COPE Webinar for Health Professionals

FEEDING THE NEED DEVELOPING SOLUTIONS

Tick Tock Goes the Clock:
Timing of Eating for Preventing Obesity

Thursday, June 15, 2023

Moderator
Lisa Diewald, MS, RDN, LDN

Program Manager
MacDonald Center for Obesity Prevention and Education
Villanova University M. Louise Fitzpatrick College of Nursing

VILLANOVA NURSING

VILLANOVA UNIVERSITY
M. LOUISE FITZPATRICK COLLEGE OF NURSING
MacDonald
CENTER FOR OBESITY PREVENTION & EDUCATION

Finding Slides for Today's Webinar

Slides are posted at

Villanova.edu/cope

From right menu—Webinars

Go to Wendy Bennett, MD, MPH webinar description page

Did you use your phone to access today's webinar?

If you are calling in today rather than using your computer to log on, and need CE credit, please email cope@villanova.edu and provide your name and we will send your certificate.

VILLANOVA NURSING

Continuing Education Credit Details

- Villanova University M. Louise Fitzpatrick College of Nursing is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

- Villanova University College of Nursing Continuing Education/COPE is a Continuing Professional Education (CPE) Accredited Provider with the Commission on Dietetic Registration.

Continuing Education Credit Details

- This activity has been approved for 1.0 CH or 1.0 CPEU for nurses and dietitians.
- To receive CE credit, you must attend the entire program.
- All nurses must complete an evaluation following the program.
- Level 2
- Suggested CDR Performance Indicators: 6.2.3, 8.1.1, 8.2.3

VILLANOVA NURSING

VILLANOVA UNIVERSITY
M. LOUISE FITZPATRICK COLLEGE OF NURSING
MacDonald
CENTER FOR OBESITY PREVENTION & EDUCATION

Tick Tock Goes the Clock: Timing of Eating for Preventing Obesity

Wendy L. Bennett, MD, MPH
Associate Professor of Medicine
General Internal Medicine
Johns Hopkins University
School of Medicine

FEEDING THE NEED DEVELOPING SOLUTIONS

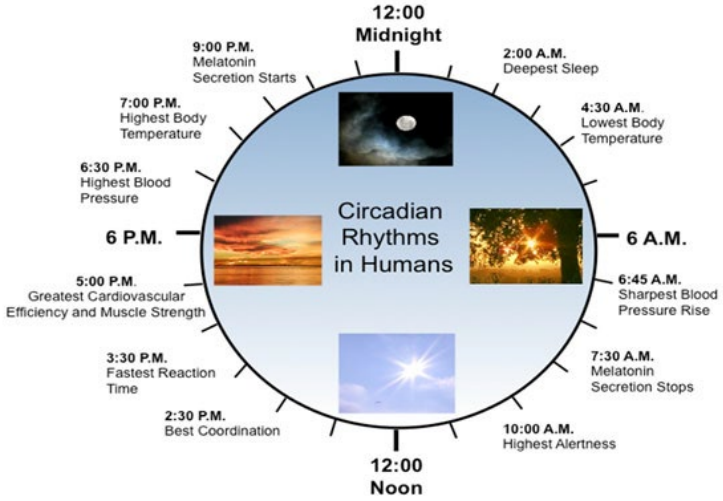
VILLANOVA NURSING

Disclosures

There are no relevant financial relationships with ineligible companies for those involved with the ability to control the content of this activity.

The planners will review participant feedback to evaluate for real or perceived commercial bias in any activity.

CDR members: Any feedback about the quality of the activity can be sent directly to CDR at **QualityCPE@eatright.org**



Tick Tock Goes the Clock: Timing of eating for preventing obesity

Wendy L. Bennett, M.D., M.P.H.

Associate Professor of Medicine,General Internal Medicine

June 14, 2023

American Heart Association's Strategically Funded Research Network on Obesity

Disclosures

- No relevant disclosures

Objectives

By the end of this session, audience members will

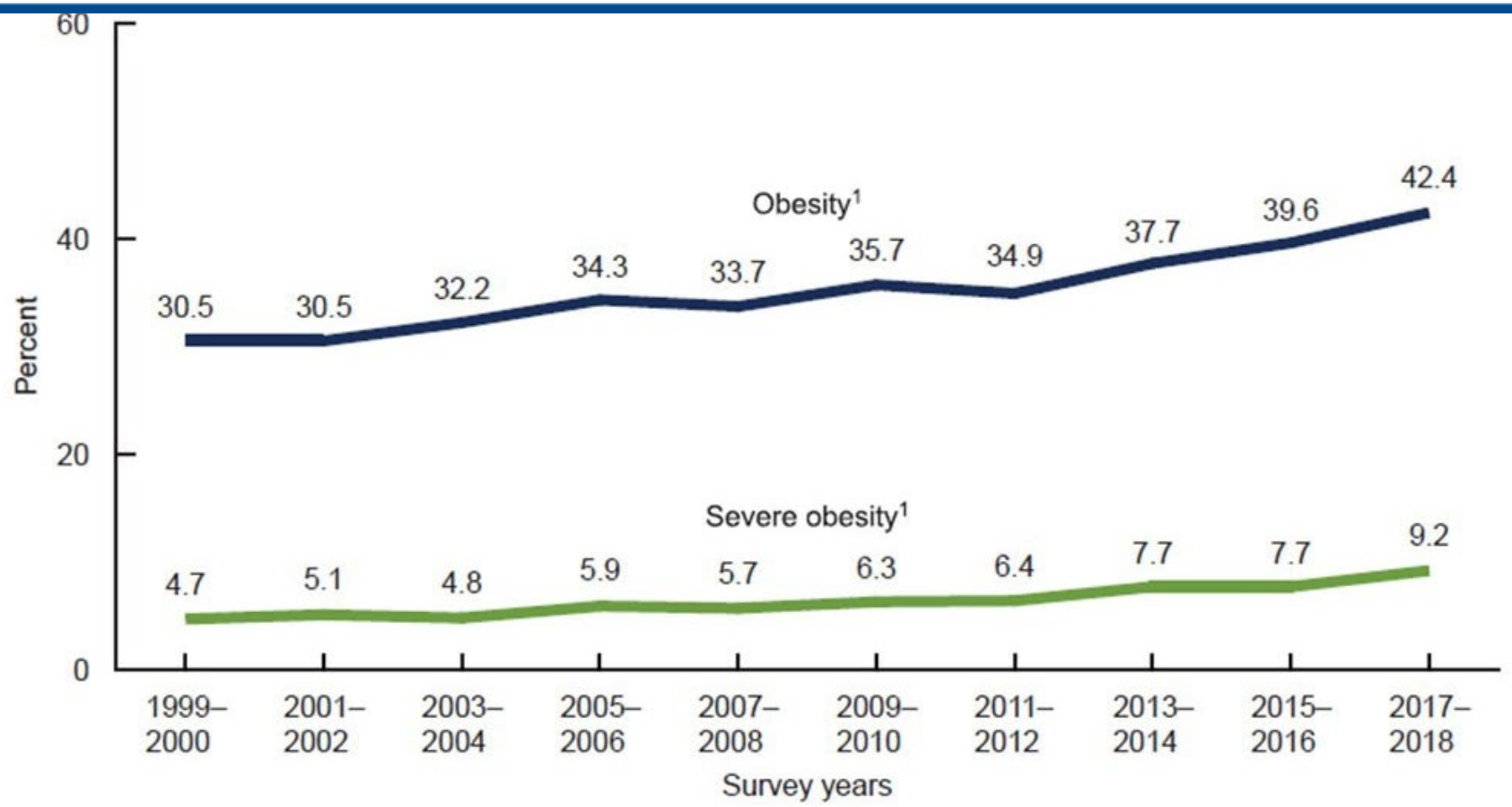
- Have a greater understanding of the role of the circadian rhythm in weight gain and obesity
- Be familiar with the effects of time-restricted feeding on weight
- Describe evidence from recent cohort study on timing of eating and weight gain

Case - Brittany

- 28-year-old new patient
- Weight history – gained 20 lbs since age 18 (about 2 lbs./yr.)
- Weight today is 208 lbs., BMI 37
- Is considering weight loss…but goal today is to prevent additional weight gain.

