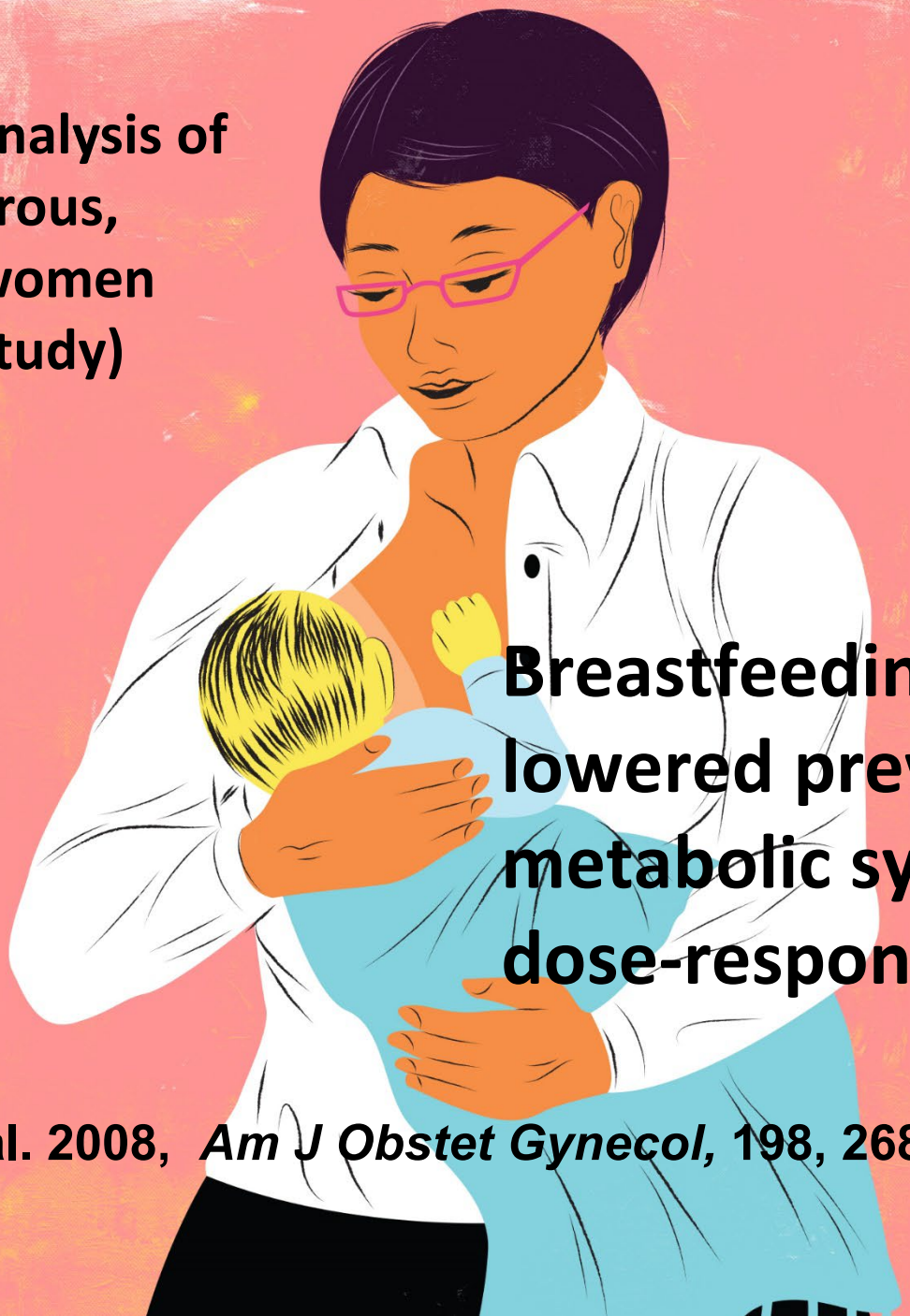
Why Breastfeeding Prevents Maternal Metabolic Syndrome and Cardiovascular Disease

Kathleen Kendall-Tackett, PhD, IBCLC, FAPA

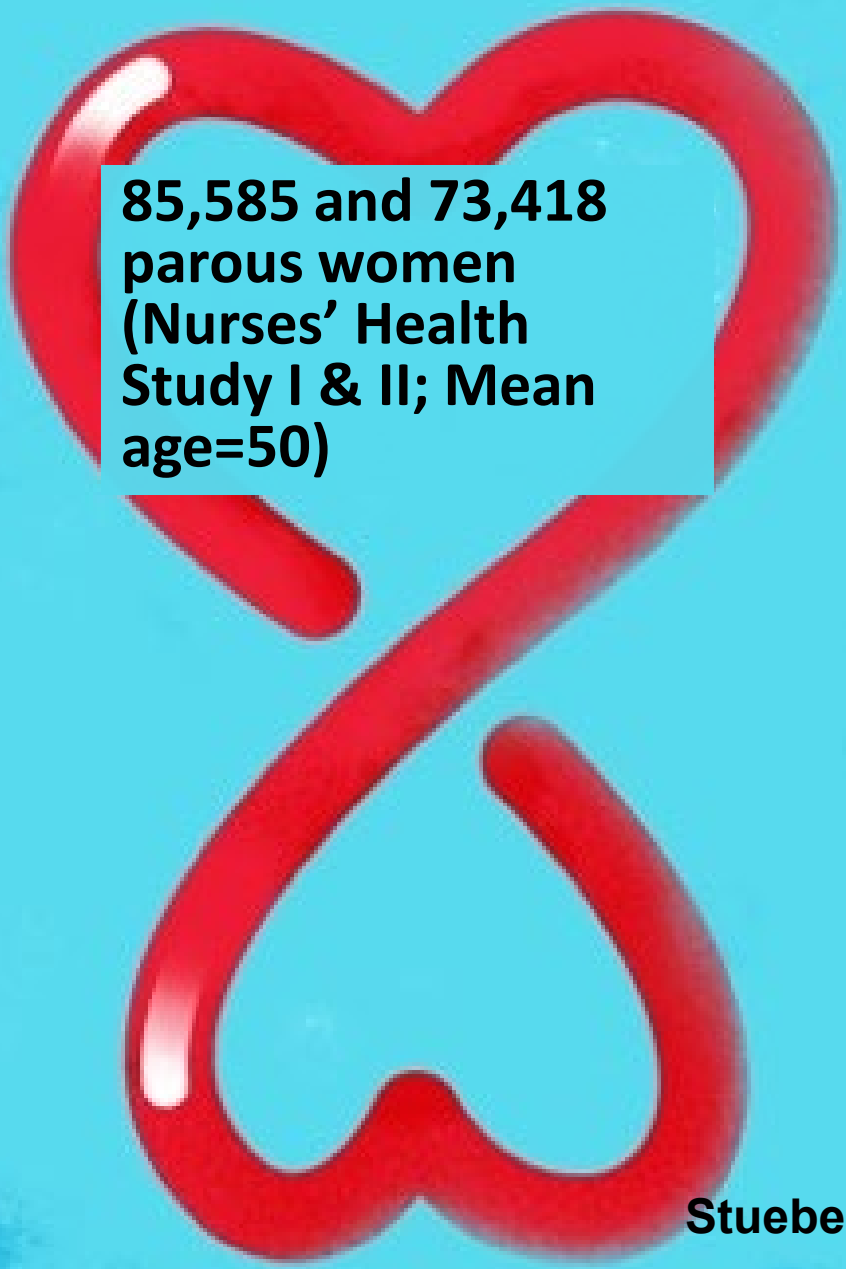
Nothing to Disclose

Cohort analysis of 2,516 parous, midlife women (SWAN study)



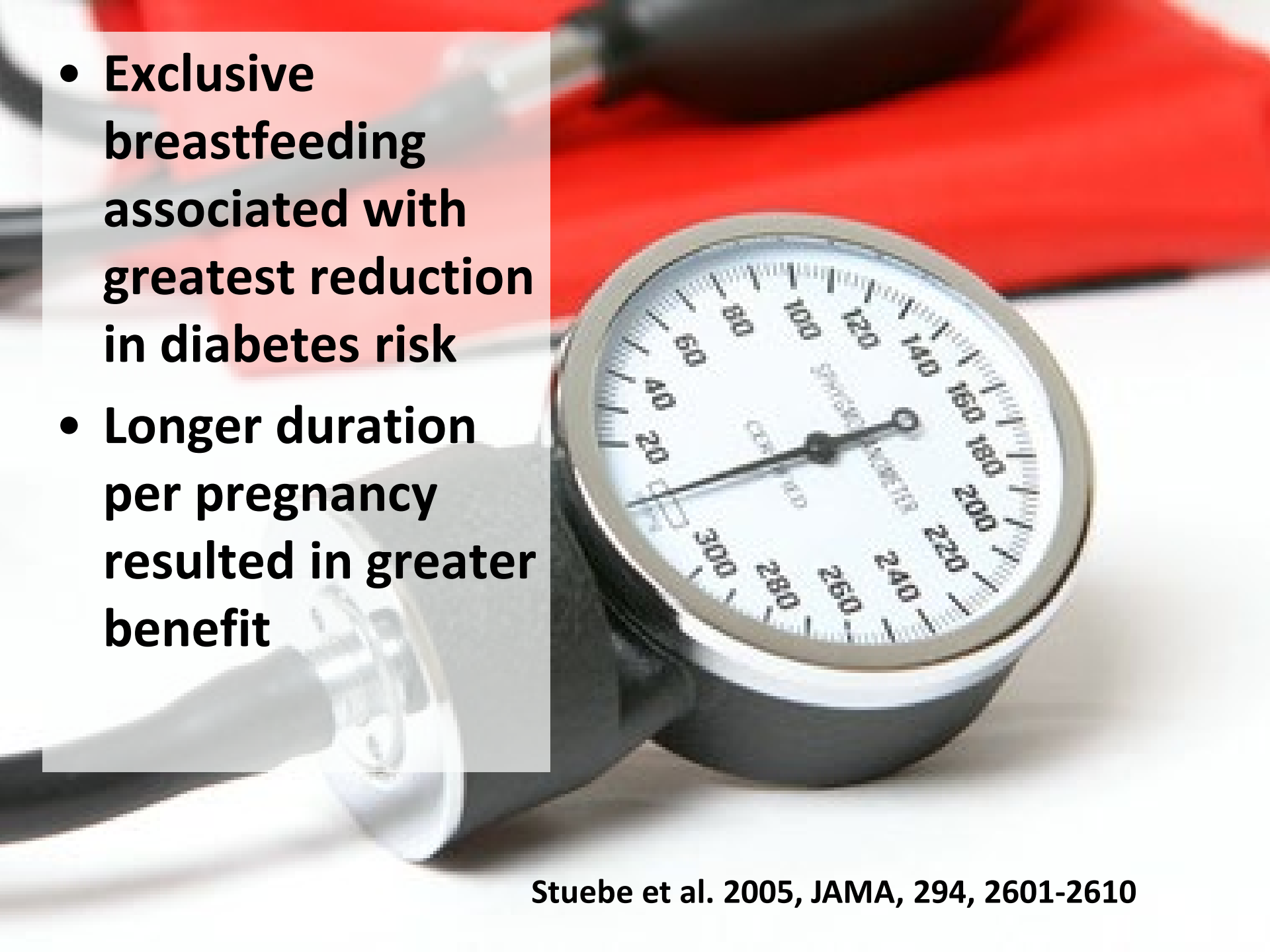
Breastfeeding duration lowered prevalence of metabolic syndrome in a dose-response way

Ram et al. 2008, *Am J Obstet Gynecol,* 198, 268e1-268e6



- Longer duration of lactation reduced risk of Type-2 diabetes
- Each additional year decreased risk by 15%
  - Independent of BMI, diet, exercise or smoking

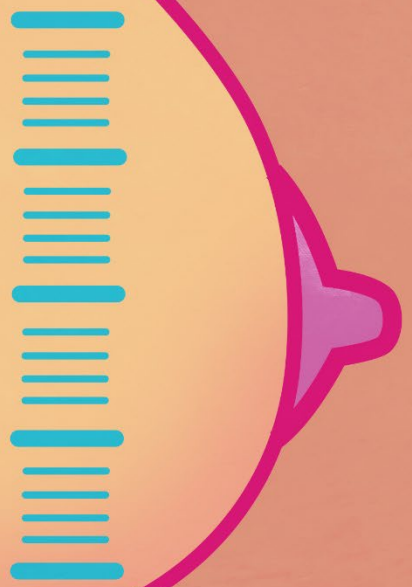
Stuebe et al. 2005, JAMA, 294, 2601-2610



- **Exclusive breastfeeding associated with greatest reduction in diabetes risk**
- **Longer duration per pregnancy resulted in greater benefit**

Stuebe et al. 2005, JAMA, 294, 2601-2610

1,260 Chinese women with history of gestational diabetes



Higher lactation intensity and longer duration lowered risk of postpartum diabetes and prediabetes

Shen et al. 2019, Diabetes Metab Res Rev, e3115, doi: 10.1002/dmrr.3115

9,128 Chinese women, age 40-81 years who had one birth

- Longer breastfeeding associated with lower risk of hypertension and diabetes
  - Controlled for waist-to-hip ratio, employment, education, family history, postpartum BMI

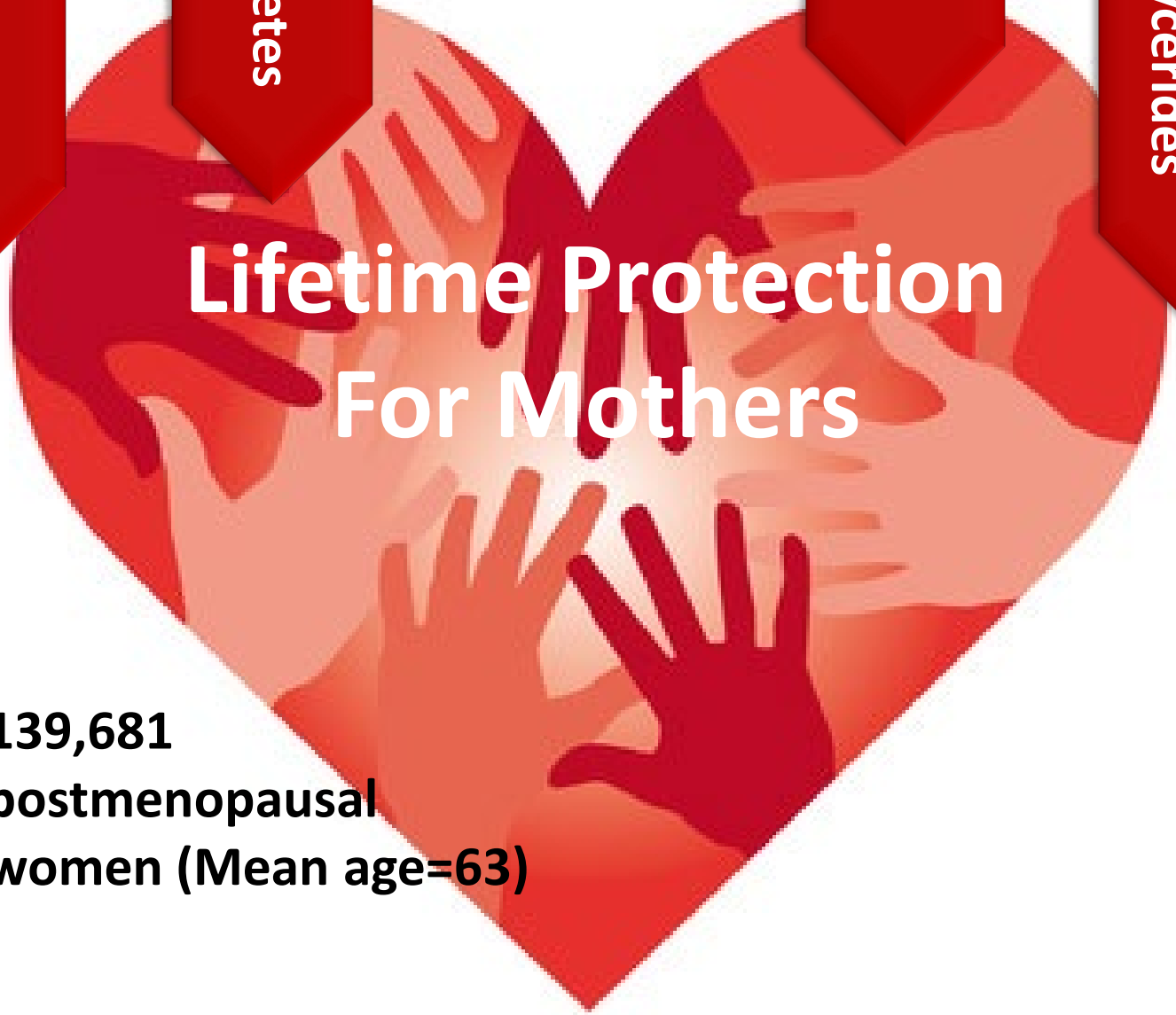
Zhang et al. 2015, *Breastfeed Med, 10*(3), 163-167

