Pediatric Brain Health Initiative

2024 Pediatric Brain Health Webinar Series

PROMOTING FAMILY & PROVIDER MENTAL WELL-BEING

Pediatric Brain Health Initiative

2024 Pediatric Brain Health Webinar Series

Parenting Begins before Birth: The New Science of Prenatal Programming and Early Brain-Behavior Development

Catherine Monk, Ph.D.
Diana Vagelos Professor of Women's Mental Health

UTHealth Houston | McGovern Medical School

Pediatric Brain Health Summit Webinar Series: Promoting family & provider mental well-being

Title: Webinar 1: Parenting Begins before Birth: The New Science of Prenatal Programming and Early Brain-Behavior Development

Speaker(s): Catherine Monk, PhD

Planning Committee Members: David Lakey, MD, Katy Butterwick, MA, Dorothy J Mandell, PhD, Louis Appel, MD, MPH, Anu Partap, MD, MPH, Sarah Presti, MS, Kim McPherson, MPA, Sasha Rasco, MPA, and Brooke King, MA

Disclosure of Financial Relationships:

Speakers:
Catherine Monk, PhD has no financial relationship(s) with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients to disclose.

Planners:
David Lakey, MD, Katy Butterwick, MA, Dorothy J Mandell, PhD, Louis Appel, MD, MPH, Anu Partap, MD, MPH, Sarah Presti, MS, Kim McPherson, MPA, Sasha Rasco, MPA, and Brooke King, MA have no financial relationship(s) with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients to disclose.

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UTHealth Houston
Cizik School of Nursing

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2024 Pediatric Brain Health Webinar Series

Parenting Begins before Birth: The New Science of Prenatal Programming and Early Brain-Behavior Development

Catherine Monk, Ph.D.
Diana Vagelos Professor of Women's Mental Health

Moderator:
Katy Butterwick, MSc

Parenting Begins before Birth:

The New Science of Prenatal Programming and Early Brain-Behavior Development

Catherine Monk, Ph.D.
Diana Vagelos, Professor of Women's Mental Health
Columbia University
Vagelos College of Physicians and Surgeons
New York

COLUMBIA | OBSTETRICS AND GYNECOLOGY

Overview

- Women's mental health
- DOHaD and prenatal programming
- Interventions for 2 Gen Impact

Perinatal Mood and Anxiety Disorders (PMADs) **Are Real**

Mental Health Conditions are Overall More Common in Women

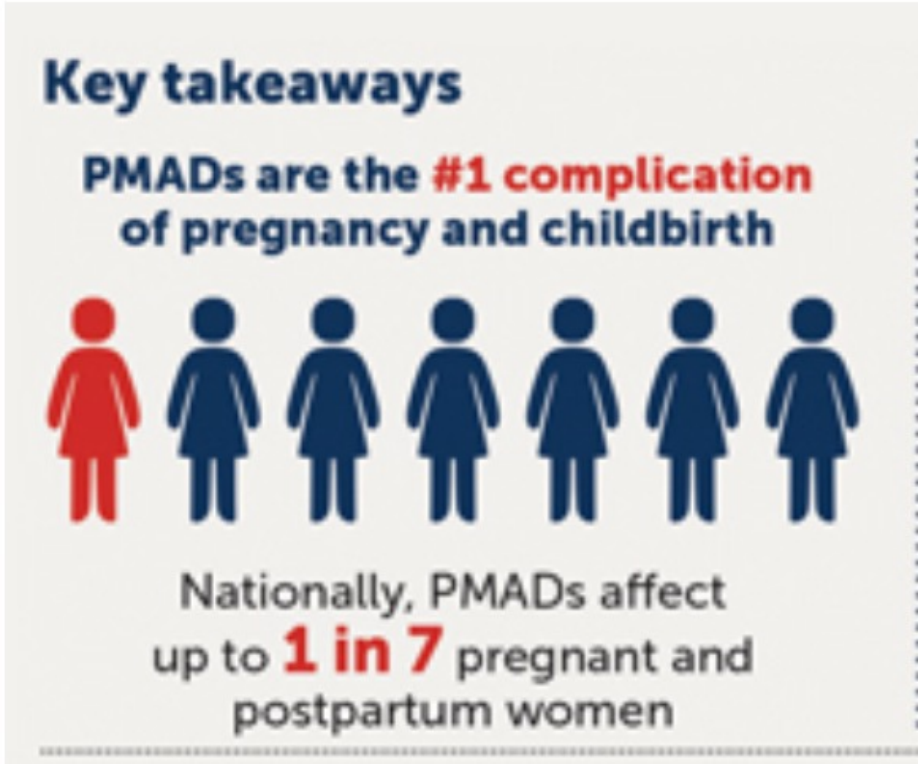
Nearly 50% of US adult population develop at least one mental health disorder in their lifetime, women at higher risk

Major Depressive Disorder (MDD)

Anxiety Disorder

Mathematica
Progress Together

PMAD = Perinatal Mood and Anxiety Disorders



https://www.mathematica.org/news/new-study-uncovers-the-heavy-financial-toll-of-untreated-maternal-mental-health-conditions

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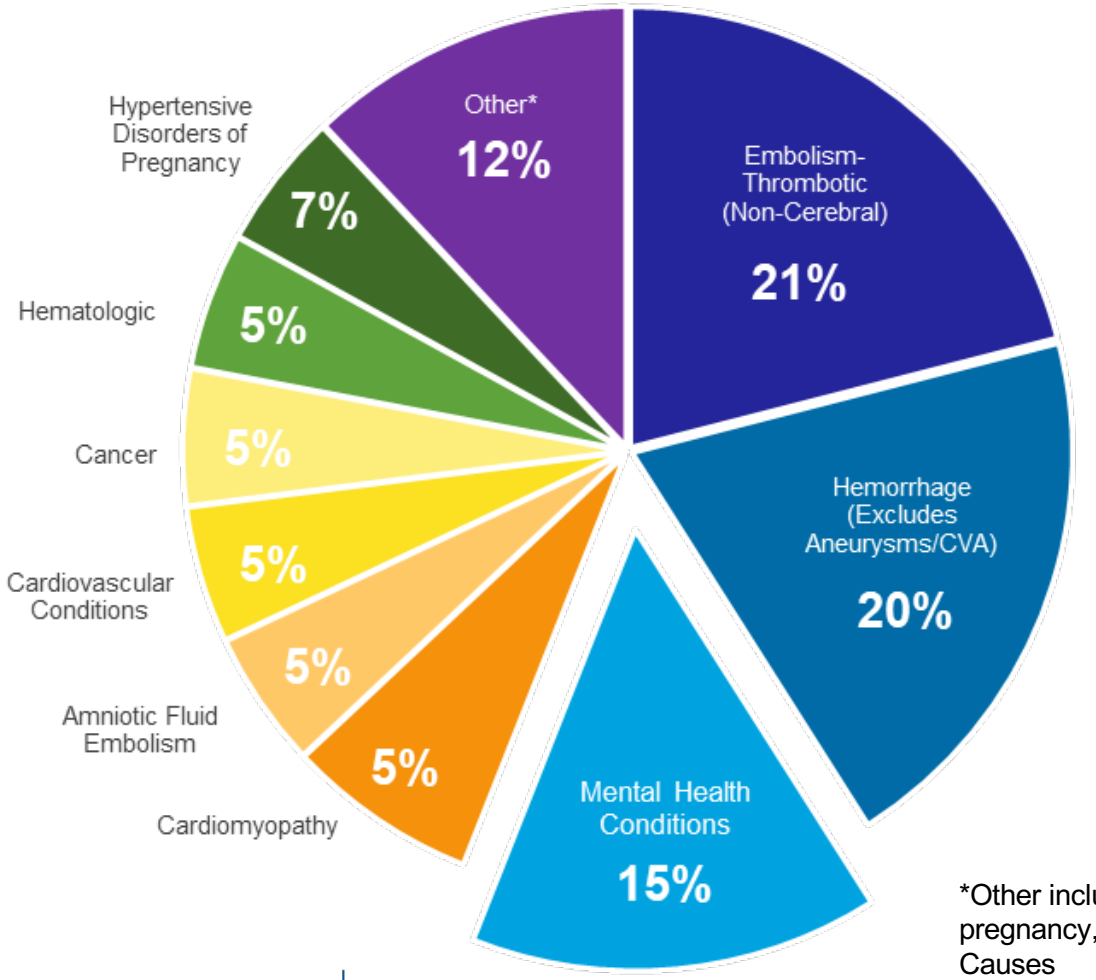
Leading Causes of Pregnancy-Related Deaths

2018 New York State Maternal Mortality Review, n=41



- Mental health conditions account for 15% of pregnancy-related deaths
- Deaths related to mental health conditions are **100% avoidable**

*Other includes Cerebrovascular Accident not secondary to Hypertensive Disorders of pregnancy, GI Disorders, Infection, Metabolic/Endocrine Disorders, and Unknown Causes

Source: NYS Maternal Mortality Review, 2018

What Contributes to Higher Rates of Mental Health Conditions in Women?

ELSEVIER

Social Science & Medicine
Volume 149, January 2016, Pages 1-8

Unequal depression for equal work? How the wage gap explains gendered disparities in mood disorders

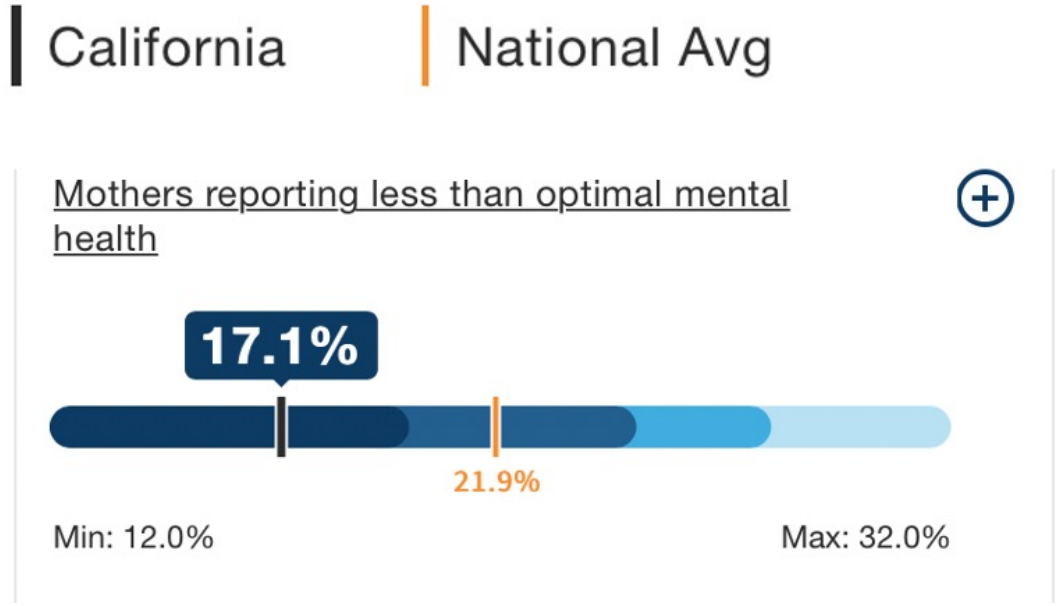
Jonathan Platt, Seth Prins, Lisa Bates, Katherine Keyes

Stressors and trauma experiences women face:

- Disproportionate burden of the care economy
- Greater emotional stress balancing paid and unpaid labor
- More workplace discrimination
- Higher rates of childhood abuse and neglect
- Higher rates of sexual and intimate partner violence
- **And biological changes in puberty, pregnancy, menopause**

What Contributes to Higher Rates of Mental Health Conditions in Women?

What Contributes to Higher Rates of Mental Health Conditions in Women?



ZERO TO THREE
Early connections last a lifetime

think babies
Make their potential our priority.

STATE OF BABIES YEARBOOK 2022

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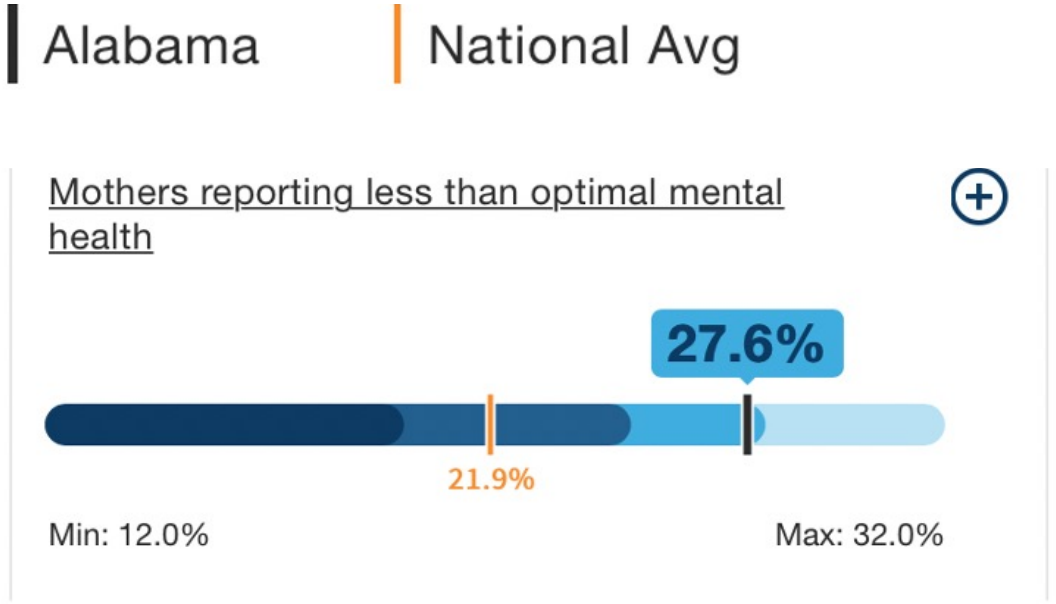
What Contributes to Higher Rates of Mental Health Conditions in Women?



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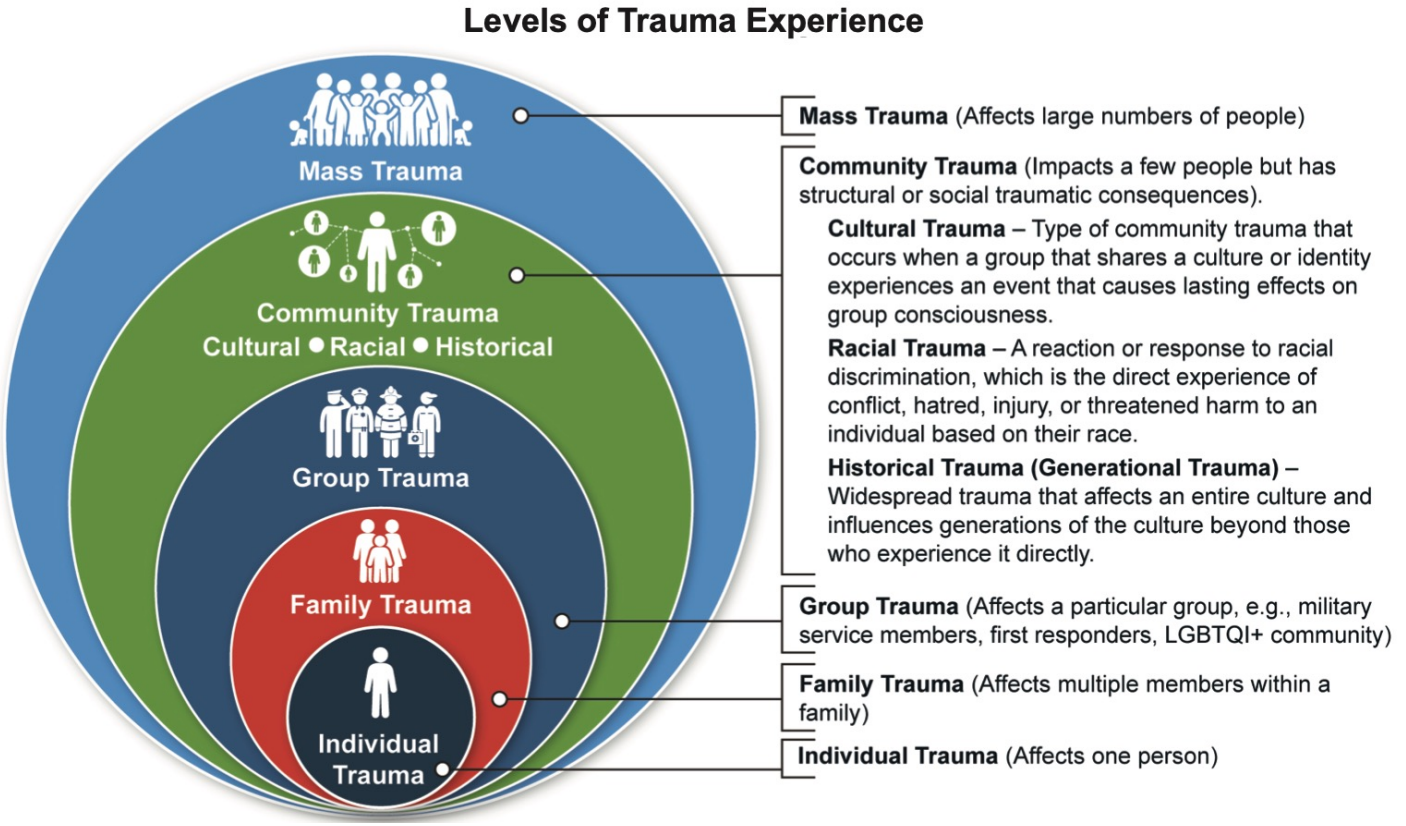
What Contributes to Higher Rates of Mental Health Conditions in Women?

Trauma



SAMHSA
Substance Abuse and Mental Health Services Administration

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What Contributes to Higher Rates of Mental Health Conditions in Women?

