Obesity in America: Focusing on psychosocial stress as a risk factor

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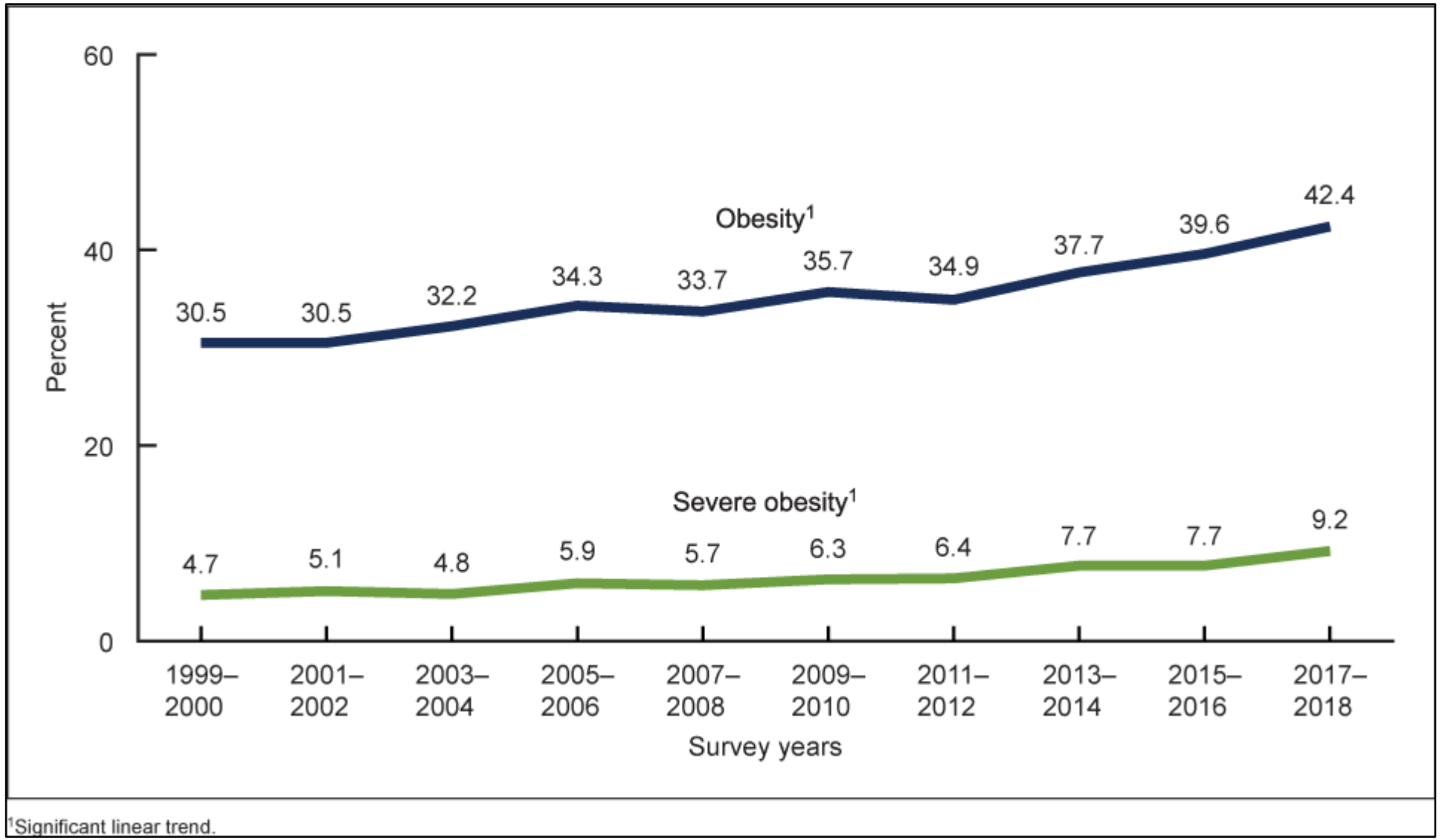
The Surgeon General's Call To Action To Prevent and Decrease Overweight and Obesity 2001

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Office of the Surgeon General
Rockville, MD

Trends in obesity 1999-2000 to 2017-2018

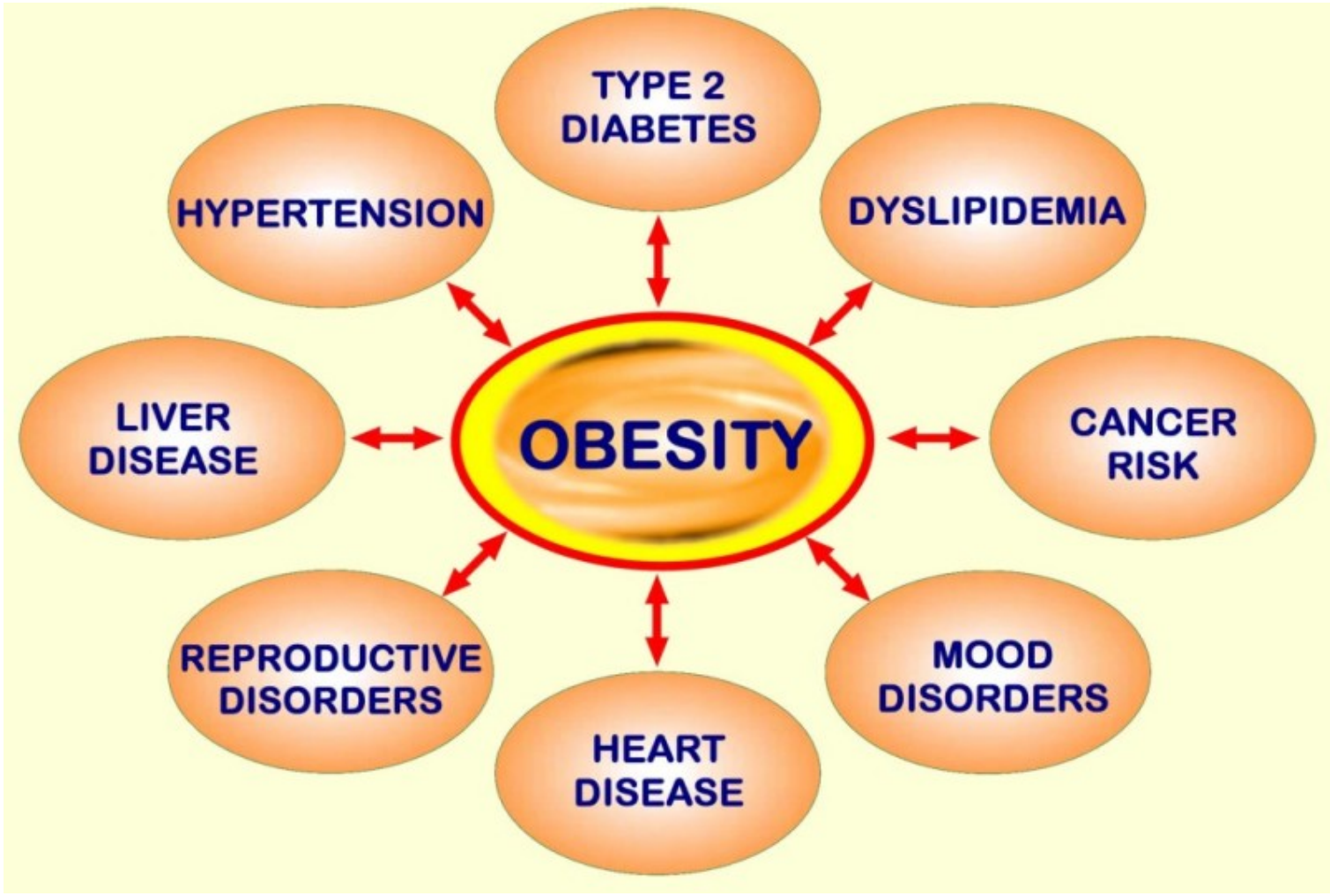


Hales et al. (2020)

The Cost of Obesity

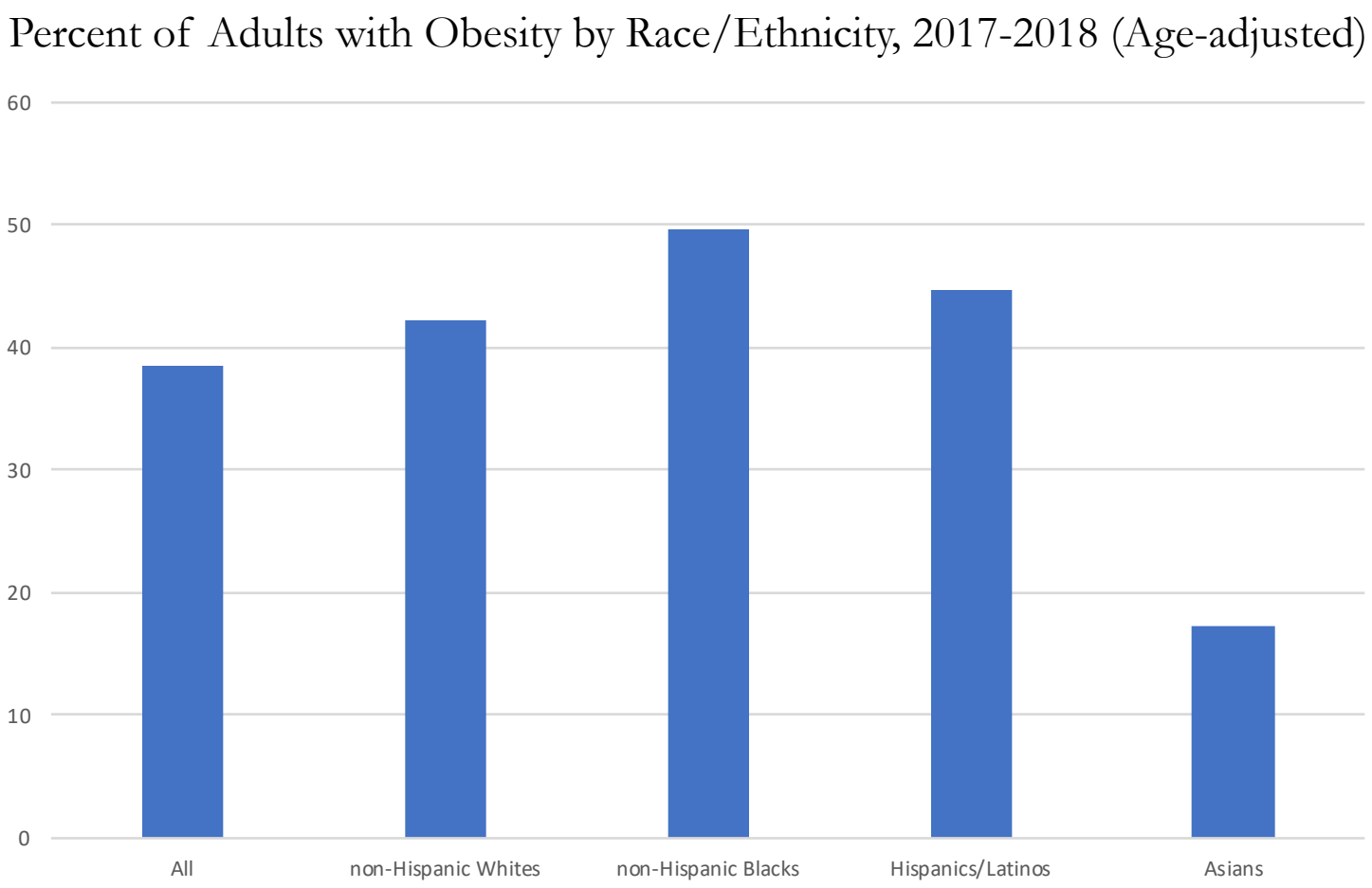
- In 2013, total medical costs of obesity estimated to be $342.2 billion[1]
- In 2014, obesity accounted for 6.5% to 12.6% of total absenteeism costs in the workplace, translating to an estimated $8.65 billion per year[2]
- Obesity accounted for 18% of deaths among Americans[3]
  - Obesity is believed to cause up to 90,000 cancer deaths per year[4]
- An NIH study in 2014 found that severe obesity may shorten life expectancy up to 14 years[5]