Hypertension

Diabetes

CVD

High Triglycerides



Lifetime Protection For Mothers

139,681 postmenopausal women (Mean age=63)

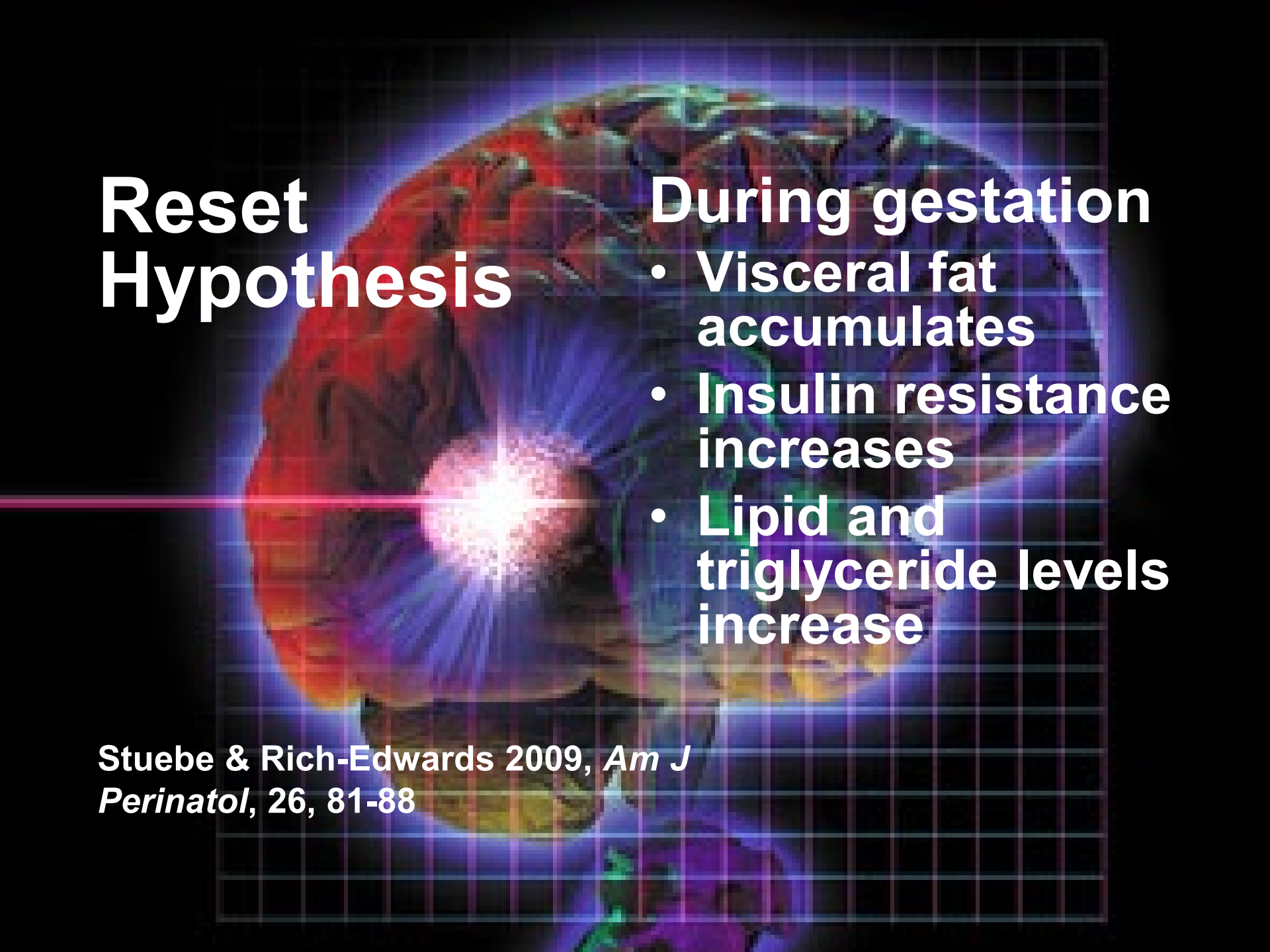
Schwartz et al. 2009, *Obstet Gyn, 113*, 974-982

Why would breastfeeding lower risk?

- Some proposed mechanisms

- **Metabolic syndrome**
  - **Insulin resistance**
  - **High LDL and VLDL cholesterol**
  - **High triglycerides**
  - **Visceral obesity**

Haffner & Taegtmeyer, *Circulation* 2003; 108: 1541-1545



Reset Hypothesis

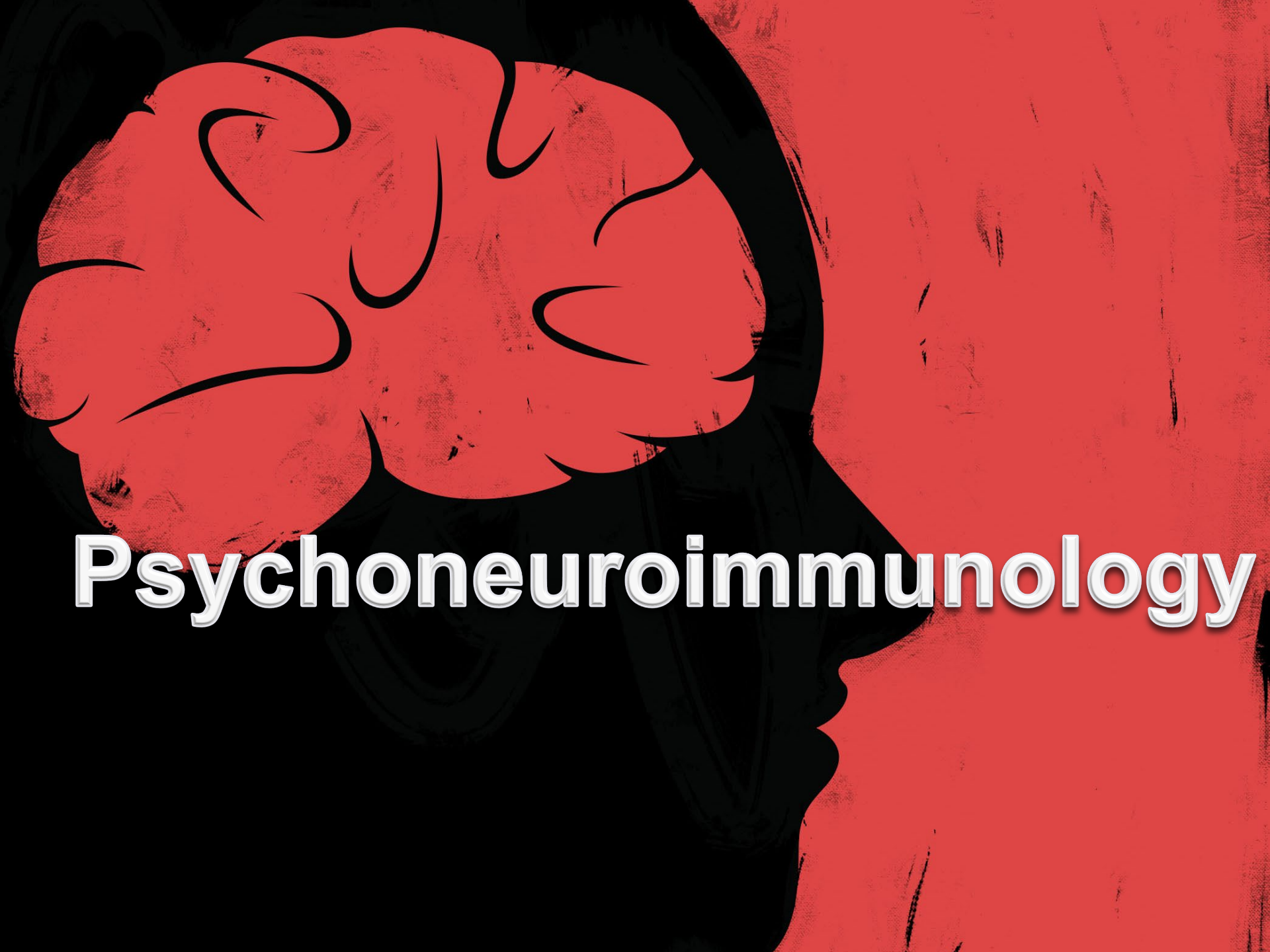
During gestation

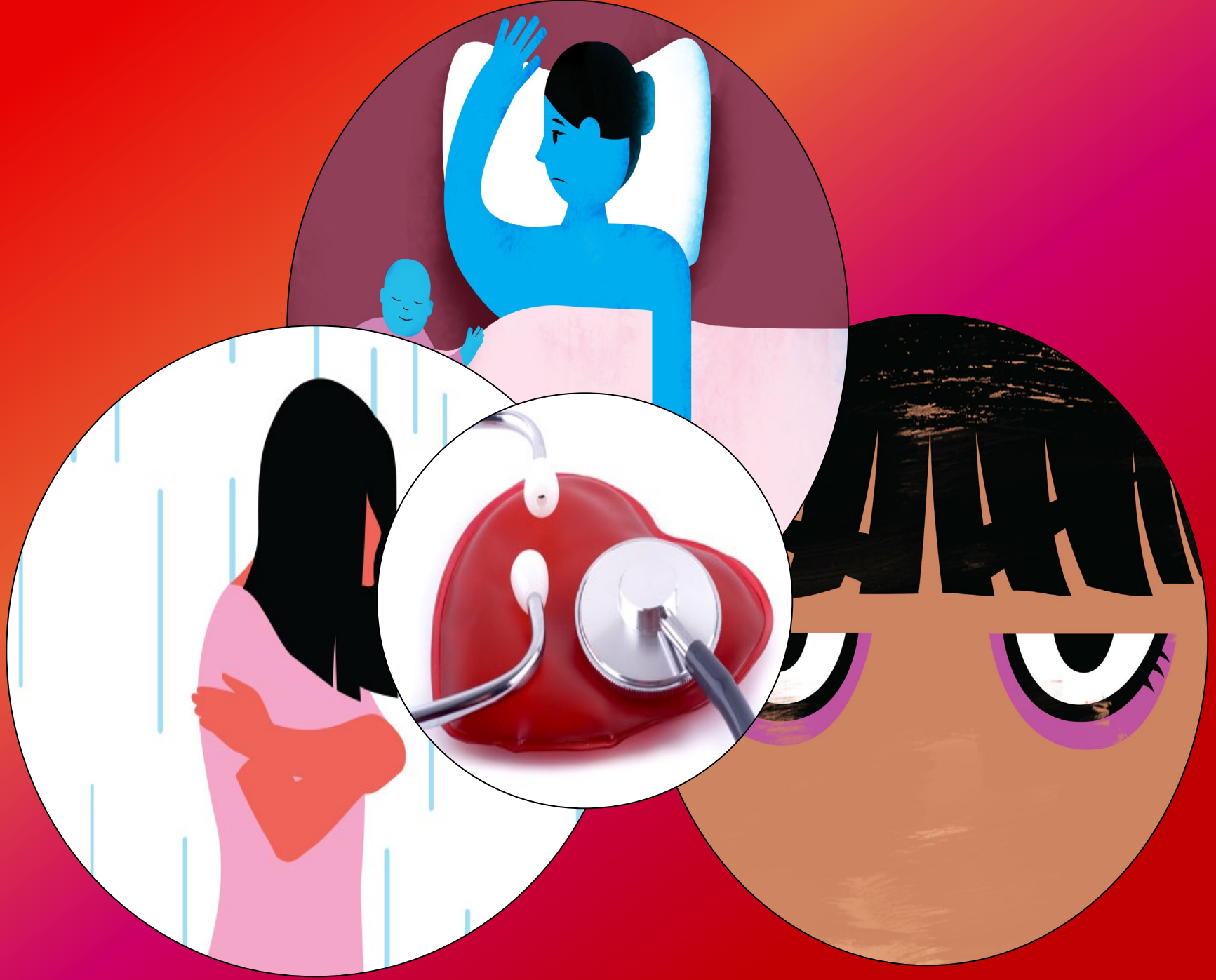
- Visceral fat accumulates
- Insulin resistance increases
- Lipid and triglyceride levels increase