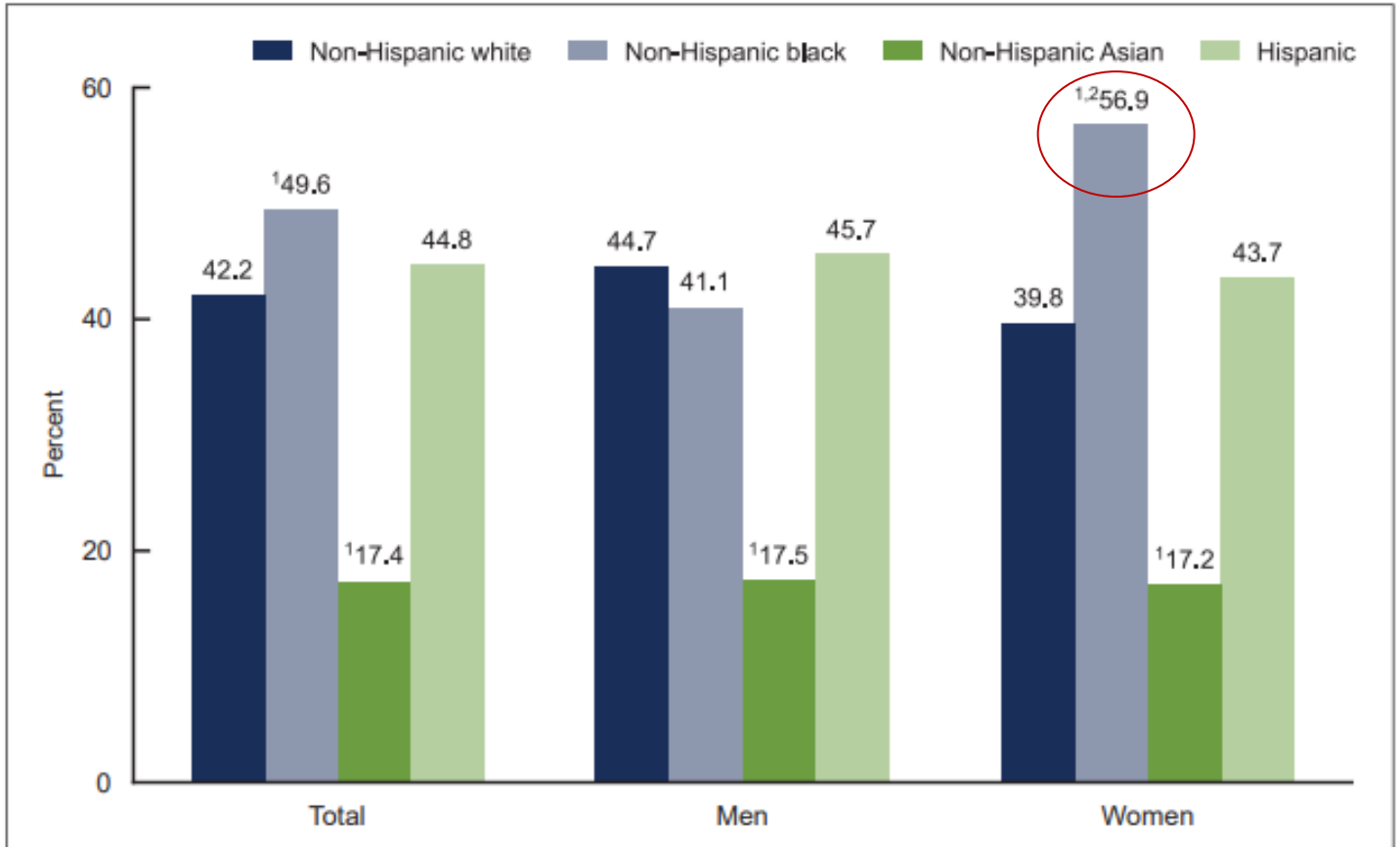
- *What is best strategy to for weight gain prevention?*

Obesity rates in U.S. continue to increase



NCHS, National Health and Nutrition Examination Survey, 1999–2018

Disparities in obesity rates



Obesity and Chronic Disease risk

- Obesity is associated with many other CVD risk factors
  - Hypertension, type 2 diabetes, dyslipidemia
- It is the 4th leading risk factor for mortality[1]
  - Particularly CVD mortality including coronary artery disease, heart failure and stroke
- Lifestyle induced weight loss, while recommended, is difficult to achieve and sustain and has not been shown to reduce deaths from CVD

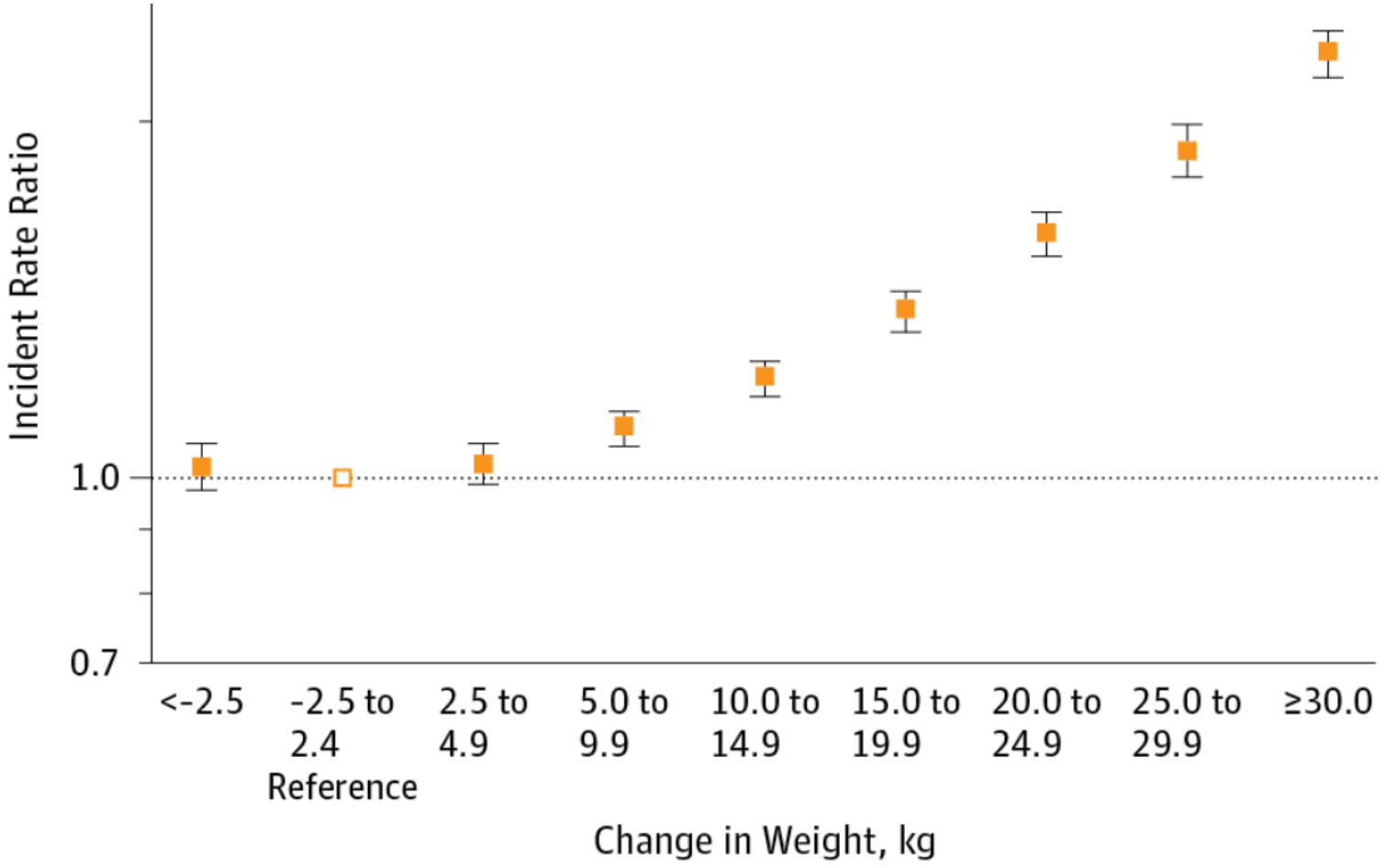
[1] The State of US Health, 1990-2016
US Burden of Disease Collaborators
JAMA. 2018;319(14):1444-1472.