The Impact of Obesity[1]



Kyrou et al. (2000)

Obesity is a public health issue



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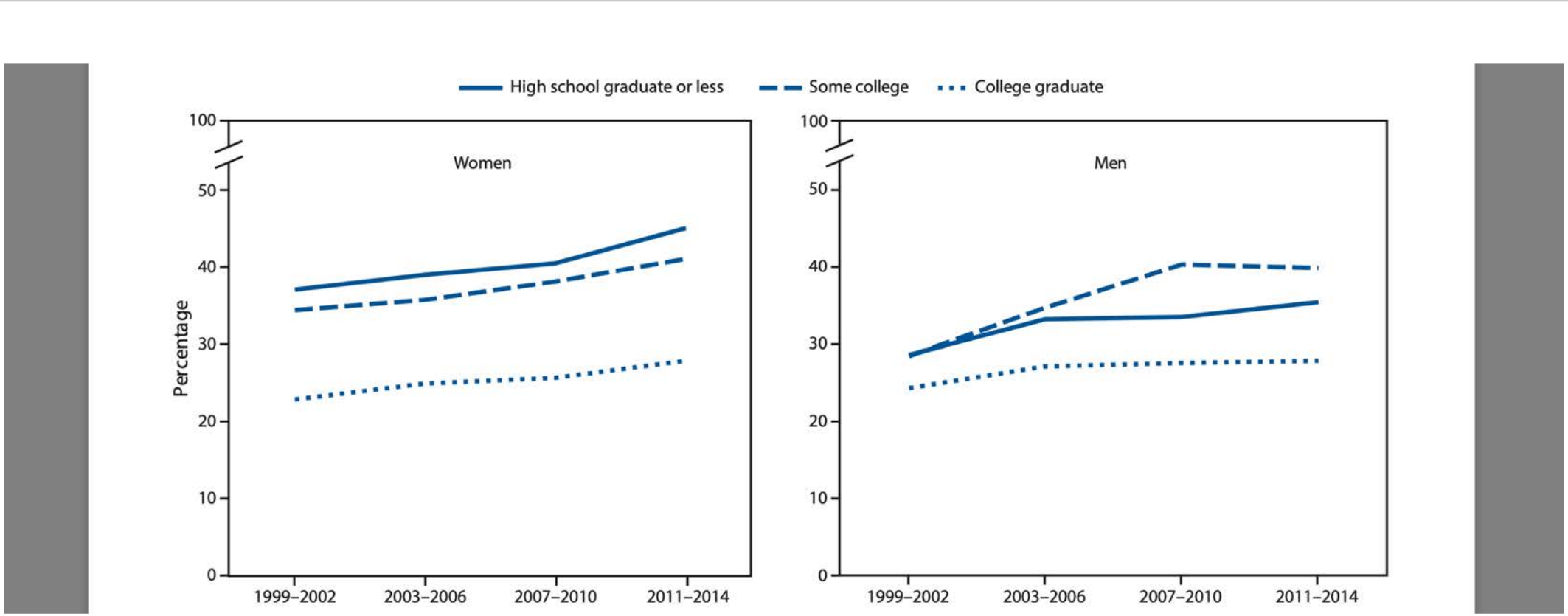
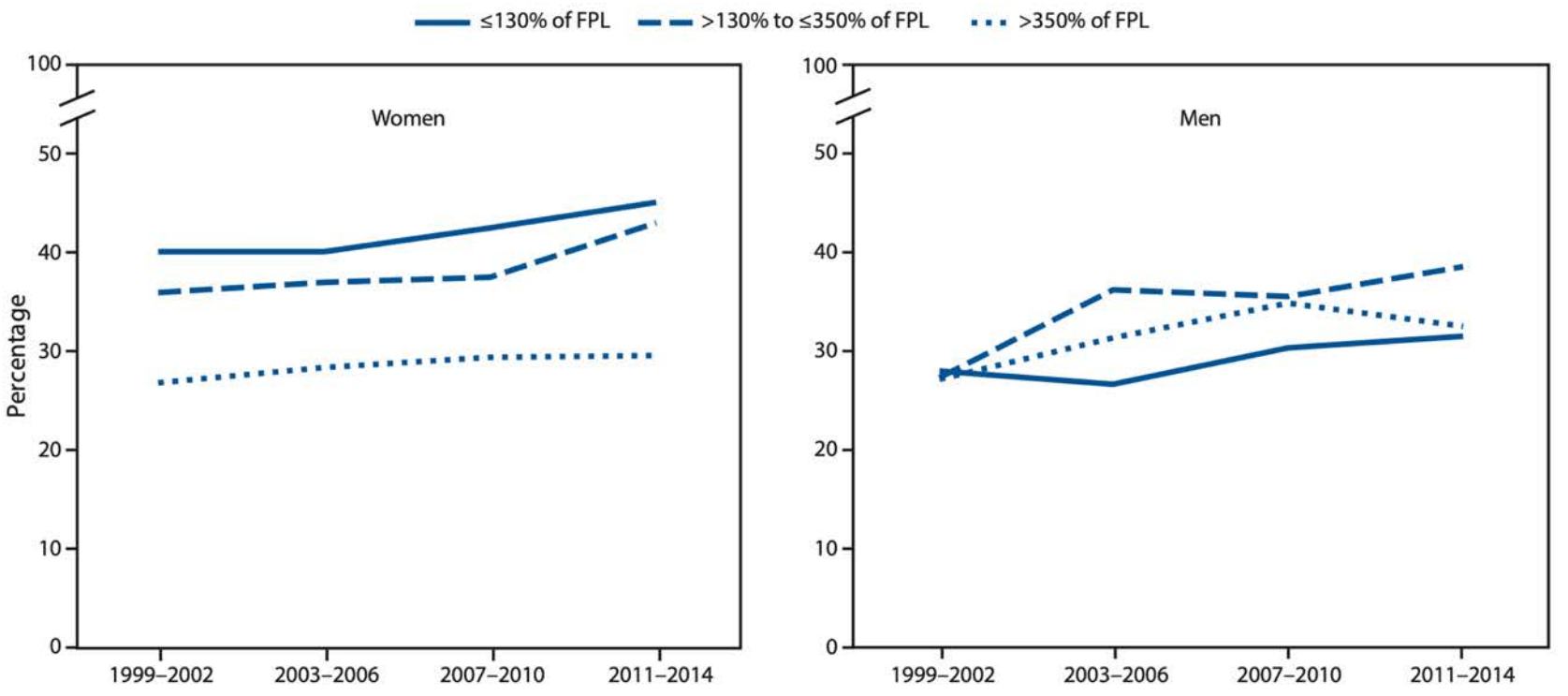
NCHS Data Brief 2020

Obesity Prevalence by Education Level and Sex



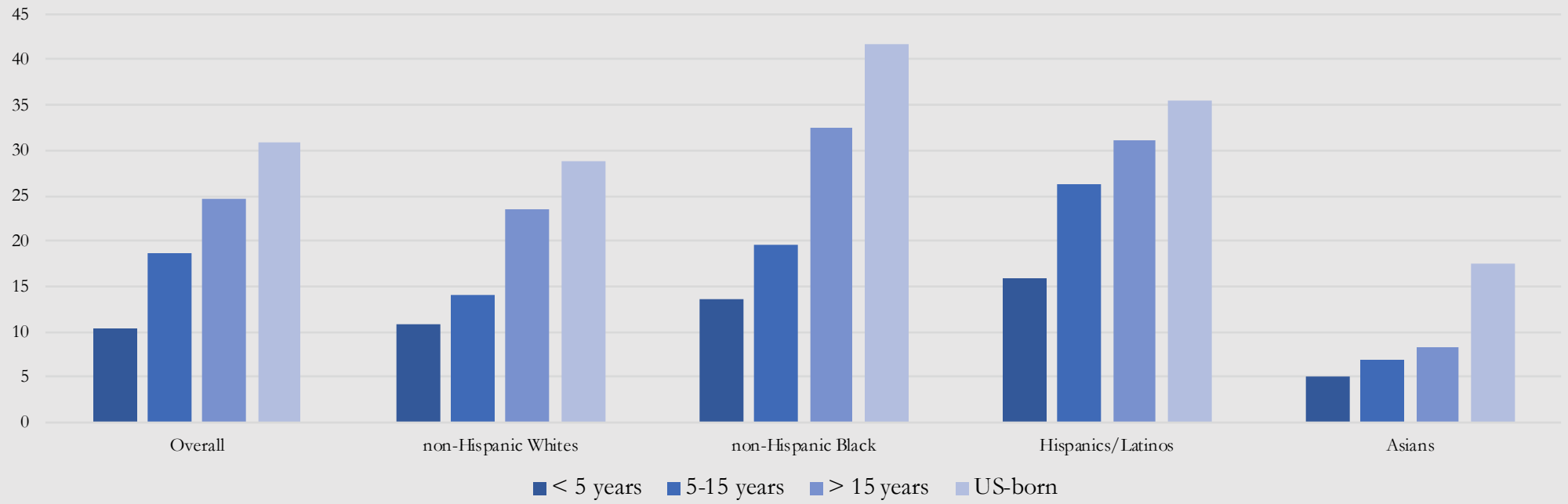
Ogden et al. 2017 MMWR

Obesity Prevalence by Income and Sex



Ogden et al. 2017 MMWR

Obesity Prevalence Among Foreign-Born Adults



Cuevas & Cofie (Accepted)

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

Projected U.S. State-Level Prevalence of Adult Obesity and Severe Obesity

Zachary J. Ward, M.P.H., Sara N. Bleich, Ph.D., Angie L. Cradock, Sc.D., Jessica L. Barrett, M.P.H., Catherine M. Giles, M.P.H., Chasmine Flax, M.P.H., Michael W. Long, Sc.D., and Steven L. Gortmaker, Ph.D.