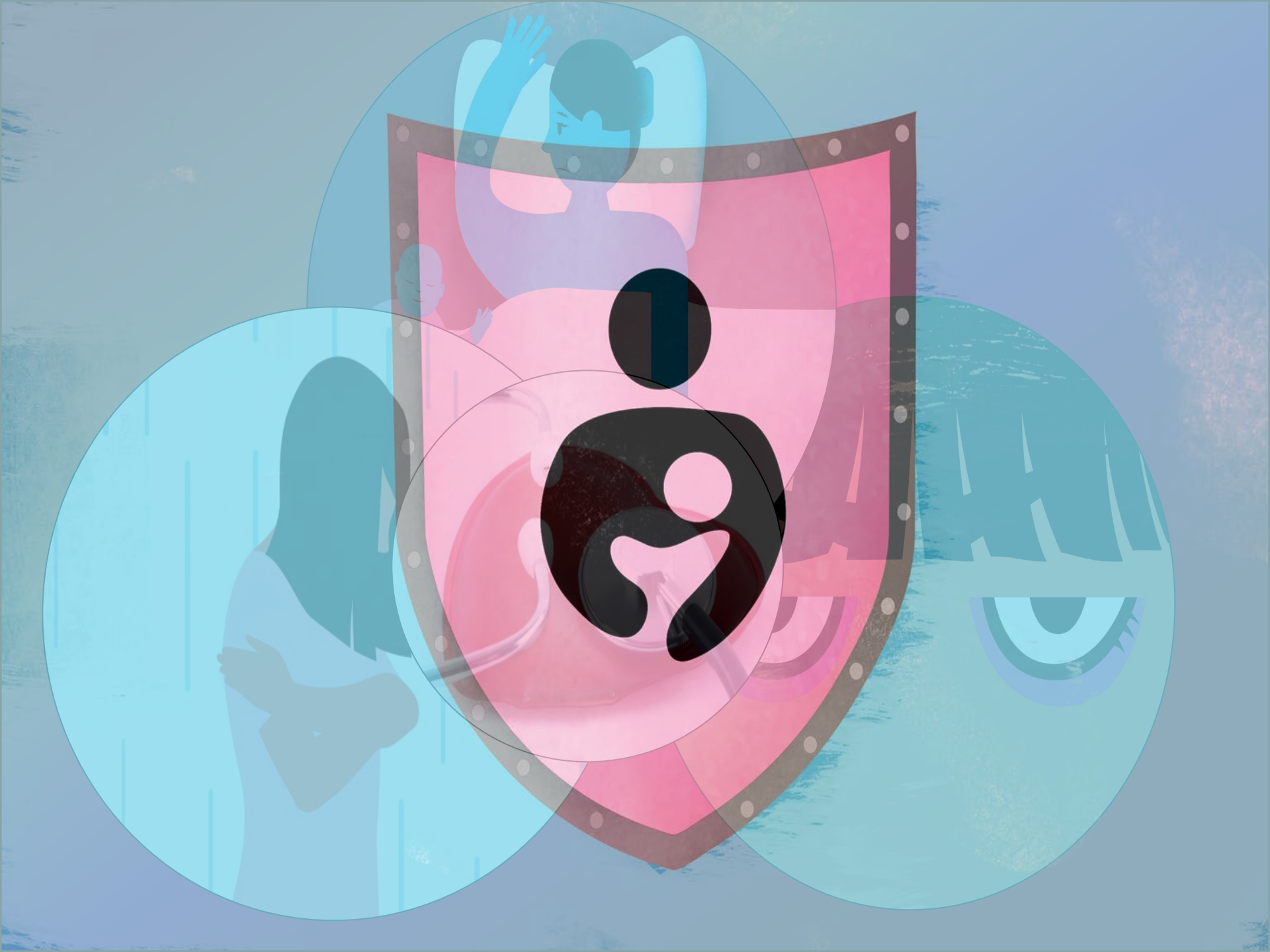
Stuebe & Rich-Edwards 2009, *Am J Perinatol*, 26, 81-88

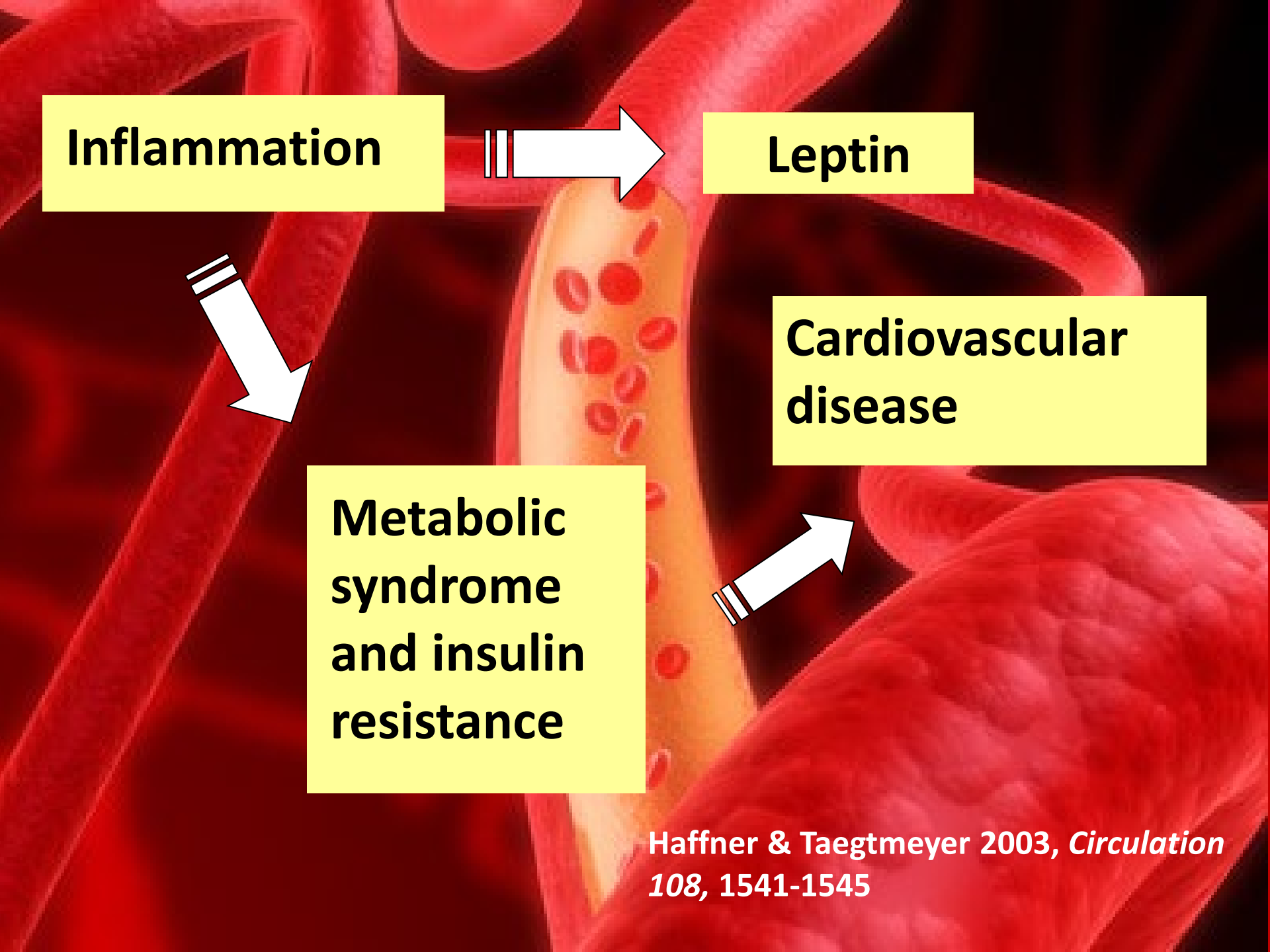
• Breastfeeding helps reverse, or reset, these changes
• For maternal metabolism, pregnancy ends with weaning, not birth
Stuebe & Rich-Edwards 2009, *Am J Perinatol*, 26, 81-88

Reset Hypothesis
Health Psychology Approach
to Metabolic Syndrome


Psychoneuroimmunology







Haffner & Taegtmeyer 2003, *Circulation 108,* 1541-1545

Negative mental states upregulate the stress response

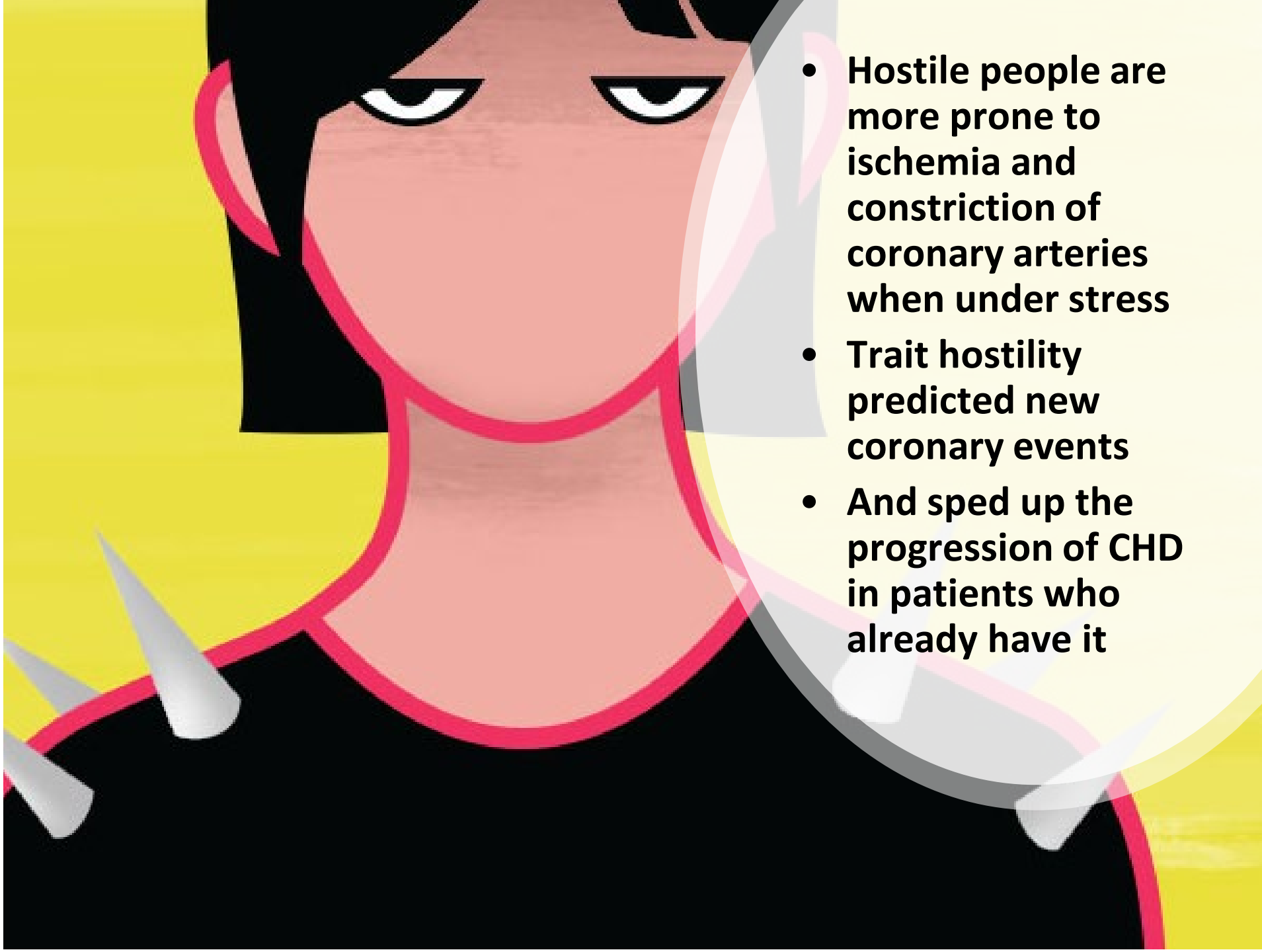
Depression increases the risk of both metabolic syndrome and cardiovascular disease

- In women, depressive symptoms associated with increased risk of metabolic syndrome
- Metabolic syndrome in childhood predicted higher depressive symptoms in adulthood

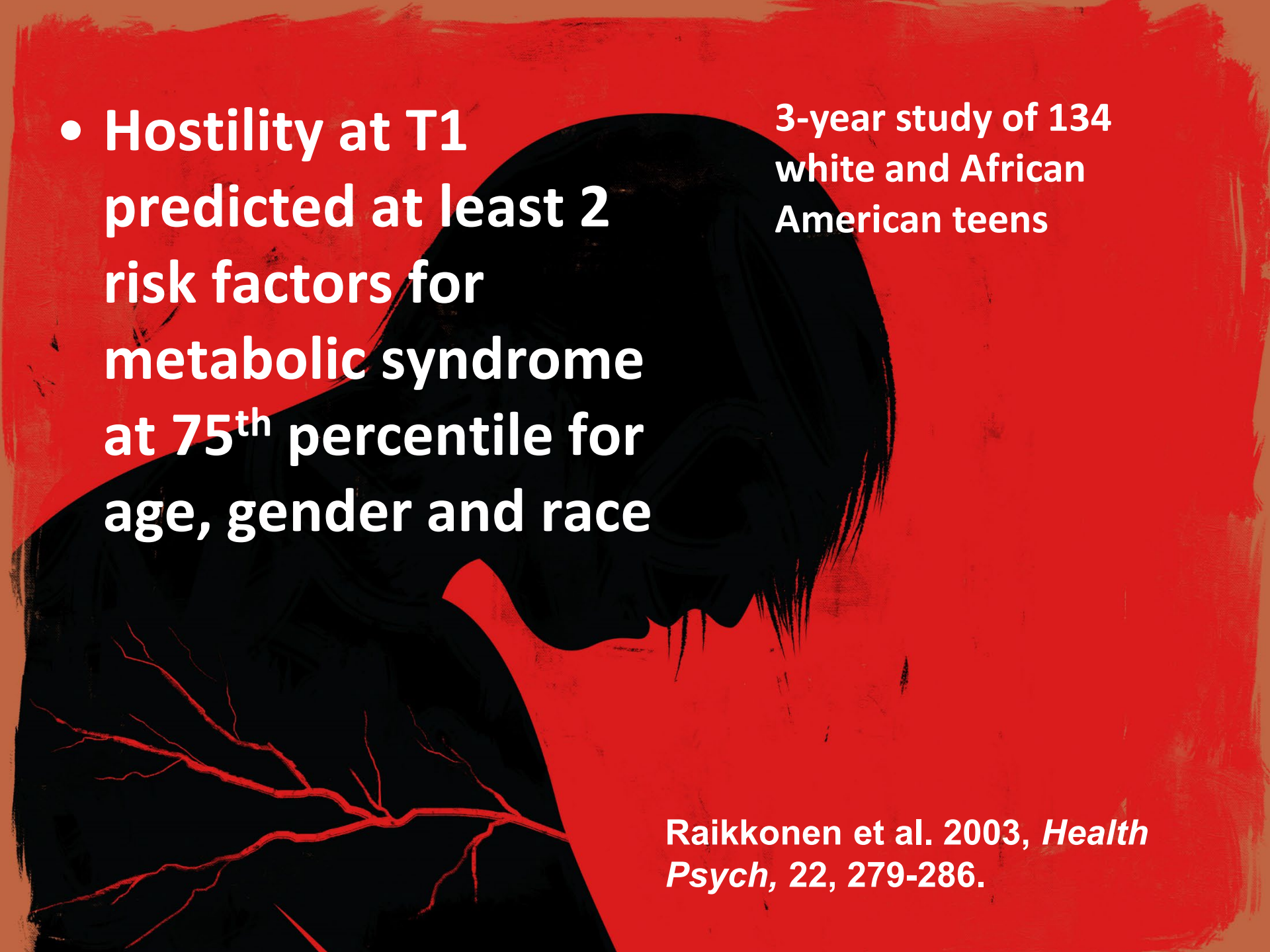
921 men and women from Finland

Pulkki-Raback et al. 2009, *Health Psychol*, 28, 108-116

Hostility also increases risk of metabolic syndrome and heart disease



- Hostile people are more prone to ischemia and constriction of coronary arteries when under stress
- Trait hostility predicted new coronary events
- And sped up the progression of CHD in patients who already have it



- **Hostility at T1 predicted at least 2 risk factors for metabolic syndrome at 75th percentile for age, gender and race**

3-year study of 134 white and African American teens

Raikkonen et al. 2003, *Health Psych*, 22, 279-286.