Weight gain in adulthood

- ~23% of women (vs. 13% of men) gain ≥20 kg from age 18 to age 55
  - Weight gain in young adulthood is highest among African American women, who gain > 1 kg/year (CARDIA Study)
- Gaining as little as 5 kg is associated with development of type 2 diabetes, other obesity-related comorbidities and greater mortality (Nurse's Health)

Dutton GR et al.25-year weight gain in…The CARDIA study. *Obesity,* 2016;
Zheng Y et al. Associations of Weight Gain From Early to Middle Adulthood With Major Health Outcomes Later in Life. *JAMA.* 2017

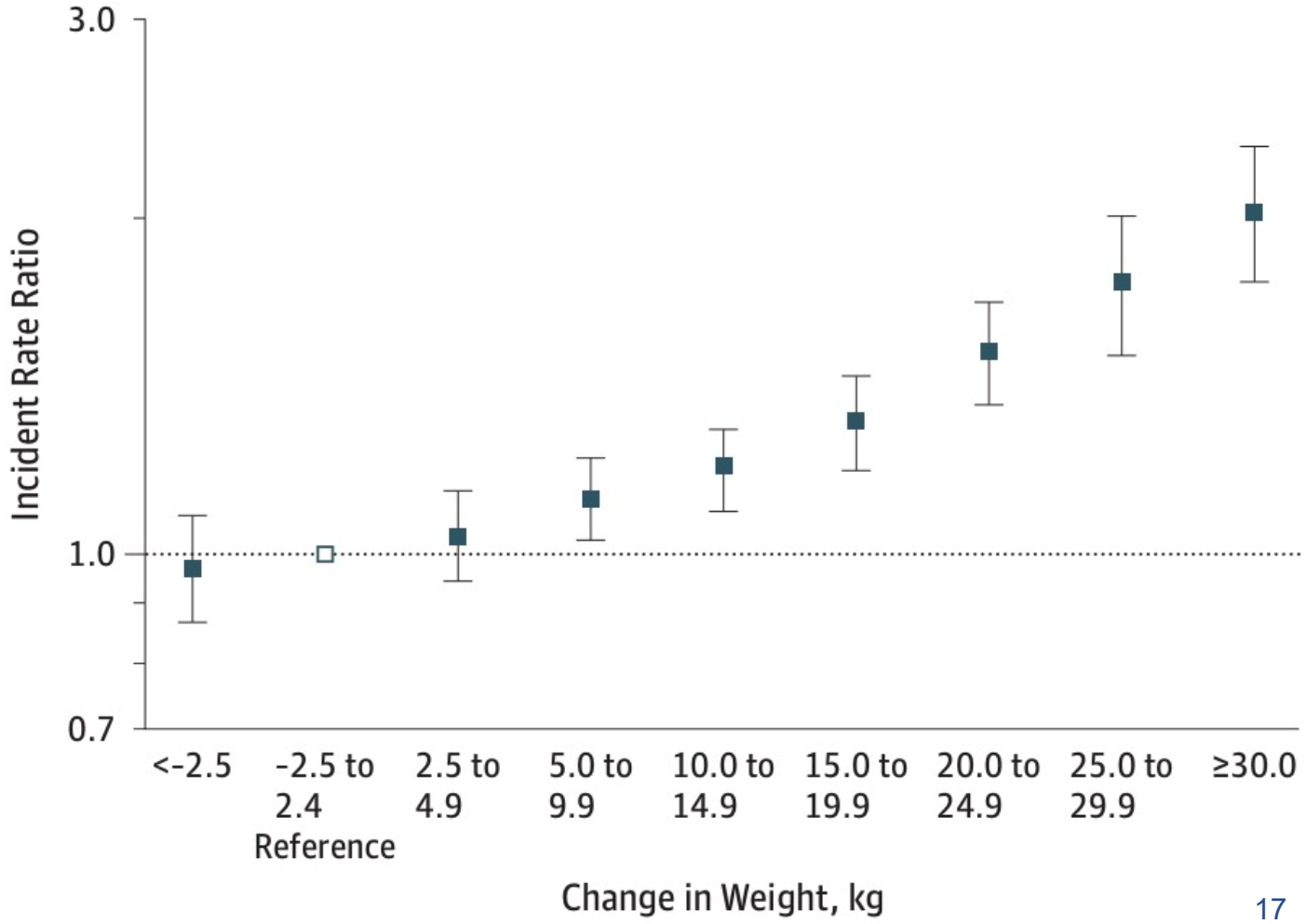
Risk of major chronic diseases (composite) across weight gain categories- women, 18 yr median followup



Zheng Y et al. Associations of Weight Gain From Early to Middle Adulthood With Major Health Outcomes Later in Life. JAMA. 2017.

Risk of major chronic diseases (composite) across weight gain categories- men, 14 yr median followup

Zheng Y et al. Associations of Weight Gain From Early to Middle Adulthood With Major Health Outcomes Later in Life. JAMA. 2017



What are the drivers of excess weight gain?

- Drivers not yet well understood: e.g. childbearing, shift-working, lack of sleep, high stress, obesogenic food/physical activity environments – it's complicated!
- To address obesity prevention – need for interventions to target communities, workplaces, health care opportunities (IOM 2012).