ABSTRACT

BACKGROUND

Although the national obesity epidemic has been well documented, less is known about obesity at the U.S. state level. Current estimates are based on body measures reported by persons themselves that underestimate the prevalence of obesity, especially severe obesity.

METHODS

We developed methods to correct for self-reporting bias and to estimate state-specific and demographic subgroup–specific trends and projections of the prevalence of categories of body-mass index (BMI). BMI data reported by 6,264,226 adults (18 years of age or older) who participated in the Behavioral Risk Factor Surveillance System Survey (1993–1994 and 1999–2016) were obtained and corrected for quantile-specific self-reporting bias with the use of measured data from 57,131 adults who participated in the National Health and Nutrition Examination Survey. We fitted multinomial regressions for each state and subgroup to estimate the prevalence of four BMI categories from 1990 through 2030: underweight or normal weight (BMI [the weight in kilograms divided by the square of the height in meters], <25), overweight (25 to <30), moderate obesity (30 to <35), and severe obesity (≥35). We evaluated the accuracy of our approach using data from 1990 through 2010 to predict 2016 outcomes.

RESULTS

The findings from our approach suggest with high predictive accuracy that by 2030 nearly 1 in 2 adults will have obesity (48.9%; 95% confidence interval [CI], 47.7 to 50.1), and the prevalence will be higher than 50% in 29 states and not below 35% in any state. Nearly 1 in 4 adults is projected to have severe obesity by 2030 (24.2%; 95% CI, 22.9 to 25.5), and the prevalence will be higher than 25% in 25 states. We predict that, nationally, severe obesity is likely to become the most common BMI category among women (27.6%; 95% CI, 26.1 to 29.2), non-Hispanic black adults (31.7%; 95% CI, 29.9 to 33.4), and low-income adults (31.7%; 95% CI, 30.2 to 33.2).

Interventions to combat obesity

Tax on sugary drinks

Positive body image

Menu labeling

Lifestyle behavioral interventions-Change in diet and physical activity

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Review
CLINICAL TRIALS: BEHAVIOR, PHARMACOTHERAPY, DEVICES, SURGERY

Obesity

NIH Working Group Report: Innovative Research to Improve Maintenance of Weight Loss

Paul S. MacLean[1], Rena R. Wing[2], Terry Davidson[3], Leonard Epstein[4], Bret Goodpaster[5], Kevin D. Hall[6], Barry E. Levin[7], Michael G. Perri[8], Barbara J. Rolls[9], Michael Rosenbaum[10], Alexander J. Rothman[11], and Donna Ryan[12]

Objectives: The National Institutes of Health, led by the National Heart, Lung, and Blood Institute, organized a working group of experts to discuss the problem of weight regain after weight loss. A number of experts in integrative physiology and behavioral psychology were convened with the goal of merging their perspectives regarding the barriers to scientific progress and the development of novel ways to improve long-term outcomes in obesity therapeutics. The specific objectives of this working group were to: (1) identify the challenges that make maintaining a reduced weight so difficult; (2) review strategies that have been used to improve success in previous studies; and (3) recommend novel solutions that could be examined in future studies of long-term weight control.

Results: Specific barriers to successful weight loss maintenance include poor adherence to behavioral regimens and physiological adaptations that promote weight regain. A better understanding of how these behavioral and physiological barriers are related, how they vary between individuals, and how they can be overcome will lead to the development of novel strategies with improved outcomes.

Conclusions: Greater collaboration and cross-talk between physiological and behavioral researchers is needed to advance the science and develop better strategies for weight loss maintenance.

Obesity (2015) **23**, 7-15. doi:10.1002/oby.20967

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Limited understanding of the up-stream contributors to weight gain and regain

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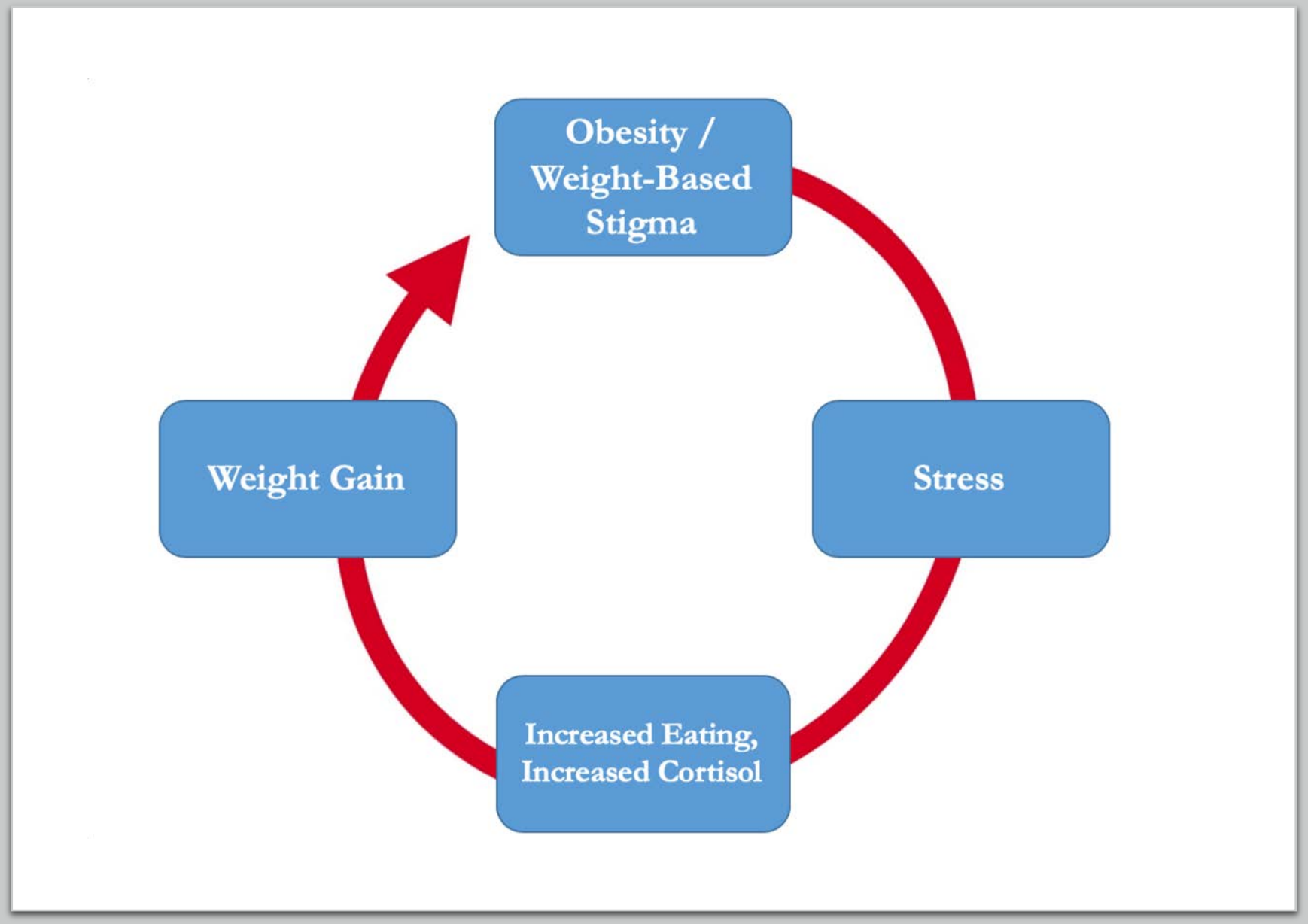
Limited understanding of the up-stream contributors to weight gain and regain

Biological and behavioral effects of stress or “triggers” which may affect weight loss maintenance

The Stress-Obesity Pathway[1]



Tomiyama 2014

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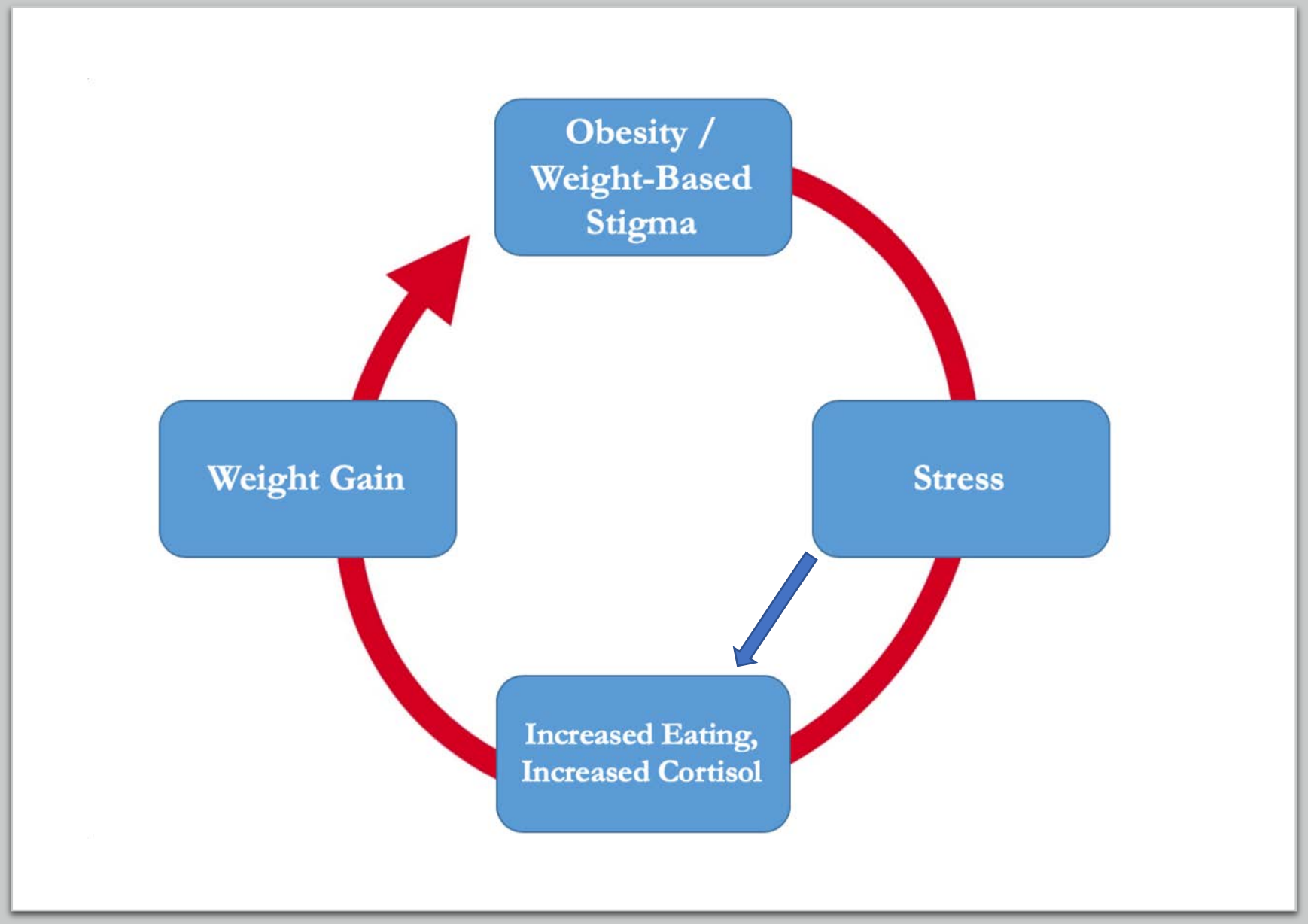