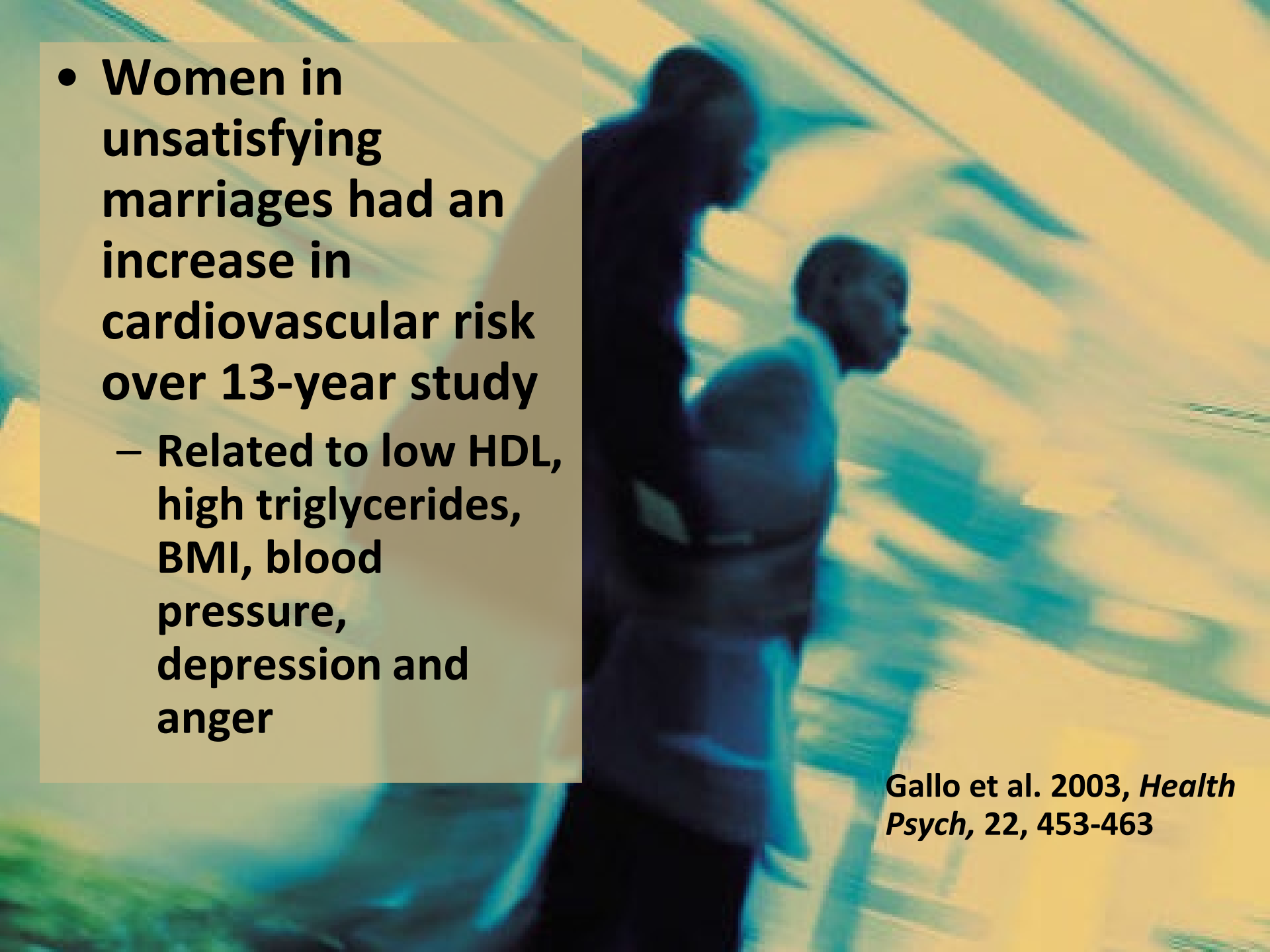
Prospective study of 135 patients with no symptoms of diabetes (75 men, 60 women)

- **Women with higher levels of depression and hostility had higher fasting insulin, glucose & insulin resistance**
  - **Independent of BMI, age, fasting triglycerides, exercise, or ethnicity**

Suarez 2006, *Health Psych, 25*, 484-492

- **Marital hostility increased systemic inflammation**
- **Hostility also impaired wound healing**
  - **High-hostile couples had 60% slower wound healing**

Kiecolt-Glaser et al. 2005, *Arch Gen Psychiatry, 62,* 1377-1384



- **Women in unsatisfying marriages had an increase in cardiovascular risk over 13-year study**
  - **Related to low HDL, high triglycerides, BMI, blood pressure, depression and anger**

Gallo et al. 2003, *Health Psych,* 22, 453-463

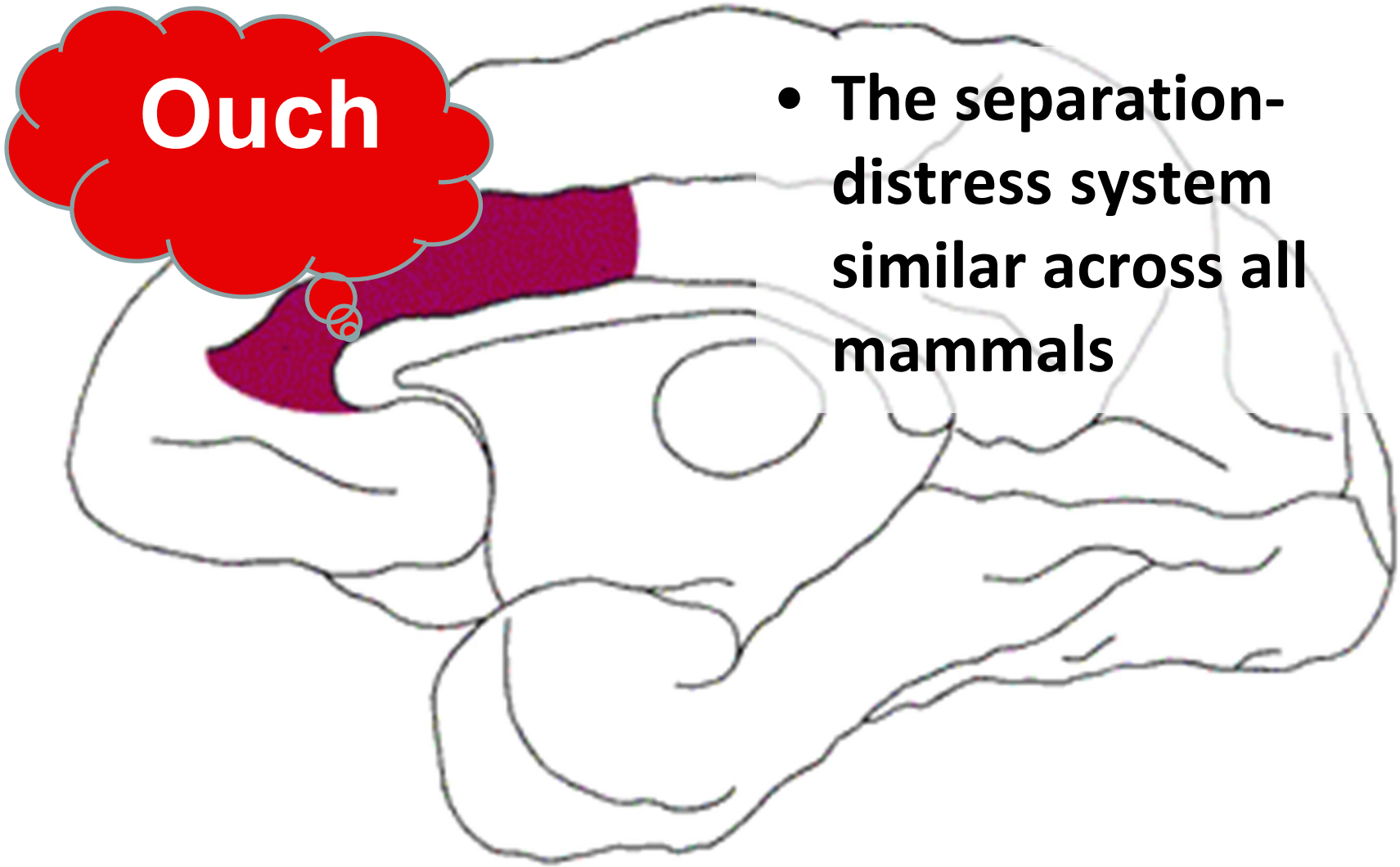
The neuroscience of social rejection

To your brain

Social Pain=Physical Pain

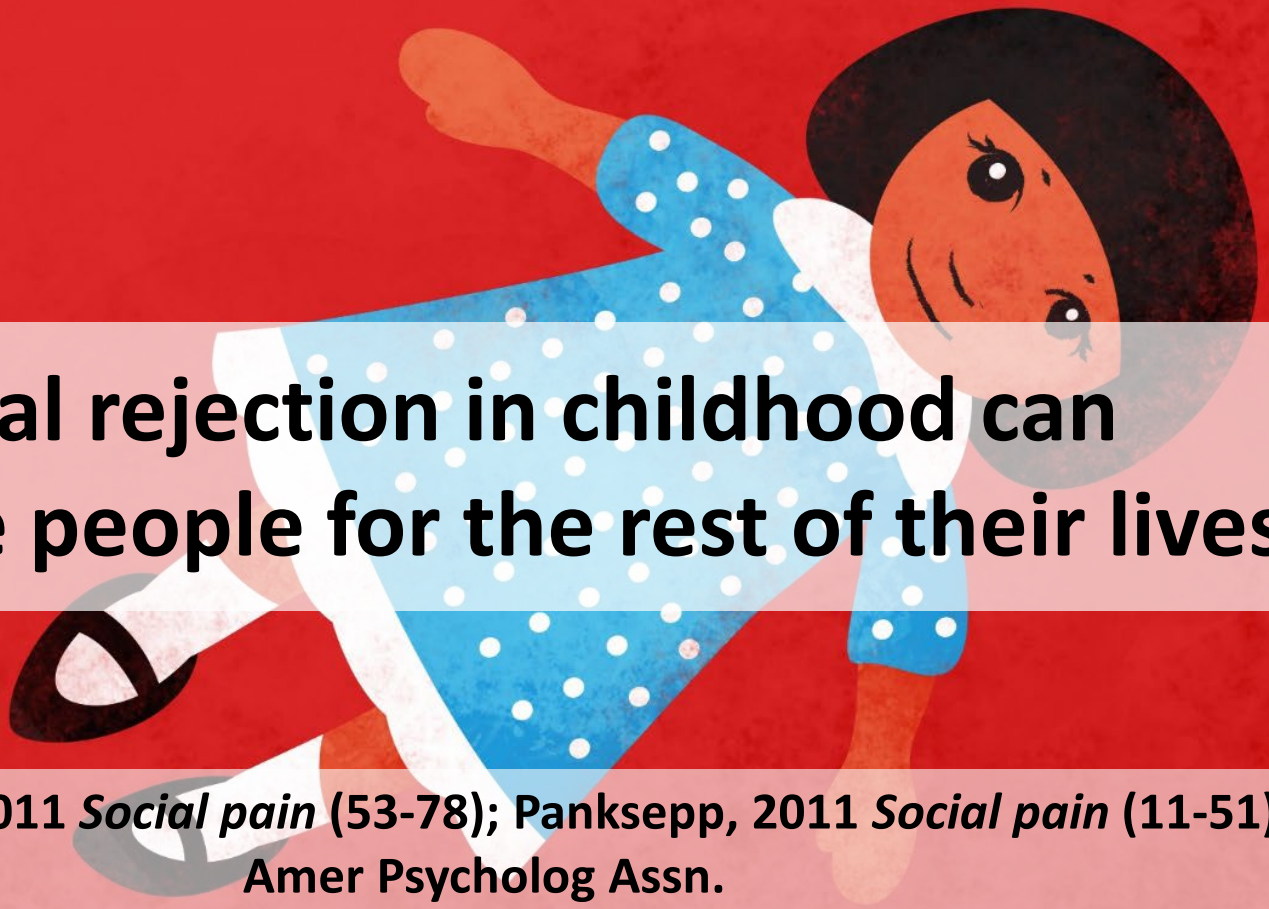
Jenson-Campbell & MacDonald, 2011
Social pain (p. 3-8). Amer Psychological Assn

Anterior Cingulate Cortex



- **The separation-distress system similar across all mammals**

We physically experience threats to our relationships as threats to our survival



Social rejection in childhood can sensitize people for the rest of their lives

Eisenberger, 2011 *Social pain* (53-78); Panksepp, 2011 *Social pain* (11-51), Amer Psycholog Assn.