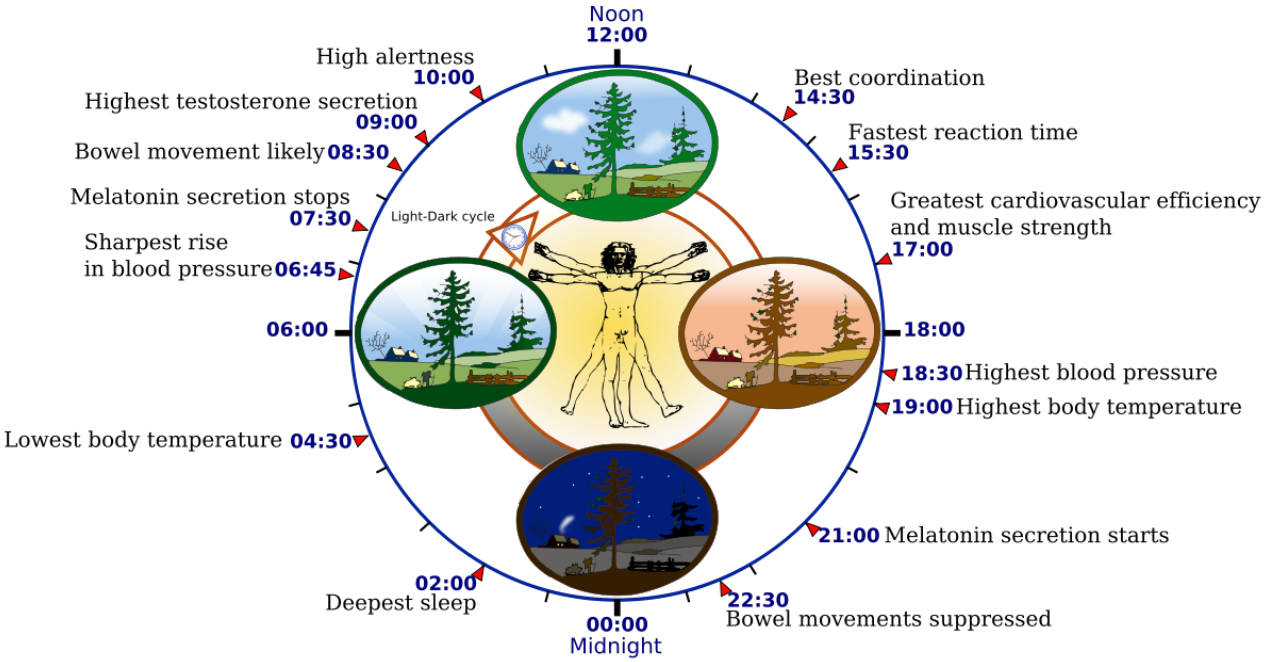
Little evidence supporting interventions to prevent weight gain

- Systematic review identified 51 studies (38 trials) in adults (2013)
  - Most promising interventions focused on work-place with multi-level intervention of diet, exercise and environmental changes
  - Most effective self-management strategies –low-cal/low-fat diet, self-monitoring –*but low adherence*
- Neighborhood-level and community-based interventions also have potential to reduce obesity risk

Hutfless S et al. Strategies to prevent weight gain in adults: a systematic review. *Am J Prev Med*. 2013

New targets are needed to prevent excess weight gain and reduce obesity

- ***Circadian rhythm*** - how our biological processes are driven by a circadian clock of about 24 hrs.
- Circadian rhythm regulates glucose, blood pressure, sleep and involves all organs



Does circadian rhythm disruption affect our health?

- Lighting (from TV or digital devices- “blue light”)
  - Suppresses melatonin and results in difficulty sleeping
- Chronic disruption of circadian rhythm (e.g., from shift work and possibly “social jet lag”)
  - Increases risk for obesity and heart disease

Buzz on *timing* of eating and fasting

JOHNS HOPKINS MEDICINE

Circulation. 2017;135:00–00. DOI: 10.1161/CIR.0000000000000476

AHA SCIENTIFIC STATEMENT

Meal Timing and Frequency: Implications for Cardiovascular Disease Prevention

A Scientific Statement From the American Heart Association

Stars Who've Found Success with Intermittent Fasting

The diet, which involves time-restricted periods of fasting and eating, has been the key to feeling healthier for these celebrities

Will Intermittent Fasting Be The Fad Diet That Finally Works?

Fasting diets work for weight-loss just as well as any other traditional caloric restriction diets — which is VERY POORLY.

PERSONAL HEALTH

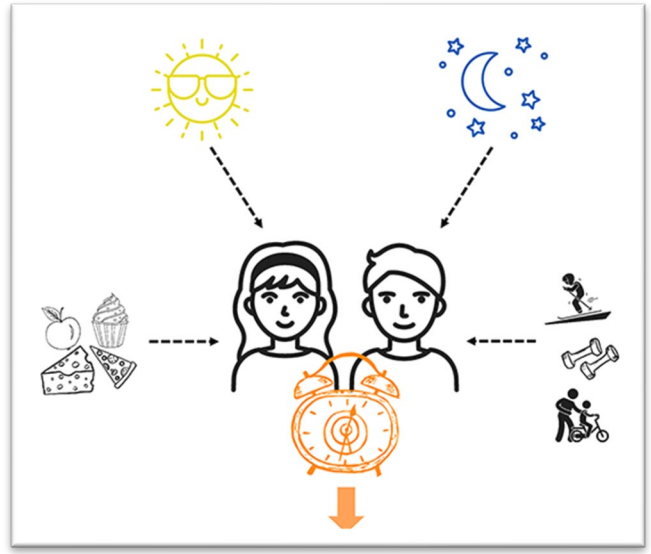
The Benefits of Intermittent Fasting

I was skeptical, but it turns out there is something to be said for a daily fast, preferably one lasting at least 16 hours.

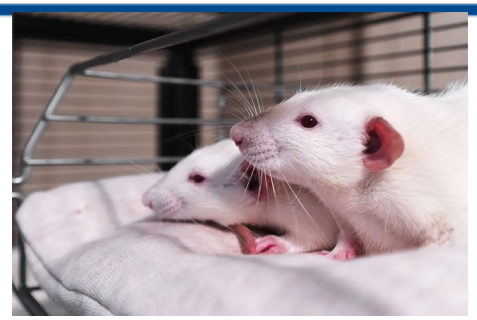
22

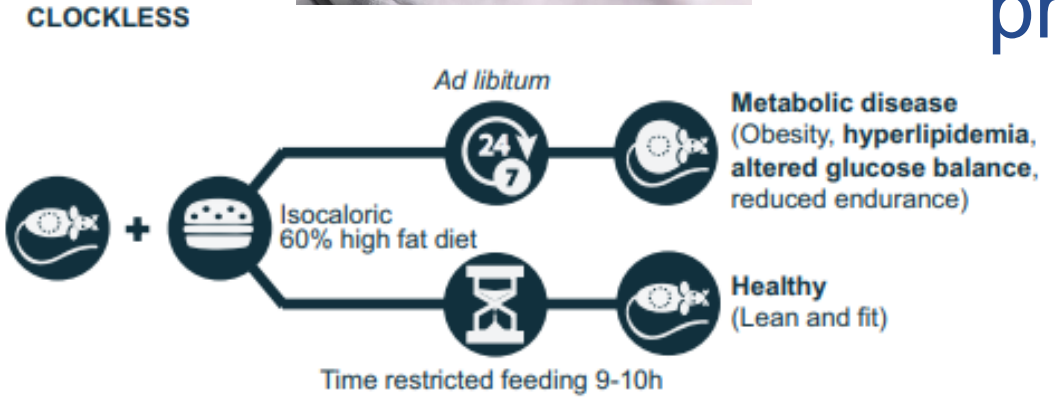
Terminology - Intermittent fasting + time restricted feeding

- Cycles between periods of fasting, with either no food or significant calorie reduction, and periods of unrestricted eating.
  - 5:2 diet - eat normally five days a week and cut back to 20% percent of your normal daily calorie intake for the other two
- Time restricted eating is more feasible
  - 16:8 diet—Longer fast (for 16 hrs) and eat normally (for 8 hrs)



Animal studies show benefits of time restricted “feeding” on obesity





- In mice lacking circadian clock, restricting feeding to “night phase” prevents obesity
  - Providing mice with access to food *ad libitum* mice rapidly gained weight
  - Suggests that circadian clock maintains metabolic homeostasis by sustaining daily feeding and fasting rhythms

Chaix et al., 2019, Cell Metabolism 28, 303–319 February 5, 2019

Observational studies in humans suggest role of timing of eating on weight

- Skipping breakfast is associated with weight gain
- Eating larger meals later in the day associated with weight gain and influenced the success of weight-loss therapy.
- Small pilot clinical studies showed that time-restricted eating resulted in reduction over time in the body weight and fat mass in patients with obesity.
  - Challenges with adjusting for caloric intake