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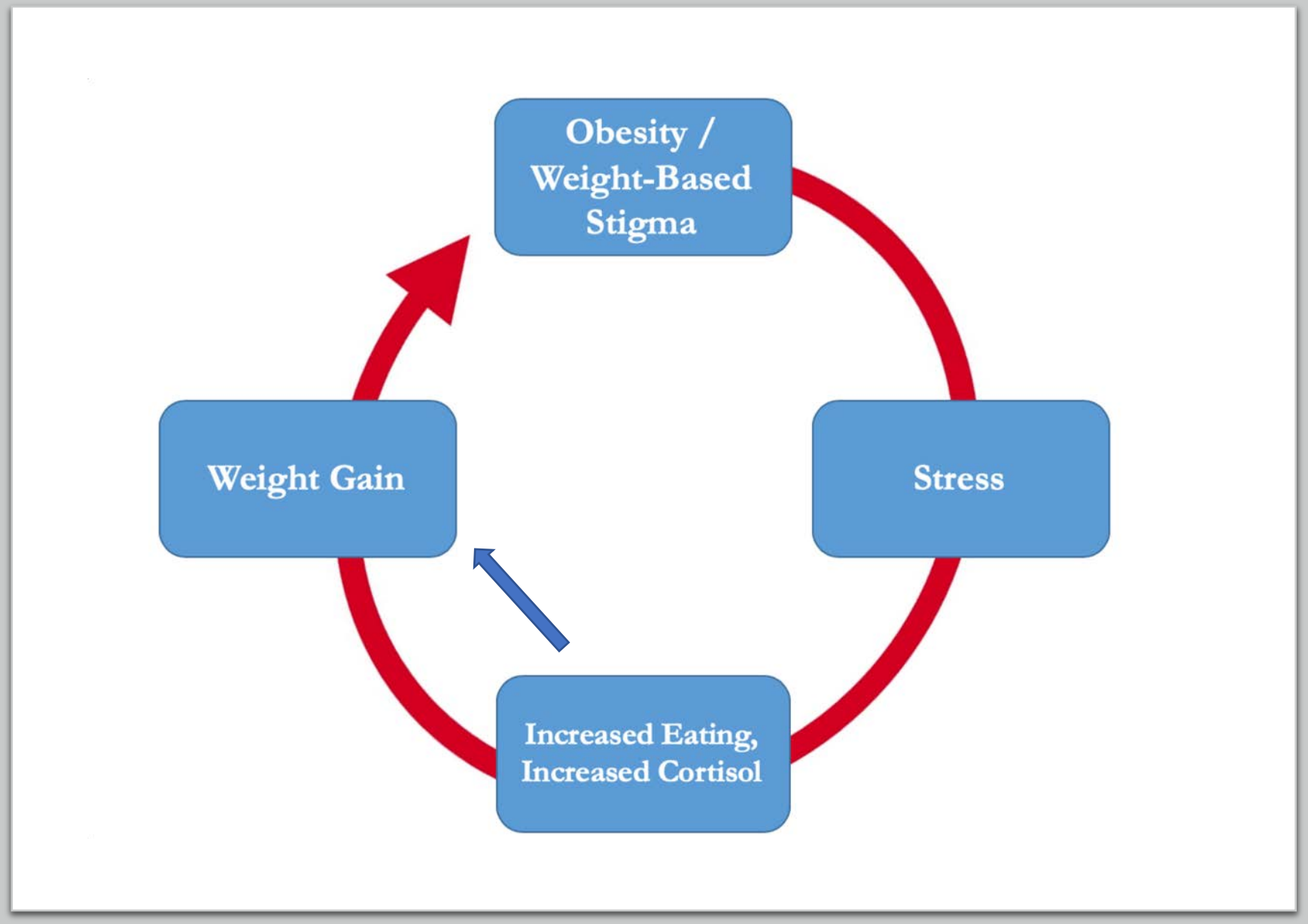

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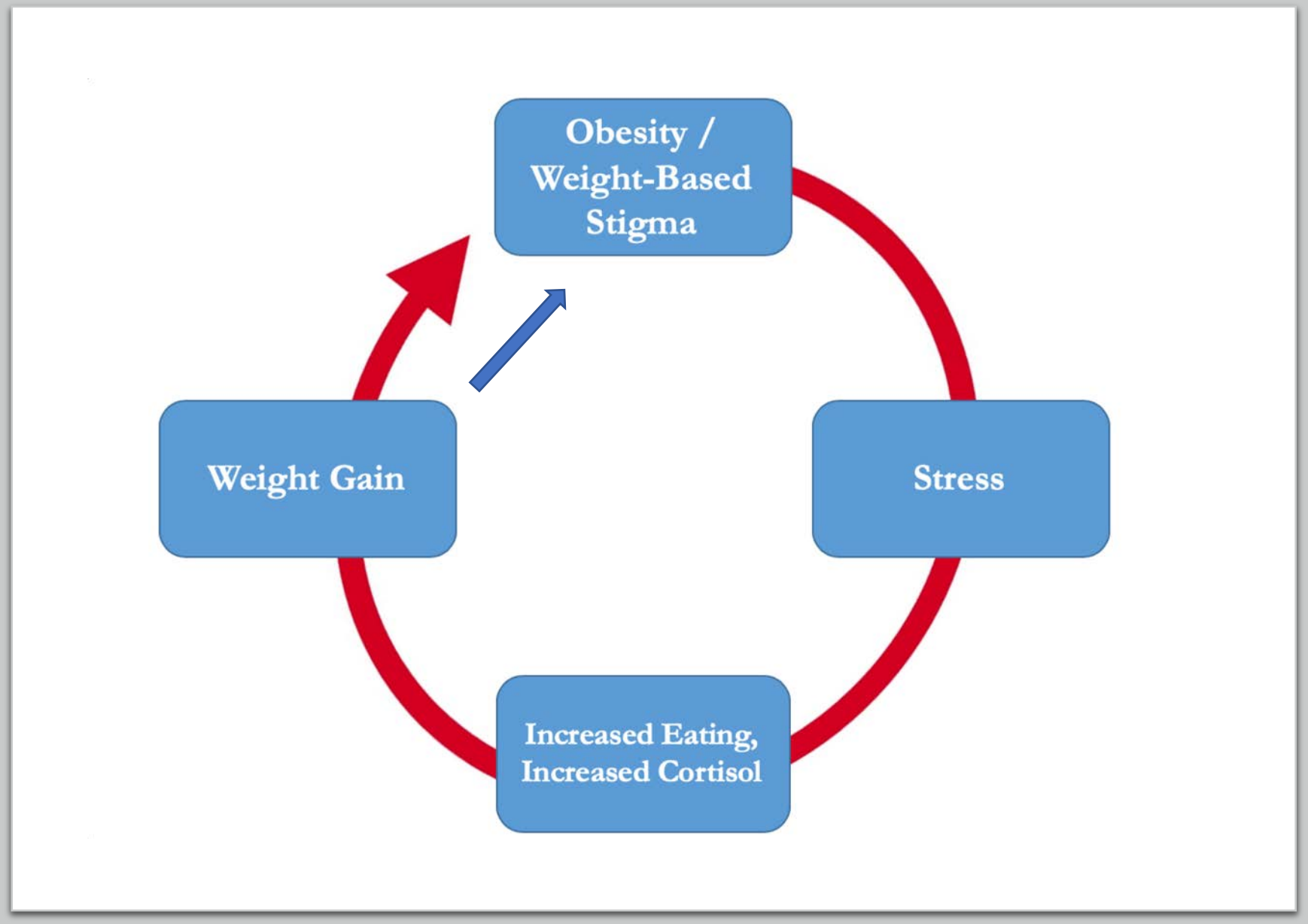
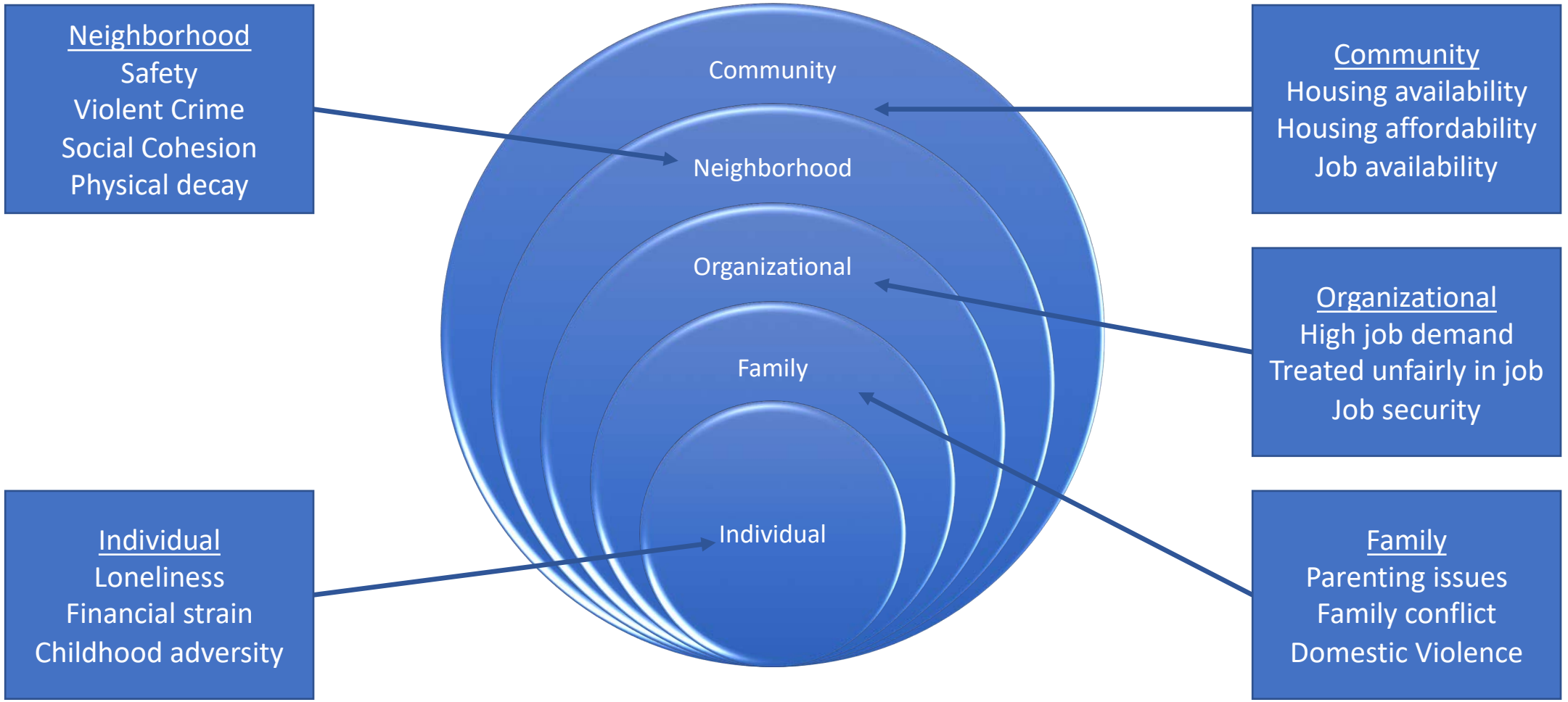