Spiegel 1999 *JAMA,* 281, 1328

- **Social connection has profound consequences for health. Being well integrated socially reduces all-cause age-adjusted mortality by a factor of two-fold, about as much as having low vs. high serum cholesterol levels or being a nonsmoker**

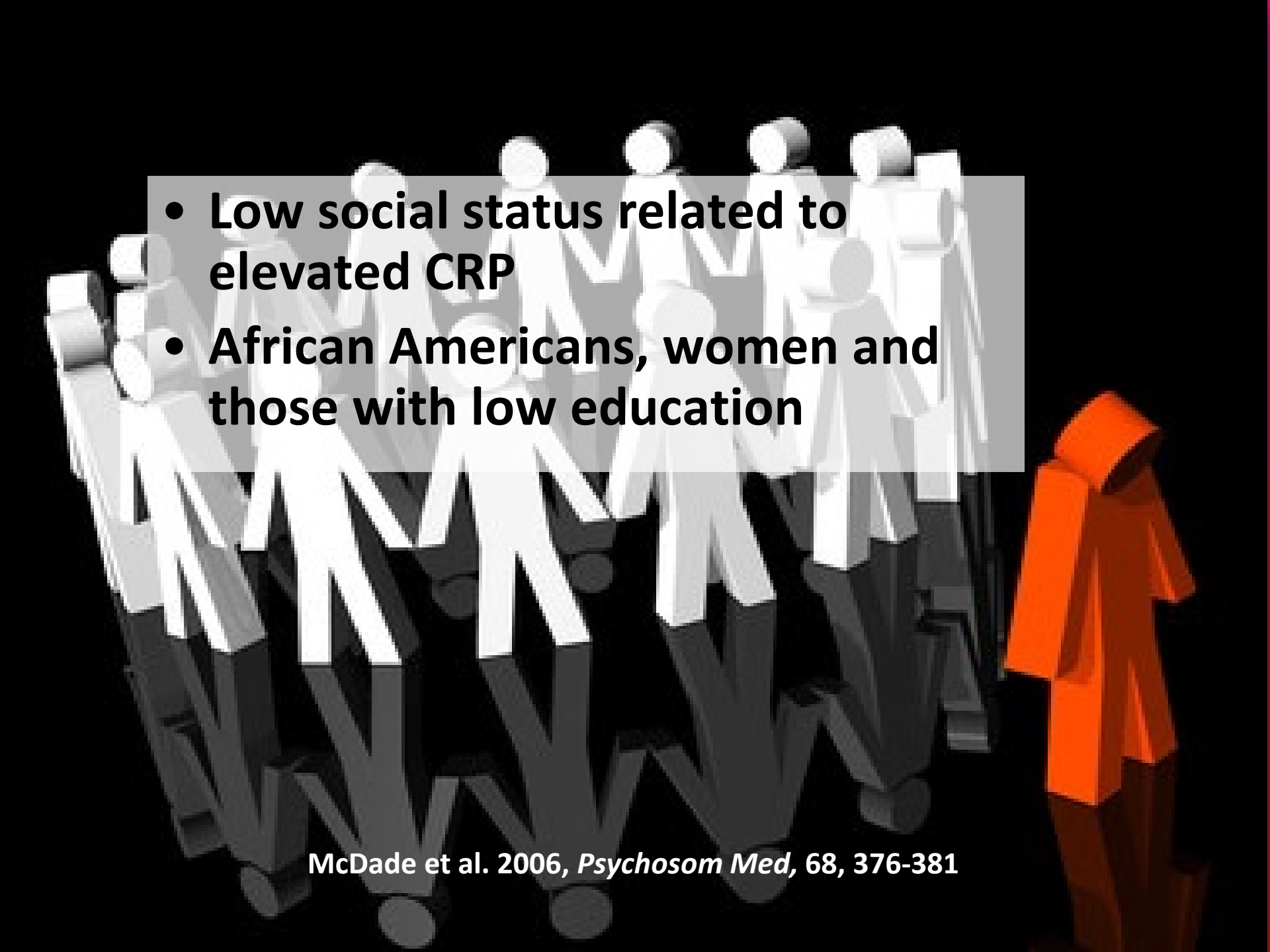
The Impact of Discrimination

296 African Americans
Discrimination associated with elevated C-reactive protein levels
Lewis et al. 2010, *Brain Behav Immun,* 24(3), 438-443

Experienced discrimination

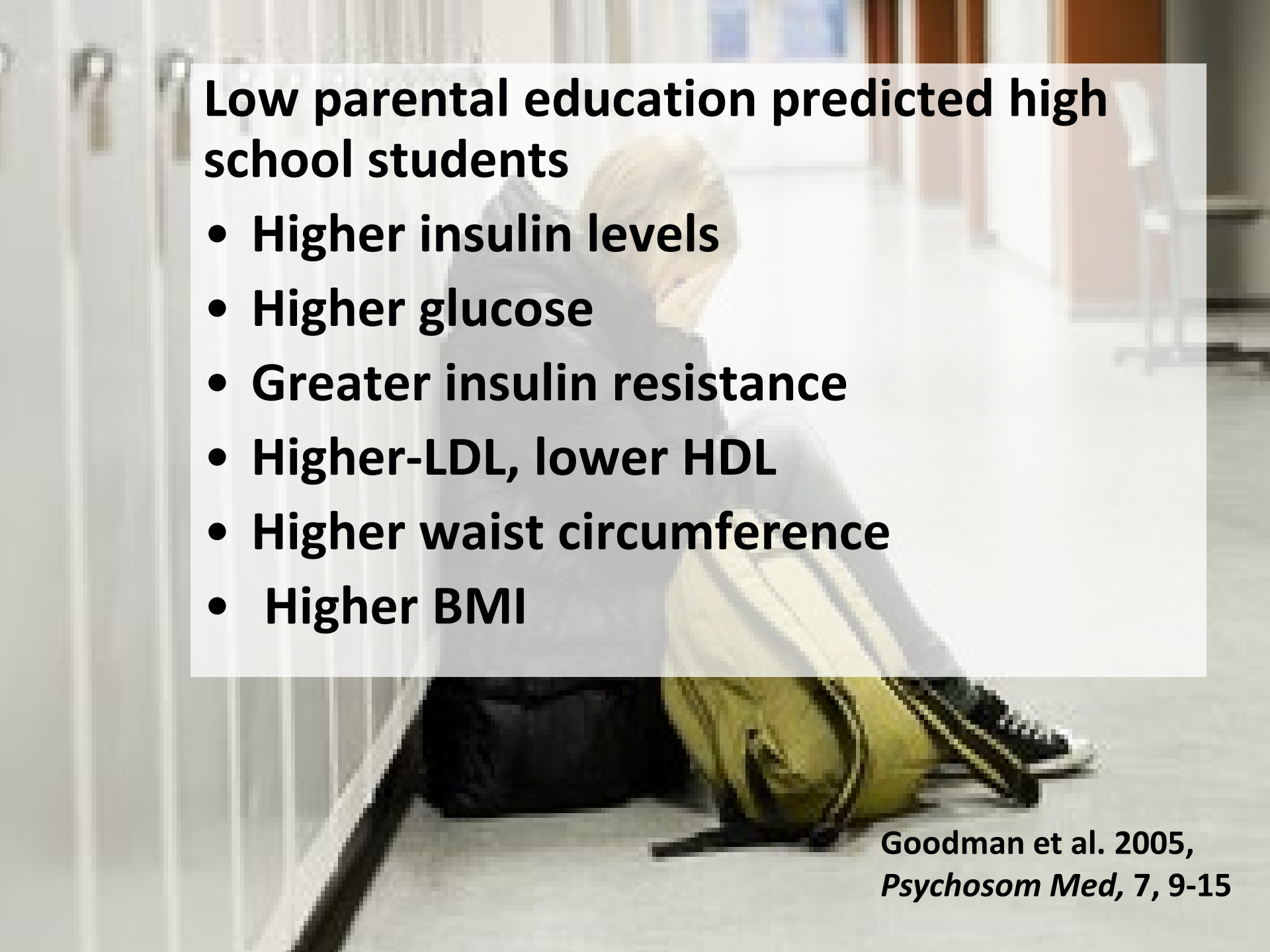
- You are treated with less courtesy other people
- You are treated with less respect than other people
- You receive poorer service than other people at restaurants and stores
- People act as if they think you are not smart

Lewis et al. 2010, *Brain Behav Immun*, 24(3), 438-443



- Low social status related to elevated CRP
- African Americans, women and those with low education

McDade et al. 2006, *Psychosom Med,* 68, 376-381

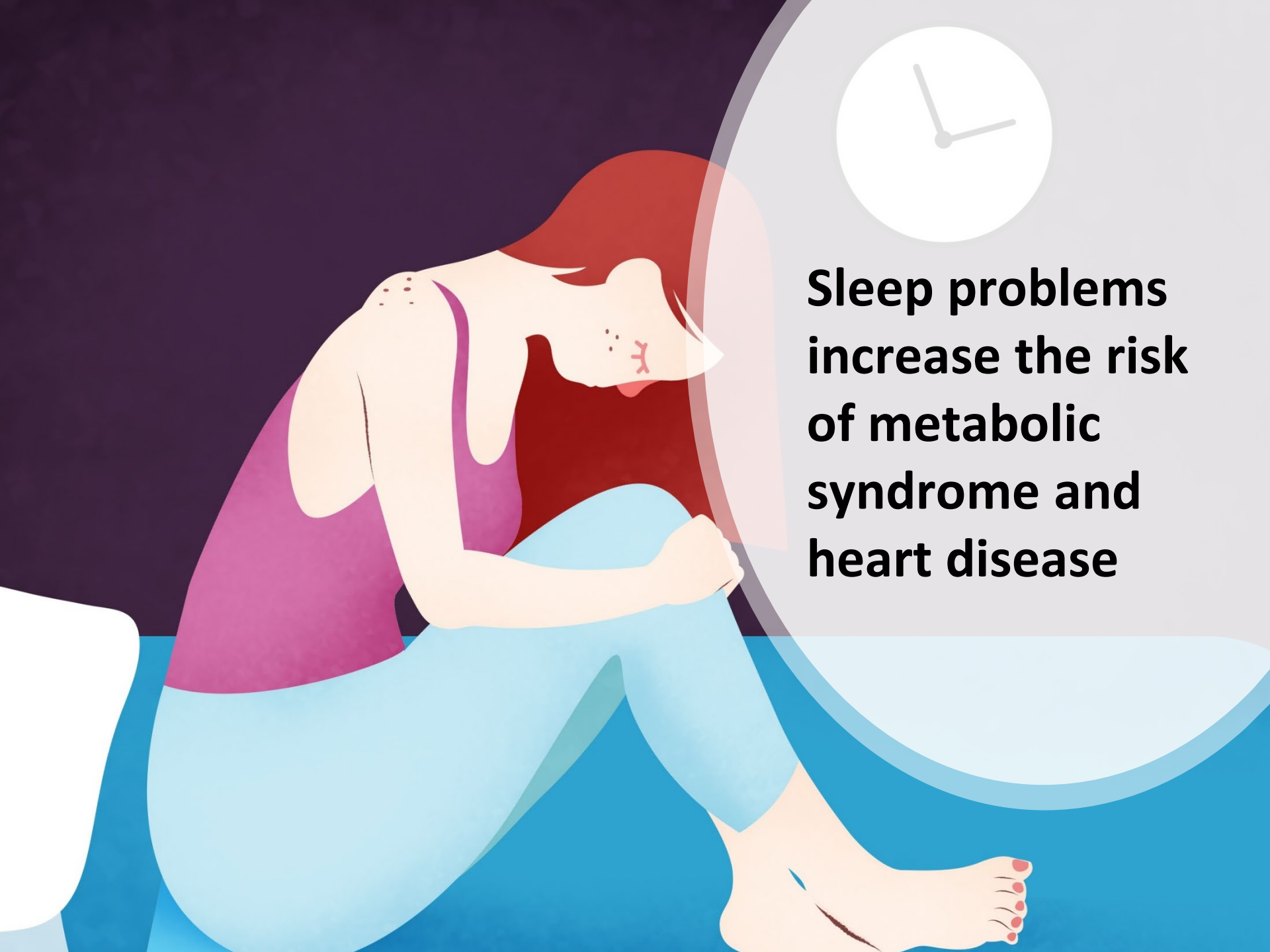


Low parental education predicted high school students

- **Higher insulin levels**
- **Higher glucose**
- **Greater insulin resistance**
- **Higher-LDL, lower HDL**
- **Higher waist circumference**
- **Higher BMI**

Goodman et al. 2005,
***Psychosom Med,* 7, 9-15**

The Role of Sleep


Sleep problems increase the risk of metabolic syndrome and heart disease

Sleep disorders increase inflammation markers (CRP, IL-6 & TNF-α)

Suarez & Goforth. 2010 In *Psychoneuroimmunology of Chronic Disease*: American Psychological Association

Subclinical sleep disorders also increase risk for CVD, hypertension, Type-2 diabetes, metabolic syndrome and all-cause mortality

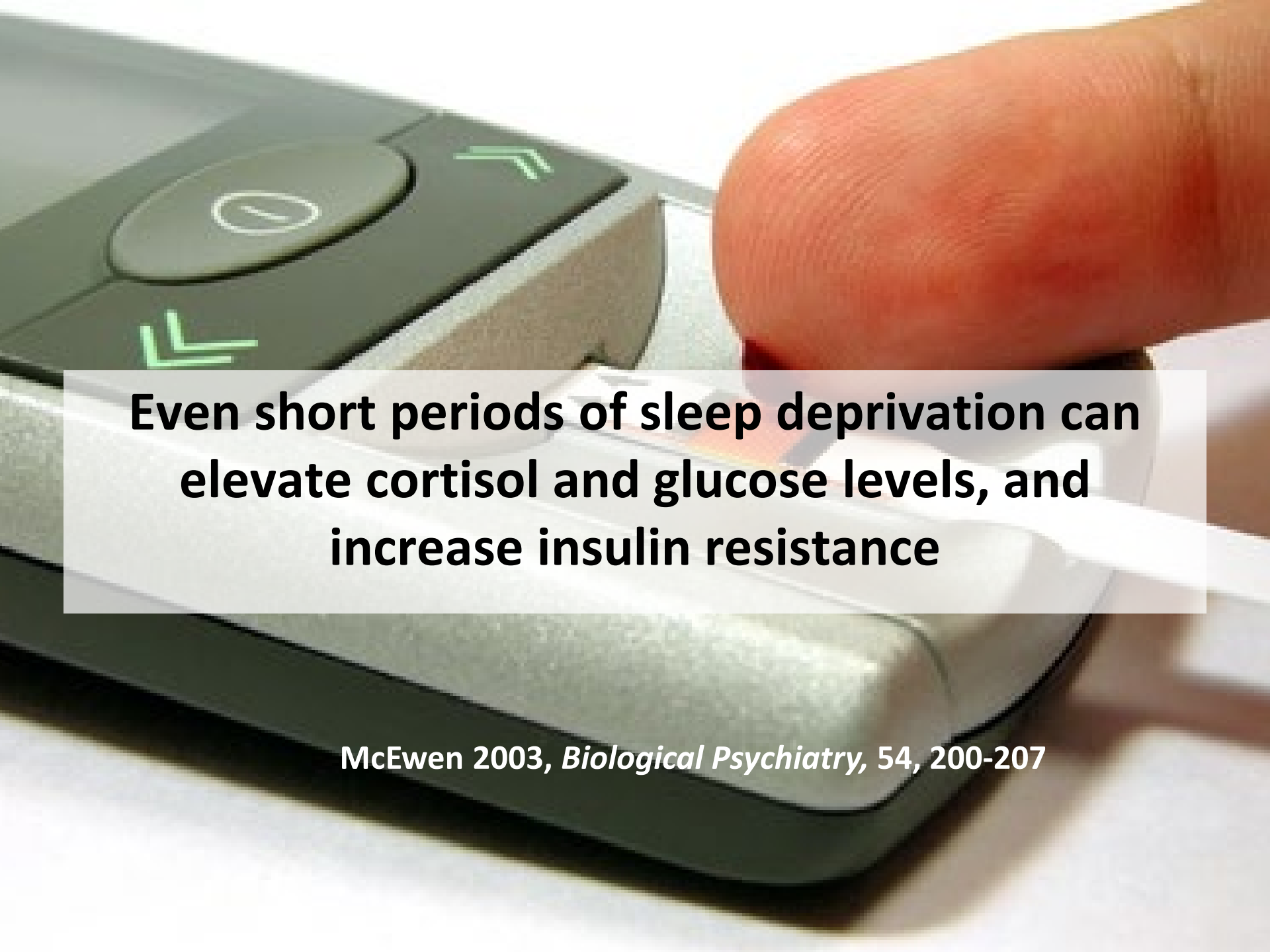
Suarez & Goforth. 2010 In *Psychoneuroimmunology of Chronic Disease*: American Psychological Association