Impact of Trauma on Individuals

Emotional	Behavioral	Physical	Developmental	Cognitive	Interpersonal	Spiritual
• Difficulty regulating emotions • Emotional numbness • Depression and anxiety • Post traumatic stress disorder	• Substance use • Self-destructive behaviors • Avoidance of situations, people, and places	• Physical symptoms resulting from emotional distress, including headaches, high blood presssure, and fatigue • Hyperarousal resulting in muscle tension and insomnia	• Impact varies by age group • Children and elderly at greatest risk • Changes occur in brain development	• Impaired short-term memory • Decreased focus or concentration • Feeling alienated or ashamed • Dissociation, depersonalization, and derealization • Flashbacks or re-experiences of the event	• Withdrawal from family, friends, community • Difficulty trusting others	• Depression and loneliness can lead to feelings of abandonment and loss of faith • Over time can experience increased appreciation of life or enhanced spiritual well-being

SAMHSA
Substance Abuse and Mental Health Services Administration

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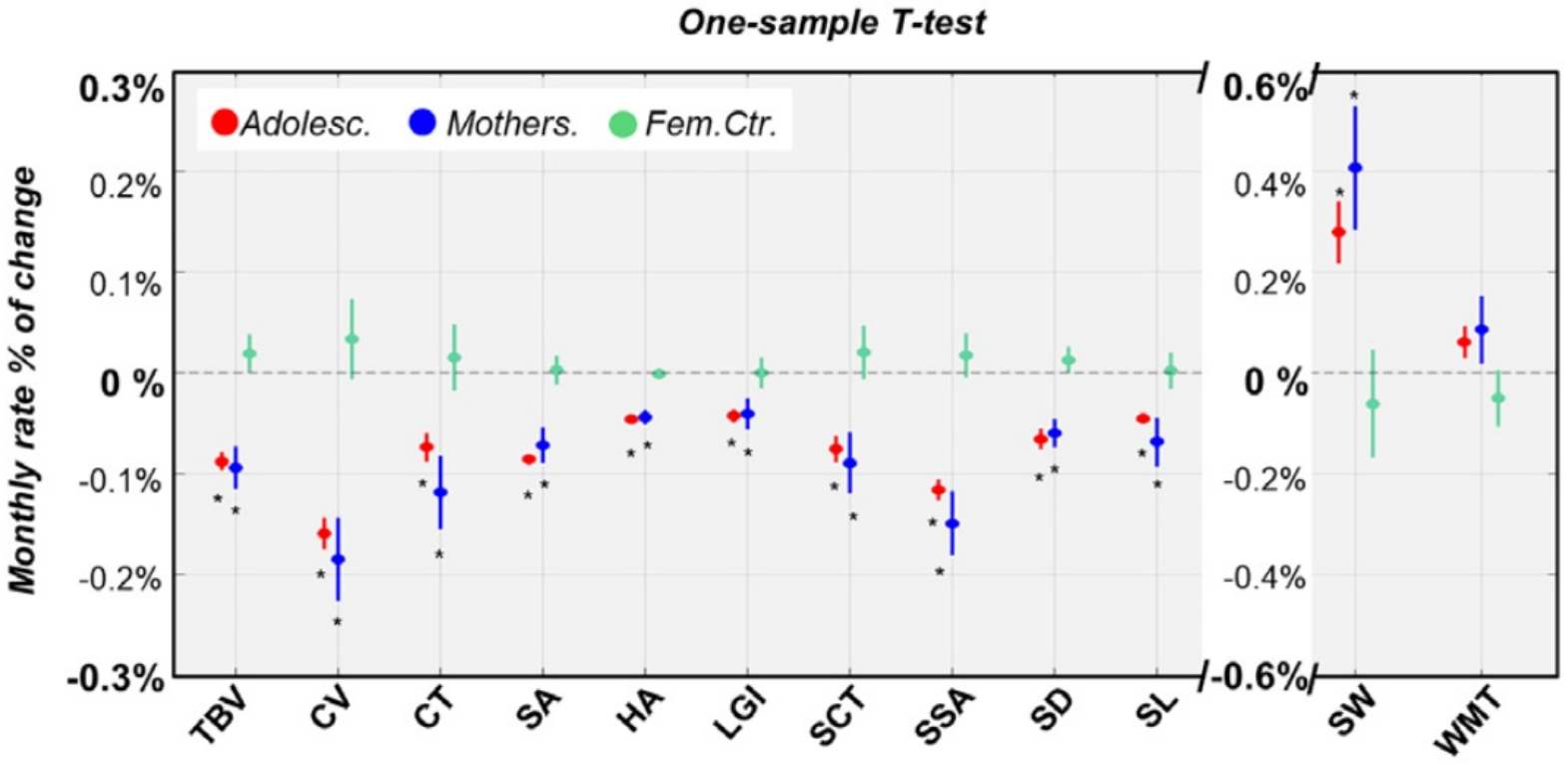
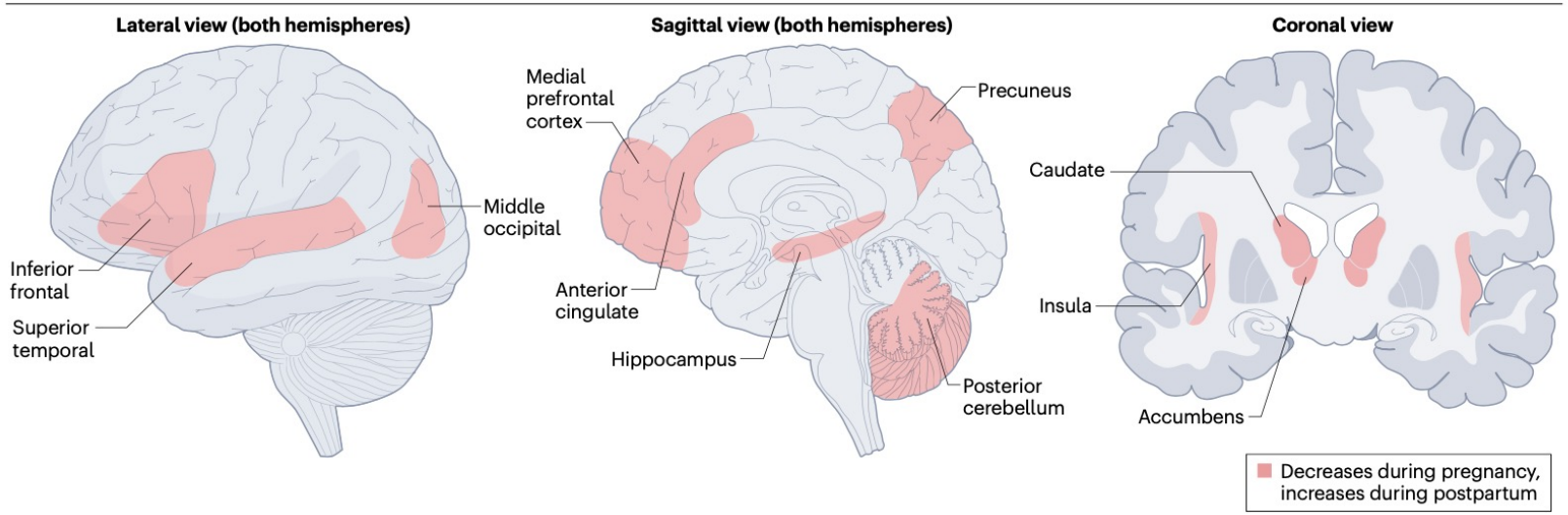
PMADs Are Real: Normative Changes in the Brain during the Transition to Motherhood



CT= cortical thickness; SA=surface area

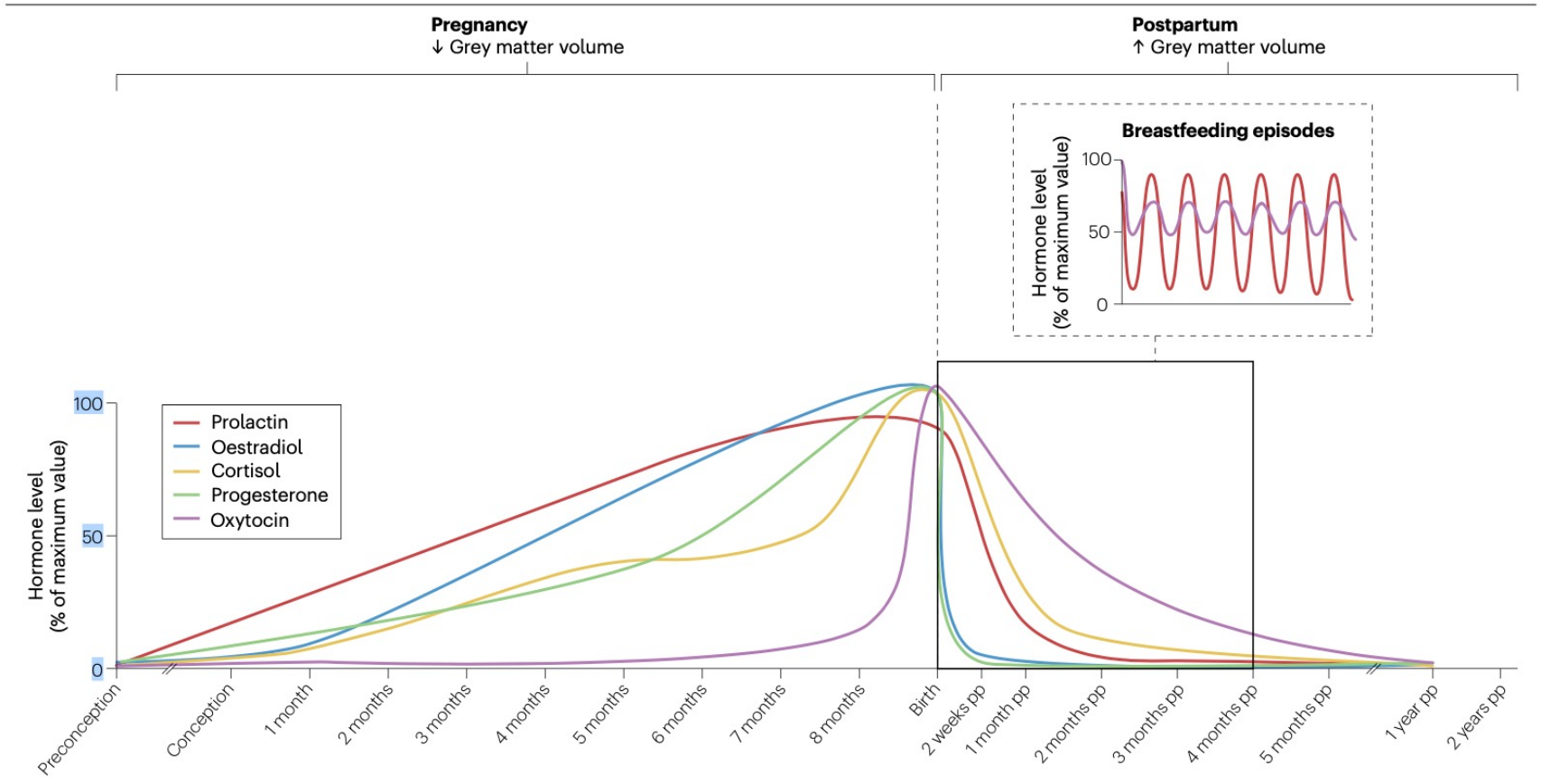
(Carmona et al., 2019)

PMADs Are Real: Normative Changes in the Brain during the Transition to Motherhood



(Servin-Barthet et al., 2023)

PMADs Are Real: Normative Changes in Hormones during the Transition to Motherhood



(Servin-Barthet et al., 2023)

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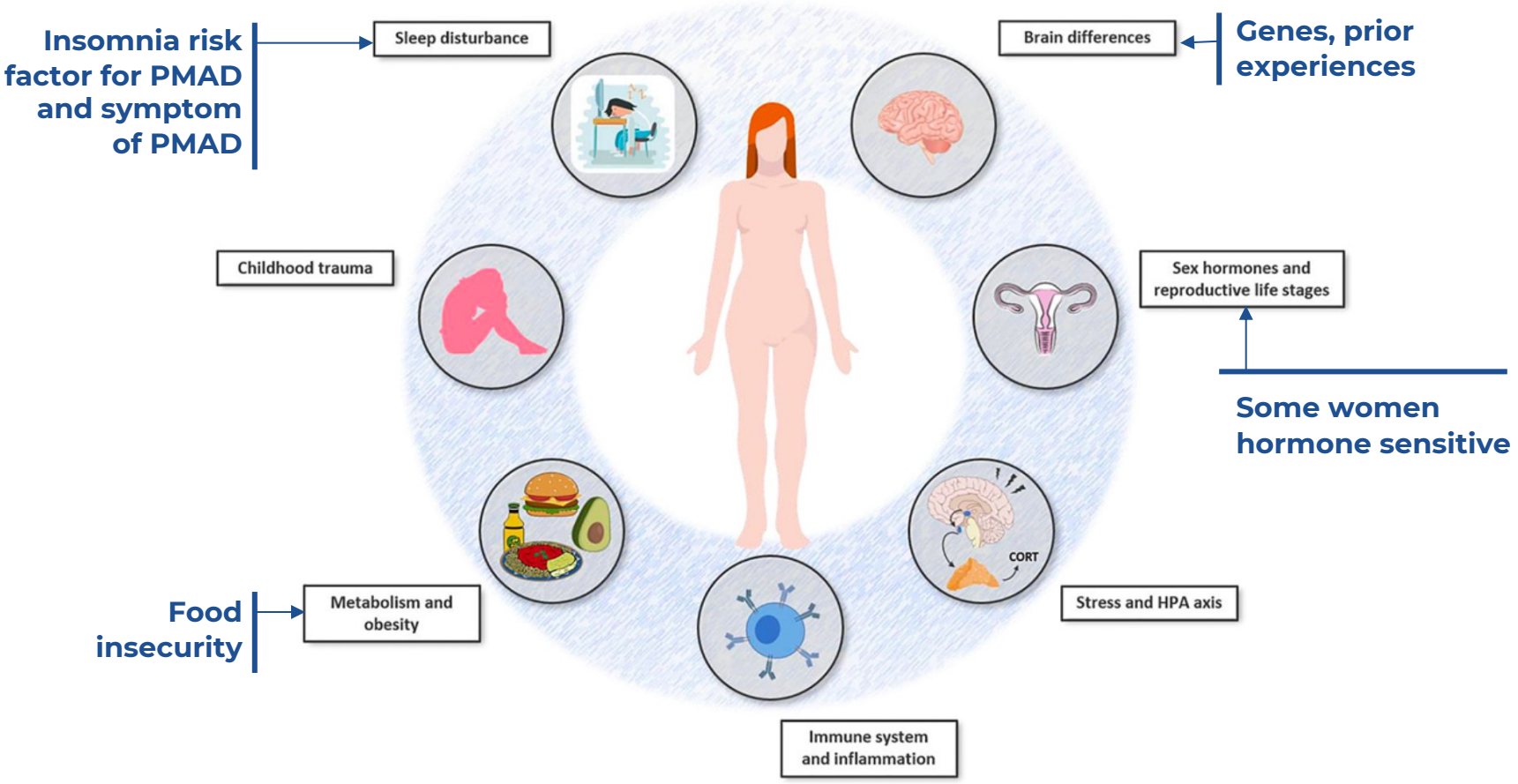
PMADs Are Real: Another Look at the Biological Level



(Grazia Di Benedetto et al., 2024)

> “We are not going to forget about the baby while we take care of the mother.”

Ramesh ‘Channi’ Kumar, Professor of Perinatal Psychiatry at the Institute of Psychiatry, King's College London

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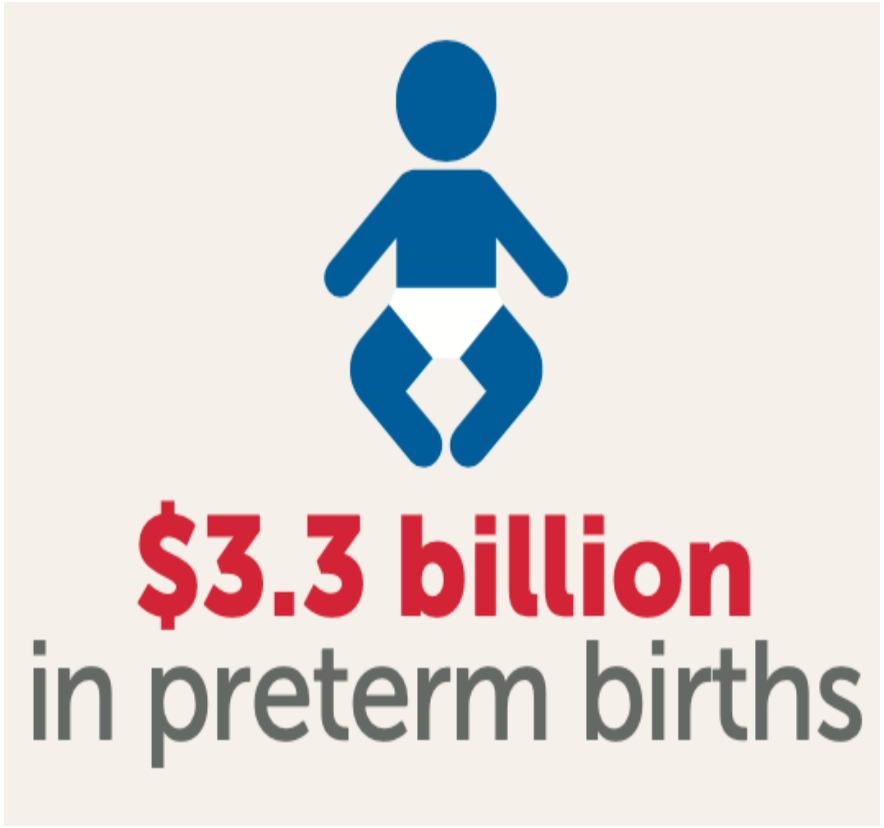
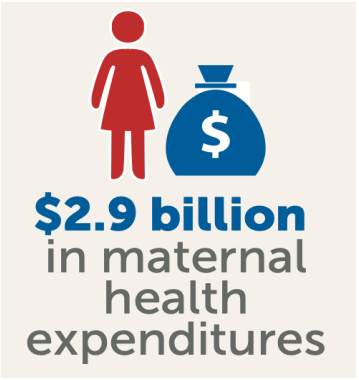
The Perinatal Period = Time of Significant Brain and Hormone Changes in the Context of Life Circumstances

A Time of Vulnerability — Also of Opportunity

PMADs in the US are costly and have multigenerational consequences





Luca, D.L., Garlow, N., Staatz, C., Margiotta, C., & Zivin, K. (2019). Societal Costs of Untreated Perinatal Mood and Anxiety Disorders in the United States.

"The womb is an influential first home."

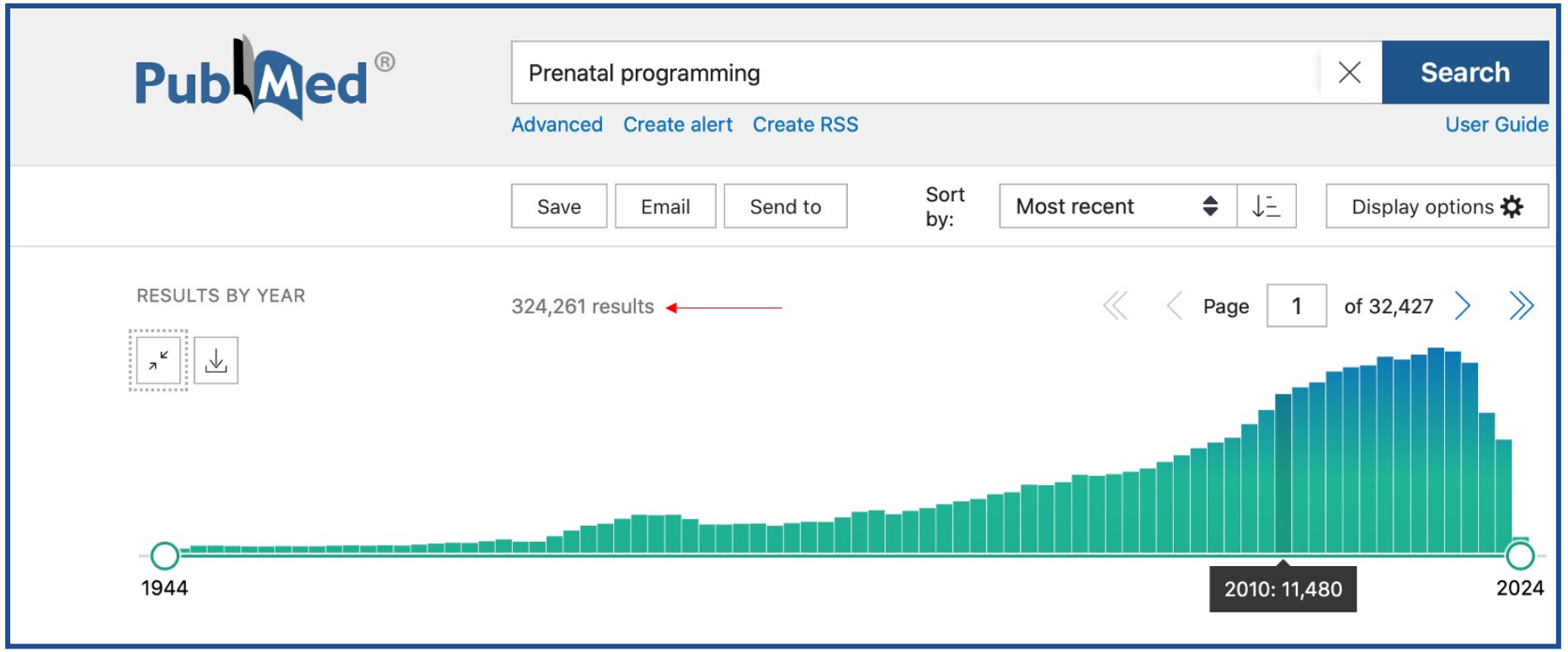
- David Barker,

PHYSICIAN AND EPIDEMIOLOGIST, 1938-2013

Developmental Origins of Health and Disease (DOHaD)

AKA, Prenatal Programming

Prenatal Programming Publications



Conceptual Model: Adaptation

The Wellcome Foundation Lecture, 1994. The fetal origins of adult disease

D. J. P. BARKER

MRC Environmental Epidemiology Unit, University of Southampton, Southampton General Hospital, Southampton, SO16 6YD, U.K.