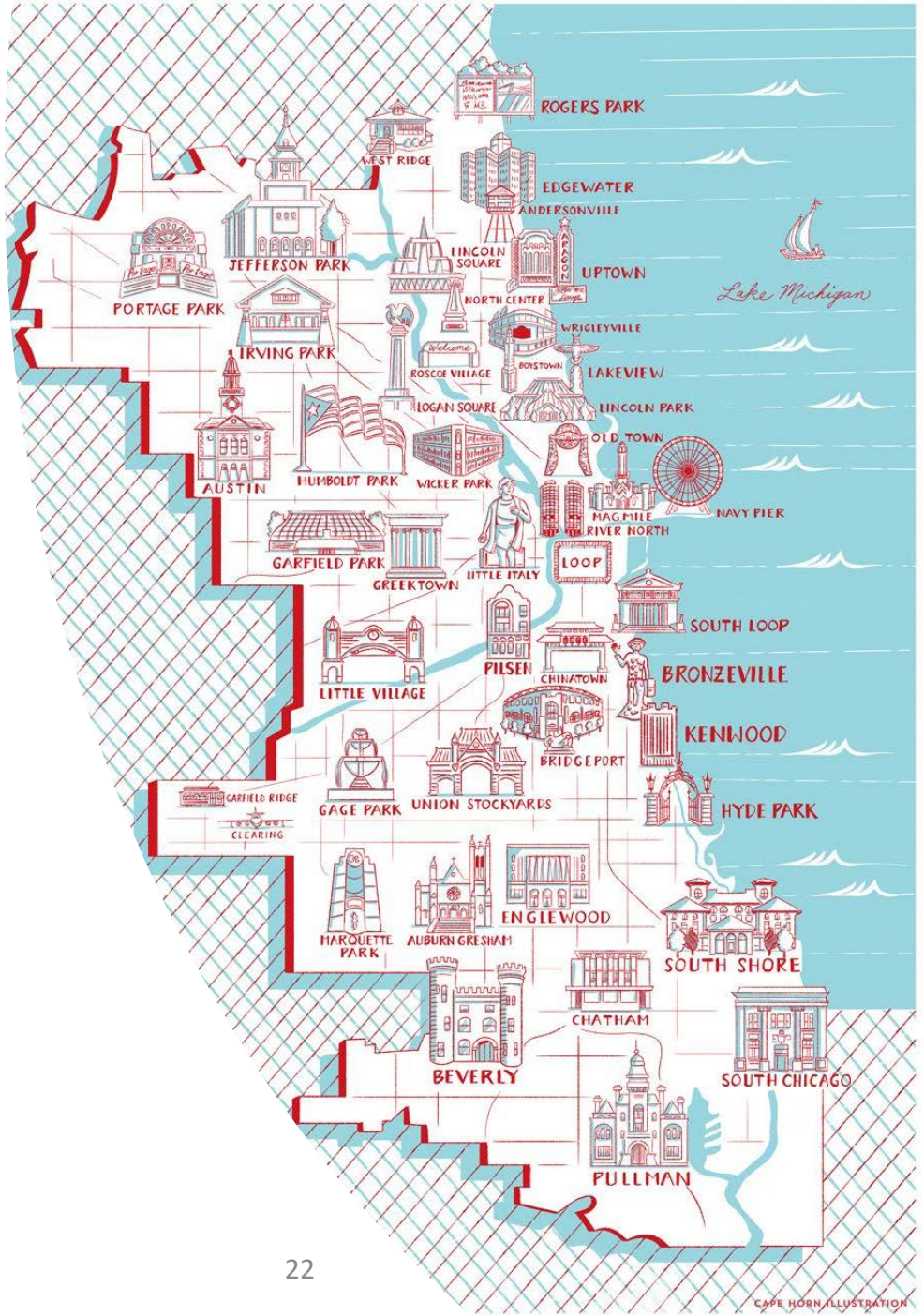
Tomiyama 2014

There is a limited understanding of how stressors contribute to obesity risk



Chicago Community Adult Health Study

- 3,105 adults (aged 18 and over)
- Living in 343 neighborhood clusters within the city of Chicago
- Face-to-face interviews were conducted between May 2001 and March 2003 with one individual per selected household.



Psychosocial stressors

- Childhood adversity
- Acute life events
- Financial strain
- Neighborhood stressors
- Employment stressors
- Job discrimination
- Relationship stressors
- Lifetime discrimination

Cuevas, A.G., Chen, R., Thurber, K., Slopen, N., Williams, D.R. (2019) Psychosocial Stress and Overweight and Obesity: Findings from the Chicago Community Adult Health Study. *Annals of Behavioral Medicine.*

Methods

Outcome: Obesity vs. no obesity

Predictors: Psychosocial stressors

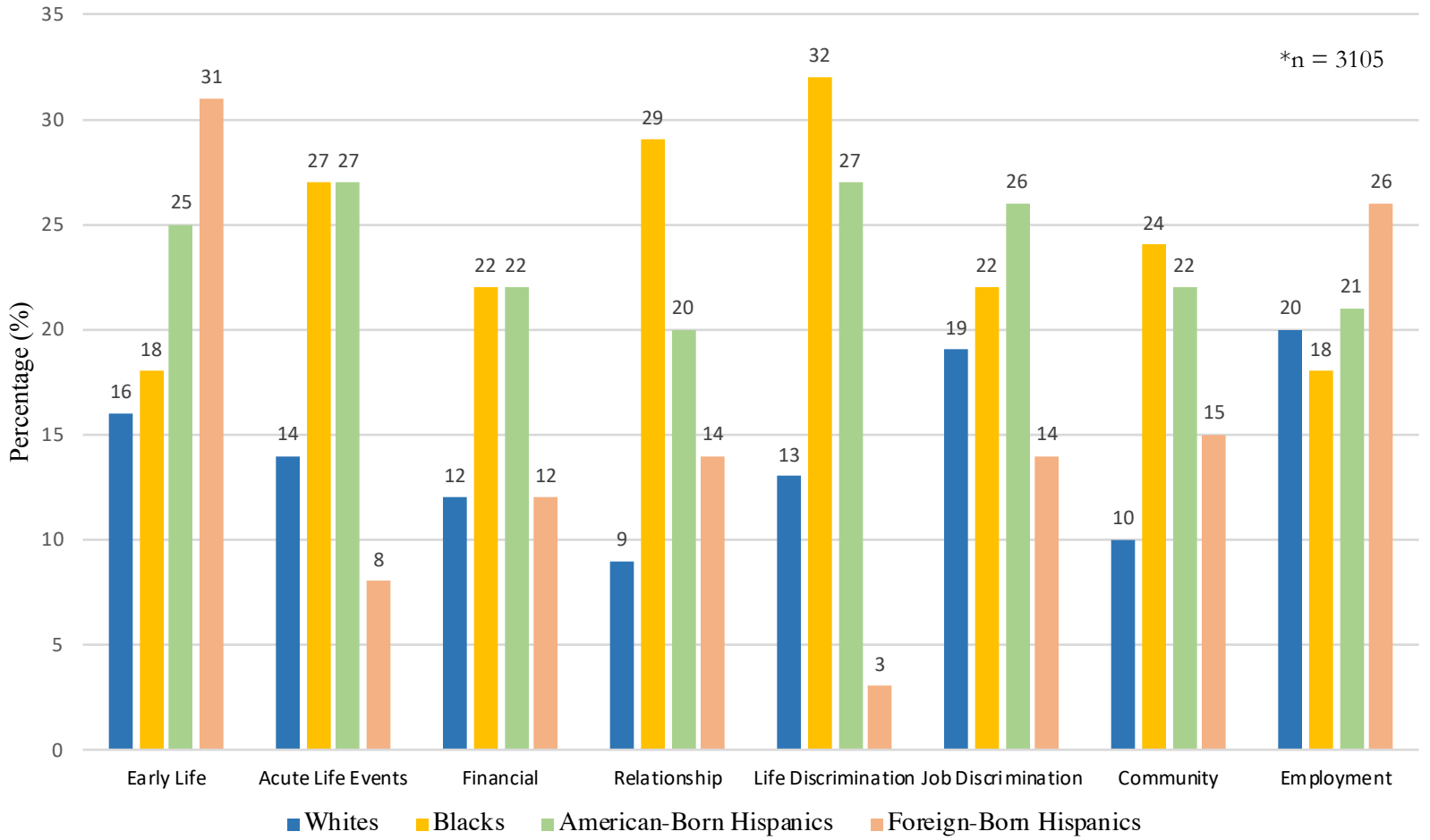
Sociodemographic factors and health behaviors

- Age
- Gender
- Race/ethnicity
- Socioeconomic status
- Smoking status
- Alcohol consumption

Logistics regression models

Cuevas, A.G., Chen, R., Thurber, K., Slopen, N., Williams, D.R. (2019) Psychosocial Stress and Overweight and Obesity: Findings from the Chicago Community Adult Health Study. *Annals of Behavioral Medicine.*

Racial/Ethnic Minorites More Likely to Have Higher Prevalence of Stressors Compared to Whites