Disturbed sleep also increases the risk of depression and obesity

Short sleep duration (< 5 hours) related to obesity worldwide

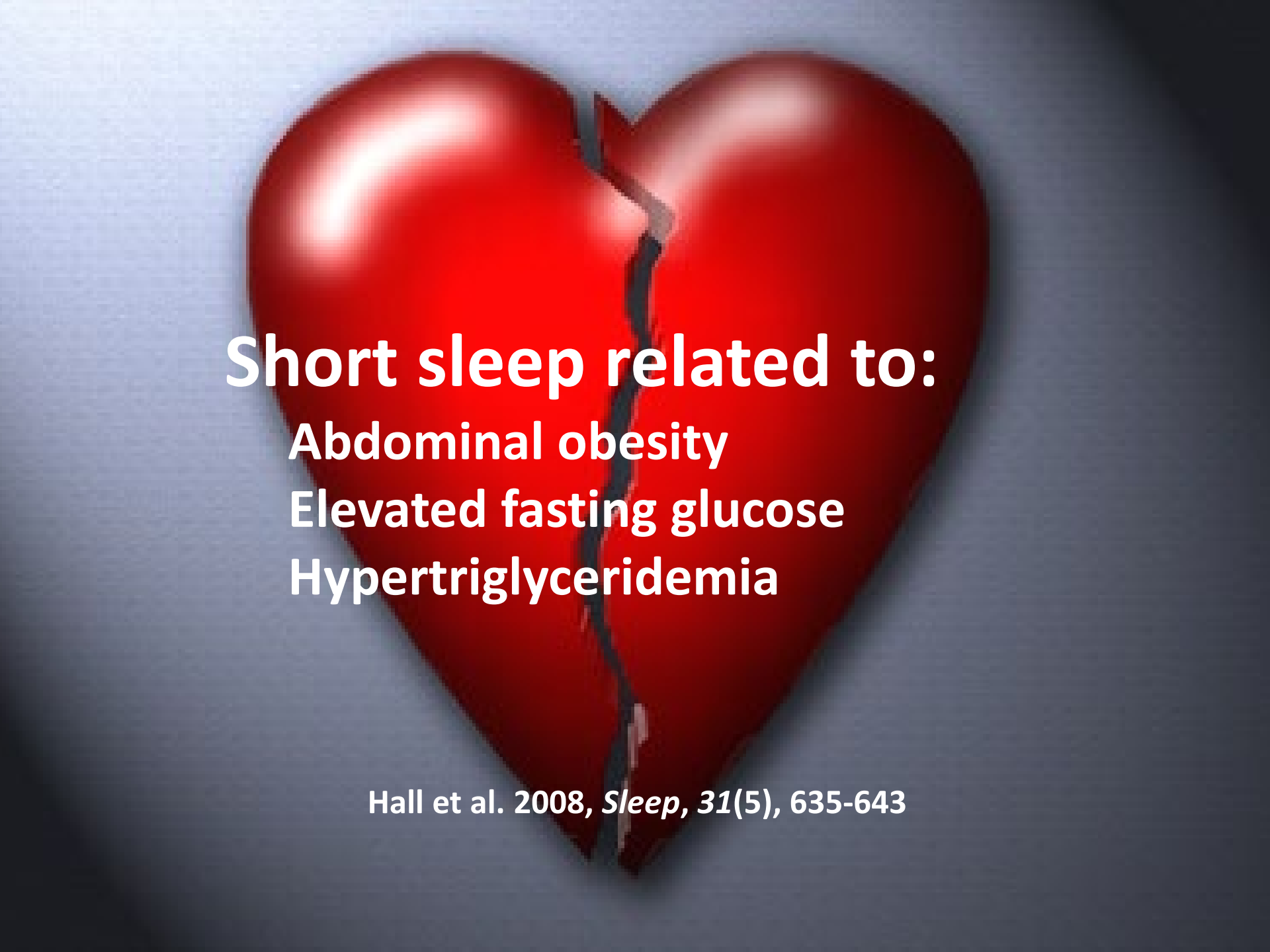
Cappuccio et al. 2008, *Sleep, 31,* 19-26

Meta-analysis of sleep duration and obesity (36 studies, *N*=634,511), adults & children



Even short periods of sleep deprivation can elevate cortisol and glucose levels, and increase insulin resistance

McEwen 2003, *Biological Psychiatry,* 54, 200-207

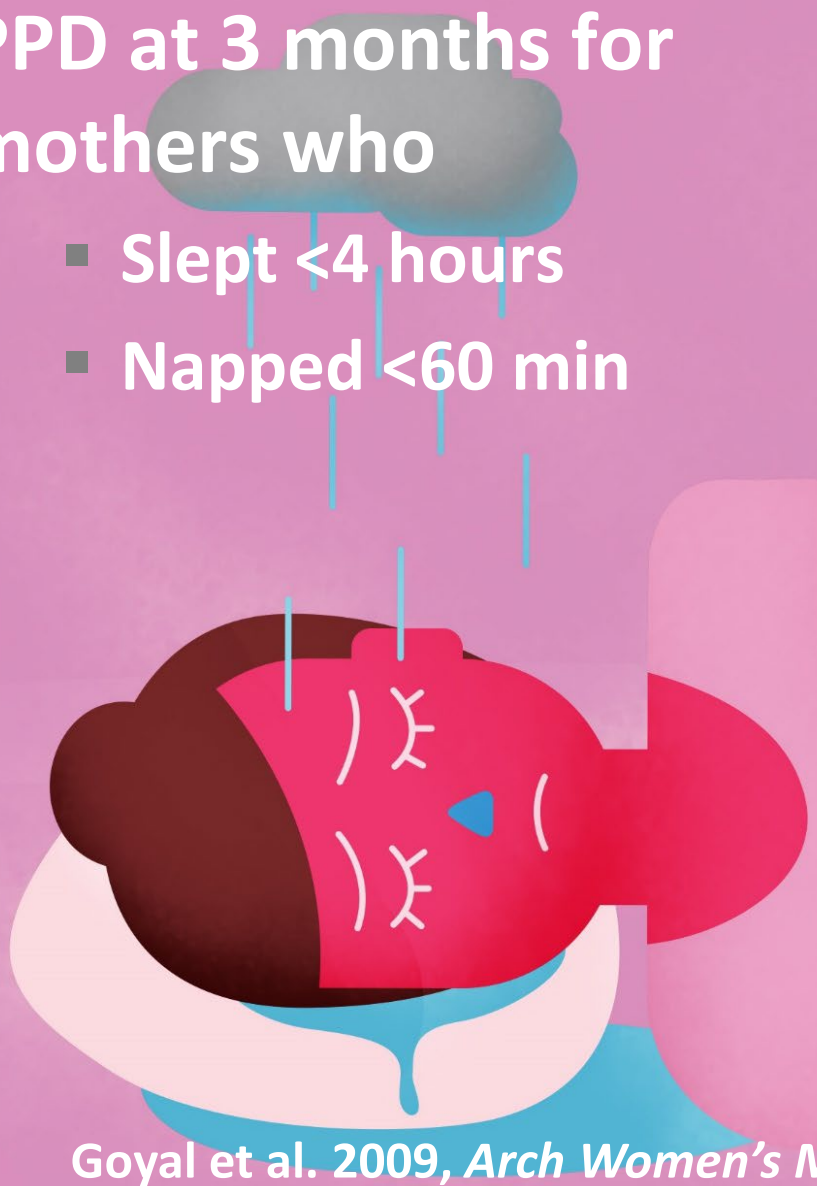

Short sleep related to:
Abdominal obesity
Elevated fasting glucose
Hypertriglyceridemia
Hall et al. 2008, *Sleep*, *31*(5), 635-643

Depression compromises sleep quality

Kendall-Tackett 2007, *Trauma, Violence & Abuse* 8, 117-126

PPD at 3 months for mothers who

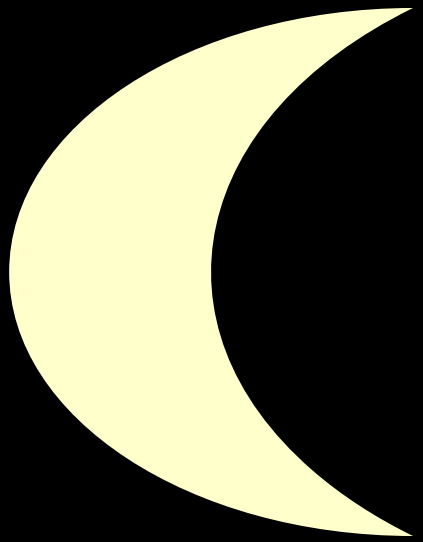
- Slept <4 hours
- Napped <60 min



Prospective study of 112 mothers

Goyal et al. 2009, *Arch Women's Ment Health,* 12, 229-237

187 adults



Whites

16 min to sleep

6.8% SWS

Sleep Time

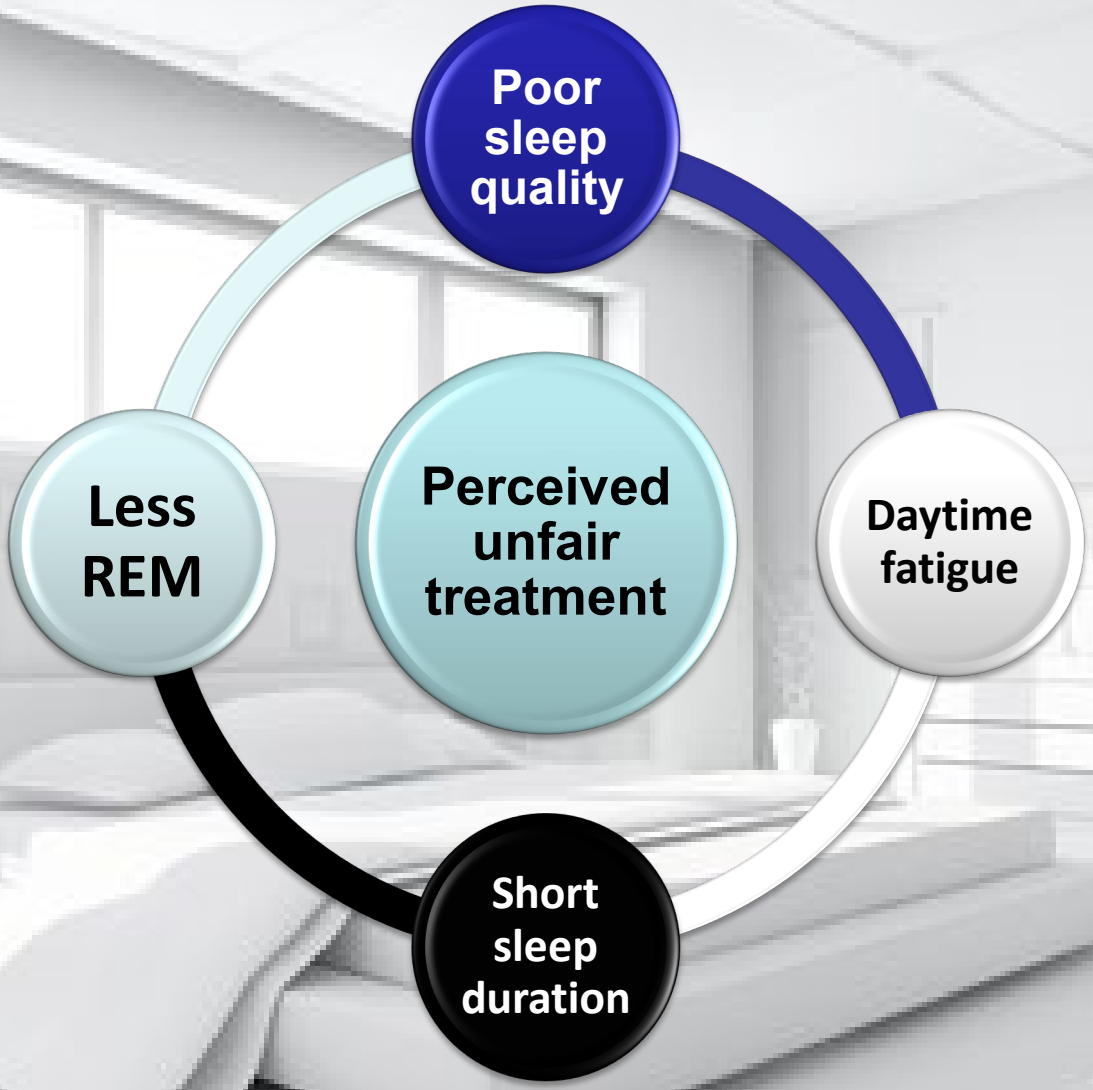
Blacks

25 min to sleep

3.6% SWS

Mezick et al. 2008,
Psychosom Med, 70, 410-416

97 Black and White adults



Beatty et al. 2011, *Health Psychol, 30*(3), 351-359

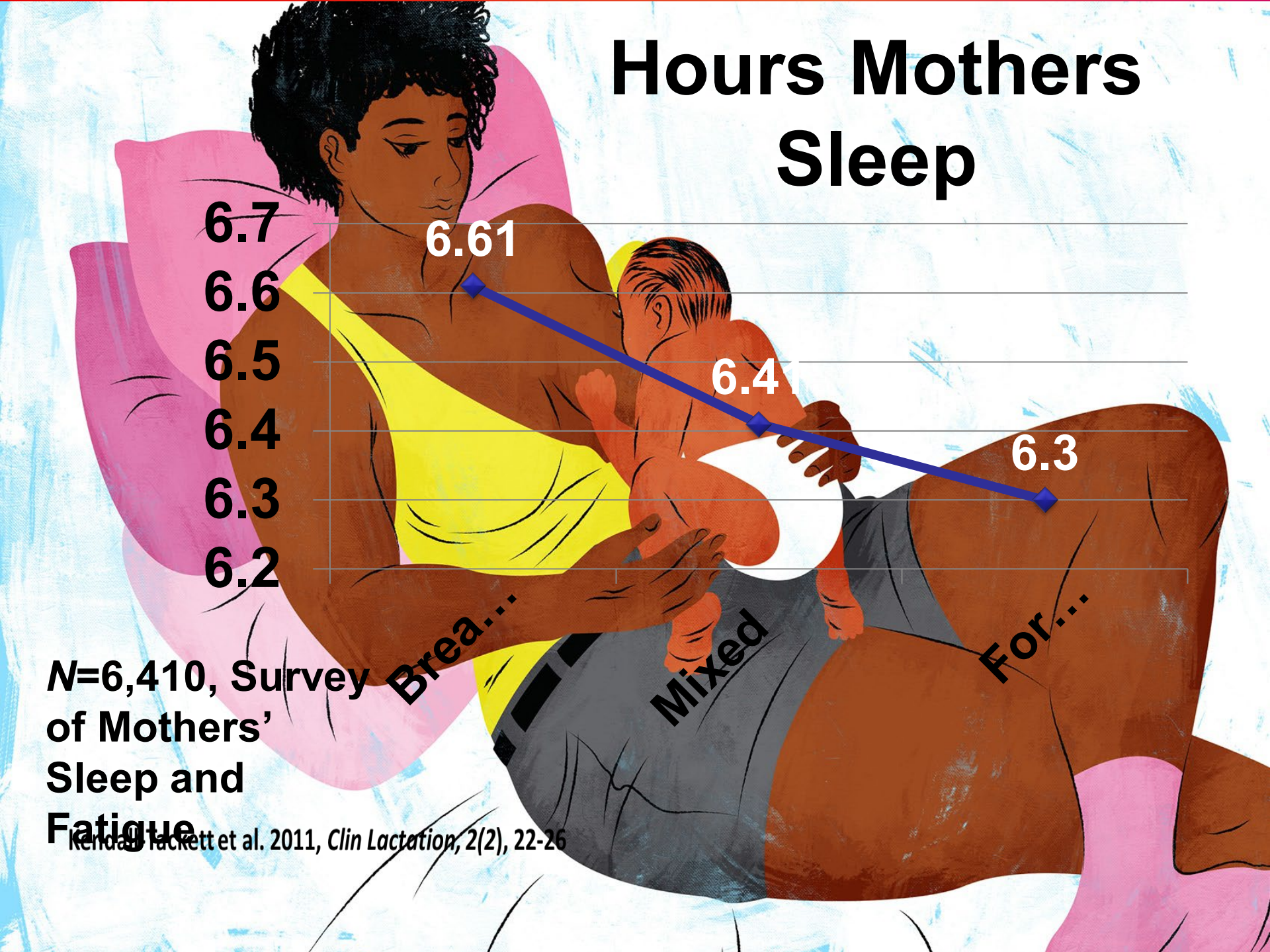
Mother-infant sleep

Study of 2,830 women at 7 weeks postpartum
Poor sleep was an independent risk factor for depression
Dorheim et al. 2009, *Sleep,* 32, 847-855