SUMMARY

Recent findings suggest that many human fetuses have to adapt to a limited supply of nutrients and in doing so they permanently change their physiology and metabolism. These 'programmed' changes may be the origins of a number of diseases in later life, including coronary heart disease and the related disorders: stroke, diabetes and hypertension.

Proceedings Bio Sci (1995)

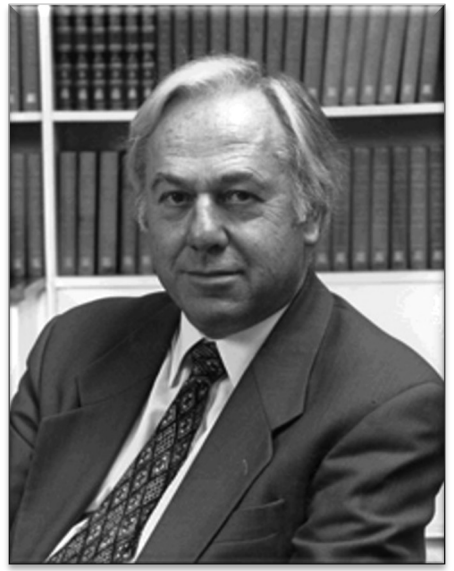
Public Health Nutrition: 4(2B), 611–624

DOI: 10.1079/P

Fetal programming and adult health

Keith M Godfrey* and David JP Barker

MRC Environmental Epidemiology Unit, University of Southampton, Southampton General Hospital, Southampton, SO16 6YD, UK



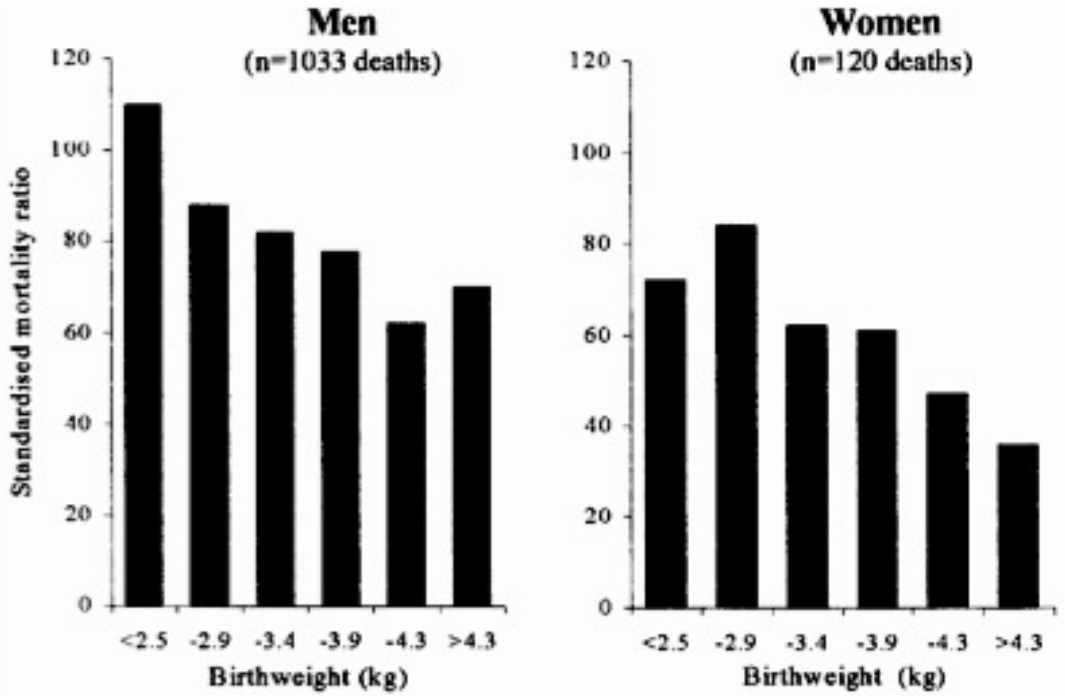


Fig. 1 Coronary heart disease death rates, expressed as standardized mortality ratios, in 10141 men and 5585 women born in Hertfordshire, UK according to birthweight[6]

Birthweight considered, in part, a consequence of fetal exposure to inadequate maternal nutrition

Conceptual Model: Adaptation and an Evolutionary Perspective

- Prenatal maternal experiences are exposures that ‘forecast’ the postnatal environment
- Fetus responds with adaptations
- Improve fitness to a later stage in development

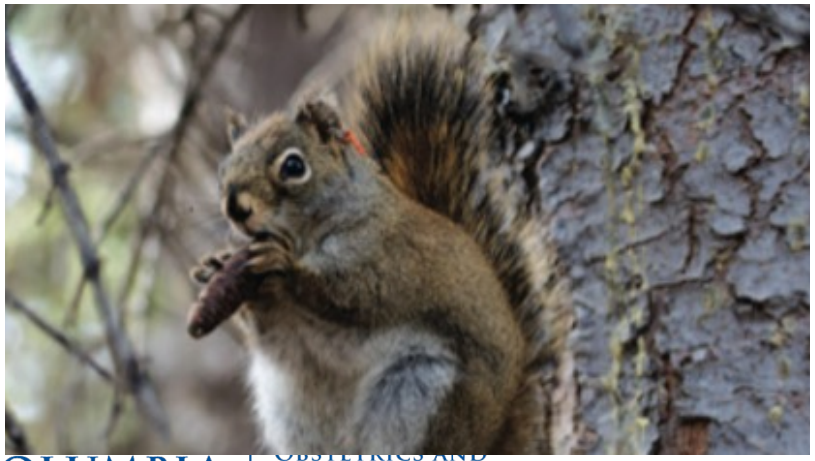
Health outcomes may result, in part, from the match between the prenatal and postnatal environments

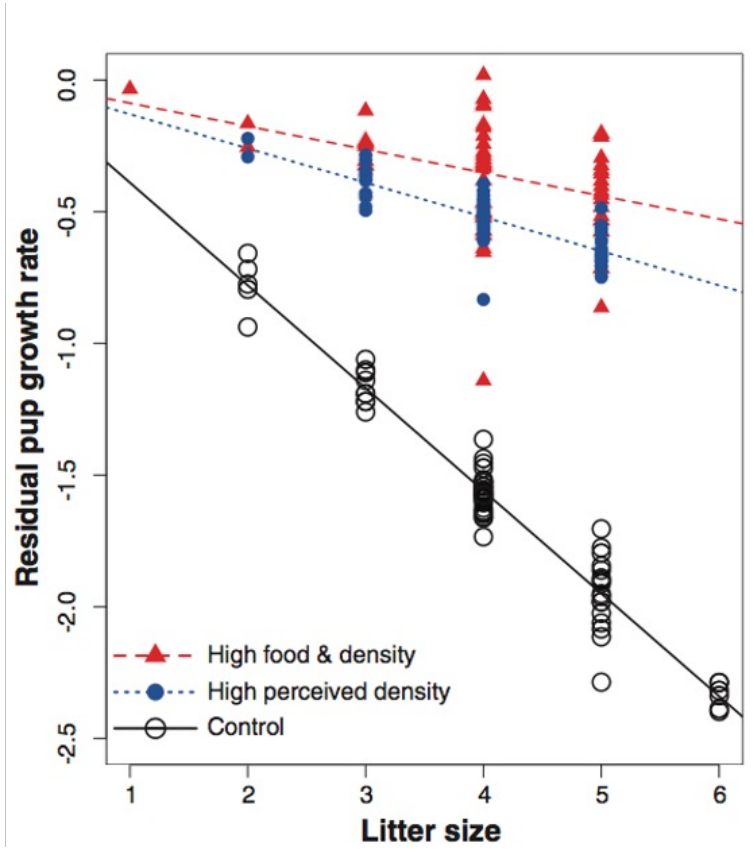
(Glover, 2011, Pike, 2005)

Conceptual Model: Adaptation and an Evolutionary Perspective

Density Triggers Maternal Hormones That Increase Adaptive Offspring Growth in a Wild Mammal

Ben Dantzer,[1*†] Amy E. M. Newman,[2] Rudy Boonstra,[3] Rupert Palme,[4] Stan Boutin,[5] Murray M. Humphries,[6] Andrew G. McAdam[1,2]





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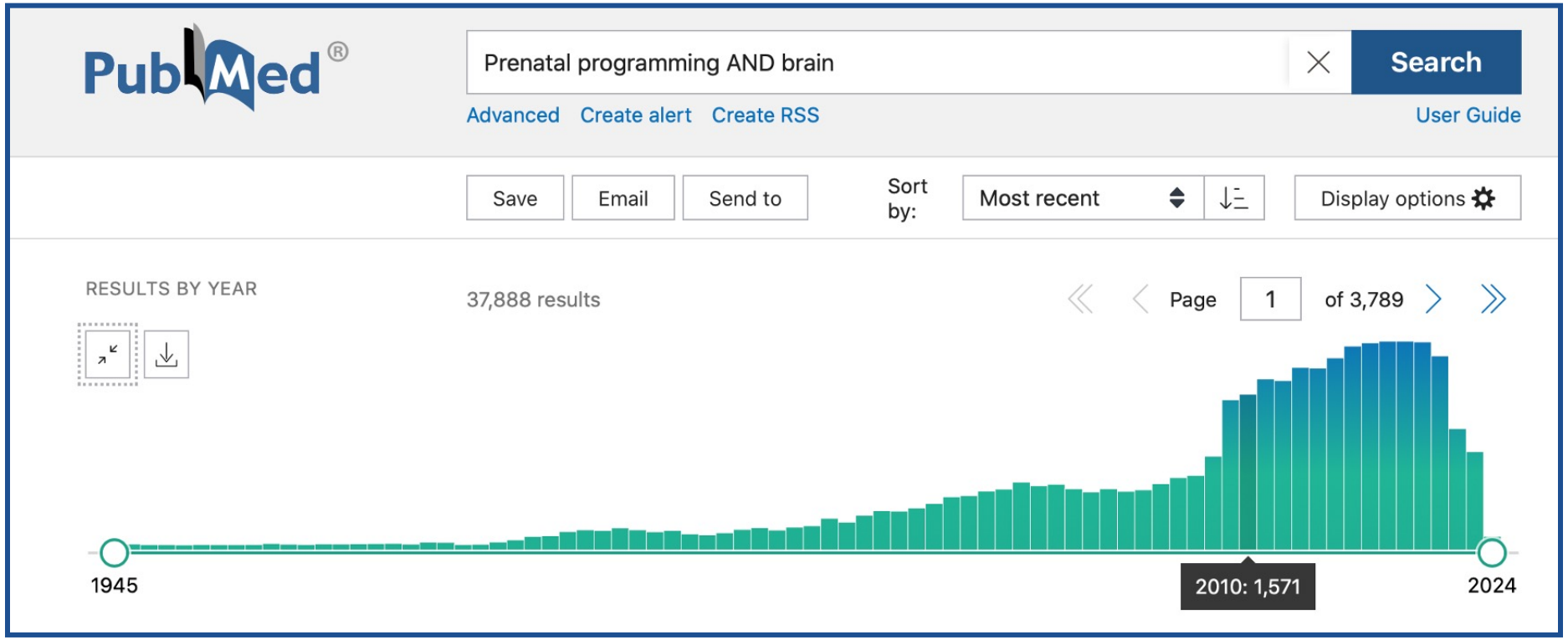
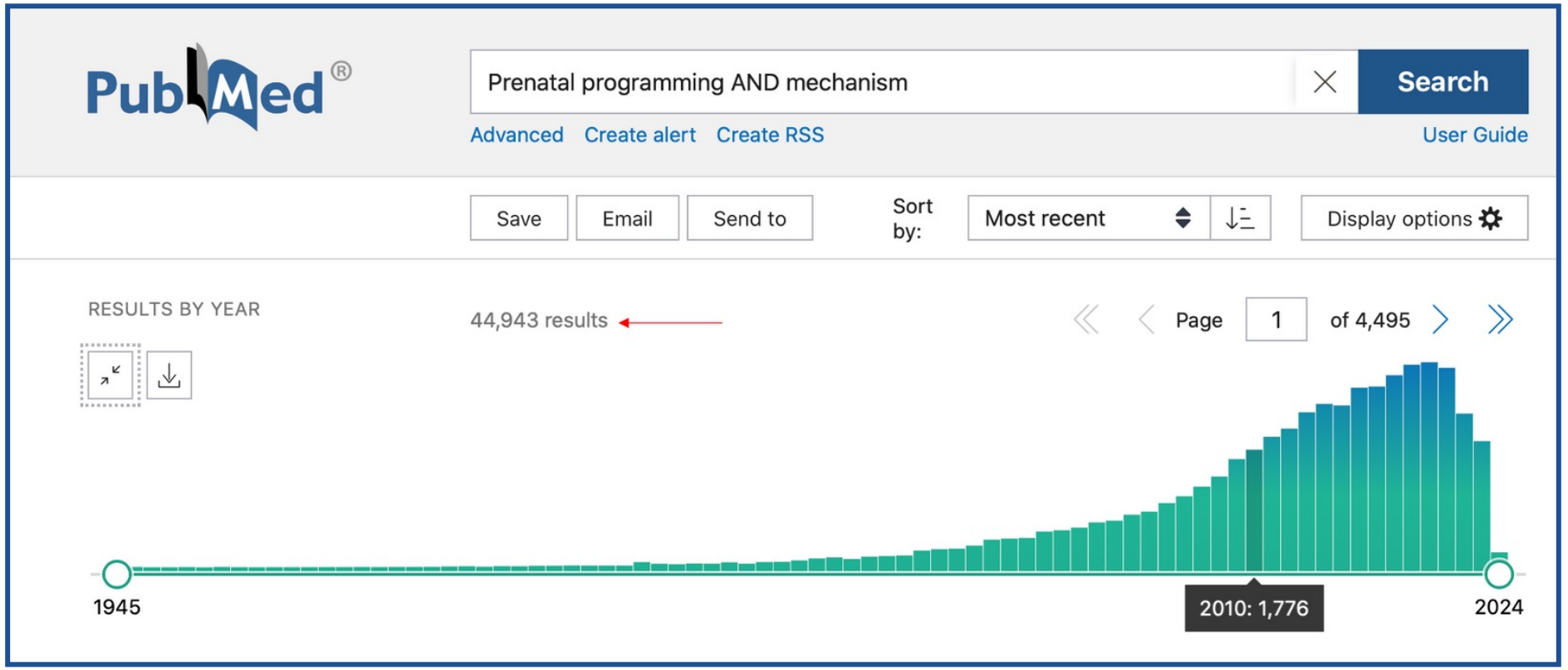
Neurodevelopment and Mental Health Outcomes

Prenatal Programming and Neuroscience



Prenatal Programming and Biological Psychiatry



Conceptual Model: Teratogenic versus Adaptation

Early life stress, prenatal secondhand smoke exposure, and the development of internalizing symptoms across childhood

Mariah DeSerisy[1,2*], Jacob W. Cohen[2,3], Jordan D. Dworkin[2,3], Jeanette A. Stingone[1], Bruce Ramphal[4], Julie B. Herbstman[5,6], David Pagliaccio[2,3] and Amy E. Margolis[2,3]

ELSEVIER

Psychoneuroendocrinology

Volume 117, July 2020, 104697

Disaster-related prenatal maternal stress predicts HPA reactivity and psychopathology in adolescent offspring: Project Ice Storm

Erin Yong Ping [a], David P. Laplante [b], Guillaume Elgbeili [b], Sherri Lee Jones [b c], Alain Brunet [b c], Suzanne King [b c]

Development and Psychopathology **26** (2014), 393–403

doi:10.1017/S0954579414000029

The persisting effect of maternal mood in pregnancy on childhood psychopathology

KIERAN J. O'DONNELL,[a] VIVETTE GLOVER,[b] EDWARD D. BARKER,[c] AND THOMAS G. O'CONNOR[d]
[a]*McGill University;* [b]*Imperial College London;* [c]*Birkbeck University; and* [d]*University of Rochester Medical Center*

Abstract

Developmental or fetal programming has emerged as a major model for understanding the early and persisting effects of prenatal exposures on the health and development of the child and adult. We leverage the power of a 14-year prospective study to examine the persisting effects of prenatal anxiety, a key candidate in the developmental programming model, on symptoms of behavioral and emotional problems across five occasions of measurement from age 4 to 13 years. The study is based on the Avon Longitudinal Study of Parents and Children cohort, a prospective, longitudinal study of a large community sample in the west of England ($n = 7{,}944$). Potential confounders included psychosocial and obstetric risk, postnatal maternal mood, paternal pre- and postnatal mood, and parenting. Results indicated that maternal prenatal anxiety predicted persistently higher behavioral and emotional symptoms across childhood with no diminishment of effect into adolescence. Elevated prenatal anxiety (top 15%) was associated with a twofold increase in risk of a probable child mental disorder, 12.31% compared with 6.83%, after allowing for confounders. Results were similar with prenatal depression. These analyses provide some of the strongest evidence to date that prenatal maternal mood has a direct and persisting effect on her child's psychiatric symptoms and support an in utero programming hypothesis.

