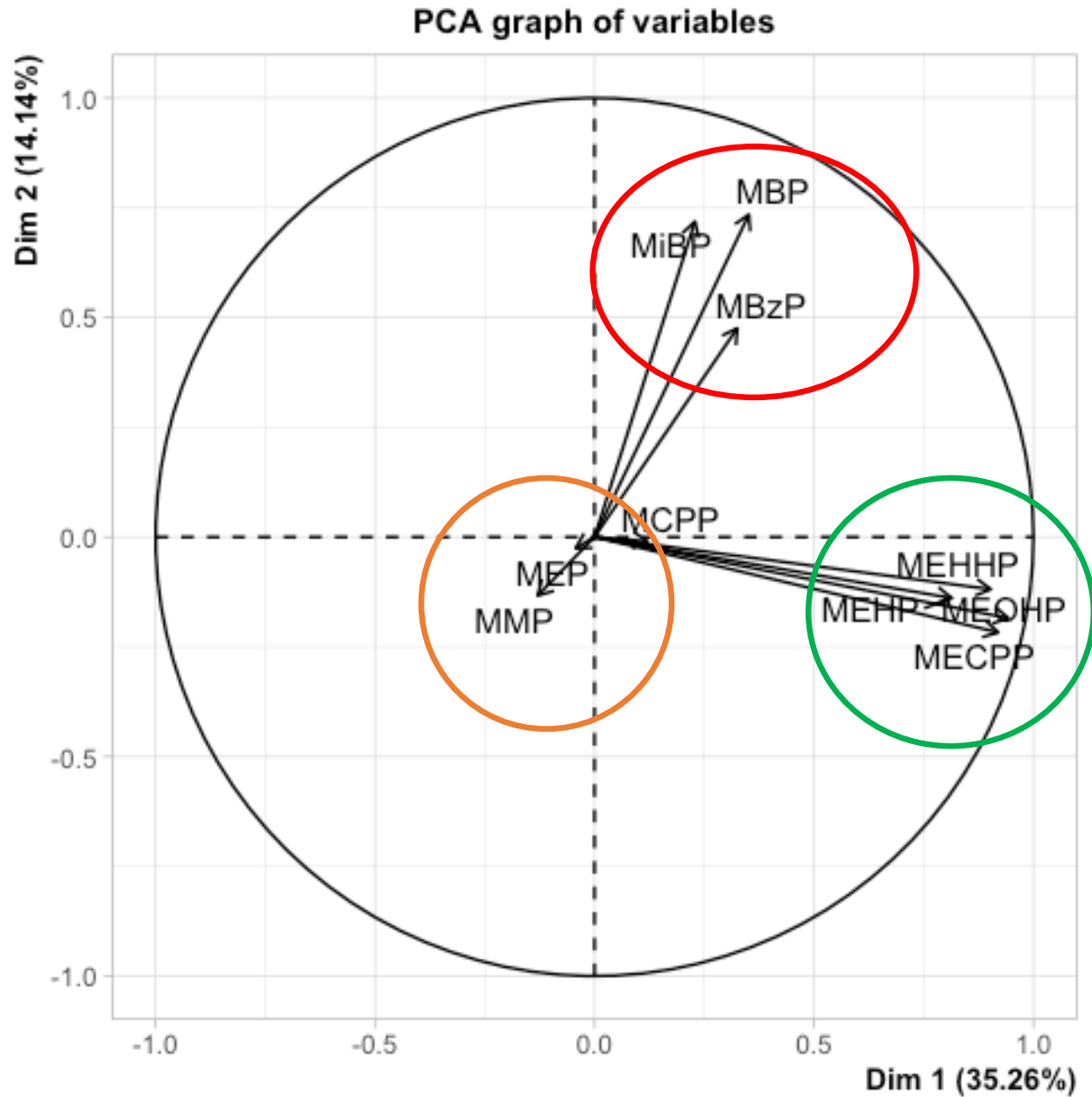|	Ever experience hot flashes?		
Variable	Yes, N = 251[1]	No/Don't Know, N = 317[1]	p-value[2]
Race			0.4
white	184 (73%)	243 (77%)	
black	67 (27%)	74 (23%)	
Income			0.6
High Income	154 (61%)	204 (64%)	
Low Income	26 (10%)	35 (11%)	
Middle Income	71 (28%)	78 (25%)	
Smoking Status			<0.001
Current smoker	39 (16%)	27 (8.5%)	
Former smoker	106 (42%)	106 (33%)	
Never smoker	106 (42%)	184 (58%)	
Menopausal Status			<0.001
Peri-menopause	156 (62%)	73 (23%)	
Pre-menopause	95 (38%)	244 (77%)	