- **Factors associated with poor sleep**
- Depression
- Previous sleep problems
- Primiparity
- Younger or male infant
- **Not exclusively breastfeeding**

Dorheim et al. 2009, *Sleep*, 32, 847-855

Hours Mothers Sleep

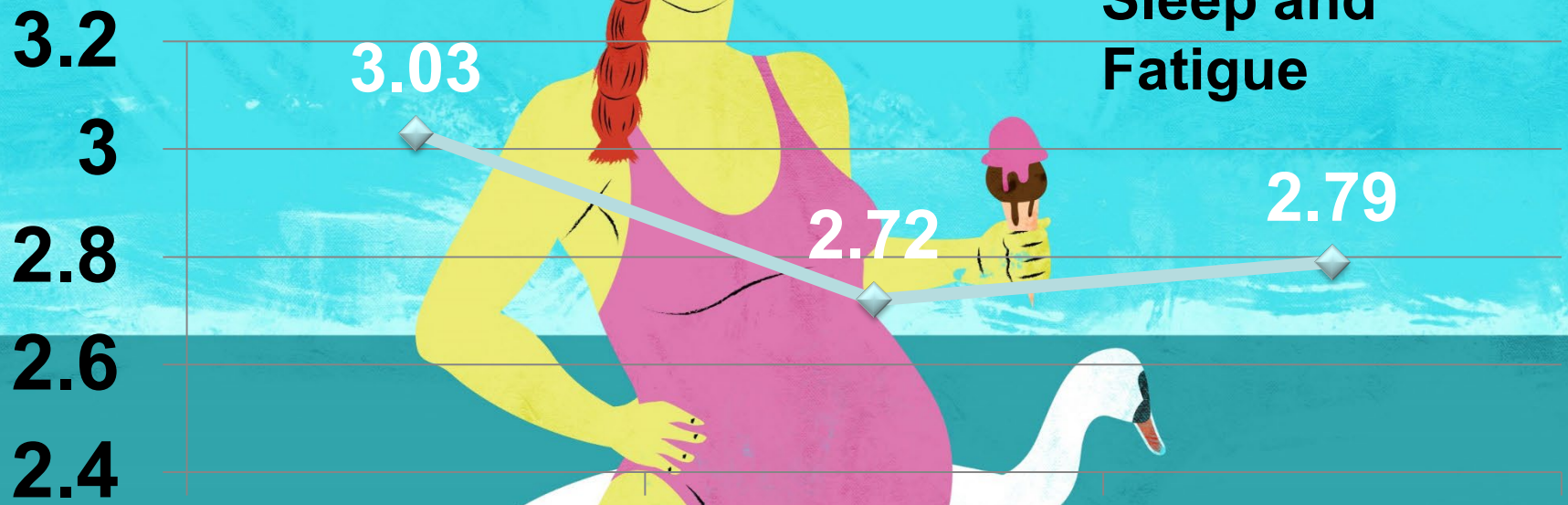


N=6,410, Survey of Mothers' Sleep and Fatigue

Kendall-Tackett et al. 2011, *Clin Lactation*, 2(2), 22-26

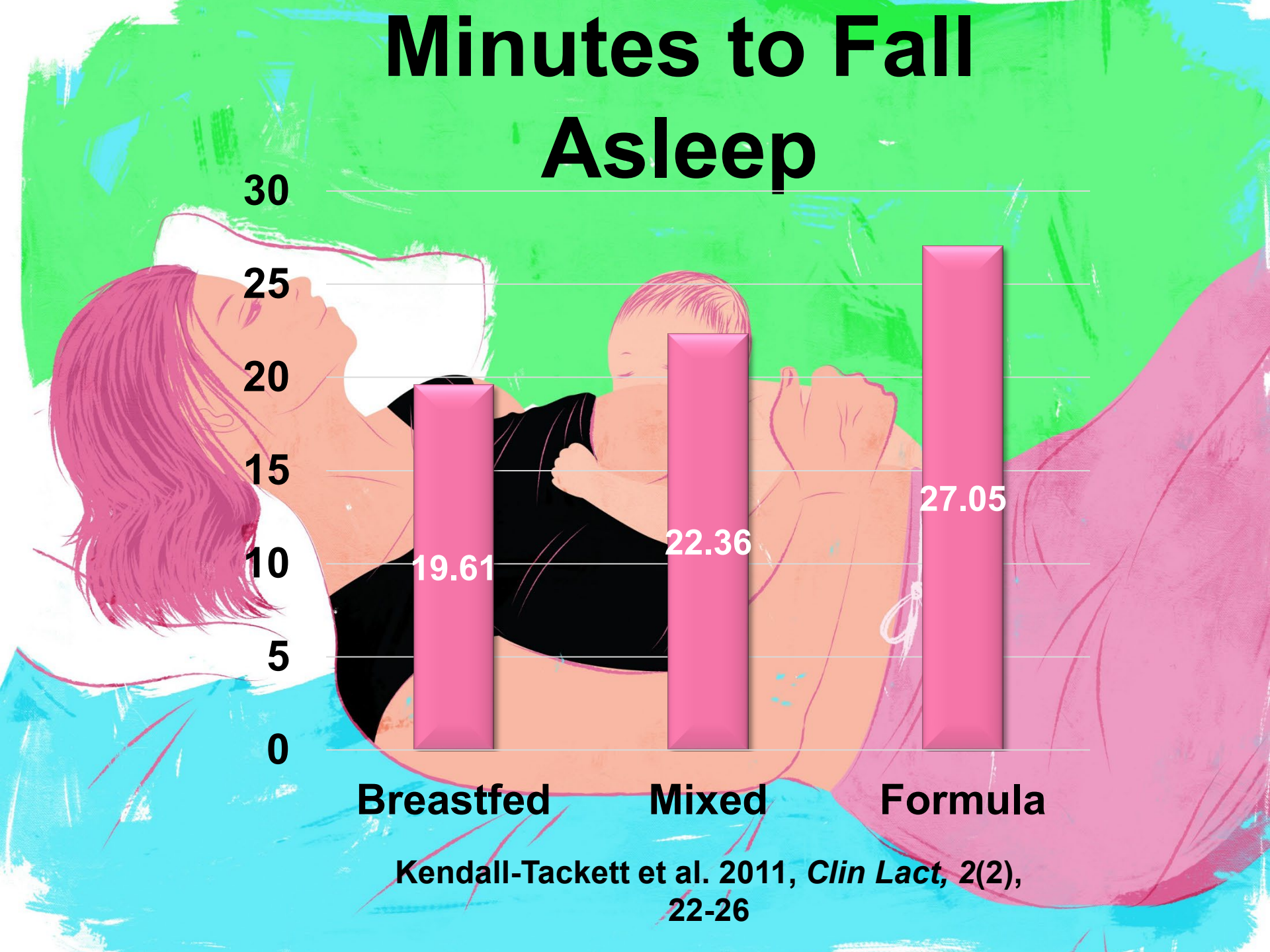
Mothers' Daily Energy

N=6,410, Survey of Mothers' Sleep and Fatigue



Kendall-Tackett et al. 2011, *Clin Lactation, 2(2)*, 22-26

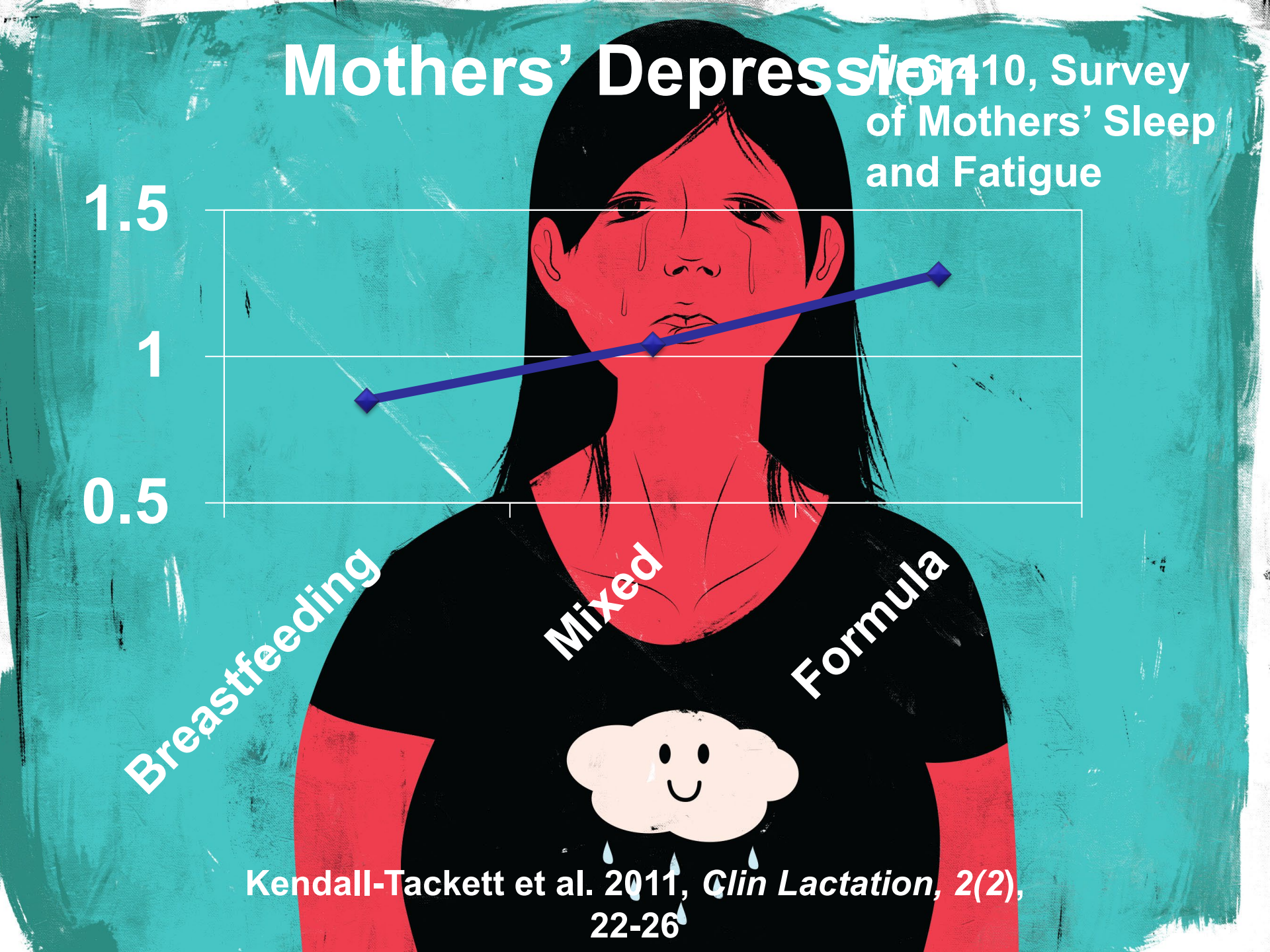
Minutes to Fall Asleep



Kendall-Tackett et al. 2011, *Clin Lact, 2*(2), 22-26

Mothers' Depression

2004-2010, Survey of Mothers' Sleep and Fatigue



Kendall-Tackett et al. 2011, *Clin Lactation, 2(2)*, 22-26

Trauma

Collaborative Perinatal Project (1959-1972), 355 offspring (*M* age=42)