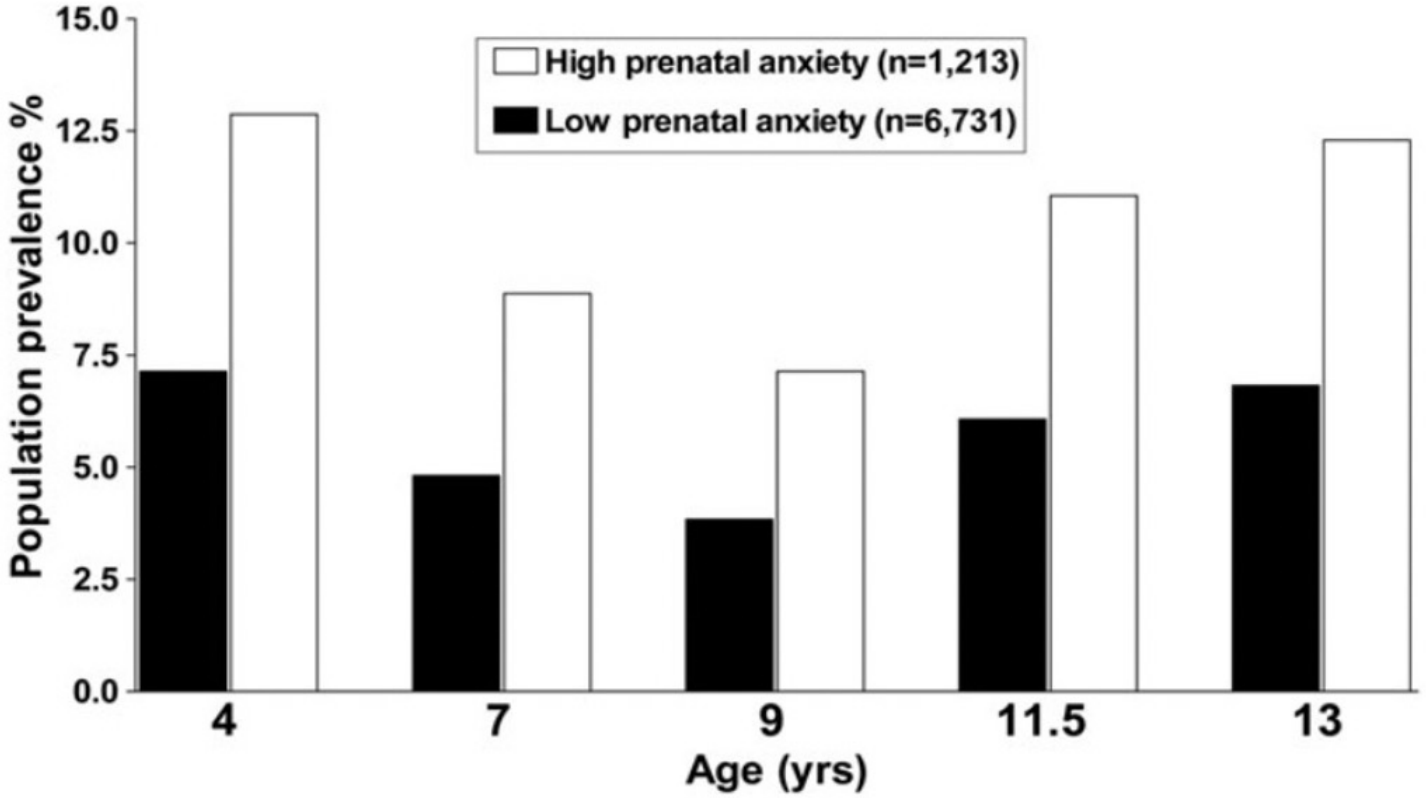
Developmental or adaptive programming, including in the fetal period, has emerged as a major model for understanding the developmental origins of health outcomes. The model proposes that in utero exposures instigate an adaptive response in the organism that is carried forward in development with persisting effects on behavior and biology. Much of this work focuses on poor nutrition or an index of poor growth (e.g., low birth weight) as the causal factor, although other and additional sources of stress with causal effects may be operating (Barker, 1999; Gluckman & Hanson, 2004; Painter, Roseboom, & Bleker, 2005; Wadhwa, Buss, Entringer, & Swanson, 2009). Evidence for the model as applied to cardiovascular and metabolic outcomes is substantial, derives from numerous large-scale investigations in diverse settings, and has spawned an influential line of study because of its potential to influence health and development of populations in developed and developing countries (Gillman et al., 2007).

We are extremely grateful to all of the families who took part in this study; the midwives for their help in recruiting them; and the whole Avon Longitudinal Study of Parents and Children team, which includes interviewers, computer and laboratory technicians, clerical workers, research scientists, volunteers, managers, receptionists, and nurses. The UK Medical Research Council, the Wellcome Trust, and the University of Bristol currently provide core support for the Avon Longitudinal Study of Parents and Children. This particular project was funded in part by NIH Grant R01 MH073842.

Address correspondence and reprint requests to: Thomas G. O'Connor, Department of Psychiatry, Wynne Center for Family Research, University of Rochester Medical Center, 300 Crittenden Boulevard, Rochester, NY 14642; E-mail: Tom_OConnor@URMC.Rochester.edu.

Building on the fetal programming model for somatic health, several research groups are seeking to translate the model for psychological and neuroscience outcomes. These studies focus on maternal prenatal anxiety or stress as a putative causal agent initiating a developmental programming response. The focus on prenatal anxiety or stress follows from decades of experimental animal studies linking prenatal stress to sizable and lasting effects on offspring fear, neurogenesis, immunity, and stress physiology, among other outcomes (Coe et al., 2003; Maccari et al., 2003). A number of observational studies in humans show that prenatal anxiety or stress in the mother is associated with behavioral outcomes in children (Bergman, Sarkar, O'Connor, Modi, & Glover, 2007; Buitelaar, Huizink, Mulder, de Medina, & Visser, 2003; Davis, Glynn, Waffarn, & Sandman, 2011; O'Connor, Heron, Golding, & Glover, 2003; Robinson et al., 2011; van den Bergh et al., 2006). These results raise important conceptual challenges for studies of developmental models of psychopathology that, with a few exceptions (Fisher et al., 2011; Liu, Portnoy, & Raine, 2012), tend to consider neither prenatal exposures nor programming effects. Furthermore, the hypothesis that there are prenatal programming effects for psychopathology has sizable implications for intervention, and particularly the timing of early interventions. Interventions starting in early infancy to promote the mother–infant relationship and the quality of parenting (Allen, 2011; Melhuish, Belsky, Leyland, & Barnes, 2008) are grounded in research linking the quality of the early postnatal rearing environment and the behavioral, emotional, and cognitive development of the child (Murray et al., 2011; Nelson et al., 2007; Ramchandani

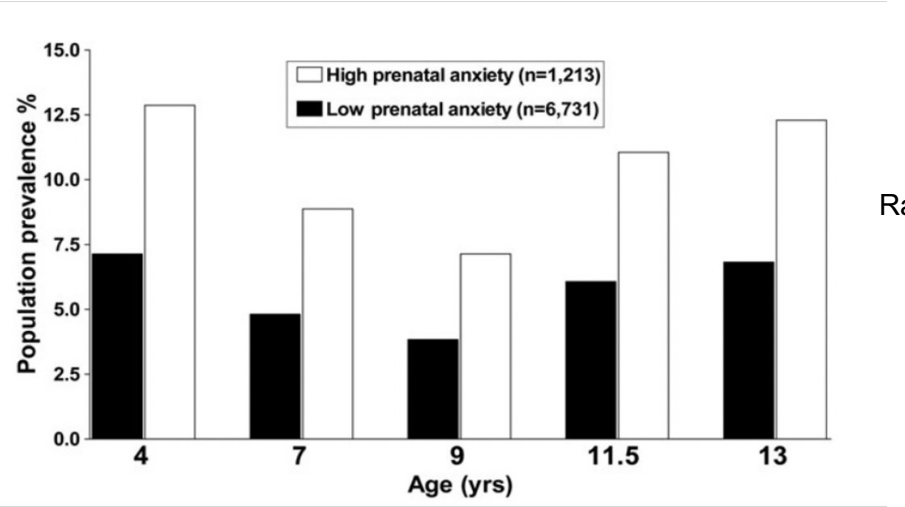
Maternal Anxiety:
Child 2x Increase Mental Health Disorders



Rates of ADHD, Anxiety
N=7,944

*comparable results with depression

Improved Methods: Observer-Based Outcomes



Rates of ADHD, Anxiety
N=7,944

NEW RESEARCH

Check for updates

Associations of Maternal Prenatal Stress and Depressive Symptoms With Childhood Neurobehavioral Outcomes in the ECHO Cohort of the NICHD Fetal Growth Studies: Fetal Growth Velocity as a Potential Mediator

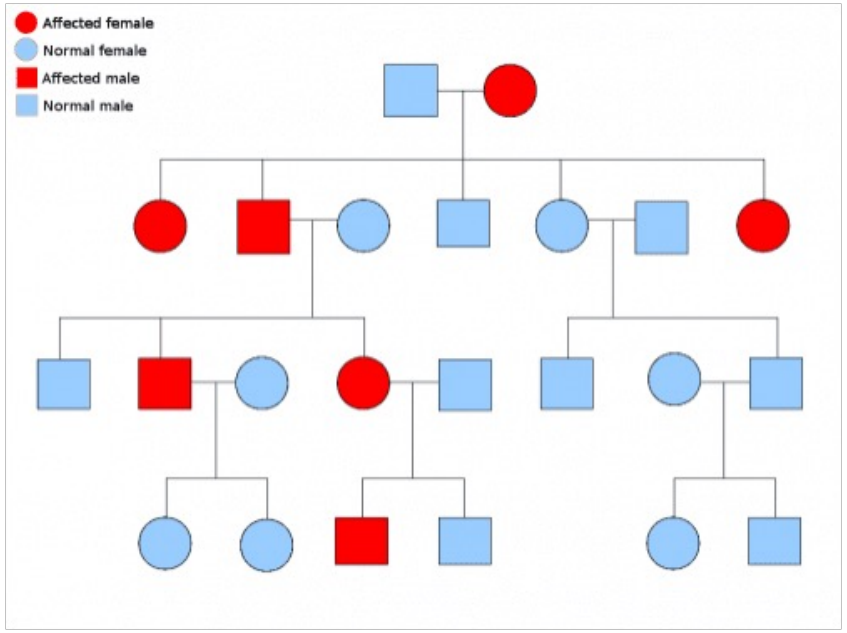
Vanessa Babineau, PhD, Yaneve N. Fonge, MD, Emily S. Miller, MD, MPH, William A. Grobman, MD, MBA, Pamela L. Ferguson, PhD, Kelly J. Hunt, PhD, John E. Vena, PhD, Roger B. Newman, MD, Constance Guille, MD, MSCR, Alan T.N. Tita, MD, PhD, Paula C. Chandler-Laney, PhD, Seonjoo Lee, PhD, Tianshu Feng, MS, Pamela Scorza, ScD, MPH, Lea Takács, PhD, Ronald J. Wapner, MD, Kristy T. Palomares, MD, PhD, Daniel W. Skupski, MD, Michael P. Nageotte, MD, Anthony C. Sciscione, DO, Stephen Gilman, ScD, Catherine Monk, PhD

J Am Acad Child Adolesc Psychiatry 2022;61(9):1155-1167.

Reporter Bias: Maternal report for her mood and child outcomes

NIH Toolbox: lower levels of inhibitory control, sustained attention in males

Improved Methods: Shared Genes of Risk



Prenatal programming reflects genetic inheritance

Offspring of prenatally stressed dams versus controls show:

- enhanced neuroendocrine responses to challenge
- increased levels of anxiety
- depressive-like behaviors
- cognitive impairments

Maccari, S. et al., 2014

Improved Methods: Shared Genes of Risk

NEW RESEARCH

Independent Prediction of Child Psychiatric Symptoms by Maternal Mental Health and Child Polygenic Risk Scores

Lawrence M. Chen, BSc, Irina Pokhvisneva, MSc, Marius Lahti-Pulkkinen, PhD, Tuomas Kvist, MSc, Jessie R. Baldwin, PhD, Carine Parent, PhD, Patricia P. Silveira, MD, PhD, Jari Lahti, PhD, Katri Räikkönen, PhD, Vivette Glover, PhD, Thomas G. O'Connor, PhD, Michael J. Meaney, PhD, Kieran J. O'Donnell, PhD

Journal of the American Academy of Child & Adolescent Psychiatry
Volume ■ / Number ■ / ■ 2023

EDITORIAL

Editorial: In Utero Exposure to Maternal Affective Symptoms: Prenatal Programming of Child Psychopathology Is Independent of Shared Genes of Risk

Catherine Monk, PhD

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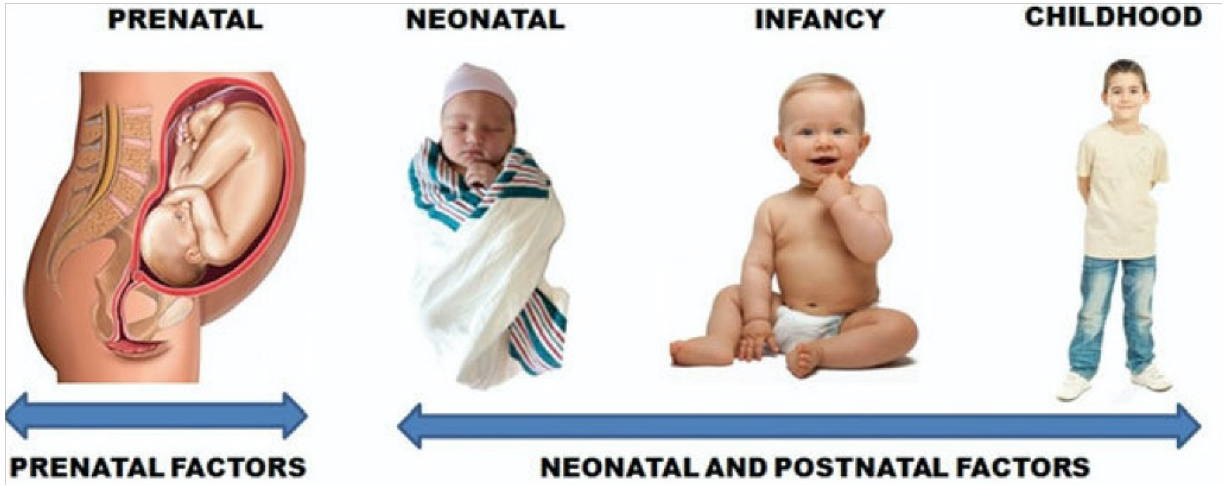
Improved Methods: Prior to Postnatal Influences



Sudhakar et al.

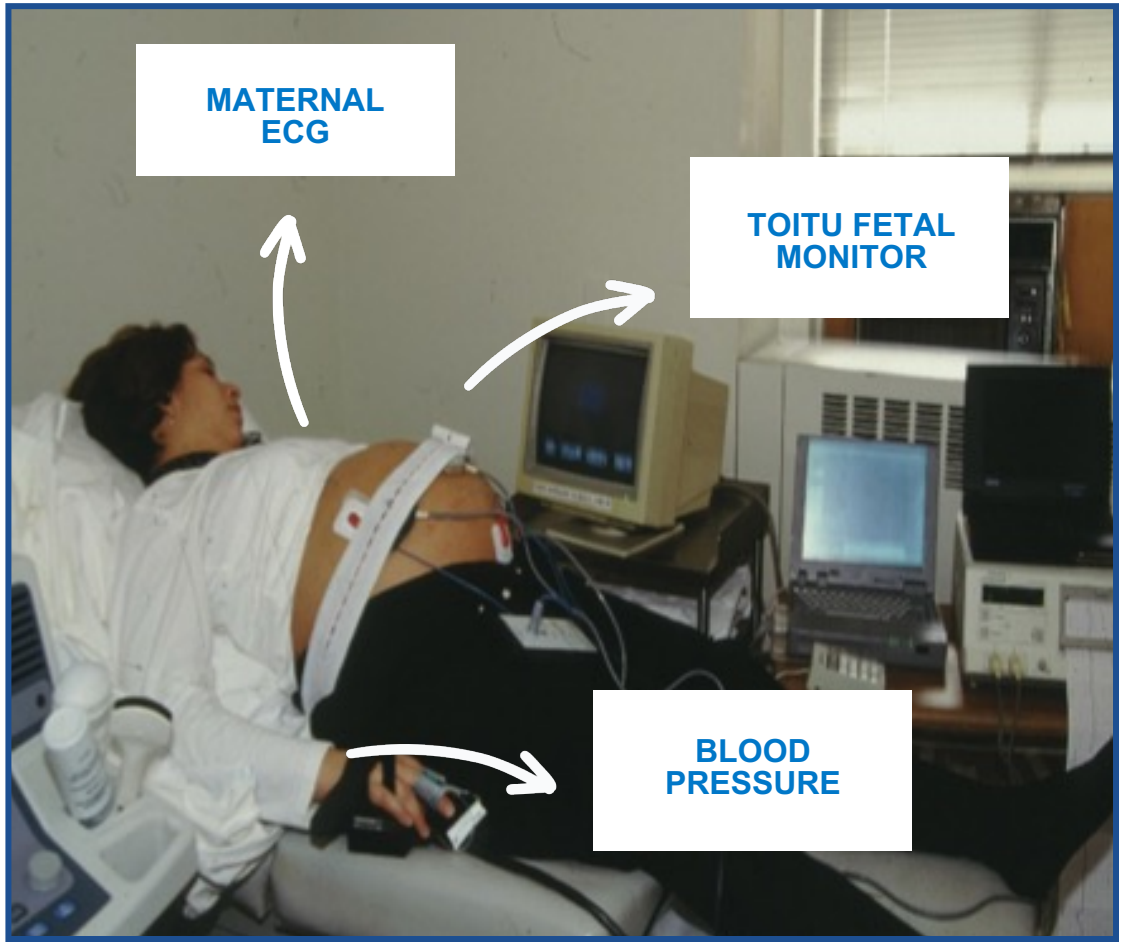
Is there an impact of maternal prenatal distress on child outcomes?

OR

Is prenatal distress merely a marker for the postnatal environment, which exerts effects?

Improved Methods: Prior to Postnatal Influences

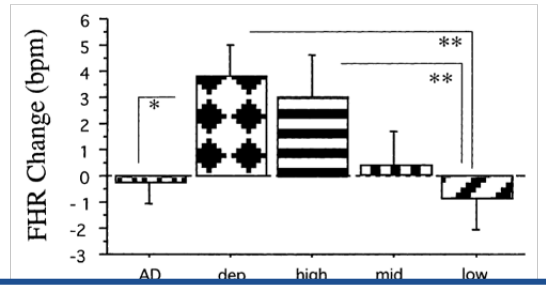
- Fetal ANS:
  - maintains body homeostasis, is a key effector of the stress response system
    - HR reactivity
    - HRV: parasympathetic control of HR
    - Higher levels associated with better emotion regulation
    - HR + movement coupling/CNS
- Newborn/fetal MRI



Fetal Heart Rate Reactivity Differs by Women's Psychiatric Status: An Early Marker for Developmental Risk?

CATHERINE MONK, PH.D., RICHARD P. SLOAN, PH.D., MICHAEL M. MYERS, PH.D., LAUREN ELLMAN, B.A., ELIZABETH WERNER, B.A., JIYEON JEON, B.A., FELICE TAGER, PH.D., AND WILLIAM P. FIFER, PH.D.

J. AM. ACAD. CHILD ADOLESC. PSYCHIATRY, 43:3, MARCH 2004



Neuroreport. 2021 Oct 6;32(14):1170-1174. doi: 10.1097/WNR.0000000000001711.