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 21, 2022 VOL. 386 NO. 16

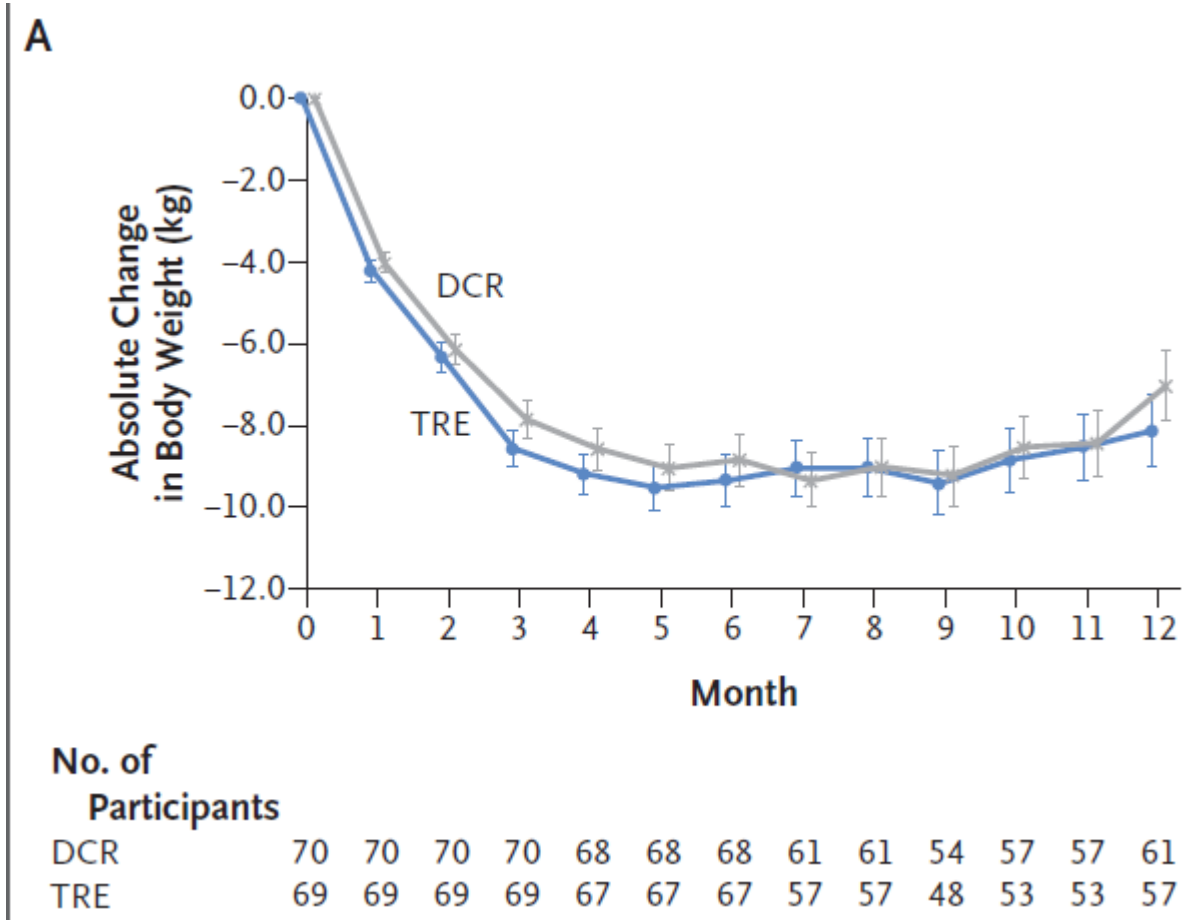
JOHNS HOPKINS MEDICINE

Calorie Restriction with or without Time-Restricted Eating in Weight Loss

- Randomized controlled trial of 139 patients with obesity in China – 12 months
  - Time restricted eating (between 8 am and 4 pm (8/16) with caloric restriction vs.
  - Caloric restriction along (1500-1800 kcal/day for me and 1200-1500 kcal/day for women

Liu D et al. NEJM. 4/21/22

Time restricted eating regimen did not produce greater weight loss than caloric restriction

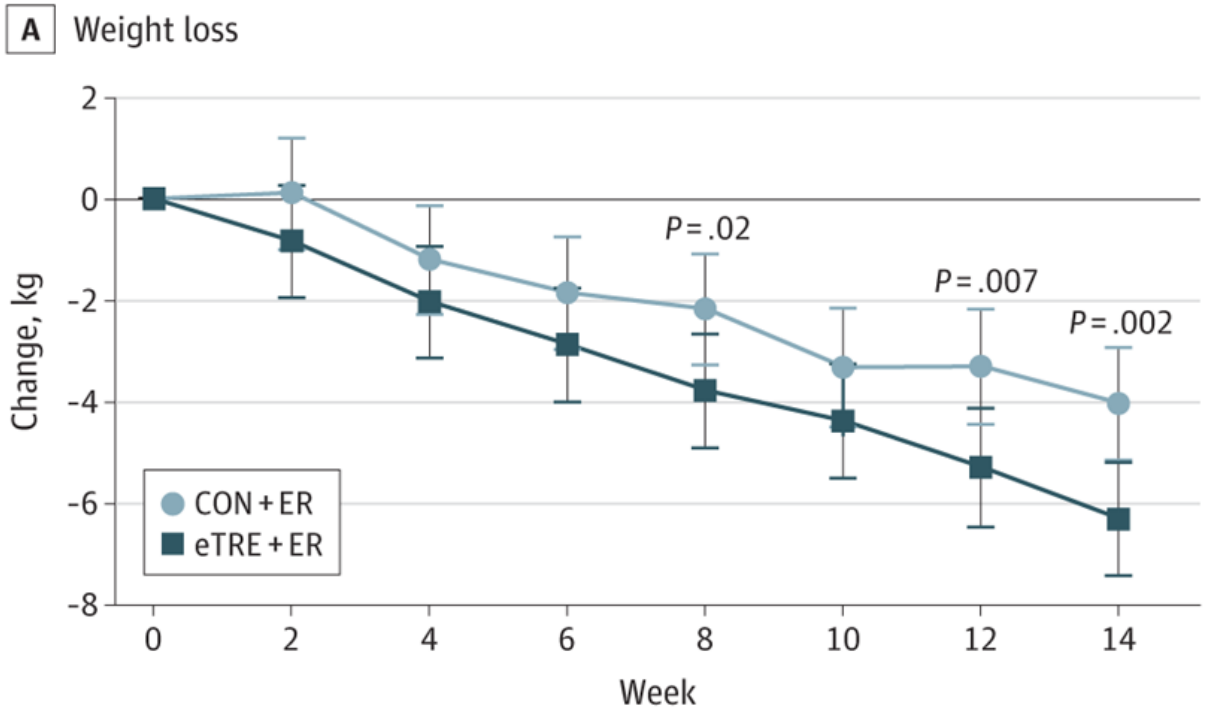


- Adherence was good
- No adverse effects

Liu D et al. NEJM. 4/21/22

14 week randomized controlled trial in U.S.