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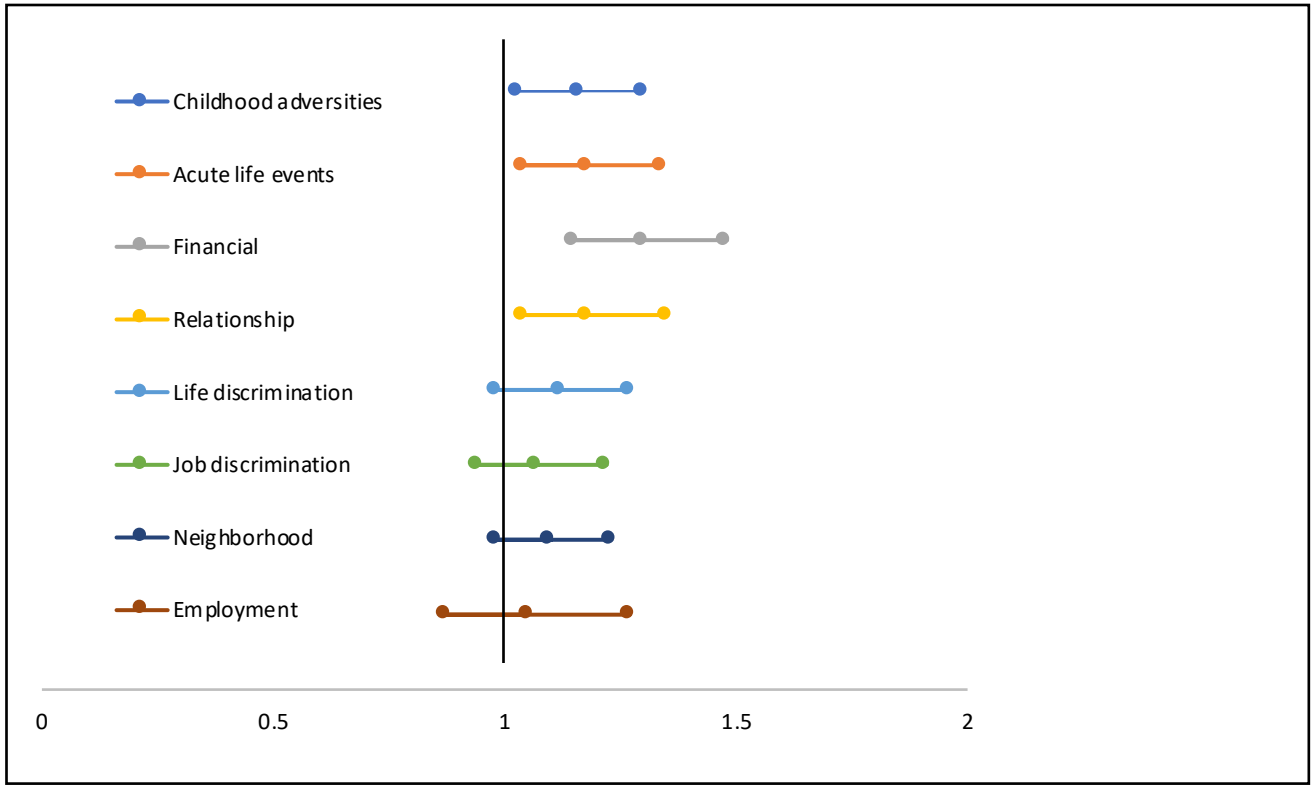
The association between individual psychosocial stressors and obesity



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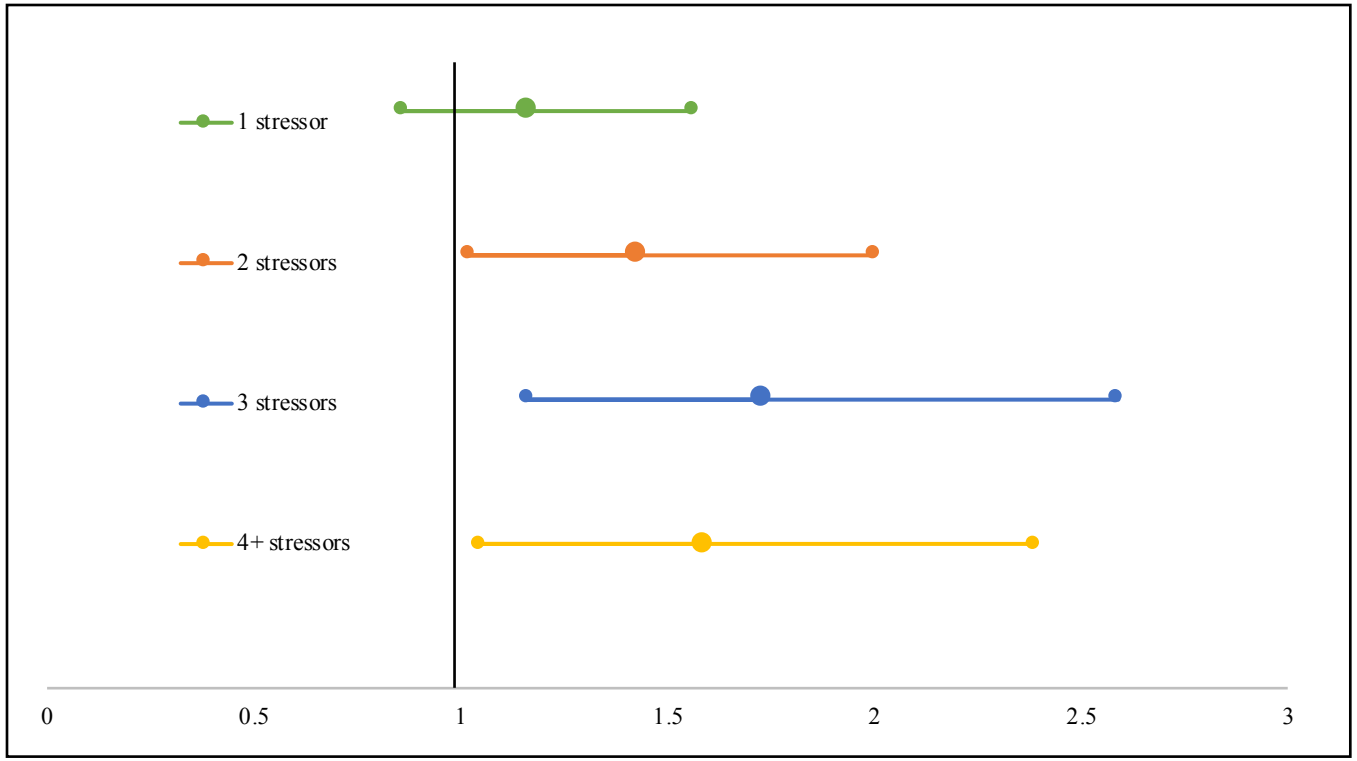
Psychosocial stressors

- Childhood adversity
- Acute life events
- Financial strain
- Neighborhood stressors
- Employment stressors
- Job discrimination
- Relationship stressors
- Lifetime discrimination
- Cumulative exposure to stressors

Cuevas, A.G., Chen, R., Thurber, K., Slopen, N., Williams, D.R. (2019) Psychosocial Stress and Overweight and Obesity: Findings from the Chicago Community Adult Health Study. *Annals of Behavioral Medicine.*

The association between cumulative stress and obesity.



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Take-aways Part 1

- Cumulative exposure to stress is associated with higher odds of obesity
- Addressing psychosocial stressors in lifestyle interventions
- Integrating mindfulness techniques
- Addressing stress at the policy level

Journal of Racial and Ethnic Health Disparities (2020) 7:109–116
https://doi.org/10.1007/s40615-019-00639-z

Check for updates

What Predicts a Mayoral Official's Opinion about the Role of Stress in Health Disparities?

Adolfo G. Cuevas[1] · Sarah Levine[1] · Jonathan Purtle[2]

Received: 20 June 2019 / Revised: 3 September 2019 / Accepted: 13 September 2019 / Published online: 4 November 2019

Abstract
High stress is a public health issue in the United States (US), that disproportionately affects socially-marginalized group members, including racial and ethnic minorities and those of low socioeconomic status. While city governments have the potential to reduce stress exposure and health disparities through municipal policies, very little is known about factors that are associated with mayor officials' beliefs about stress as a determinant of disparities. This information is important because it can inform the design of interventions to educate city policymakers about evidence related to stress and health disparities. Using data from a 2016 survey of 230 mayor officials (101 mayors, 129 senior staff), multivariable logistic regression was used to determine the extent to which respondents' individual characteristics (e.g., ideology, highest level of education) and the characteristics of their city's population (e.g., percentage of residents non-white) were associated with their identification of stress as a factor that has a "very strong effect" on health disparities. Forty-four percent of respondents identified stress as having a very strong effect on health disparities. In the fully adjusted model, every percentage point increase in the proportion of a respondent's city population that was non-White increased the odds of identifying stress as having a very strong effect on health disparities by 2% [adjusted odds ratio (aOR) = 1.02; 95% CI = 1.00,1.04]. Interventions are needed to increase city policymakers' knowledge about the role of stress in the production of health disparities, which could, in turn, help cultivate political will for city policies that reduce disparities.

Prevalence of Obesity Among U.S. Workers and Associations with Occupational Factors

Sara E. Luckhaupt, MD, MPH, Martha A. Cohen, PhD, Jia Li, MS, Geoffrey M. Calvert, MD, MPH

This activity is available for CME credit. See page A4 for information.

Background: Along with public health and clinical professionals, employers are taking note of rising obesity rates among their employees, as obesity is strongly related to chronic health problems and concomitant increased healthcare costs. Contributors to the obesity epidemic are complex and numerous, and may include several work characteristics.

Purpose: To explore associations between occupational factors and obesity among U.S. workers.

