2019 Scientific Retreat
FRIDAY, APRIL 26, 2019
DISCOVERY WORLD PAVILION

ADDRESSING OBESITY AND LIFESTYLE IN UNDERSERVED CANCER SURVIVORS

Together, Taking on Cancer’s Toughest Challenges

Melinda Stolley, PhD
• 164% increase among Hispanics
• 60% increase among African Americans

### Prostate Cancer
#### SEER Survival Rates by Time Since Diagnosis, 2000–2015
**By Race/Ethnicity, All Ages, All Stages**

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>5-YR</th>
<th>10-YR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>96.1</td>
<td>93.2</td>
</tr>
<tr>
<td>Hisp</td>
<td>95.1</td>
<td>91.2</td>
</tr>
<tr>
<td>White</td>
<td>98.7</td>
<td>98.3</td>
</tr>
</tbody>
</table>

(Per 100,000)

### Breast Cancer
#### SEER Survival Rates by Time Since Diagnosis, 2000–2015
**By Race/Ethnicity, Female, All Ages, All Stages**

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>5-YR</th>
<th>10-YR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>79.7</td>
<td>71.1</td>
</tr>
<tr>
<td>Hisp</td>
<td>87.0</td>
<td>78.4</td>
</tr>
<tr>
<td>White</td>
<td>90.5</td>
<td>84.9</td>
</tr>
</tbody>
</table>

(Per 100,000)
16.9 MILLION SURVIVORS 2019
20.3 MILLION EXPECTED BY 2026
TRENDS IN OBESITY PREVALENCE IN ADULTS WITH CANCER (1997-2014)

Greenlee et al., JCO 2016; 34:3133-3140
## Body mass index and survival in women with breast cancer—systematic literature review and meta-analysis of 82 follow-up studies

**Chan DS, Ann Oncol. 2014;25(10):1901-1914.**

### Table 1: Body mass index (BMI) and survival in women with breast cancer

<table>
<thead>
<tr>
<th>Study</th>
<th>Per 5 kg/m²</th>
<th>BMI RR (95% CI)</th>
<th>% Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-diagnosis BMI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kamineni 2013</td>
<td>1.14 (0.68, 1.47)</td>
<td>1.62</td>
<td></td>
</tr>
<tr>
<td>Conroy 2011</td>
<td>1.28 (1.14, 1.46)</td>
<td>6.95</td>
<td></td>
</tr>
<tr>
<td>Lu 2011</td>
<td>1.09 (1.00, 1.19)</td>
<td>13.36</td>
<td></td>
</tr>
<tr>
<td>Chen 2006</td>
<td>1.15 (1.01, 1.32)</td>
<td>5.79</td>
<td></td>
</tr>
<tr>
<td>Emans 2010</td>
<td>1.14 (1.00, 1.30)</td>
<td>6.15</td>
<td></td>
</tr>
<tr>
<td>Hellmann 2010</td>
<td>1.26 (1.05, 1.52)</td>
<td>3.21</td>
<td></td>
</tr>
<tr>
<td>Nichols 2009</td>
<td>1.20 (1.06, 1.35)</td>
<td>7.26</td>
<td></td>
</tr>
<tr>
<td>Wei 2009</td>
<td>1.15 (1.01, 1.31)</td>
<td>5.89</td>
<td></td>
</tr>
<tr>
<td>Caan 2008</td>
<td>1.26 (1.05, 1.52)</td>
<td>3.12</td>
<td></td>
</tr>
<tr>
<td>Dal Maso 2008</td>
<td>1.11 (0.96, 1.26)</td>
<td>6.61</td>
<td></td>
</tr>
<tr>
<td>Reding 2008</td>
<td>1.17 (1.10, 1.23)</td>
<td>25.25</td>
<td></td>
</tr>
<tr>
<td>Abrahamsson 2006</td>
<td>1.52 (1.16, 1.94)</td>
<td>1.49</td>
<td></td>
</tr>
<tr>
<td>Krokene 2005</td>
<td>1.13 (1.02, 1.25)</td>
<td>9.06</td>
<td></td>
</tr>
<tr>
<td>Zhang 1996</td>
<td>1.14 (0.93, 1.39)</td>
<td>2.59</td>
<td></td>
</tr>
<tr>
<td>Hellberg 1994</td>
<td>1.47 (1.14, 1.90)</td>
<td>1.67</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>1.17 (1.13, 1.21)</td>
<td>0.37</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2: Underweight vs normal weight

<table>
<thead>
<tr>
<th>Study</th>
<th>BMI RR (95% CI)</th>
<th>% Weight</th>
<th>BMI kg/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alasker 2011</td>
<td>1.20 (0.94, 1.52)</td>
<td>7.30</td>
<td>1.40</td>
</tr>
<tr>
<td>Conroy 2011</td>
<td>1.17 (0.96, 1.43)</td>
<td>3.70</td>
<td>1.40</td>
</tr>
<tr>
<td>Lu 2011</td>
<td>1.09 (1.00, 1.20)</td>
<td>13.36</td>
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<td>1.17 (1.13, 1.21)</td>
<td>0.37</td>
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</tr>
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</table>

### All cause mortality


### BC specific mortality
OBESITY AND PROSTATE CANCER MORTALITY

Shared Equal Access Regional Cancer Hospital (SEARCH) database (n= 4268)

Vidal AC et al., Prostate Cancer and Prostatic Diseases (2017) 20, 72–78

Low adherence to nutrition and physical activity guidelines

High rates of obesity-related comorbidities

More likely to report fair-poor health status compared to minority controls and other survivors
FIGURE 1—Effect of biological, behavioral, clinical, and nonclinical factors on disease pathways in cardiovascular disease (CVD) and cancer: Transdisciplinary Cardiovascular and Cancer Health Disparities Training.