Maternal corticosteroids and depression during gestation and decreased fetal heart rate variability

Sharon K Hunter [1], Robert Freedman [1], Amanda J Law [1 2 3], Uwe Christians [4], Jacob B W Holzman [1 5], Zachary Johnson [1], M Camille Hoffman [1 6]

Affiliations + expand

PMID: 34284445 DOI: 10.1097/WNR.0000000000001711

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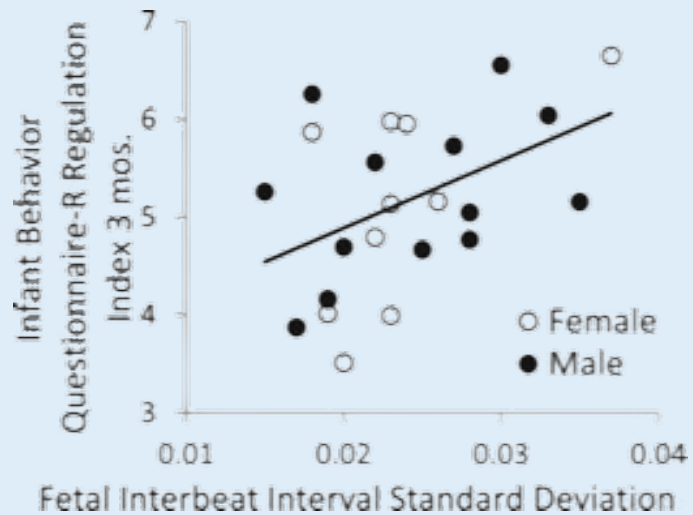
Prenatal Predictors of Infant Temperament

ABSTRACT: Emerging data suggest that prenatal factors influence children's temperament. In 50 dyads, we examined fetal heart rate (FHR) activity and women's antenatal psychiatric illness as predictors of infant temperament at 4 months (response to novelty and the Infant Behavior Checklist). FHR change during maternal challenge was positively associated with observed infant motor reactivity to novelty ($p = .02$). The odds of being classified as high versus low motor among fetuses who had an increase in FHR during maternal stress was 11 times those who had a decrease in FHR ($p = .0006$). Antenatal psychiatric diagnosis was

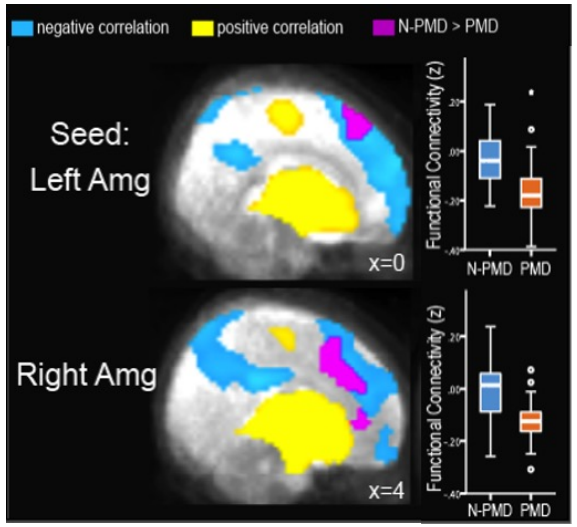


Citation: Transl Psychiatry (2016) 6, e935; doi:10.1038/tp.2016.146
www.nature.com/tp

ORIGINAL ARTICLE

Alterations in amygdala–prefrontal circuits in infants exposed to prenatal maternal depression

J Posner[1,2,5], J Cha[1,2,5], AK Roy[3], BS Peterson[4], R Bansal[4], HC Gustafsson[1], E Raffanello[2], J Gingrich[1,2] and C Monk[1,2]



JAMA Network | Open

Original Investigation | Pediatrics

Association of Elevated Maternal Psychological Distress, Altered Fetal Brain, and Offspring Cognitive and Social-Emotional Outcomes at 18 Months

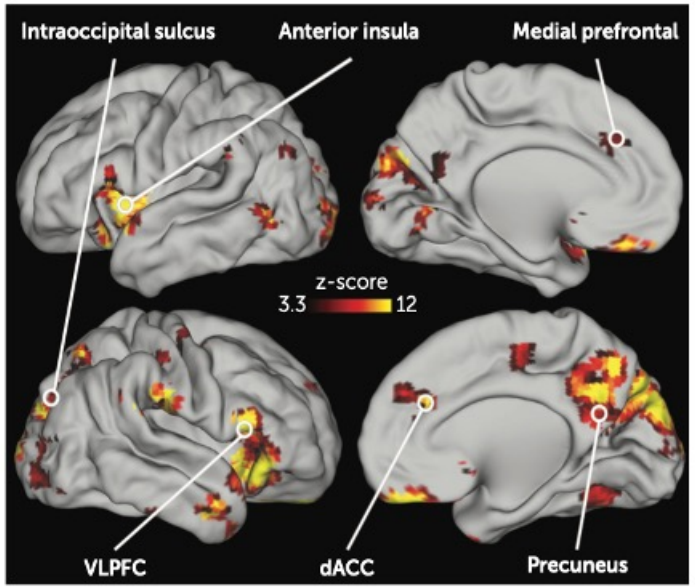
Yao Wu, PhD; Kristina M. Espinosa, PsyD; Scott D. Barnett, PhD; Anushree Kapse, MBA; Jessica Lynn Quistorff, MPH; Catherine Lopez, MS; Nickie Andescavage, MD; Subechhya Pradhan, PhD; Yuan-Chiao Lu, PhD; Kushal Kapse, MS; Diedtra Henderson, BA; Gilbert Vezina, MD; David Wessel, MD; Adré J. du Plessis, MBChB; Catherine Limperopoulos, PhD

Neonatal Brain Response to Deviant Auditory Stimuli and Relation to Maternal Trait Anxiety

Chad M. Sylvester, M.D., Ph.D., Michael J. Myers, B.A., Michael T. Perino, Ph.D., Sydney Kaplan, B.S., Jeanette K. Kenley, B.S., Tara A. Smyser, M.S., Barbara B. Warner, M.D., Deanna M. Barch, Ph.D., Daniel S. Pine, M.D., Joan L. Luby, M.D., Cynthia E. Rogers, M.D., Christopher D. Smyser, M.D.

Am. Journal Psychiatry, 2021

FIGURE 3. Brain areas in which neonatal neural activity following onset of deviant sounds varied depending on maternal trait anxiety[a]



Conceptual Model: Adaptation and an Evolutionary Perspective

- Prenatal maternal distress associated with greater reactivity to environment
- Evolutionary perspective
- Prenatal maternal distress exposure ‘forecasts’ an adverse (dangerous) environment
- Heightened reactivity may be adaptive: be prepared for (challenging) postnatal environment to come
- Consequences for the child:
  - Mismatch with environment?
  - ADHD
  - Anxiety

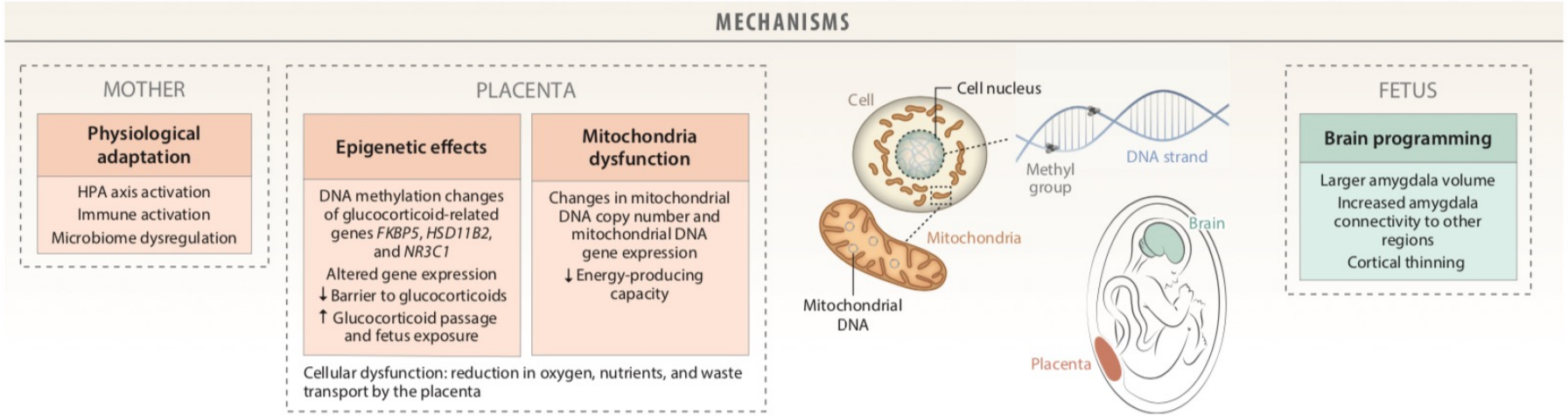
Improved Methods: Mechanisms

Annual Review of Clinical Psychology

Prenatal Developmental Origins of Future Psychopathology: Mechanisms and Pathways

Catherine Monk,[1,2,3] Claudia Lugo-Candelas,[1,3] and Caroline Trumpff[1,3]

- Adds rigor to results based on associations
- May lead to direct biological targets for intervention

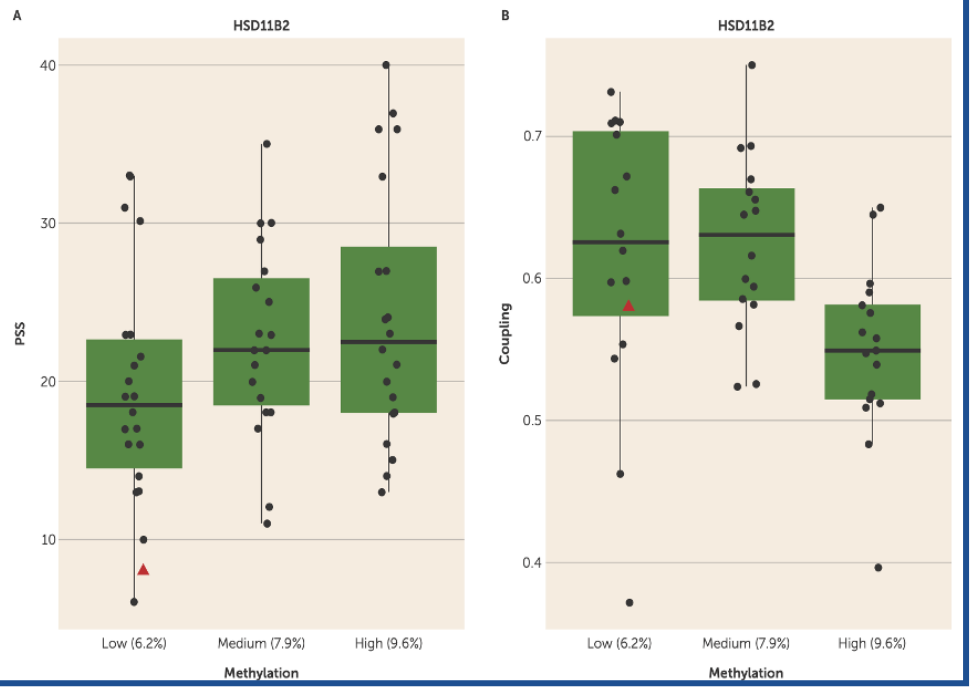


Distress During Pregnancy: Epigenetic Regulation of Placenta Glucocorticoid-Related Genes and Fetal Neurobehavior

Catherine Monk, Ph.D., Tianshu Feng, M.S., Seonjoo Lee, Ph.D., Izabela Krupska, M.A., Frances A. Champagne, Ph.D., Benjamin Tycko, M.D., Ph.D.

Am Journal Psychiatry 2016

FIGURE 2. Tertiles of *HSD11B2* Promoter Region Methylation in Relation to the Perceived Stress Scale and Fetal Coupling[a]



Translational Psychiatry www.nature.com/tp

ARTICLE OPEN

Check for updates

Prenatal exposure to maternal disadvantage-related inflammatory biomarkers: associations with neonatal white matter microstructure

Ashley F. P. Sanders[1✉], Brian Tirado[1], Nicole A. Seider[2], Regina L. Triplett[2], Rachel E. Lean[1], Jeffrey J. Neil[2], J. Philip Miller[3], Rebecca Tillman[1], Tara A. Smyser[1], Deanna M. Barch[1,4], Joan L. Luby[1], Cynthia E. Rogers[1,5], Christopher D. Smyser[2,5,6], Barbara B. Warner[5,7], Edith Chen[8,9] and Gregory E. Miller[8,9]

Higher average maternal IL-6 was associated with very low socioeconomic status (INR < 200% poverty line) and lower neonatal axial diffusivity in the uncinate

Practical Implications

- Maternal mental health matters for 2 generations

- Parenting begins before birth

- Prenatal programming research used judiciously in risk/benefit discussion of prenatal use of psychotropic medications; need a RCT of treated/untreated

- Oxygen mask on plane metaphor is useful; for your baby to be healthy, you need to be healthy

Don't blame the mothers

Careless discussion of epigenetic research on how early life affects health across generations could harm women, warn **Sarah S. Richardson** and colleagues.

On the Horizon: Stress Assessment

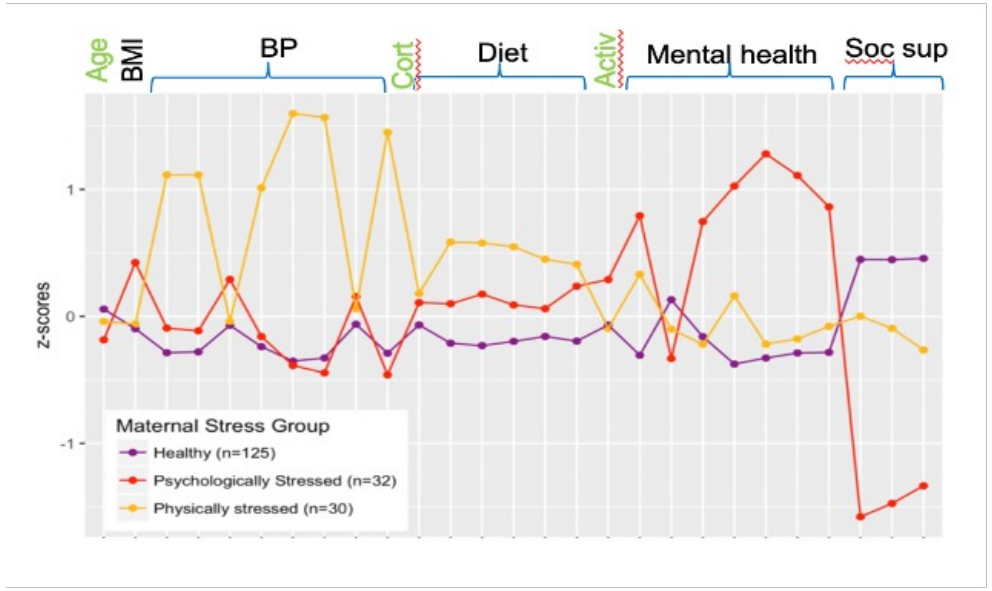
PNAS

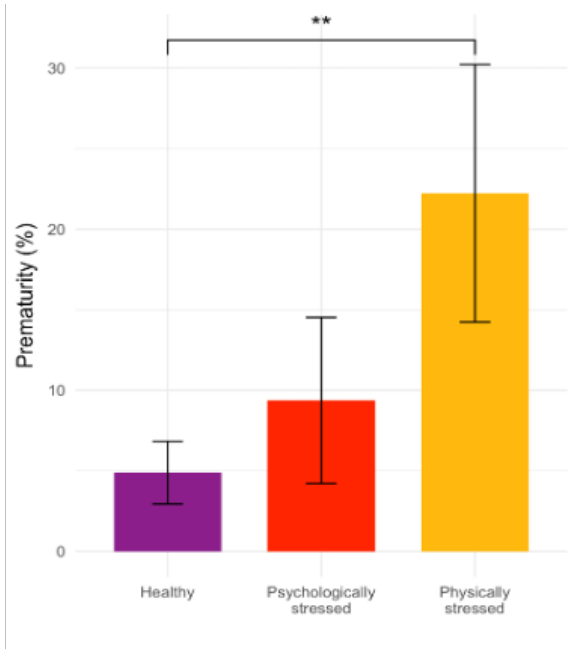
Maternal prenatal stress phenotypes associate with fetal neurodevelopment and birth outcomes

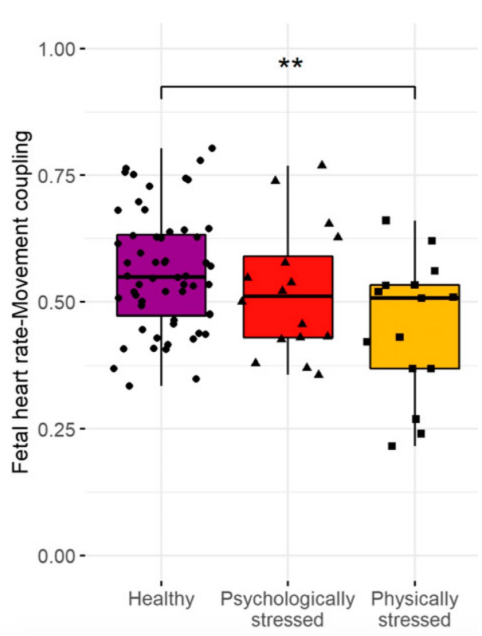
Kate Walsh[a,b], Clare A. McCormack[c], Rachel Webster[d], Anita Pinto[e], Seonjoo Lee[f,g], Tianshu Feng[g], H. Sloan Krakovsky[d], Sinclaire M. O'Grady[d], Benjamin Tycko[h], Frances A. Champagne[i,j], Elizabeth A. Werner[d,i], Grace Liu[i], and Catherine Monk[d,f,i,1]

[a]Ferkauf Graduate School of Psychology, Yeshiva University, The Bronx, NY 10461; [b]Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY 10032; [c]Center for Science and Society, Columbia University, New York, NY 10027; [d]Department of Obstetrics and Gynecology, Columbia University Medical Center, New York, NY 10032; [e]Data Science, Columbia University, New York, NY 10027; [f]Division of Behavioral Medicine, New York State Psychiatric Institute, New York, NY 10032; [g]Department of Biostatistics (in Psychiatry), Mailman School of Public Health, Columbia University, New York, NY 10032; [h]Hackensack-Meridian Health Center for Discovery and Innovation, Nutley, NJ 07110; [i]Department of Psychiatry, Columbia University, New York, NY 10032; and [j]Department of Psychology, University of Texas at Austin, Austin, TX 78712

Edited by Bruce S. McEwen, Rockefeller University, New York, NY, and approved September 18, 2019 (received for review April 16, 2019)







ARTICLE

Check for updates

The effects of experience of discrimination and acculturation during pregnancy on the developing offspring brain

Marisa N. Spann[1,2✉], Kiarra Alleyne[3], Cristin M. Holland[1], Antonette Davids[1], Arline Pierre-Louis[1], Claire Bang[3], Victoria Oyeneye[4], Rebecca Kiflom[5], Eileen Shea[2], Bin Cheng[3], Bradley S. Peterson[6,7], Catherine Monk[1,2] and Dustin Scheinost[8]

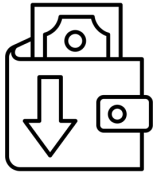
COLUMBIA | OBSTETRICS AND GYNECOLOGY

PMADs
Have 2
Gen Impact

SDoH: Women in the Psychologically Stressed Group vs Other Two Groups

more likely to be Latina

fewer years of education



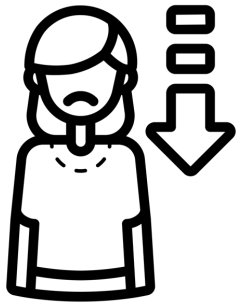
lower household income

more public assistance

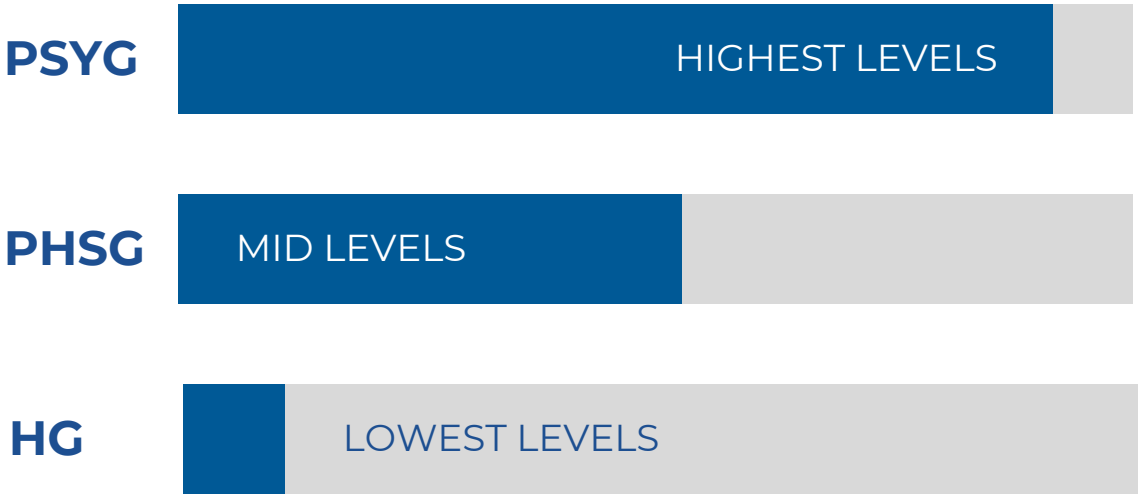
higher levels of emotional abuse and physical neglect