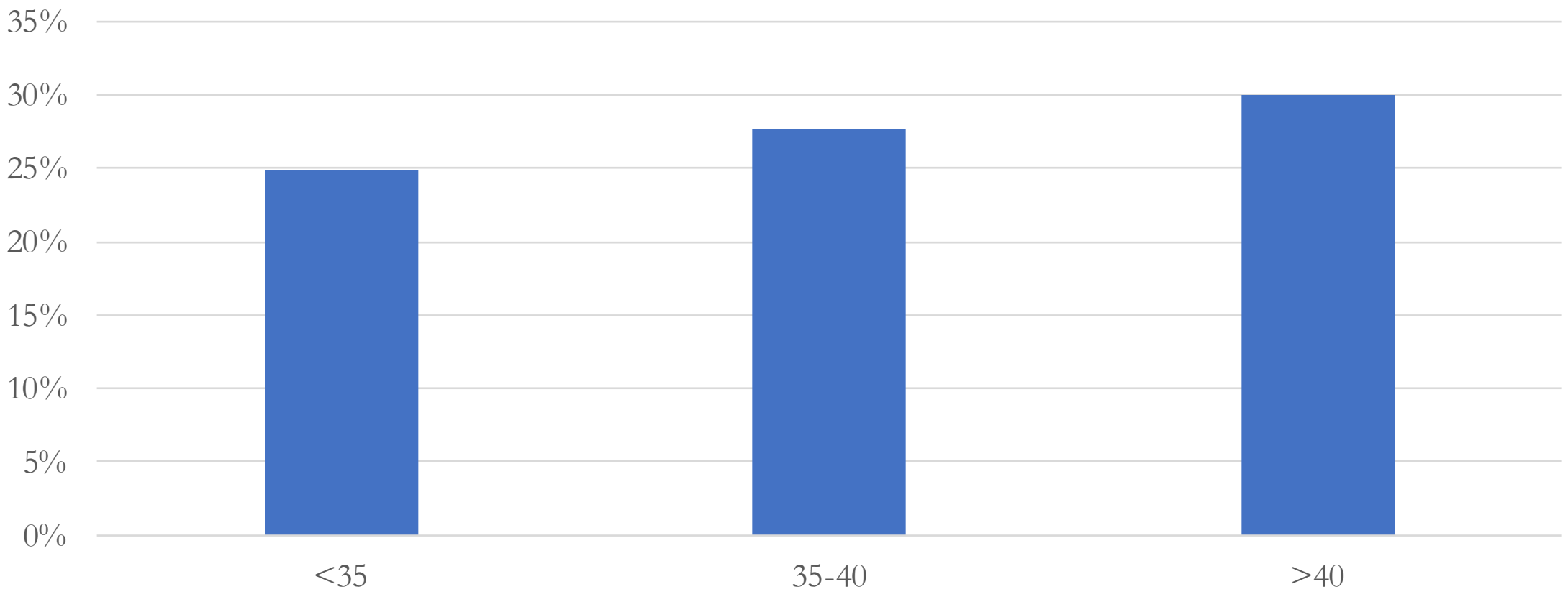
Methods: Data from the 2010 National Health Interview Survey were utilized to calculate weighted prevalence rates and prevalence ratios (PRs) for obesity in relation to workweek length, work schedule, work arrangement, hostile work environment, job insecurity, work–family imbalance, and industry and occupation of employment. Data were collected in 2010 and analyzed in 2012–2013.

Results: Overall, 27.7% of U.S. workers met the BMI criterion for obesity. Among all workers, employment for more than 40 hours per week and exposure to a hostile work environment were significantly associated with an increased prevalence of obesity, although the differences were modest. Employment in health care and social assistance and public administration industries, as well as architecture and engineering, community and social service, protective service, and office and administrative support occupations was also associated with increased obesity prevalence.

Conclusions: Work-related factors may contribute to the high prevalence of obesity in the U.S. working population. Public health professionals and employers should consider workplace interventions that target organization-level factors, such as scheduling and prevention of workplace hostility, along with individual-level factors such as diet and exercise.

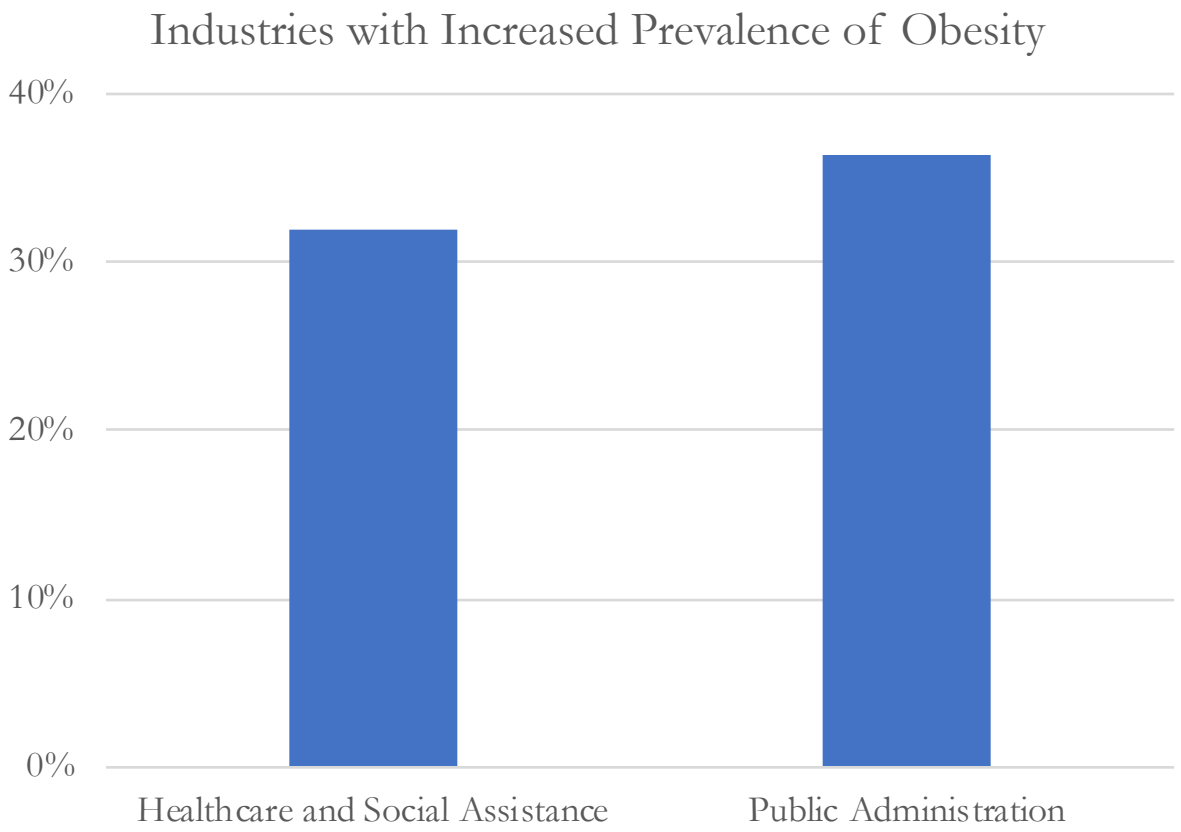
(Am J Prev Med 2014;46(3):237–248) Published by Elsevier Inc. on behalf of American Journal of Preventive Medicine

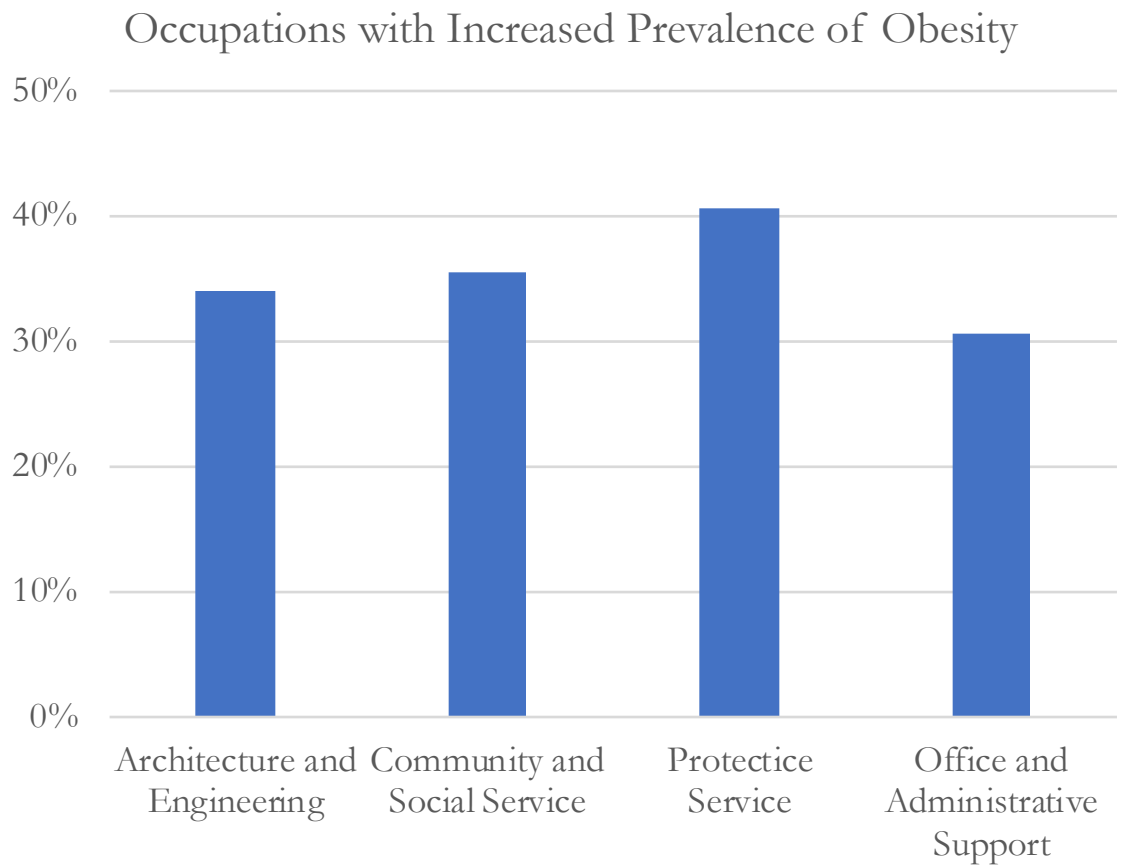
Prevalence of Obesity by Weekly Hours Worked[1]



Luckhaupt et al. 2014 AJPM

Industries and Occupations with an Increased Prevalence of Obesity[1]





Luckhaupt et al. 2014 AJPM

Prevalence of Stress in the Workplace[1]