- 14 week RCT of TRE vs. eating duration of >12 hrs
  - Sample - 90 people with obesity
  - Main result - TRE was more effective for weight loss
  - **No adverse effects**



Jamshed H, et al. Effectiveness of Early Time-Restricted Eating for Weight Loss, Fat Loss, and Cardiometabolic Health in Adults With Obesity: A Randomized Clinical Trial. JAMA Intern Med. 2022 Sep

Four Strategically-focused Research Networks on Obesity

AHA is investing in this Network:

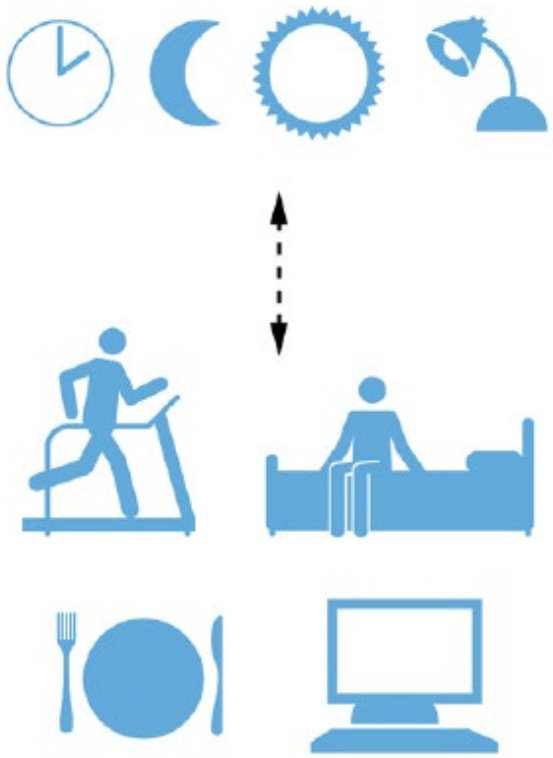
***$15 Million** in Research | **$3.7 Million** for Each Center*

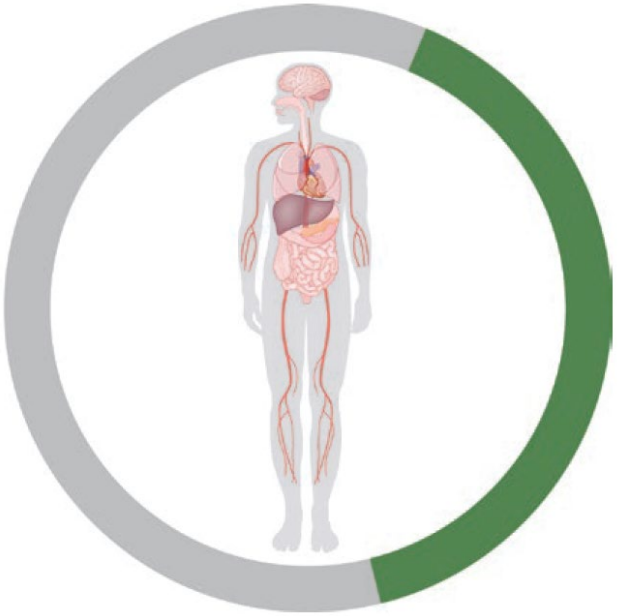
Our Center's Hypothesis

The mistiming of caloric intake relative to normal circadian rhythm contributes to obesity and adverse cardiometabolic outcomes including impaired glucose homeostasis, dyslipidemia, and hypertension.

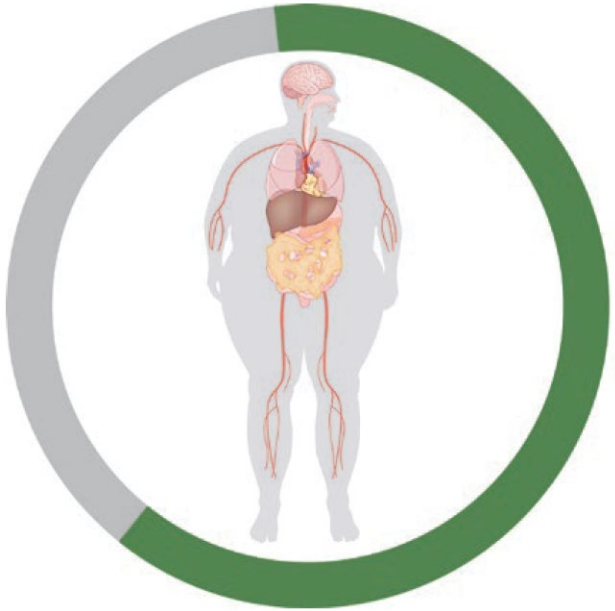
Therefore, realigning behaviors (eating, sleeping) with the circadian rhythm will improve obesity and CVD risk factors and outcomes.

Circadian rhythm, environmental cues, behavior and metabolic phenotypes





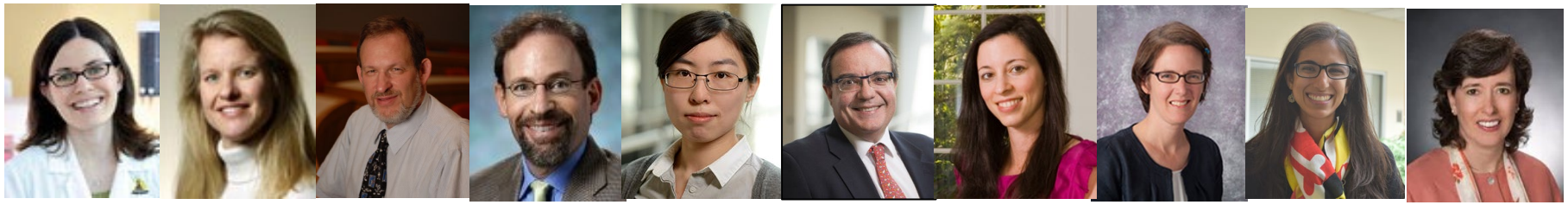
Eating < 10 hours
Eating during active period (day)
Circadian intact
Aligned sleep/wake cycles
Healthy metabolism
Low CVD risk



Eating > 12 hours
Eating at night; grazing
Circadian disruption
Misaligned sleep/wake cycles
Unhealthy metabolism (obese)
High CVD risk

The Impact of Timing of Eating on Weight: Multi-site Cohort Study using the Daily24 Mobile Application

- Aim 1: To optimize the functionality, usability and behavioral aspects of the Daily24 mobile application
- Aim 2: To conduct a population-based cohort study of 1,000 patients from 3 health systems to assess association between windows of eating and weight change over time.



PaTH Network
patient empowered research

University of Pittsburgh

Geisinger

Design of Cohort Study using Daily24

- Study design: 6-month prospective cohort study with ~ 6 years linked electronic health record (EHR) retrospective data
- Participants: Adults identified from 3 health systems – Hopkins, Geisinger, Univ Pitt—part of PaTH Clinical Data Research Network
  - Eligibility: height/weight recorded in EHR within last 2 years.
- Electronic recruitment: e-mail/EHR Patient Portal (MyChart) messages
- Data collection: Daily24 mobile app x 6 months + Online surveys (baseline + 4 mos) + EHR data (6 months after enrollment + 6 yrs pre-enrollment)
- Daily 24 Engagement strategy: Messages targeted to increased use during “Power Month” (month 1) and then one “Power Week” per month x 5 more months

Adherence: can people stick with diet?