PMADs
Have 2
Gen Impact

Trauma: Women Differed by Stress Groups



Childhood Emotional Neglect



PMADs
Have 2
Gen Impact

DOI: 10.1111/bdi.13207

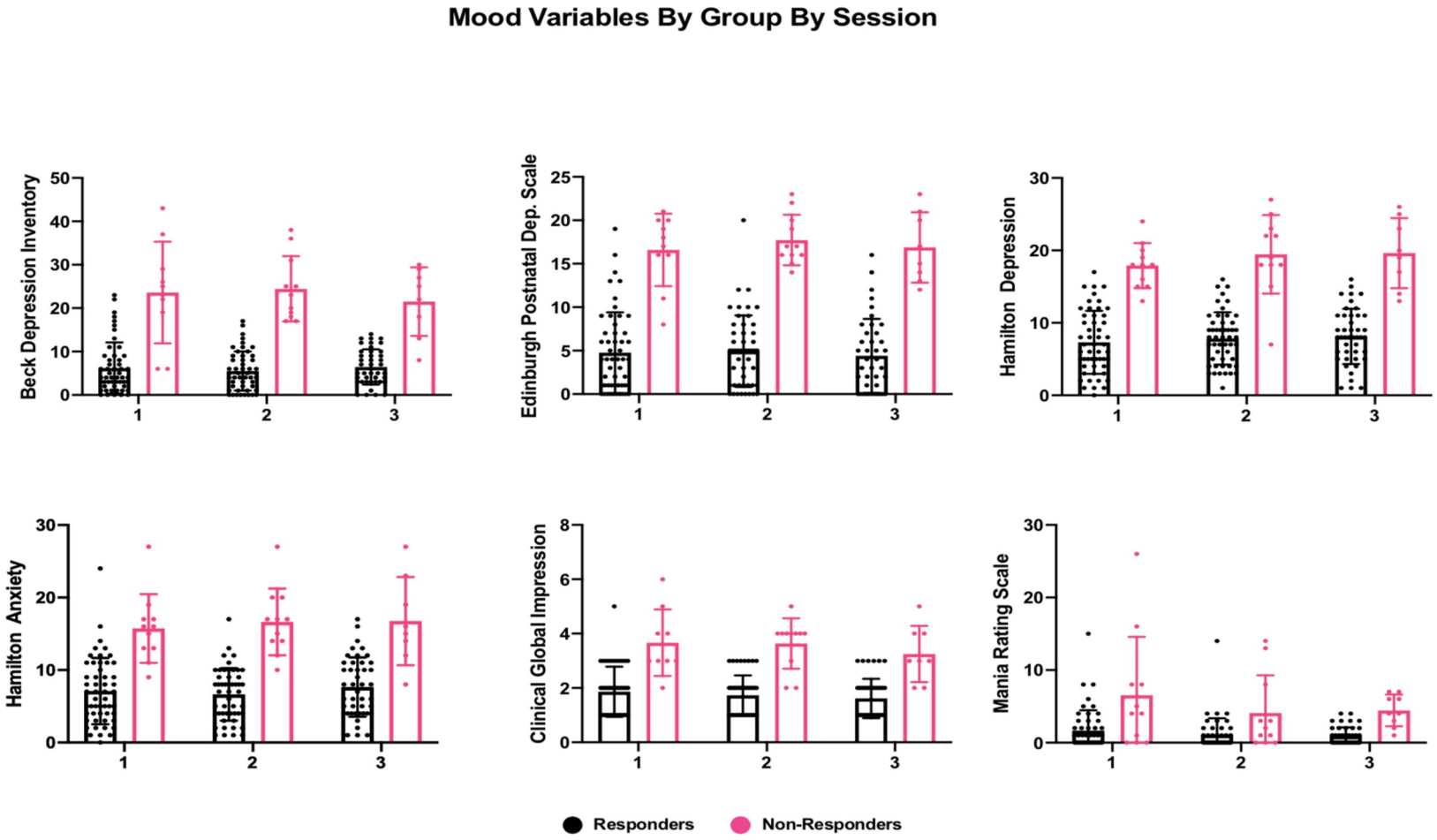
ORIGINAL ARTICLE

Pregnant women with bipolar disorder who have a history of childhood maltreatment: Intergenerational effects of trauma on fetal neurodevelopment and birth outcomes

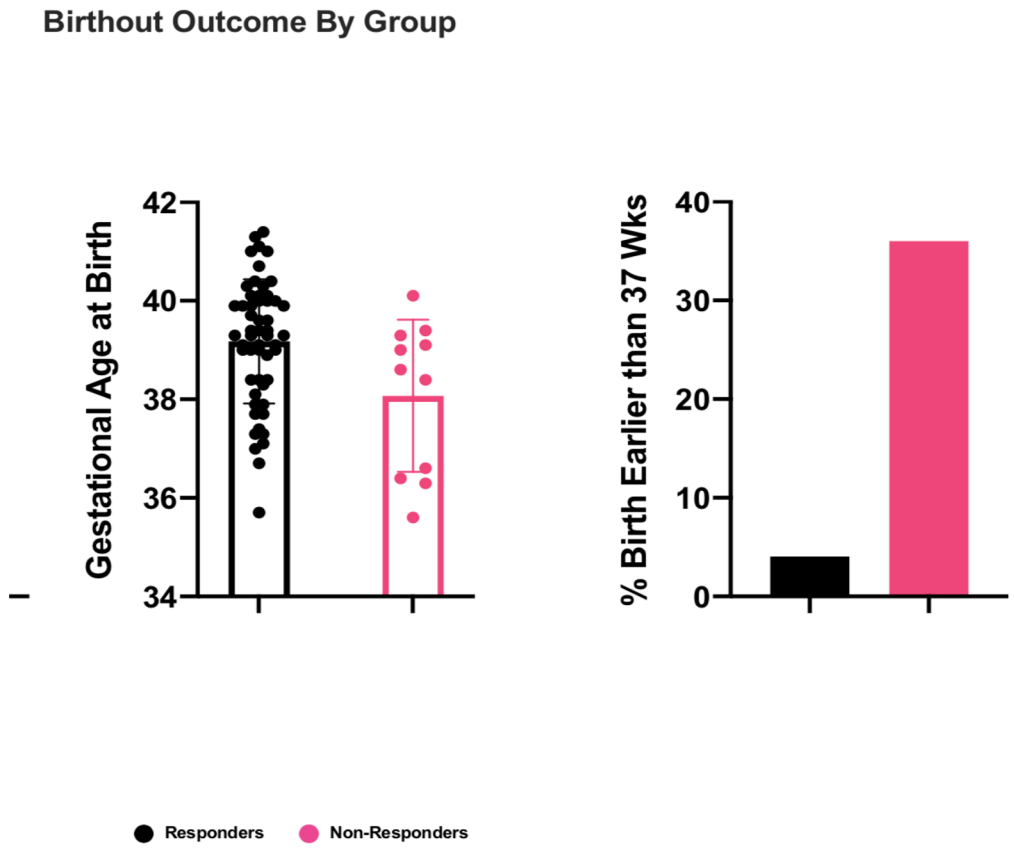
Vanessa Babineau[1] | Clare A. McCormack[2] | Tianshu Feng[3] | Seonjoo Lee[4,5] | Obianuju Berry[6] | Bettina T. Knight[7] | Jeffrey D. Newport[8] | Zachary N. Stowe[9] | Catherine Monk[10]

Bipolar Disorders. 2022;00:1–12.

PMADs
Have 2
Gen Impact

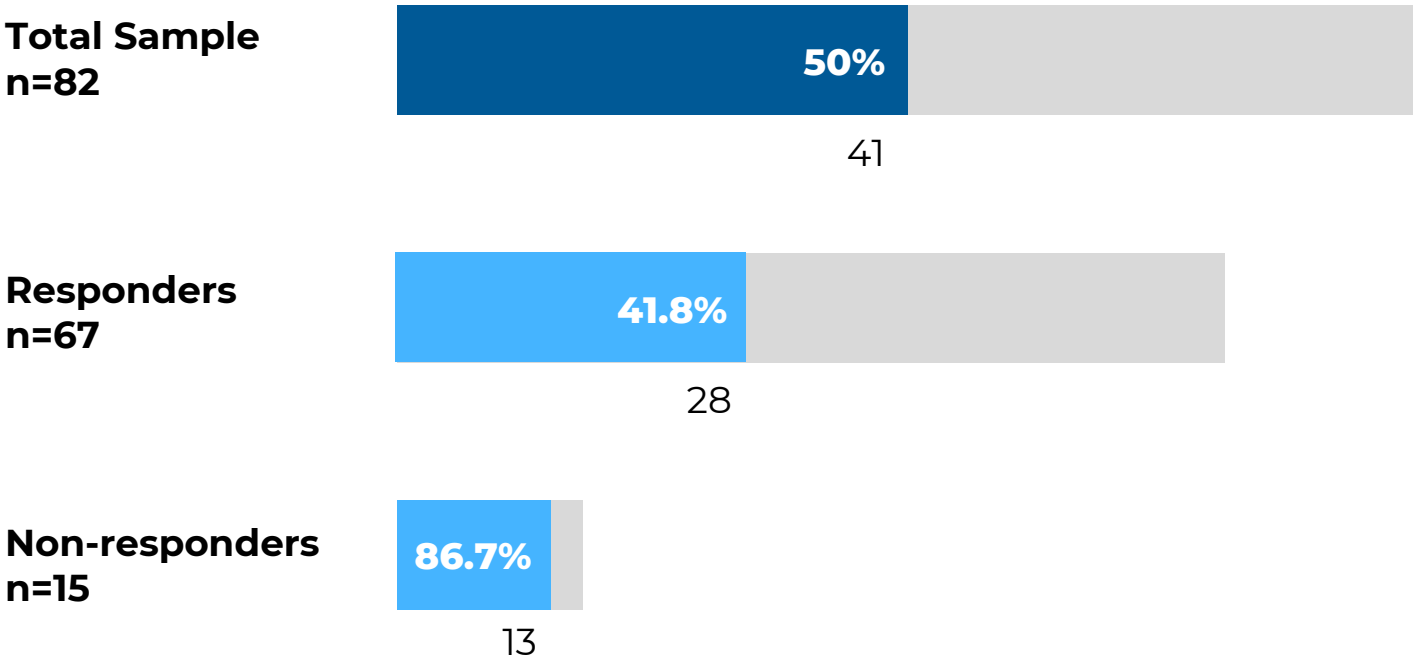


PMADs
Have 2
Gen Impact



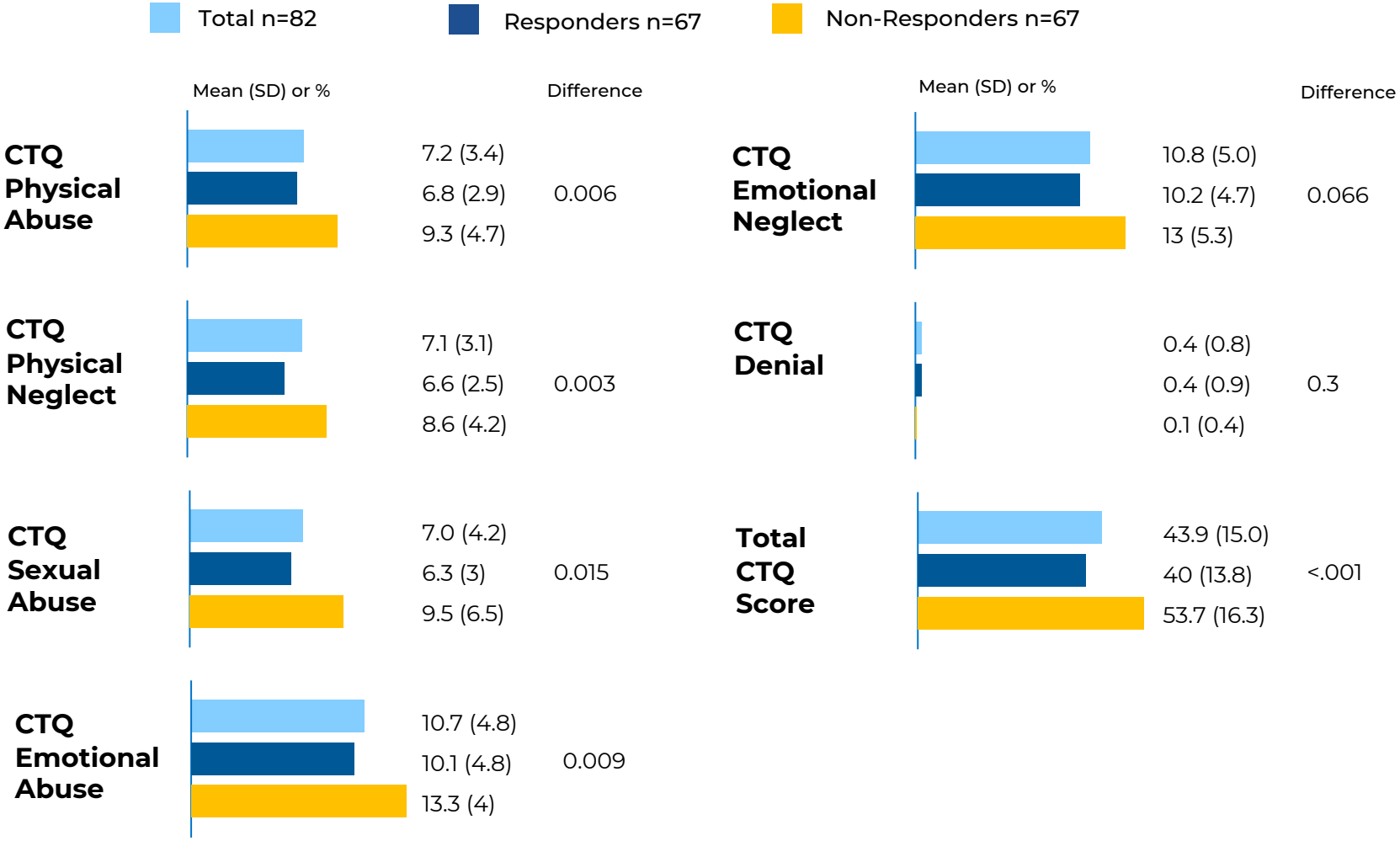
PMADs
Have 2
Gen Impact

Trauma: Groups Differed by Childhood Maltreatment



PMADs
Have 2
Gen Impact

Trauma: Groups Differed by Childhood Maltreatment



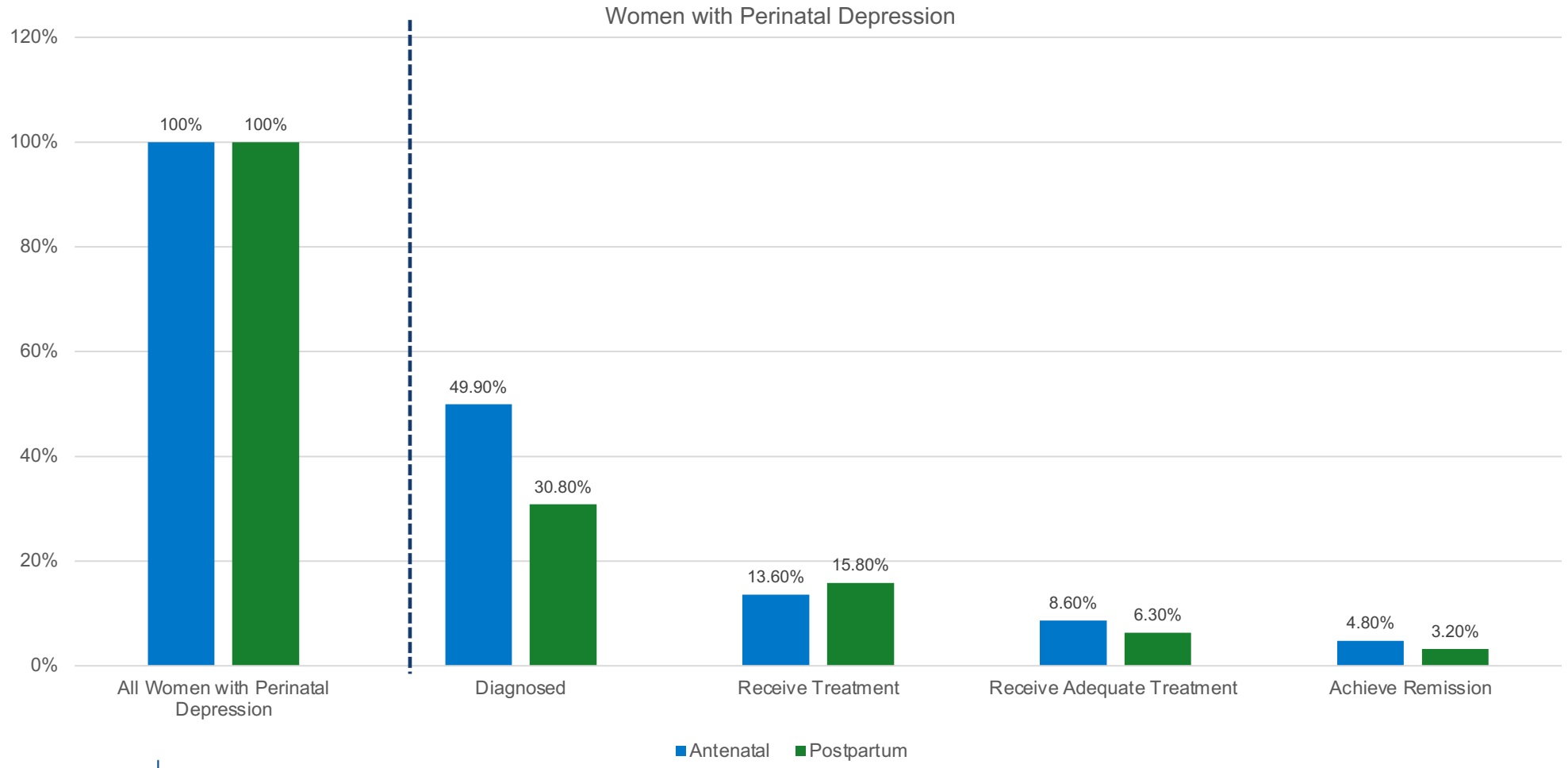
The Perinatal Period = Time of Significant Brain Changes Across Two Generations

A Time of Vulnerability — Also of Opportunity

Biggest Impediment to Recovery from PMADs is **Access to Treatment**

Perinatal Depression: Treatment Inadequacies Across Course of Care

Very few women with depression receive adequate treatment and achieve remission



COLUMBIA | OBSTETRICS AND GYNECOLOGY

NewYork-Presbyterian

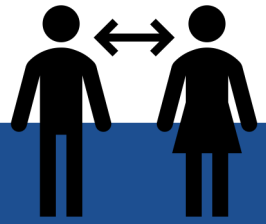
Source: Cox, E. Q., et al. (2016). "The Perinatal Depression Treatment Cascade: Baby Steps Toward Improving Outcomes." J Clin Psychiatry **77**(9): 1189-1200.