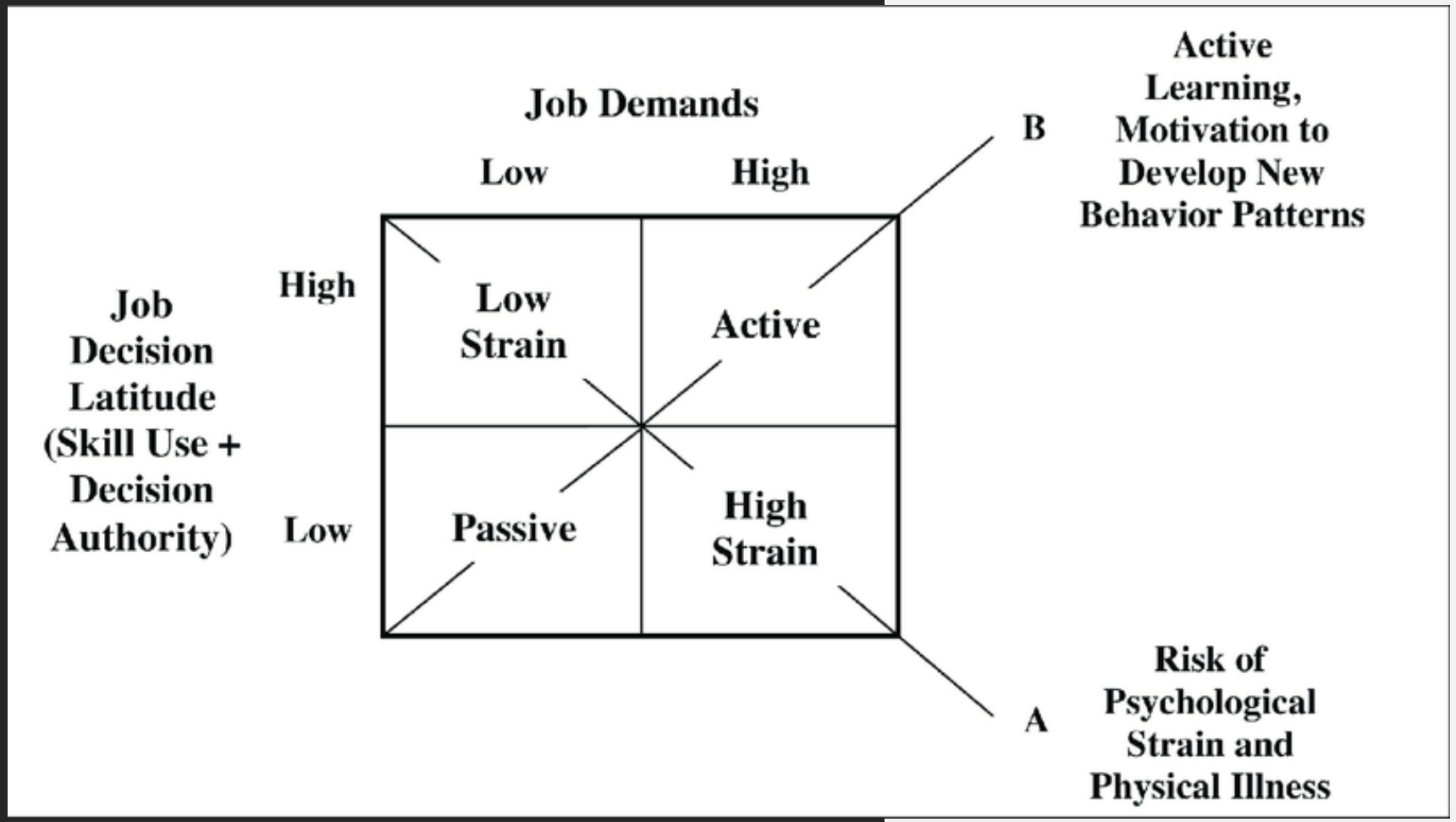
- 40% of workers in the United States view their job as very or extremely stressful
- 25% of workers believe that their job is their largest source of stress
- 75% of workers think that workplace stress has increased compared to the last generation
- Job strain has been associated with depressive illnesses and workplace stress-related anxiety

Kamaldeep et al. 2012 JEPH

What is Job Strain?

- Widely studied measure of work stress[1]
- Associated with CVD, stroke, and type 2 diabetes[1]
- Includes factors such as job control and job demands[2]
  - Job control encompasses factors such as decision authority and the opportunity to lean new skills
  - Examples of job demand indicators: pace, speed, time pressure, concentration, and attention

Karasek's Job Strain Model[1]



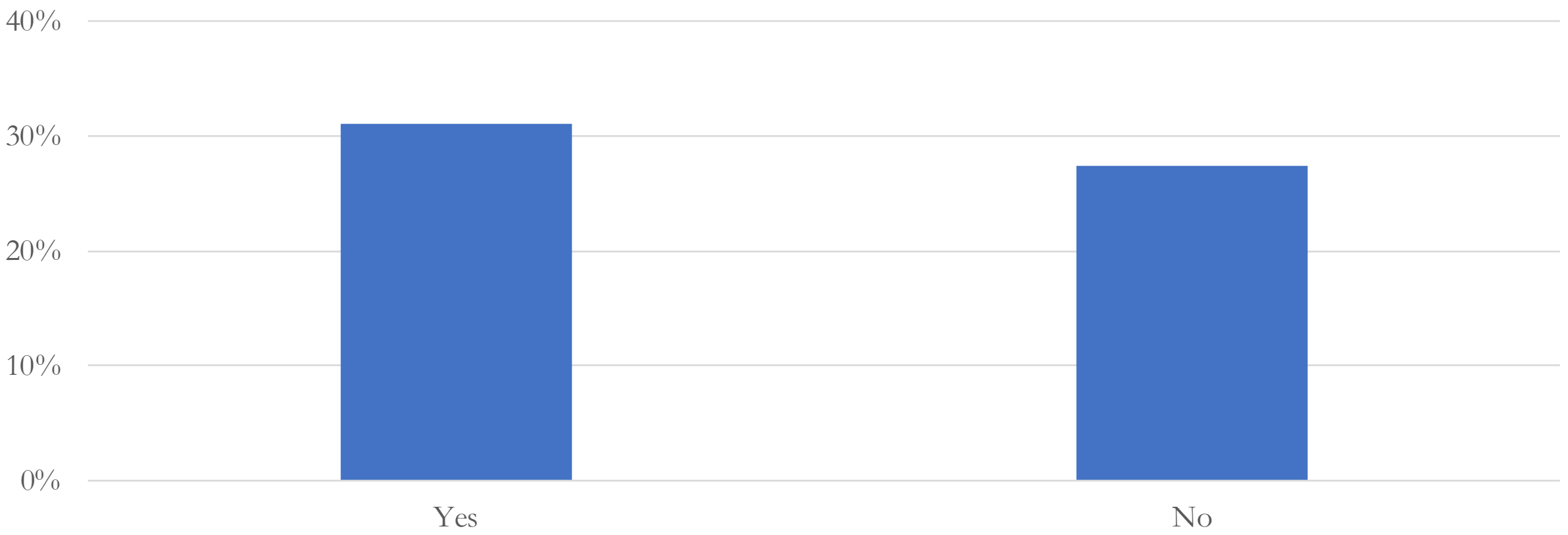
Workplace Stressors and Obesity

- Currently, no association between job strain and obesity[1,2]
  - Hypothesize that job strain can lead to either weight gain or weight loss, obscuring the association[1]
- Other dimensions of workplace stress need to be explored

Workplace Stressors and Obesity Continued

- New literature has found associations between:
  - Hostile work environment[3]
  - Burnout and obesity[2]
    - Emotional exhaustion and unhealthy eating
    - Professional efficacy and obesity
  - Night shift work and increased risk of overweight and obesity[1]

Prevalence of Obesity with a Hostile Work Environment[1]



Luckhaupt et al. 2014 AJPM

Review of Shift Work and Obesity Literature

Public Health

Meta-analysis on shift work and risks of specific obesity types

M. Sun[1], W. Feng[2], F. Wang[1], P. Li[2], Z. Li[2], M. Li[1], G. Tse[4], J. Vlaanderen[5], R. Vermeulen[5] and L. A. Tse[1,3]

[1]JC School of Public Health and Primary Care, The Chinese University of Hong Kong, Sha Tin, Hong Kong, [2]Shenzhen Prevention and Treatment Center for Occupational Diseases, Shenzhen, China, [3]Shenzhen Municipal Key Laboratory for health Risk Analysis, Shenzhen Research Institute of the Chinese University of Hong Kong, Shenzhen, China, [4]Department of Medicine and Therapeutics, Faculty of Medicine, The Chinese University of Hong Kong, Sha Tin, Hong Kong, and [5]Division of Environmental Epidemiology, Institute for Risk Assessment Sciences, Utrecht University, Utrecht, The Netherlands

Received 23 June 2017; revised 27 August 2017; accepted 28 August 2017

Address for correspondence: LA Tse, JC School of Public Health and Primary Care, The Chinese University of Hong Kong, 4/F School of Public Health and Primary Care, Prince of

Summary

Aims: This systematic review and meta-analysis evaluated the associations between shift work patterns and risks of specific types of obesity.

Methods: PubMed was searched until March 2017 for observational studies that examined the relationships between shift work patterns and obesity. Odds ratio for obesity was extracted using a fixed-effects or random-effects model. Subgroup meta-analyses were carried out for study design, specific obesity types and characteristics of shift work pattern.

Results: A total of 28 studies were included in this meta-analysis. The overall odds ratio of night shift work was 1.23 (95% confidence interval = 1.17–1.29) for risk of obesity/overweight. Cross-sectional studies showed a higher risk of 1.26 than those with the cohort design (risk ratio = 1.10). Shift workers had a higher frequency of developing abdominal obesity (odds ratio = 1.35) than other obesity types. Permanent night workers demonstrated a 29% higher risk than rotating shift workers (odds ratio 1.43 vs. 1.14).

Conclusion: This meta-analysis confirmed the risks of night shift work for the development of overweight and obesity with a potential gradient association suggested, especially for abdominal obesity. Modification of working schedules is recommended, particularly for prolonged permanent night work. More accurate and detailed measurements on shift work patterns should be conducted in future research.

How do we reduce stress and obesity in the workplace?

Workplace Stress-Reduction Interventions

- Individual interventions related to physical activity[1]
- Green exercise shows promise[2]
  - Believed to combine the benefits of physical activity and nature
  - Demonstrated better physiological benefits, higher scores of Positive Affect, and more potential for restoration from mental fatigue compared to indoor exercise
  - Weak but observable improvements in blood pressure and cortisol awakening response with exercise in nature
  - Green exercise participants more likely to continue engaging in outdoor exercising

Typology of stress management interventions

Intervention type	Individual
Primary	Selection & Assessment Pre-employment medical examination
Secondary	Mindfulness training Health promotion, e.g., exercise Cognitive behavioral therapy Relaxation Meditation
Tertiary	Employee Assistance Programs Counseling Disability management

Typology of stress management interventions

Intervention type	Individual	Organizational
Primary	Selection & Assessment Pre-employment medical examination	Job Redesign Working time and schedules Management training, e.g. mentoring
Secondary	Mindfulness training Health promotion, e.g., exercise Cognitive behavioral therapy Relaxation Meditation	Improving communication and decision-making Conflict management Peer support groups Coaching & career planning
Tertiary	Employee Assistance Programs Counseling Disability management	Vocational rehabilitation Outplacement

Psychosocial Determinants of Health Lab

Core Group Members:

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- Shruti Sagar
- Claudia Guetta

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- Jose Ordovas (Tufts University)
- Ichiro Kawachi, MD, PhD (Harvard University)
- Masayoshi Zaitsu, MD (Dokkyo Medical University)
- David R. Williams, MPH, PhD (Harvard University)
- Natalie Slopen, ScD (Harvard University)
- Shervin Assari, PhD (University of Michigan)
- Leslie Cofie (East Carolina University)

Questions?