[1]Statistics presented: n (%)
[2]Statistical tests performed: chi-square test of independence

- Smoking and menopausal status significantly associated with ever experiencing hot flashes
- 84% former or never smoked
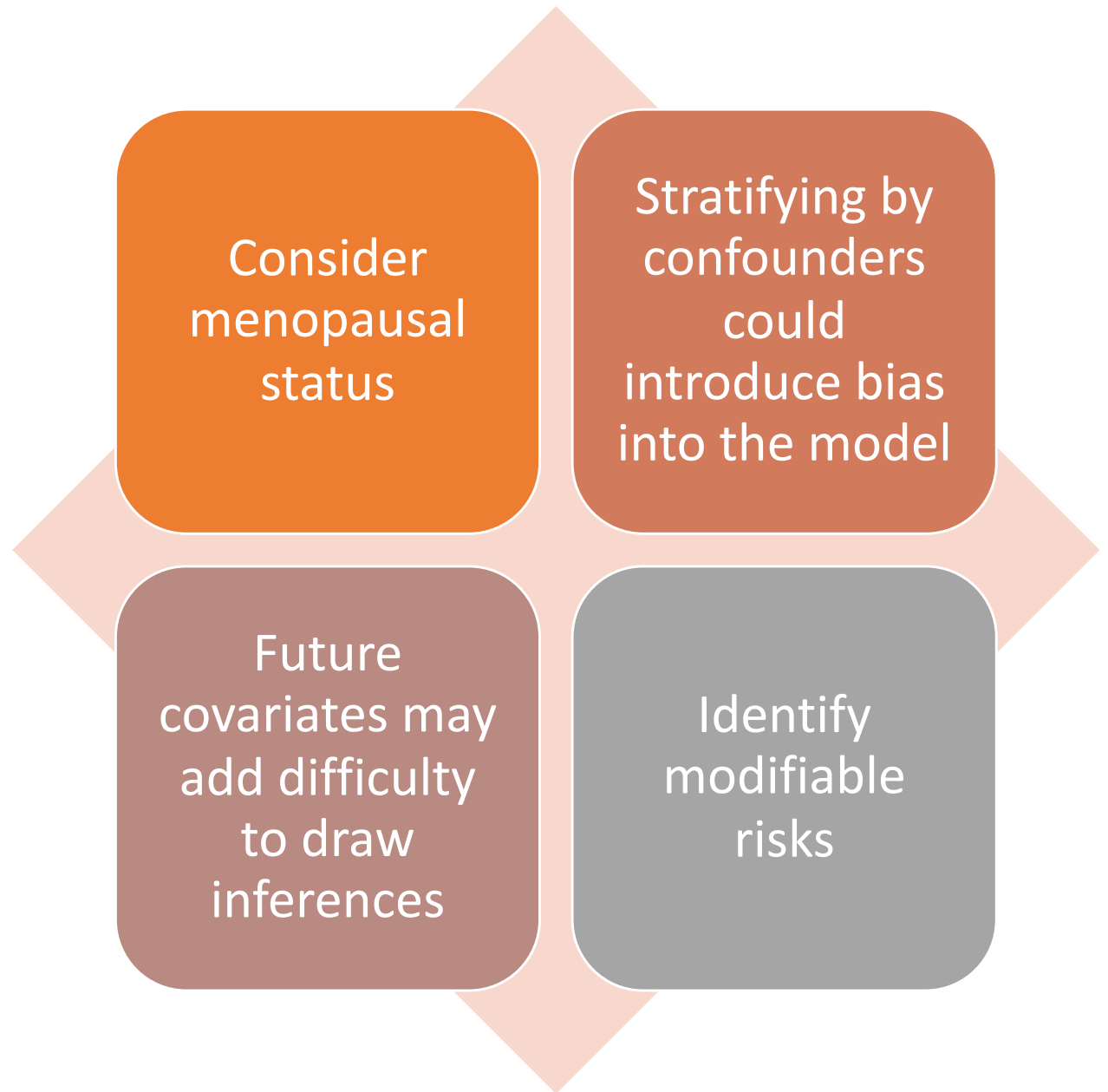- 62% perimenopausal
- 38% pre-menopausal