Prenatal adversity increased inflammation for the baby in adulthood by 3 times

Slopen et al. 2015, *Psychoneuroendocrinology, 51*, 403-413

Child Maltreatment

CSA, CPA, CEA, Neglect

Parental Impairment

Substance abuse, mental illness, partner violence, criminal activity

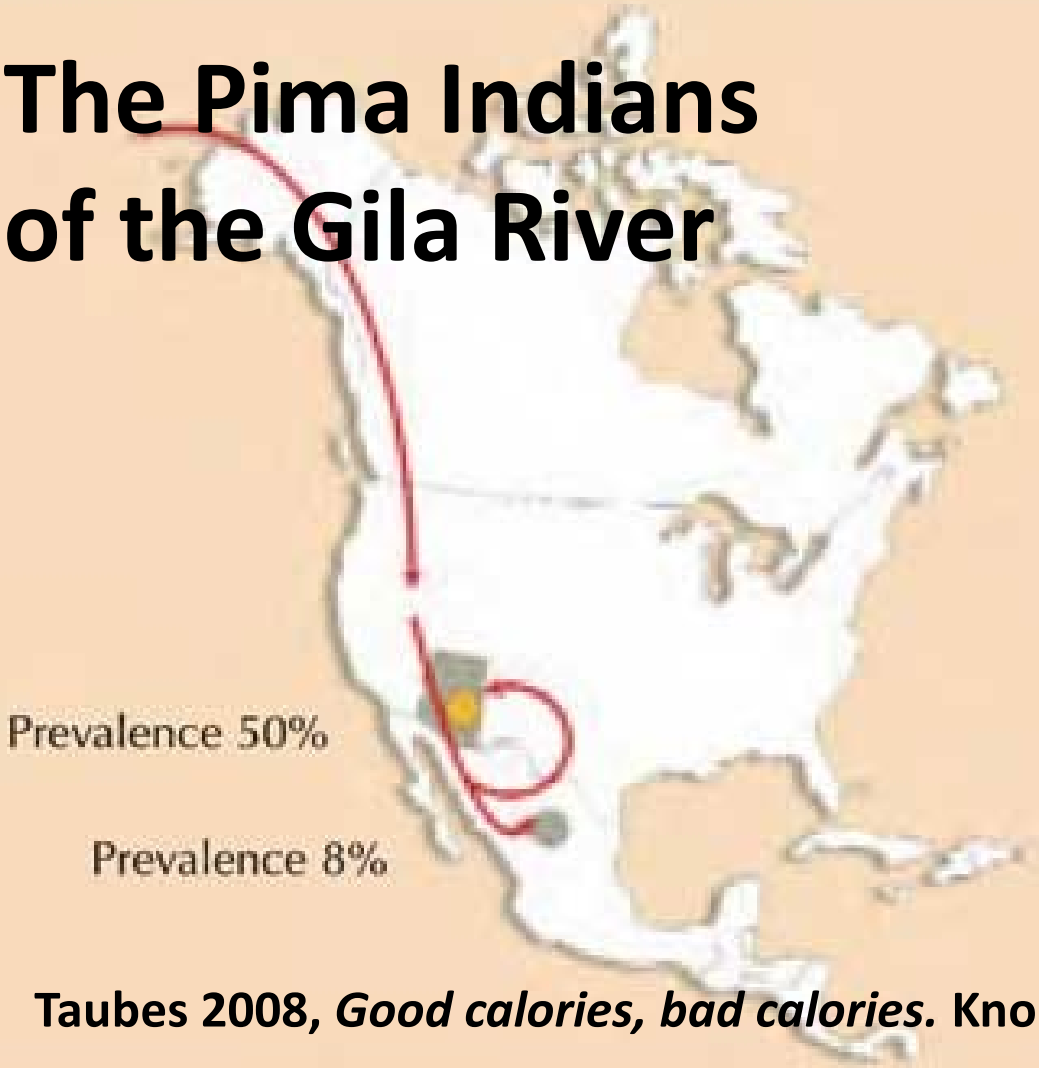
Parental Loss

Death or divorce

Low Socioeconomic Status

Community violence, unsafe housing, food insecurity, medical care

The Pima Indians of the Gila River

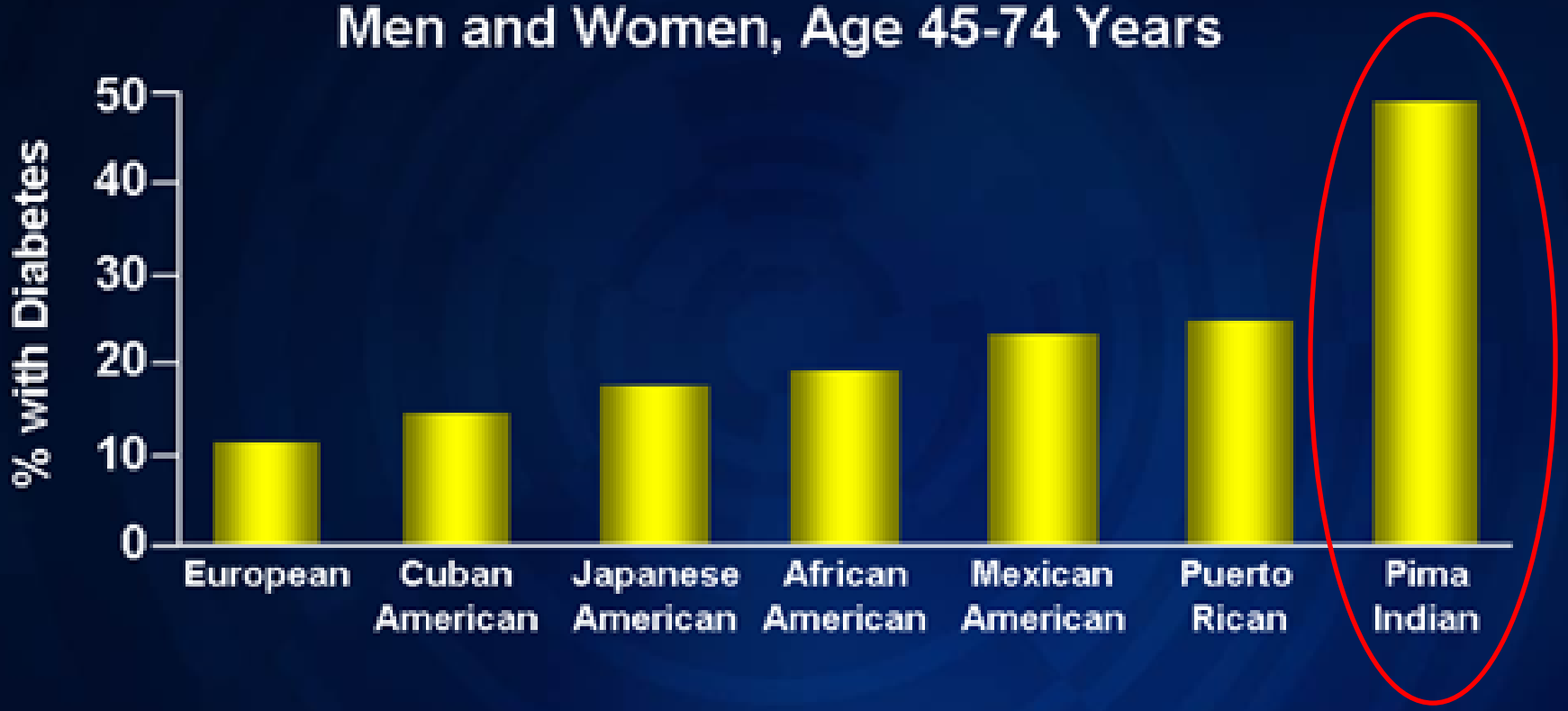


Taubes 2008, *Good calories, bad calories*. Knopf

Now

Then

U.S. Diabetes Prevalence by Ethnic Group



Harris MI, et al. *Diabetes.* 1987;36:523-534.
Flegal KM, et al. *Diabetes Care.* 1991;14(suppl 3):628-638.
Knowler WC, et al. *Diabetes Care.* 1993;16(suppl 1):216-227.
Fujimoto WY, et al. *Diabetes Res Clin Pract.* 1991;13:119-128.
Fujimoto WY, et al. *Diabetes.* 1987;36:721-729.

www.StrangeCosmos.com

Why does breastfeeding help?

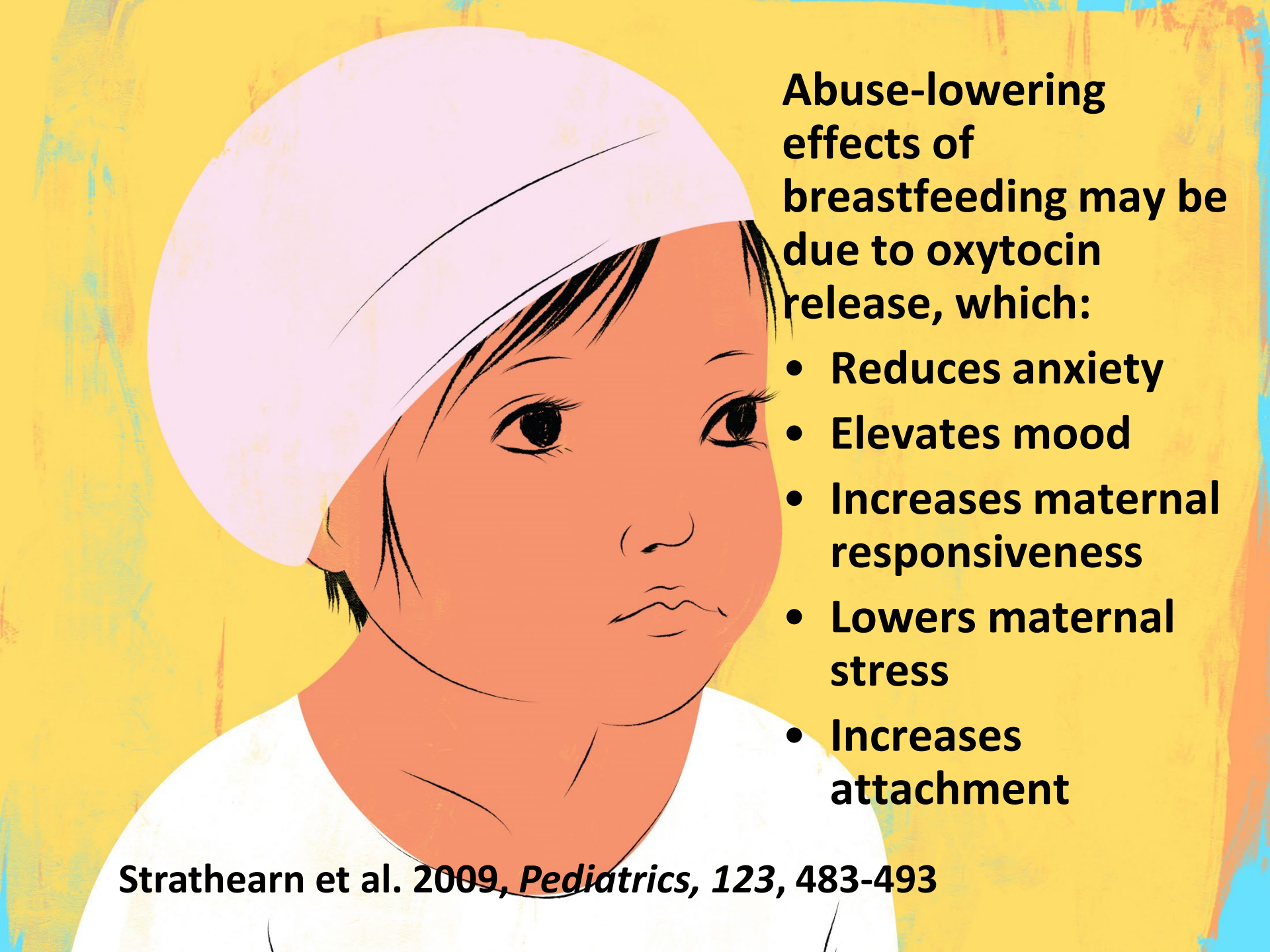
Breastfeeding

- Downregulates stress
- Improves mood
- Decreases risk of depression
- Decreases hostility
- Improves mother-infant bond

- Breastfeeding downregulates the stress response
- Directs mother toward milk production, conservation of energy and nurturing behaviors

Groër et al. 2002, *JOGNN, 31*, 411-417

OXYTOCIN
STRESS



Abuse-lowering effects of breastfeeding may be due to oxytocin release, which:

- **Reduces anxiety**
- **Elevates mood**
- **Increases maternal responsiveness**
- **Lowers maternal stress**
- **Increases attachment**

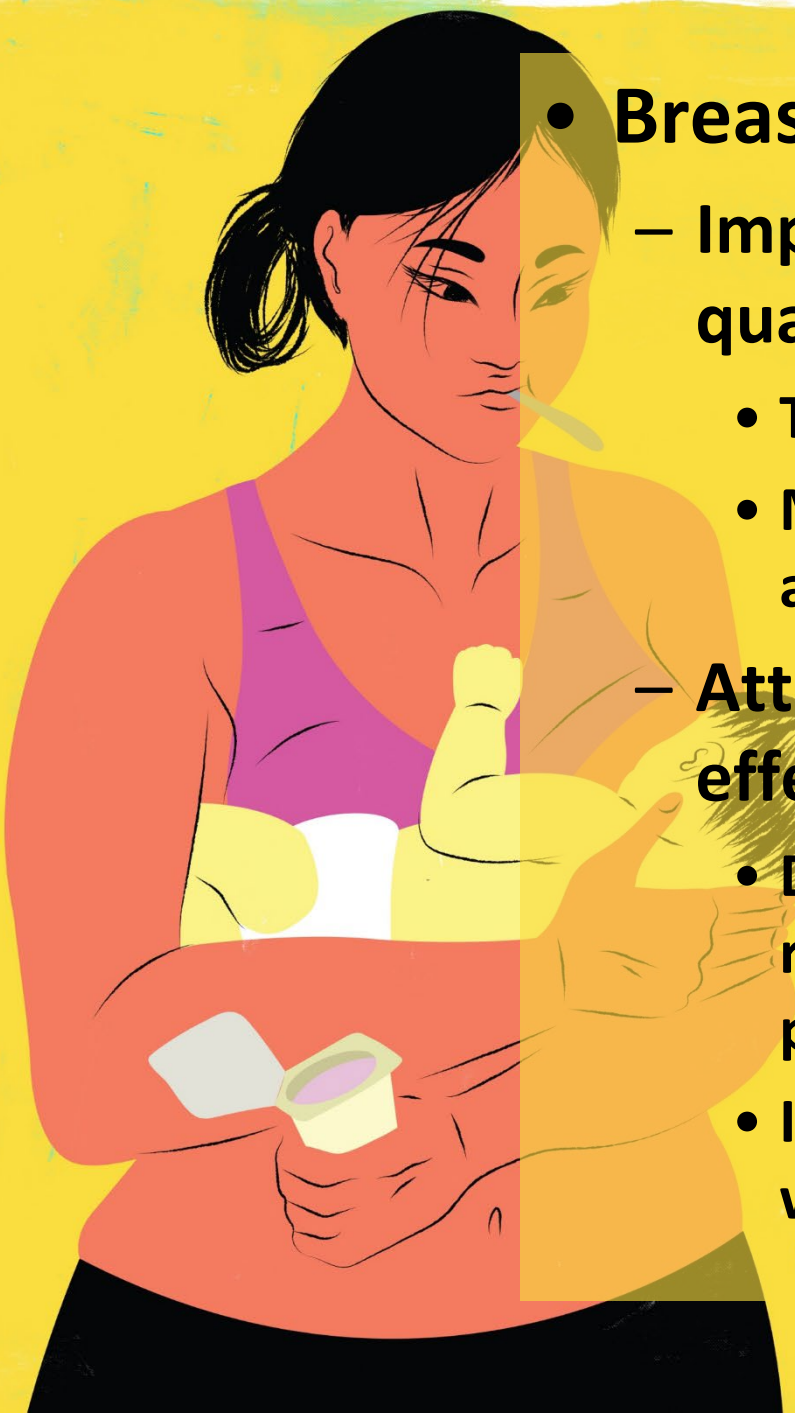
Strathearn et al. 2009, *Pediatrics, 123*, 483-493

Breastfeeding also improves maternal sleep

Conclusions

Breastfeeding lowers risk of metabolic syndrome and CVD by

- **Decreasing depression and hostility**
- **Increasing mother-infant bond**



- **Breastfeeding also**
  - **Improves sleep quality**
    - **Total sleep hours**
    - **Minutes to fall asleep**
  - **Attenuates the effects of trauma**
    - **Decreasing trauma-related sleep problems**
    - **Improving maternal well-being**

• Breastfeeding—particularly exclusive breastfeeding—protects women's physical and mental well-being
• These effects persist long past the perinatal period

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BREASTFEEDING

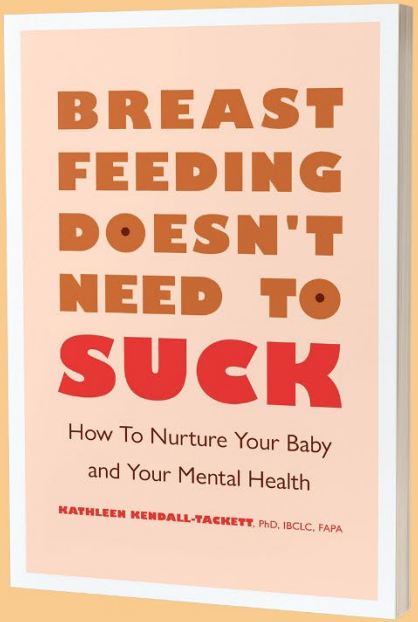
IT CAN BE LONELY...

IT CAN BE CONFUSING...

IT CAN BE CHALLENGING...

BUT IT DOESN'T NEED TO

SUCK!



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