- Behavior change is hard
  - Social eating, emotional eating
  - Hunger, irritability, difficulty concentrating
    - Does get better over time.
- Safety – medical supervision may be needed
  - Fasting causes build up of ketones – which could be harmful
  - Could cause low blood sugars in people w/ diabetes on medications
  - Could trigger an eating disorder

Daily24 Recruitment and retention flow

JOHNS HOPKINS MEDICINE

Potentially eligible and sent recruitment message N=70,661
N=29,263 via e-mail & N=41,398 via MyChart

↓

Online Consent
N=1,255 (1.8%)

↓

Baseline Survey Complete (i.e., Enrolled)
N=1,017 (~1%)

↓

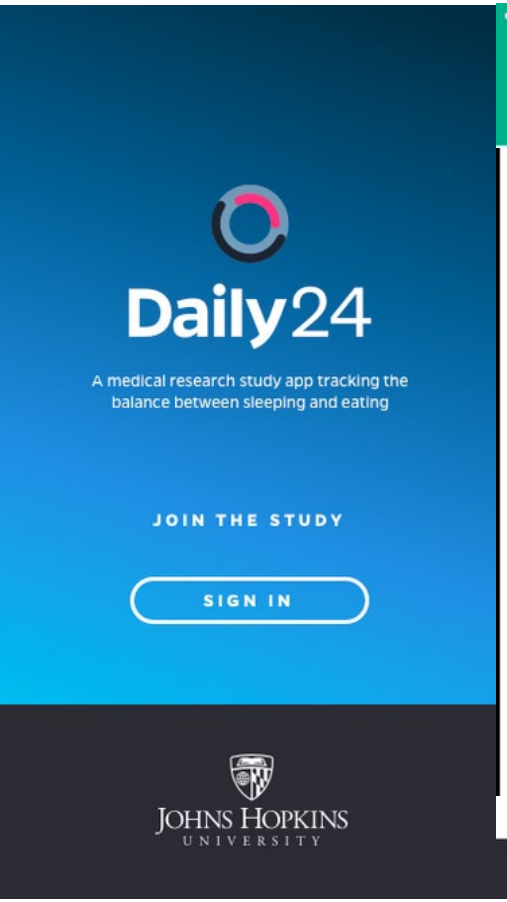
Non-App User
N=470 (46%)

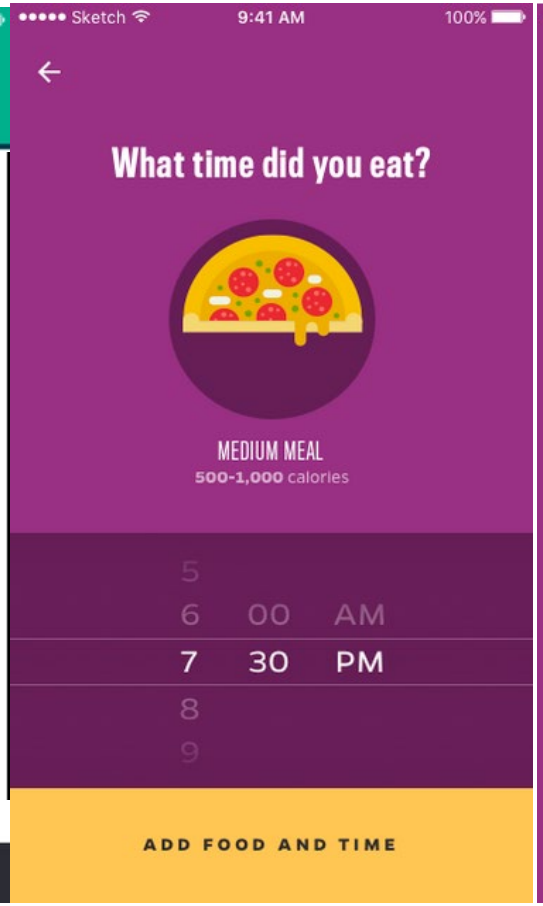
App-User *
N=547 (54%)

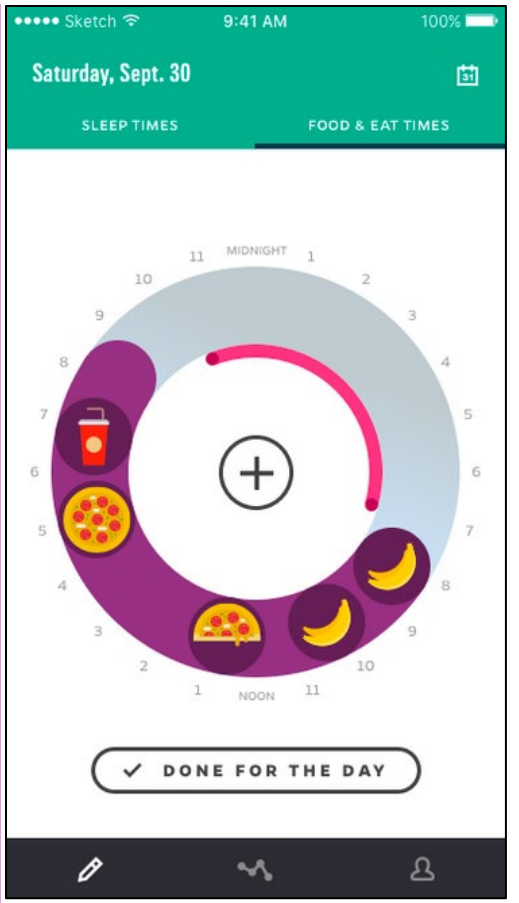
*App user=downloaded and used App for >= 1 day

REDCap
Research Electronic Data Capture

Daily24 app to collect timing of eating and sleeping







Study participants (n=1,017), by app use

	Overall	Non-app user	App-user	p-value
N	1017	470	547	
Age, year, M (SD)	51.1 (15.0)	53.2 (14.6)	49.3 (15.0)	<0.001
Male, n(%)	224 (22.0)	115 (24.5)	109 (19.9)	0.07
Race, n (%)				0.14
White	788 (77.5)	351 (74.7)	437 (79.9)	
Black	149 (14.7)	82 (17.4)	67 (12.2)	
Asian	29 (2.9)	13 (2.8)	16 (2.9)	
Other races or ≥ 2 races	51 (5.0)	24 (5.1)	27 (4.9)	
Education, n (%)				<0.001
≤ High school	63 (6.2)	40 (8.5)	23 (4.2)	
Some college	205 (20.2)	109 (23.2)	96 (17.6)	
College graduate	749 (73.6)	321 (68.3)	428 (78.2)	
Annual household income, n (%)				0.02
< $35k	120 (11.8)	70 (14.9)	50 (9.1)	
$35k -< $50k	109 (10.7)	53 (11.3)	56 (10.2)	
$50k - <$75k	148 (14.6)	66 (14.0)	82 (15.0)	
≥ $75k	550 (54.1)	234 (49.8)	316 (57.8)	
BMI, kg/m^2, M (SD)	30.5 (7.9)	30.8 (8.2)	30.3 (7.6)	0.29

Odds ratio (95% CI) for Daily24 app-use vs. non-use.

	Adjusted* Odds Ratio
Age, per 10 years increase	**0.78 (0.71, 0.86)**
Female (ref=male)	1.22 (0.88, 1.69)
Race	
White	Ref (1)
Black	**0.67 (0.46, 0.98)**
Other races	0.82 (0.50, 1.34)
≥ College education (ref= <college)	**1.36 (1.00, 1.86)**
Household income	
< $35k	Ref (1)
$35k -< $50k	1.40 (0.80, 2.44)
$50k - <$75k	**1.82 (1.07, 3.07)**
≥ $75k	**2.00 (1.26, 3.17)**
BMI, per 1 kg/m² increase	1.00 (0.98, 1.02)
Used 1 - 5 health apps in past mo (ref=0 apps)	**1.70 (1.22, 2.37)**