Increased median phthalate metabolites levels in blacks compared whites
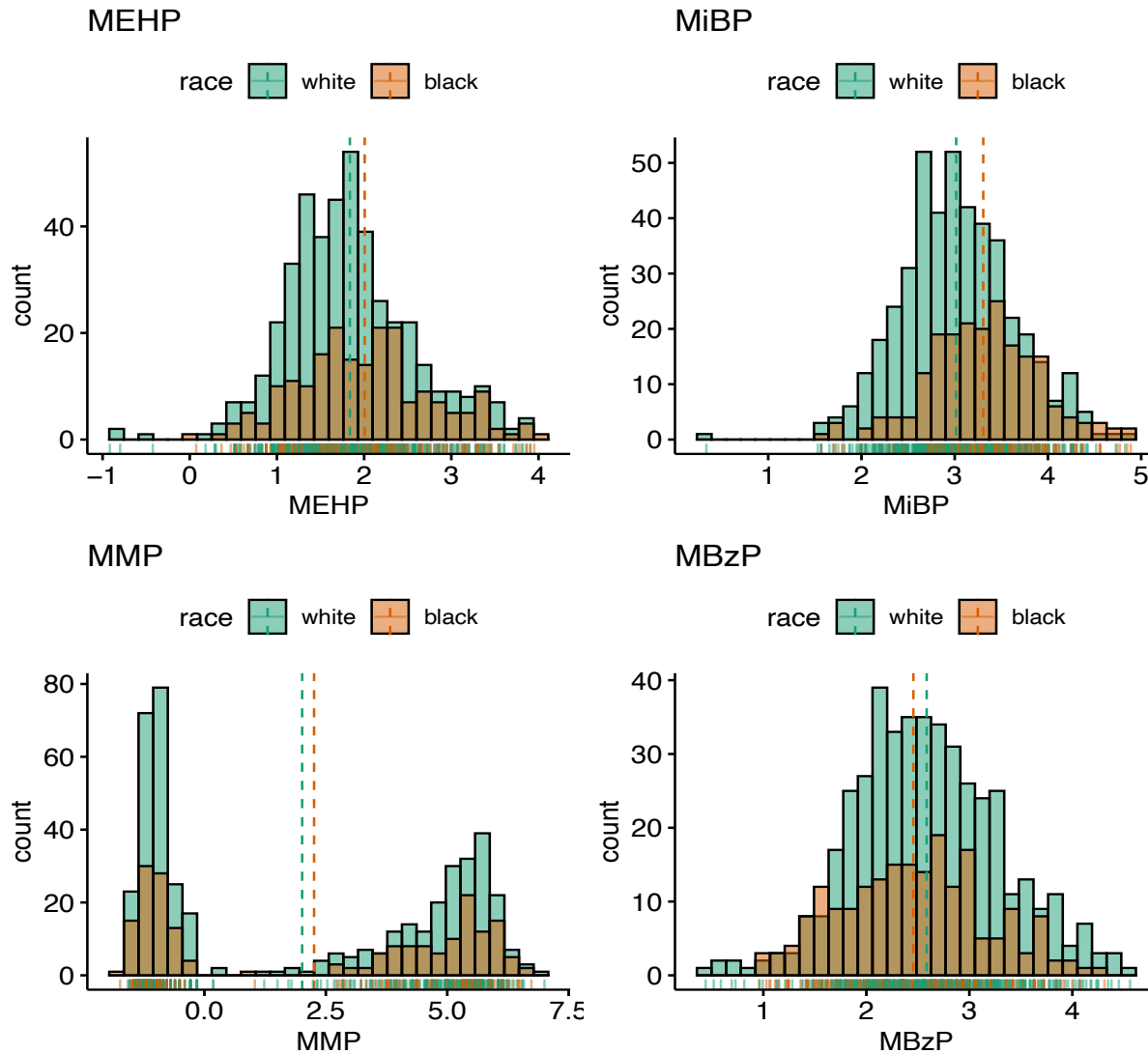
Principle component analysis (PCA) reduces the number of correlated metabolite variables

PCA graph of variables

Conclusions

Consider menopausal status

Stratifying by confounders could introduce bias into the model

Future covariates may add difficulty to draw inferences

Identify modifiable risks

Future Works

Mediation analysis with PCs

Robust models for collinearity

Other health outcomes

Race Stratification

The Big Picture

Committee Members

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Collaborative on Health and the Environment

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Questions