Women's Mental Health @Ob/Gyn: Program Overview

Mental health care offered across ColumbiaDoctors ObGyn Clinical Services

- Direct access to a mental health care provider
- Accept most commercial insurances and some managed Medicaid plans
- Early identification and prevention of mental health conditions in addition to treating existing ones
- Two-generation Impact; 60% of patients are pregnant or postpartum
- Treat women across the life course
- Multidisciplinary team

Women's Mental Health @Ob/Gyn Program Design



Referrals

Provider Concern

Patient Request

Routine depression screening

- According to ACOG guidelines using the Patient Health Questionnaire (PHQ-9 for depression)

Treatment options

- Psychotherapy
- Psychopharmacology
- Support groups (e.g., Parents to be of color; fertility; endometriosis)

Treatment duration

- Up to 6 months postpartum psychotherapy
- Short-term, approximately 15 psychotherapy sessions outside of perinatal period
- Psychopharmacology ongoing
- Patients return: another episode, pregnancy, life stress

PMADs Are Treatable:

Access to Care

Women's Mental Health @Ob/Gyn: Utilization Outcomes

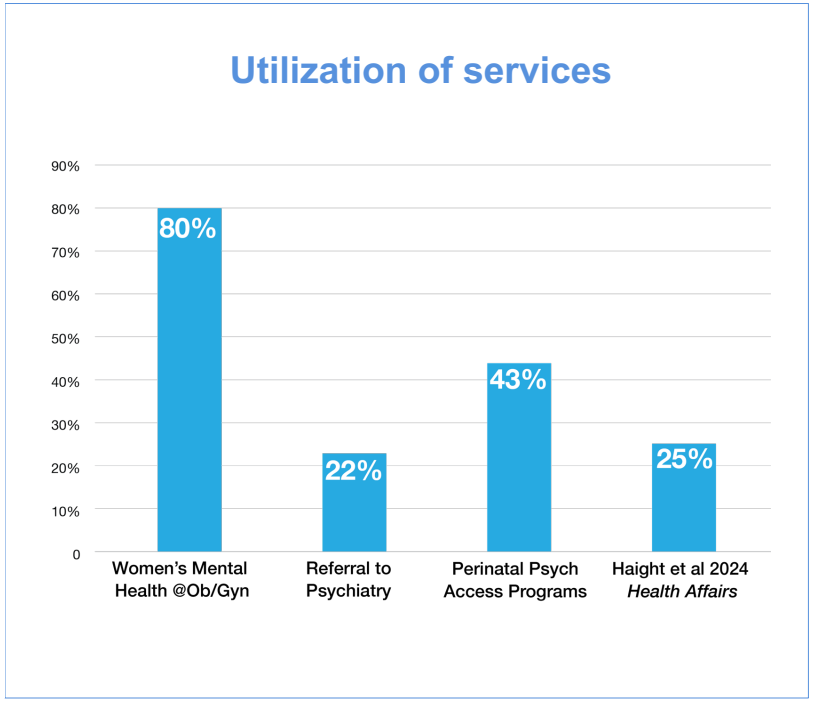
Data reflects outcomes from February 2020 to December 2023

2,015
Total Referrals

20-30
Referrals/Week

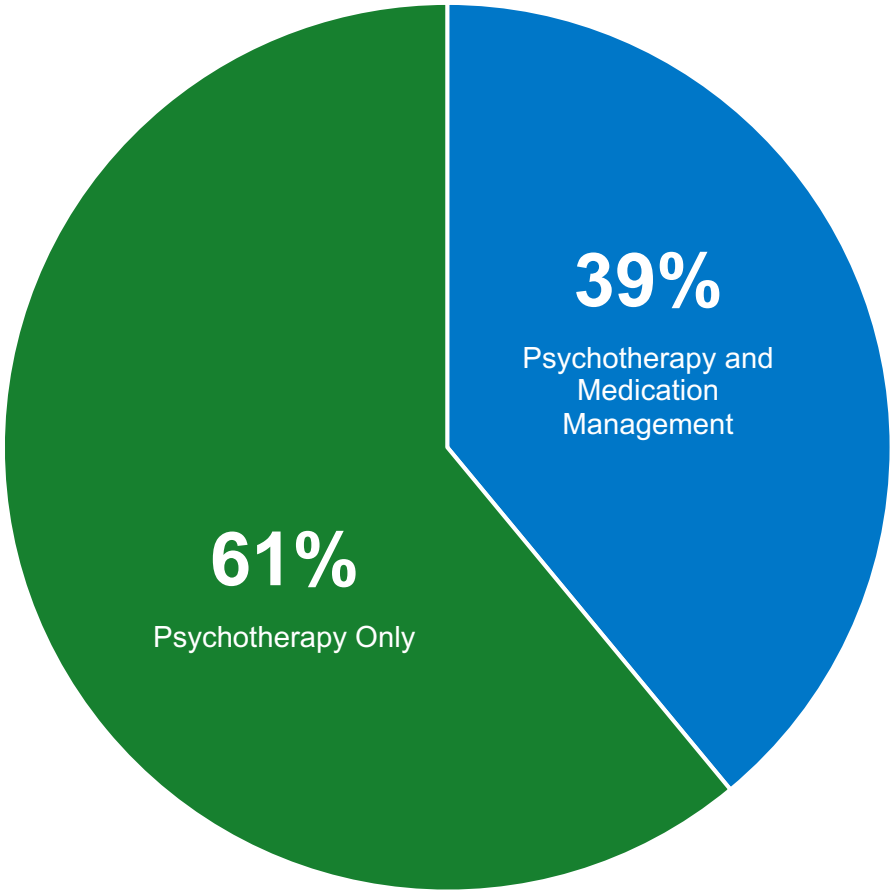
7
DAYS
Referral to First Evaluation and Visit with Mental Health Provider

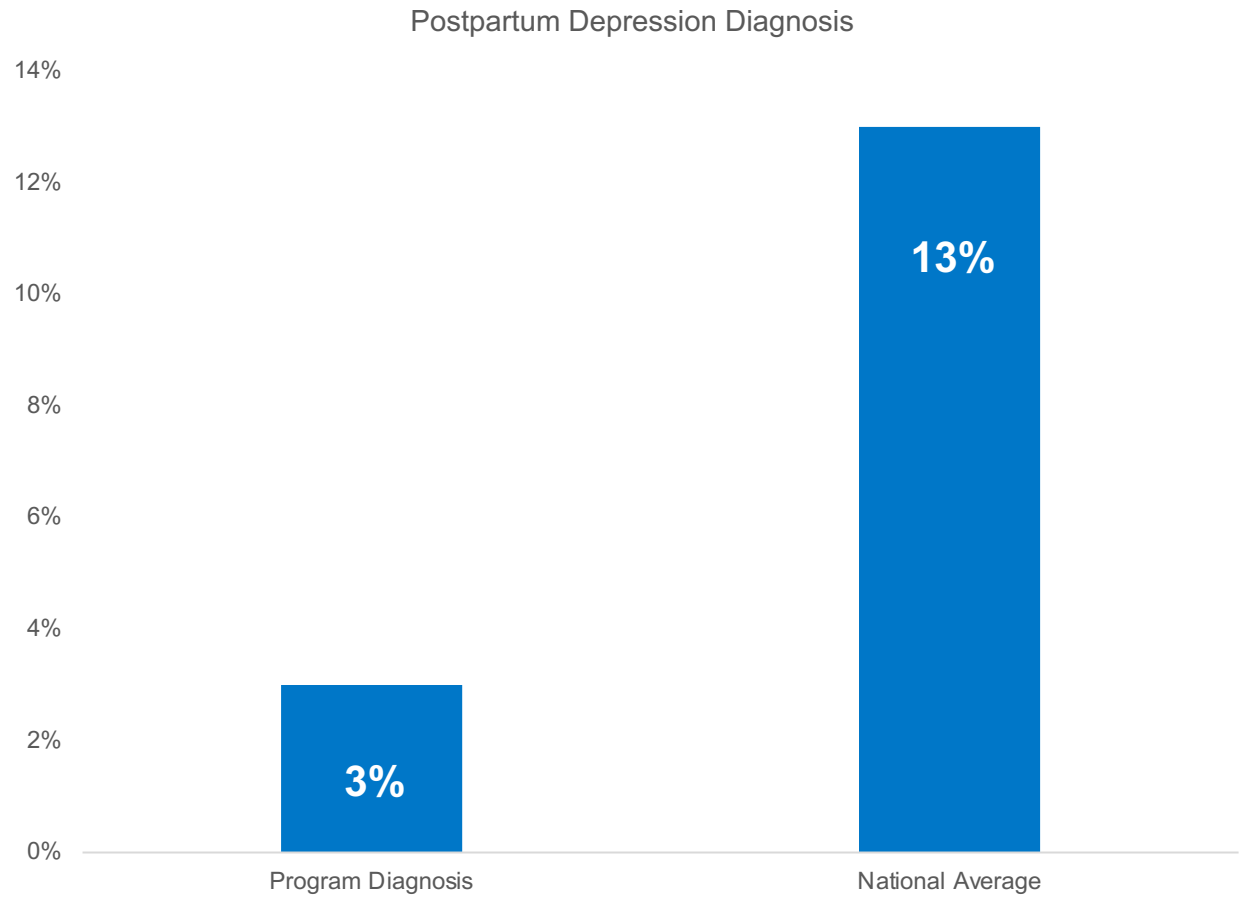
23
AVERAGE VISITS



Women's Mental Health @Ob/Gyn: Utilization Outcomes

Early intervention and treatment leading to improved outcomes





COLUMBIA | OBSTETRICS AND GYNECOLOGY

NewYork-Presbyterian

PMADs Are Preventable

REACH OUT STAY STRONG ESSENTIALS (ROSE)

FOR NEW MOMS

Caron Zlotnick, PhD, Brown University

MOTHERS & BABIES

Ricardo Munoz, PhD

Darius Tandon, PhD

Northwestern University

PMADs Are Preventable

PREPP

PRACTICAL RESOURCES FOR EFFECTIVE POSTPARTUM PARENTING

A Mother-Infant Dyadic Treatment to Prevent Postpartum Depression

Dr. Elizabeth Werner

PMADs Are Preventable

Billing:
CPT Code 90834

ICD-10 Adjustment Disorder with anxiety and/or depression

Preventing maternal mental health disorders in the context of poverty: pilot efficacy of a dyadic intervention

Pamela Scorza, ScD; Catherine Monk, PhD; Seonjoo Lee, PhD; Tianshu Feng, PhD; Obianuju O. Berry, MD, PhD; Elizabeth Werner, PhD

PREPP

PRACTICAL RESOURCES FOR EFFECTIVE POSTPARTUM PARENTING

A Mother-Infant Dyadic Treatment to Prevent Postpartum Depression

Dr. Elizabeth Werner

Overview

- Overall treatment protocol
- Conceptual model and rationale
- [a bit of] Efficacy Data
- Quick look at PREPP intervention
- Training

PREPP Treatment Protocol

Brief (5 sessions)

- 28-32 gestational weeks – 6 week postpartum

For those at risk of developing PPD

- Stress, depressive symptoms; experiencing poverty

PREPP Conceptual Model

Two unique features

- Begins in pregnancy
- Dyadic approach

Rationale for beginning in pregnancy with parenting foci

- Identification with the parenting role, and a 'primary preoccupation' with the baby begins in pregnancy —leverage this relationship for PPD prevention efficacy (Monk et al., 2022)

Rationale for dyadic focus

- Mother and infant affect each other
  - Lack of sleep is a risk factor for PPD (Leistikow, N et al., 2022)
  - Greater infant fuss/cry/sleep behavior is associated with PPD (Cutrona et al., 1986, Murray et al., 1996, Miller et al., 1993)
  - Behavioral techniques are effective in improving infant fuss/cry and sleep behavior (Hiscock et al, 2008, 2014)
  - Confidence in parenting role protective factor in PPD (Gross et al., 1994)

PREPP Conceptual Model

Two unique features

- Begins in pregnancy
- Dyadic approach

An intervention based on the conceptualization of postpartum depression as a potential disorder of the dyad, and one that can be approached through preventative psychological and behavioral changes in the mother that affect her and the child — even before birth

PREPP: Three Treatment Components

- Three components
  - Mindfulness, sleep hygiene and self-reflection
  - Psychoeducation and cognitive support managing expectations
  - Behavioral techniques for newborn care
- Combine established mindfulness and psycho-education/CBT tools with a dyadic approach, specifically behavioral techniques *for parenting newborns before the baby is born*

Optimize infant's behavioral regulation

Improve women's sleep, lessen distress

Build self– efficacy/ competence in parenting, foster positive infant attributions, and maternal sensitivity

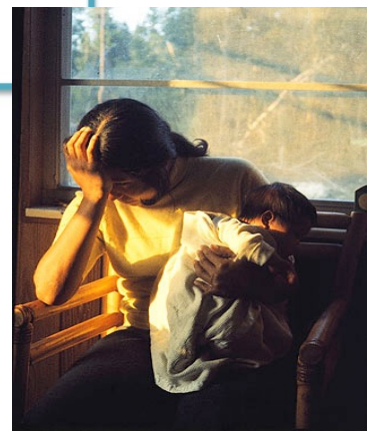
Behavioral skills

Aid newborn sleep

- Day/night cues
- Focal feed

Comforting techniques

- Swaddling
- Carrying independent of crying



Sleep skills & mindfulness & self-reflection; Psychoeducation & cognitive support

GOU

PREPP: Improving Access to, & Uptake of, Prevention Services

- Shame in endorsing distress in the context of child bearing (Dennis & Chung-Lee, 2006)

  Focus on maternal role and infant—the dyad

- Stigma associated with receiving mental health services (Dennis & Chung-Lee, 2006; Goodman, 2009)
  - **Coach; Name**

- Logistical challenges of attending added health care appointments at a different location (Byatt, Simas, Lundquist, Johnson, & Ziedonis, 2012; Goodman, 2009)
  - **Sessions adjunctive to OB prenatal visits and 6-week well-baby visit *and via telehealth***
  - **Potential to incorporate into OB practices and prenatal care ecosystem**
  - **A variety of providers/disciplines can be trained**

- Disinclination to take medication while pregnant or breastfeeding (Battle, Salisbury, Schofield, & Ortiz-Hernandez, 2013; Goodman, 2009)
  - **Behavioral and cognitive foci**

Efficacy Data

Arch Womens Ment Health
DOI 10.1007/s00737-015-0549-5

ORIGINAL ARTICLE

PREPP: postpartum depression prevention through the mother–infant dyad

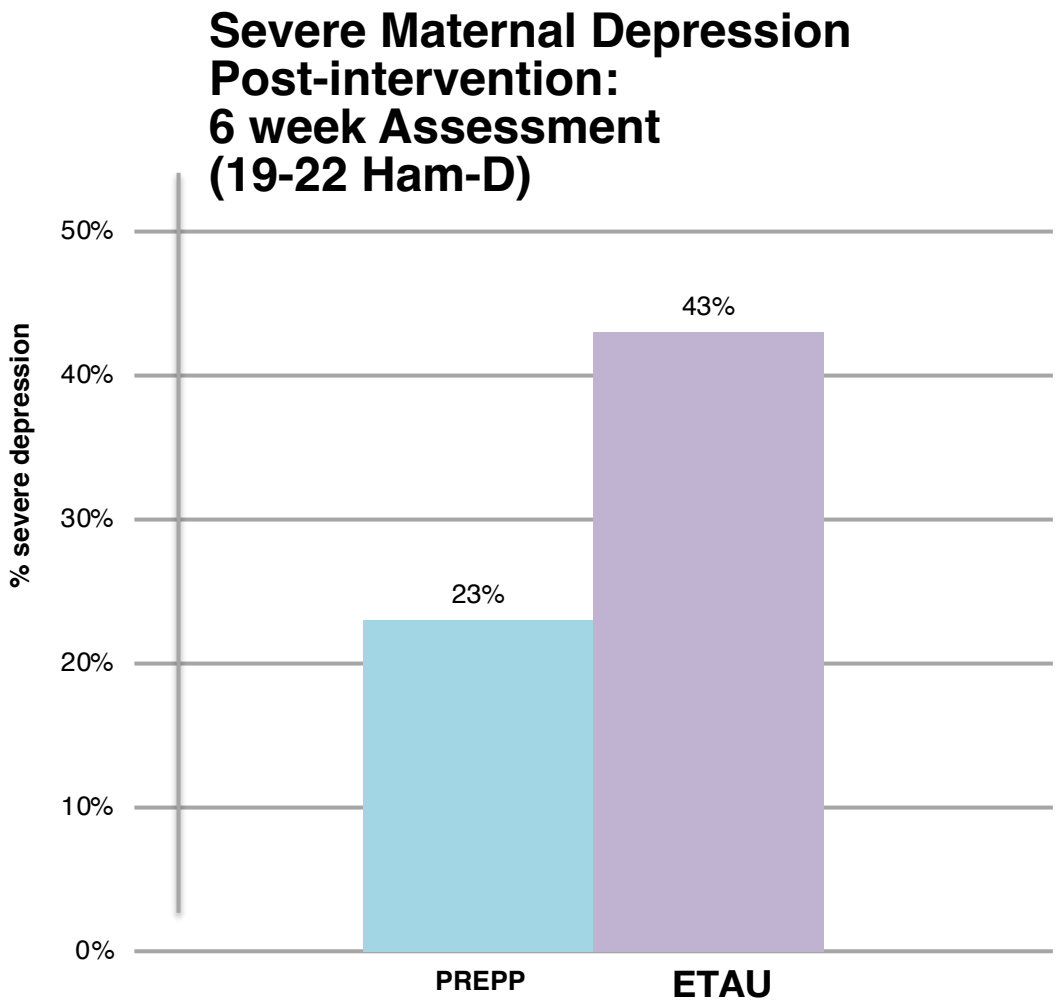
Elizabeth A. Werner[1] · Hanna C. Gustafsson[1] · Seonjoo Lee[3,4] · Tianshu Feng[3] · Nan Jiang[1] · Preeya Desai[1] · Catherine Monk[1,2]

Archives of Women's Mental Health, 2016

Efficacy Data

- 58% Latinx, 19% Black
- Age: 18-45 yrs old, average=30
- At risk for PPD based on Predictive Index of PPD (Cooper, 1996)
- Baseline mild to moderate depression symptoms
  - average of 16.11 on the HRSD, max 54, 14-17 mild to moderate
- Adherence: 100% completed PREPP intervention

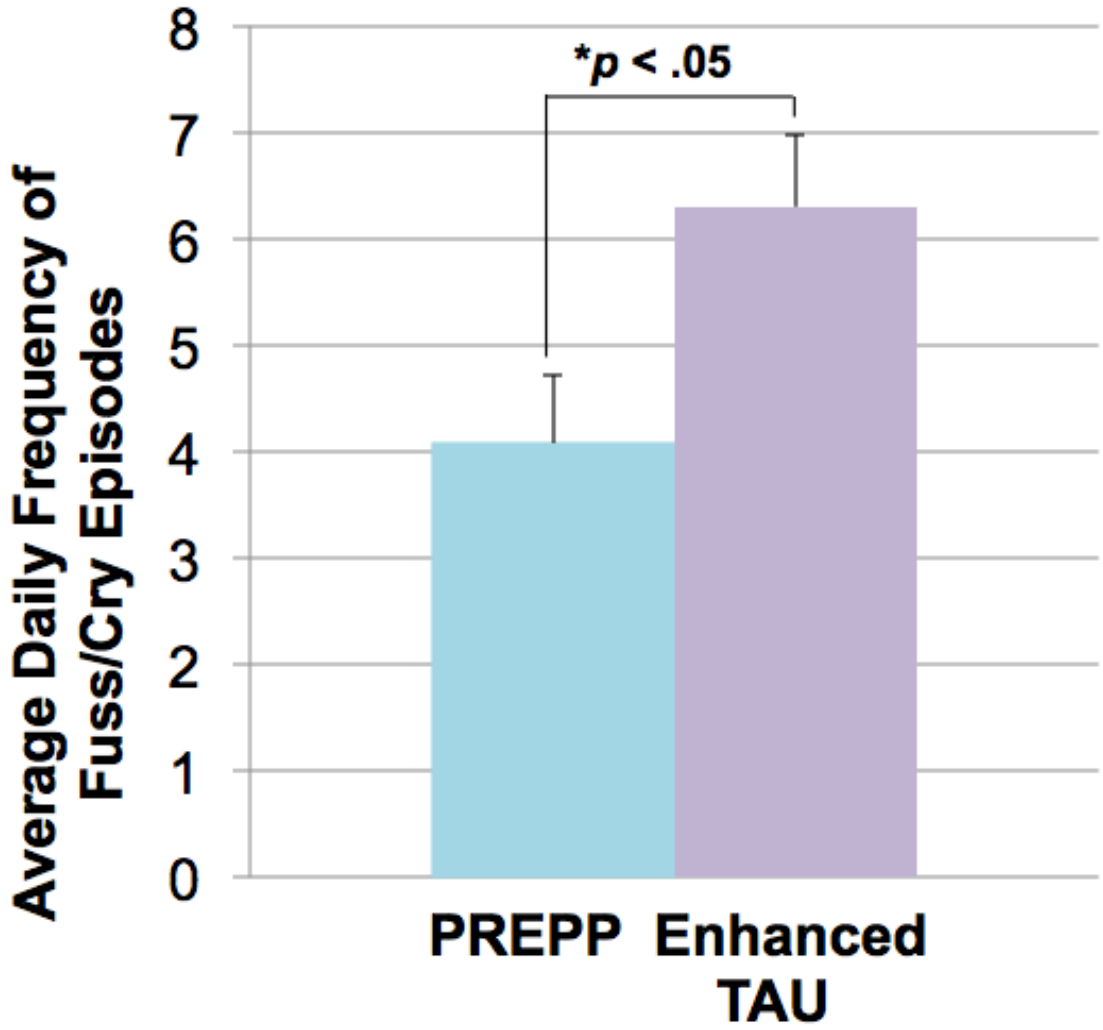
PREPP Reduced Rate of Severe PPD



ETAU= Enhanced Treatment as Usual

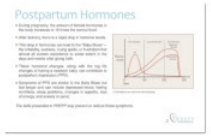
COLUMBIA | OBSTETRICS AND GYNECOLOGY

PREPP Associated with Less Infant/Fuss Cry Behavior at 6 weeks Old



COLUMBIA | OBSTETRIC GYNECOLO

Informational Pamphlet



PREPP

PRACTICAL RESOURCES FOR EFFECTIVE POSTPARTUM PARENTING

COLUMBIA UNIVERSITY MEDICAL CENTER
CATHERINE MONK, PHD
COLUMBIA UNIVERSITY PSYCHIATRY

Catherine Monk, PhD; Elizabeth Werner, PhD; Maia Miller, PhD;

email: ew150@cumc.columbia.edu | tel: 646.774.8945

Welcome to PREPP!