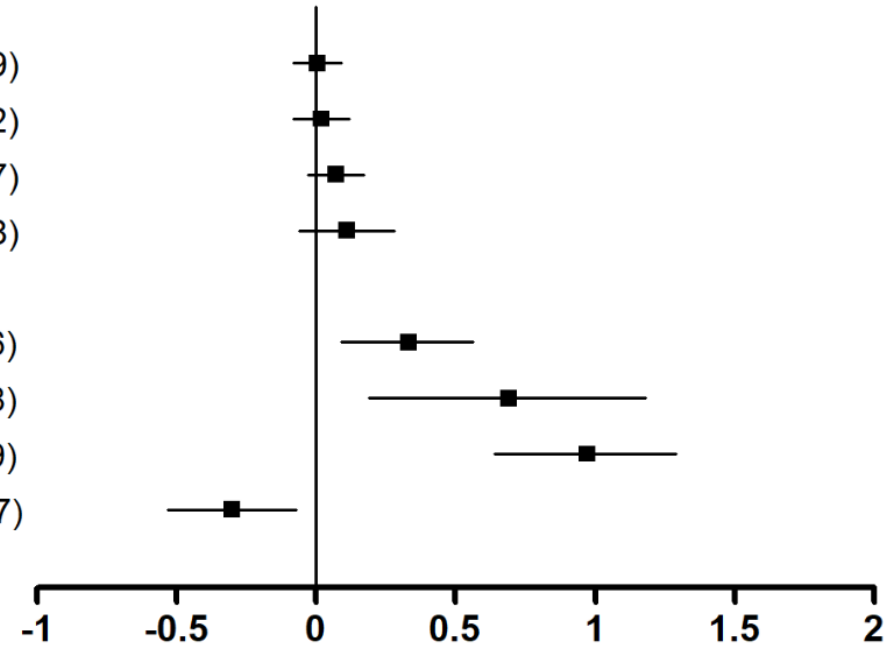
* Adjusted for age, sex, race, education, household income, kid < 18 years old, physical activity, fruit and intake (cups) of vegetables/day, sleep quality, BMI.

Eating and sleeping intervals by BMI categories, n=547

	Overall N=547	BMI <25 kg/m^2 N=138	BMI 25 - <30 kg/m^2 N=169	BMI ≥30 kg/m^2 N=240	*p*-value
Time (mean), hours (SD)	547	138	169	240	
First to last meal	11.5 (2.3)	11.9 (2.2)	11.5 (2.1)	11.2 (2.4)	0.008
Wake up to first meal	1.6 (1.9)	1.5 (1.9)	1.6 (2.0)	1.8 (1.8)	0.49
Last meal to sleep	4.0 (2.1)	3.4 (1.2)	4.1 (2.6)	4.2 (2.0)	0.001
Sleep duration	7.5 (1.2)	7.6 (1.0)	7.4 (1.0)	7.5 (1.4)	0.21
# meals/day by size, median (IQR)					
Total # meals	3.0 (2.6, 3.4)	3.0 (2.5, 3.3)	3.0 (2.5, 3.4)	3.0 (2.6, 3.4)	0.48
# large meals per day	0.2 (0.0, 0.6)	0.2 (0.0, 0.6)	0.2 (0.0, 0.5)	0.3 (0.0, 0.6)	0.67
# medium meals per day	1.3 (0.9, 1.7)	1.2 (0.9, 1.6)	1.2 (0.9, 1.6)	1.4 (1.0, 1.8)	0.08
# small meals per day	1.2 (0.7, 1.8)	1.1 (0.6, 1.7)	1.3 (0.7, 1.9)	1.2 (0.7, 1.7)	0.60

Annual weight change (kg), over ~6 years by eating interval and meal size*

	Mean (SD) or median (IQR)	Effect estimate (95% CI)
Intervals		
Time from first to last meal, hours	11.5 (2.3)	0.00 (-0.08, 0.09)
Time from wake up to first meal, hours	1.6 (1.9)	0.02 (-0.08, 0.12)
Time from last meal to sleep, hours	4.0 (2.1)	0.07 (-0.03, 0.17)
Sleep duration, hours	7.5 (1.2)	0.11 (-0.06, 0.28)
Frequencies		
Number of meals	3.0 (2.6, 3.4)	0.33 (0.09, 0.56)
Number of large meals	0.2 (0.0, 0.6)	0.69 (0.19, 1.18)
Number of medium meals	1.3 (0.9, 1.7)	0.97 (0.64, 1.29)
Number of small meals	1.2 (0.7, 1.8)	-0.30 (-0.53, -0.07)



*Linear effects model adjusted for: age at consent, sex, height, health care system, race, physical activity level, smoking, chronic health conditions (i.e., diabetes chronic kidney disease, ever acute myocardial infarction, COPD, heart failure, hypertension status, ischemic heart disease, stroke, # complete days for using app.

Conclusions and Implications

- EHR recruitment offers an efficient (i.e., high-reach/low-touch, minimal participant burden) approach to recruiting participants from healthcare settings into mHealth research.

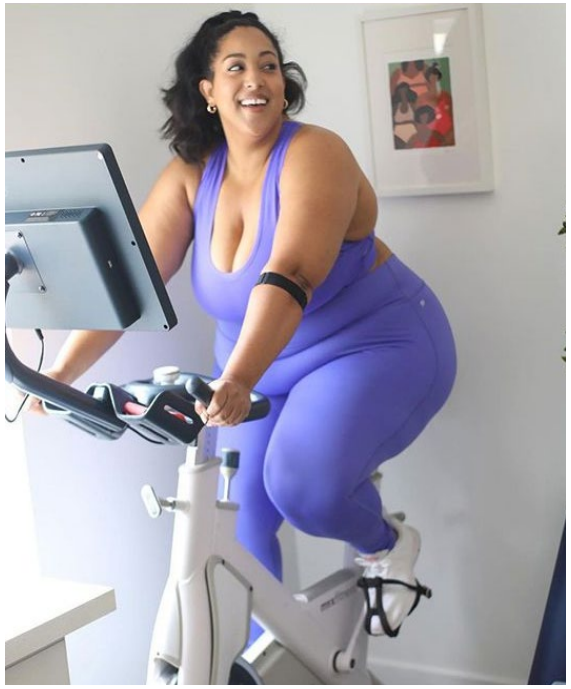
- Efforts to recruit and retain less engaged subgroups are needed to collect more generalizable data. Additionally, future app iterations should include more evidence-based features to increase participant utilization.

Conclusions and Implications

- Eating more meals is associated with weight increase over 6 years.
- Eating smaller meals associated with weight loss or less weight gain
- Study did not support restriction of eating window as strategy for long-term weight loss or weight gain prevention in a general medical population.

What do we advise patients about time restricted eating and weight gain prevention?

- Time restricted eating is not harmful if you'd like to try it – probably the 16/8 pattern is easiest to adhere to
  - Patients who have diabetes or do shift work need special consideration
- "Eating less" is still the "gold standard"
  - But restricting eating windows might help people to eat less
- More studies needed to identify whether sub-populations might show differences in the role of timing of eating with weight change.



American Heart Association.

PaTH Network
patient empowered research

University of Pittsburgh

JOHNS HOPKINS MEDICINE

Geisinger

Daily24

To Receive Your CE Certificate

- Look for an email from Villanova COPE containing a link to an evaluation. The email will be sent to the email address you used to register for the webinar.

  If you do not see the evaluation, look in your spam folder.

- Complete the evaluation soon after receiving it. It will expire after 3 weeks.

- Nurses must complete the evaluation before receiving the CE certificate. RDs must at the minimum provide CDR number on evaluation.

- Certificate will be sent to you upon completion of the evaluation.

VILLANOVA NURSING

Q&A

VILLANOVA UNIVERSITY
M. LOUISE FITZPATRICK COLLEGE OF NURSING
MacDonald
CENTER FOR OBESITY PREVENTION & EDUCATION

Moderator:
Lisa Diewald, MS, RDN, LDN
cope@villanova.edu

If you are an RD or RDN and have any questions or concerns about this continuing education activity, you may contact CDR directly at QualityCPE@eatright.org.