This is a program to help you with the challenges of being a mom to a newborn baby. Every mother can have times when she feels very stressed.

This can be even more true if you felt overwhelmed during your pregnancy. This program will teach you skills that you can use to cope with these difficult moments and to care for your newborn baby.

Challenges of Being a Mom to a Newborn

All mothers, even mothers who already have children, have moments when parenting a newborn feels frustrating and overwhelming.

These moments may include:

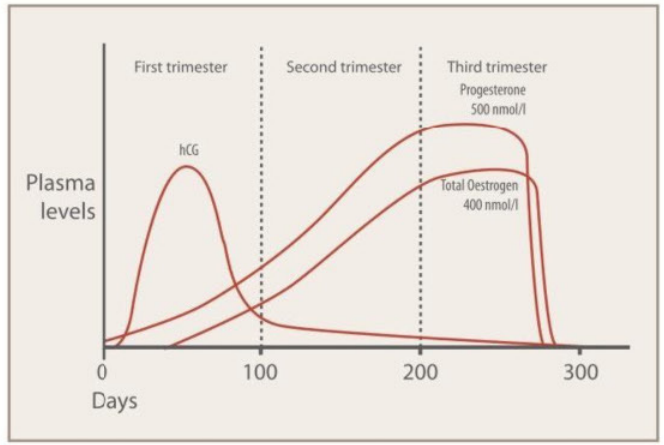
- When your baby cries more than you expected
- When your baby is crying and won't stop, even though you've tried everything
- When you are tired and feel guilty for not having the energy to care for your baby
- When caring for your baby seems harder and less enjoyable than you thought it would be

Common responses that mothers have in these moments:

- Feeling like a bad parent or that you are doing something wrong
- Feeling angry at yourself, and sometimes at your baby
- Feeling like things will never get better
- Feeling like you are not ready to care for your newborn

Postpartum Hormones

- During pregnancy, the amount of female hormones in the body increases to 10 times the normal level.
- After delivery, there is a rapid drop in hormone levels.
- This drop in hormones can lead to the "Baby Blues"—the irritability, sadness, crying spells, or frustration that almost all women experience to some extent in the days and weeks after giving birth.
- These hormonal changes, along with the big life changes of having a newborn baby, can contribute to postpartum depression (PPD).
- Symptoms of PPD are similar to the Baby Blues but last longer and can include depressed mood, feeling worthless, sleep problems, changes in appetite, loss of energy, and anxiety or panic.



© Fleshandbones.com Davies et al: Human Physiology

The skills presented in PREPP may prevent or reduce these symptoms.

Crying

All babies cry. You may be surprised by how much time your baby spends crying.

- At about 2 weeks of age, babies start to cry more each week.
- By 2 months of age, babies usually cry more than at any other time. This is sometimes referred to as the **Period of PURPLE Crying®**. For more information, please go to *www.purplecrying.info.*
- As babies become older than 2 months, they begin to cry less with each week.
- Babies still can be normal and healthy even if they cry 5 hours a day.

All of this crying can be overwhelming, but remember: this period of your baby's life will not last forever!

PREPP Skills: Comforting Measures

When your baby is crying, there are things that you can do to try to help comfort your baby:

- Check to see if your baby is hungry, tired, or has a wet diaper.
- Rock or dance with your baby.
- Go for a walk in the stroller or a ride in a car.
- Sing or talk to your baby.
- Hold your baby close to you with skin-to-skin contact or in a carrier.

Remember, you can always check with your doctor to see if there is something wrong that is causing your baby to cry.

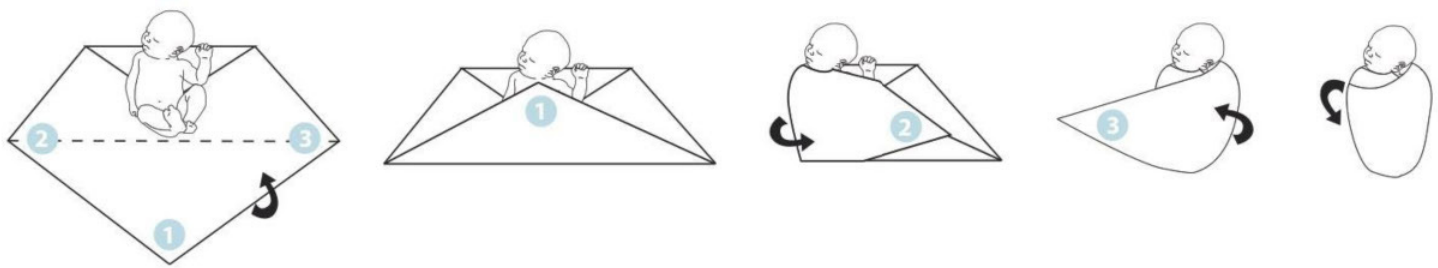
PREPP Skills: Swaddling

Swaddling involves carefully and tightly wrapping an infant in a blanket or other piece of fabric. It has been used for hundreds of years to calm babies.

Swaddling can help by:

- Making it easier for your baby to fall asleep
- Lengthening the periods of time your baby stays asleep
- Reducing the number of times your baby wakes up
- Increasing the chances that if your baby does wake up, he or she will be able to fall back asleep on his or her own

Swaddling Method:



You should feel comfortable and take care when swaddling. Try to only use swaddling at nighttime or when you put your baby to bed.

- Remember that for sleeping, "back is best". This is true even if you don't swaddle. Make sure to use a very light blanket to swaddle in hot weather so that your baby does not get too hot. If you have any questions about swaddling, please speak with your doctor or with your PREPP counselor.

PREPP Skills: Carrying

Benefits of using an infant carrier:

- Leaves your hands free to do other things (including taking care of your other children)
- Makes the baby happier
- Provides a chance for your baby to feel close to you and for you to feel close to your baby
- Reduces crying and fussiness in babies

When using a baby carrier remember:

"T.I.C.K.S."

Safety tips for using a baby carrier—"T.I.C.K.S.":

Tight—Make sure the carrier is fastened tightly around your baby, with no loose fabric.

In view at all times—You should be able to see your baby's face at all times by looking down. There should not be any fabric covering your baby's face.

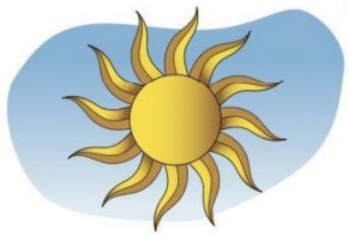
Close enough to kiss—Keep your baby's head as close to your chin as is comfortable. You should be able to kiss your baby's forehead by tipping your head forward.

Keep chin off the chest—Make sure that there is always at least a finger width of space between your baby's chin and chest.

Supported back—Your baby should be held close to you, with the baby's back supported by the carrier and his or her tummy and chest against you. If the carrier is too loose, the baby's back will slump, which can cause breathing problems.

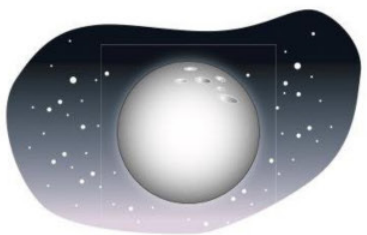
PREPP Skills: Day and Night Cues

Almost all newborns need help getting onto our day and night schedule. These tools can help them learn that daytime is for active play and nighttime is for sleeping.



During the day:

- Interact with your baby as much as possible.
- Open the curtains or shades and play lively music.
- Don't minimize background noise, like the phone or the TV.



At night:

- Keep your baby's room quiet and dark.
- Instead of playing with your baby when he or she wakes up, focus on his or her needs, such as feeding or a diaper change.
- Make nighttime interactions with your baby as brief as possible. Avoid turning on the lights during feedings and diaper changes (a nightlight is useful for this). Keep your voice soft and low.
- Swaddle your baby.

PREPP Skills: Feeding to Help Your Baby Sleep

Making some changes to the way you feed your baby at night can help your baby get onto your sleep schedule and learn to sleep through the night.

Focal Feeding:

- Feed your baby between 10pm and midnight, even if it requires waking him or her.
- The idea is to make sure that your baby is full when you put him or her down for the night.

Lengthening the time between feeding at night:

- When your baby wakes up at night, try to delay feeding him or her for a few moments. You can calmly rest your hand on your baby's belly or change the diaper to add a short delay.
- This does *not* involve leaving the baby to cry for a long time or playing with him or her.

Start using these tools 2 to 3 weeks after your baby is born, and only if your baby is healthy and gaining the right amount of weight.

PREPP Skills: Mindfulness

- Sometimes you will use all of the PREPP skills and your baby will still cry or have a lot of trouble going to sleep. Sometimes being a mom to a newborn can be so stressful! If you feel like you are becoming overwhelmed, it is okay to place your baby is a safe place (e.g., the crib) and take a moment for yourself away from your baby.
- Using mindfulness exercises at these times can be really helpful. Mindfulness is learning a new way to handle your thoughts and feelings. These exercises can help you feel less overwhelmed by upsetting thoughts and remind you that a difficult experience is only temporary.

Exercise 1: Progressive Muscle Relaxation

Close your eyes. Turn your focus to your breathing. Breathe normally. If you notice your mind wander to anything other than your breath, notice where your mind goes and then bring it back to your breath.

Then turn your focus to your tension or stress that you are holding in your body. Each time you breathe in tighten a specific muscle in your body and with each exhale, focus on releasing tension from that part of your body. Start by tightening and releasing tension in your head and neck and work your way down to your toes.

Exercise 2: Mindful Walk (can be done with your baby in carrier or in a stroller)

Take a walk in your neighborhood or in a favorite spot.

Notice your breathing, your body, and how the air feels against your skin. Notice smells and what you see.

When your mind wanders (and it will), gently guide it back to noticing the outside world. Stay present in the moment and in touch with what you are smelling, seeing, and feeling.

Hospital Packing List

FOR YOU

- ☐ comfortable socks
- ☐ slippers
- ☐ toiletries
- ☐ 1–2 pairs of pajamas
- ☐ bathrobe
- ☐ a nursing bra
- ☐ nursing pads
- ☐ 3–4 pairs underwear
- ☐ maternity outfit to wear home (you'll still be swollen)
- ☐ toiletries (e.g., toothbrush, toothpaste, hairbrush, shampoo, soap, lotion, etc.)
- ☐ eyeglasses and/or contact solution
- ☐ prescription medications you are taking
- ☐ an iPod, or music device, and charger
- ☐ cell phone and charger
- ☐ camera with charger and extra batteries
- ☐ magazine or book
- ☐ snacks
- ☐ health insurance forms
- ☐ pre-registration forms from the hospital
- ☐ personal identification
- ☐ this pamphlet!
- ☐

FOR YOUR BABY

- ☐ infant car seat
- ☐ going-home outfit
- ☐ baby hat
- ☐ mittens to keep your baby from scratching his or her face
- ☐ blankets and outerwear for the trip home (if cold weather)

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PREPP

PRACTICAL RESOURCES FOR EFFECTIVE POSTPARTUM PARENTING

designed by amy oh

References for research studies on the skills presented in PREPP can be furnished by PREPP developers.

	PREPP Session	Components
Session 1	28-32 weeks gestation In clinic or virtual 45-60 minutes	Harnessing a dyadic focus Establish alliance Self-reflection practice Sleep skills and mindfulness Distributed Materials: Prepp App/Mindfulness Audio File
Session 2	34-39 weeks gestation In clinic or virtual 45-60 minutes	Psychoeducation Infant caregiving techniques Review prior skills Distributed materials: PREPP pamphlet
Session 3	18-72 hours post delivery Virtual 15-20 minutes	Review PREPP pamphlet Practice techniques: -Swaddling -Carrying -Mindfulness
Session 4	2-3 weeks postpartum Virtual 15-30 minutes	Check in about mother & infant well-being Assess use of techniques Discuss challenges of newborn car
Session 5	6 weeks postpartum In clinic or virtual 45-60 minutes	Practice self-reflection Assess use of techniques Review techniques where necessary

C

Trainings are:

- Straightforward
- Tailored to the intended clinical population
- Customized to the trainee's experience & previous training
- Can be 100% virtual

Requires ~8 training hours and a 1 hour certification assessment.

Our previous trainees have come from a variety of clinical backgrounds.

Clinical Psychologists
Psychiatrists
Occupational Therapists
Social Workers
Case Managers
Community Health Workers
Nurse Practitioners
NP Students
Social Work Student
Masters Psychologist

VIII: The Perinatal Care Ecosystem

Expert Review

The transition to parenthood in obstetrics: enhancing prenatal care for 2-generation impact

Catherine Monk, PhD; Sona Dimidjian, PhD; Ellen Galinsky, MS; Kimberly D. Gregory, MD, MPH; M. Camille Hoffman, MD, MSc; Elizabeth A. Howell, MD, MPP; Emily S. Miller, MD, MPH; Cynthia Osborne, PhD, MPP; Cynthia E. Rogers, MD; Darby E. Saxbe, PhD; Mary E. D'Alton, MD

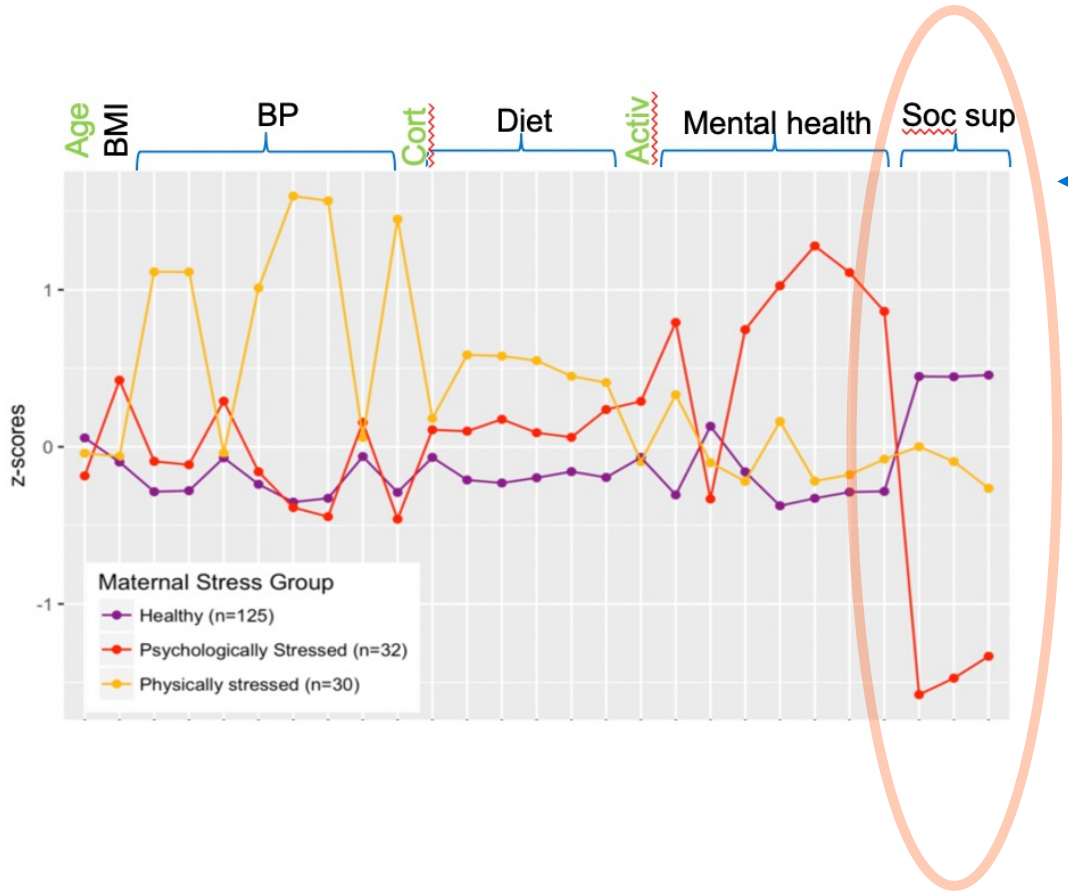
American Journal of Obstetrics & Gynecology – Maternal Fetal Medicine; August, 2022

Women's Mental Health @Ob/Gyn: Center for the Transition to Parenthood

Established with $21 million gift from Bezos Family Foundation

- First ever research-to-practice center enhancing perinatal care ecosystem for 2 Generation impact
- Ob care as a touchpoint for public health intervention
  - Promote family well-being from the start
  - Whole-person approach
  - The psychological birth of parents that affect the child
- Support Obs supporting patients, support patients
  - Community collaborators
  - Evidenced-based materials available in multiple formats (TikTok, X, handouts, MyCare)
  - Website: clearinghouse for resources (e.g., Black Birthing Joy)
  - Demonstration projects, scale up

PMADs Are Preventable:
Social Support



Role of relationships and communities and interventions that build on these strengths to improve maternal and child health

PMADs Are Preventable:
Social Support

COLUMBIA UNIVERSITY
Office of Work/Life

Well-Being ▾ Housing & Relocation ▾ Child Care & Schooling ▾ Breastfeeding ▾

Home > Events > Birth of Parent, Birth of Child: Expectant Parents thro...

Events

PAST EVENT

Birth of Parent, Birth of Child: Expectant Parents through 1st Year

Add to Calendar: Calendar / Outlook Google Yahoo

PMADs Are Preventable: Social Support and Community Expertise

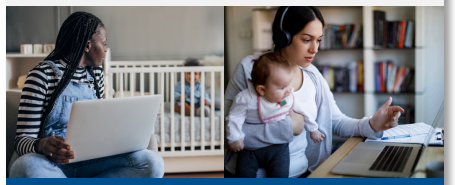
COLUMBIA | OBSTETRICS AND GYNECOLOGY

Join our virtual **Postpartum Drop-In Groups** designed to give postpartum patients the opportunity to connect with others, gain support, ask questions and get answers.

These weekly groups are hosted by obstetrics providers, mental health providers, and patient peers. Attendees are encouraged to join as many sessions as they would like.

Weekly Session Schedule:

Wednesdays:	10:00 - 11:00 AM
Wednesdays:	1:00 - 2:00 PM
Thursdays:	4:00 - 5:00 PM



Questions?

Contact **Kiyanne Rivers** at **LF2292@cumc.columbia.edu**

NewYork-Presbyterian

Instagram

Kimberly Seals Allers



THANK YOU