Golden et al.,
4 RANDOMIZED TRIALS, 4 POPULATIONS

- 246 African American breast cancer survivors
  - Partnership with Chicago Park District

- 200 African American prostate cancer survivors
  - Partnership with Milwaukee Rec

- 40 women with Metastatic Breast Cancer

- PILOT – 40 Latina BC Survivors
  - Adapt Moving Forward for Latinas
  - Partnership with United Community Center

Moving Forward

EVERY DAY COUNTS

Avanzando Juntas
CONCEPTUAL FRAMEWORK AND STUDY DESIGN (DATA COLLECTED BASELINE, POST-INTERVENTION, FOLLOW-UP)

Independent Mediators Outcomes

Guided

Individual Self-Efficacy

Anthropometrics
Weight, body composition

Behavioral
Diet, Physical Activity

Self-Guided or Waitlist Control

Interpersonal Social Support

Biological
General health & recurrence risk

Community Access to Healthy Eating and Exercise Community Resources

Psychosocial
Quality of Life, Mood

Stolley et al., BMC Cancer, 2015
Improved diet and physical activity patterns

↓ Weight and/or Improved Body composition: ↓ % Body Fat, ↑ % Lean Mass

↑ Adiponectin  ↓ Leptin

↑ Insulin sensitivity (C-Peptide, IGF-1)

Hormones
↓ Estradiol, ↑ SHBG, ↑ Testosterone

Reduced Inflammation
↓ CRP, IL-6,

Improved lipids
↓ Blood Pressure (BP)

Carcinogenesis/ tumor growth

Quality of Life

Comorbidity risk

BIOLOGICAL FRAMEWORK
MOVING FORWARD
N = 246 African American Breast Cancer Survivors

• 6-month weight loss intervention
  • Guided: 2x weekly meetings with supervised exercise, 2x weekly text messaging Program binder, Newsletter
  • Self-Guided: Program Binder, Monthly calls, Newsletter
• Primary outcome: weight loss
• Secondary outcomes: behavior, biomarkers, quality of life
• 6-month retention – 86%; 12-month intervention – 84%
## DIET

### Caloric Intake: \( p < 0.03 \)
- **Guided:** -563.9 (72.6)
- **Self-Guided:** -226.2 (75.8)

### % Calories from Fat: \( \text{ns} \)
- **Guided:** 22.19 (0.74)
- **Self-Guided:** 20.67 (0.77)

### Fiber (g/1000kcal): \( p < 0.001 \)
- **Guided:** 3.24 (0.33)
- **Self-Guided:** 0.91 (0.35)

### Added Sugars (tsp./day): \( p = 0.03 \)
- **Guided:** -6.98 (1.02)
- **Self-Guided:** -3.85 (1.06)
PHYSICAL ACTIVITY

Together, Taking on Cancer's Toughest Challenges

2019 Scientific Retreat

Moderate Activity: ns
- Guided: +98.4 (0.42) mins/day
- Self-Guided: +60.6 (0.44) mins/day

Vigorous Activity: (p=0.03)
- Guided: +17.4 (0.08) mins/day
- Self-Guided: + 2.4 (0.08) mins/day
**BIO MARKER RESULTS**

**Between Groups Post-Intervention:**
- Triglycerides $(p < 0.02)$
- Leptin $(p < 0.008)$
- C-Peptide $(p < 0.02)$

**<3% Weight Loss Across Groups**
- HbA1c $(p < 0.008)$
- DBP $(p < 0.004)$
- SBP $(p < 0.01)$
- Leptin $(p < 0.0001)$
- C-Peptide $(p < 0.008)$
QUALITY OF LIFE (PROMIS-10)

Guided
- Mental Pre: 47.7
- Mental Post: 50.7
- Physical Pre: 44.9
- Physical Post: 47.3

Self-Guided
- Mental Pre: 48.2
- Mental Post: 48.3
- Physical Pre: 45.3
- Physical Post: 45.6
BIOLOGICAL PATHWAYS’ RESULTS

Improved diet and physical activity patterns

Body Composition: ↓ % Body Fat, ↑ Lean Mass

- ↓ Adiponectin, ↑ Leptin
- Insulin sensitivity: ↓ C-Peptide, ↓ HbA1C
- Not yet analyzed Hormones: ↓ Estradiol, ↑ SHBG, ↑ Testosterone
- Reduced Inflammation: ↓ CRP

↓ DBP, ↓ SBP, Improved lipids: ↓ LDL, ↑ HDL, ↓ Triglycerides

Carcinogenesis / tumor growth

Quality of Life

Comorbidity risk
SIGNIFICANT IMPROVEMENTS ACROSS ALL OUTCOMES

HIGH PARTICIPANT SATISFACTION

AFFORDABLE, ACCESSIBLE RESOURCES TO SUPPORT HEALTHY LIFESTYLES – WANTED AND NEEDED

PUBLIC RECREATION SYSTEMS - VALUABLE PARTNERS TO ENGAGE IN CANCER SURVIVORS INTERVENTION EFFORTS.
LIFESTYLE AND SURVIVORSHIP-RELATED EFFORTS IN MILWAUKEE
### Diet and Physical Activity Patterns

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary Intake¹</td>
<td></td>
</tr>
<tr>
<td>Saturated fat, grams</td>
<td>21.2 (8.9)</td>
</tr>
<tr>
<td>Added Sugar, grams</td>
<td>60.7 (53.4)</td>
</tr>
<tr>
<td>Fiber, grams</td>
<td>12.1 (5.2)</td>
</tr>
<tr>
<td>Fruits, cup equivalents</td>
<td>1.7 (1.3)</td>
</tr>
<tr>
<td>Vegetables, cup equivalents</td>
<td>1.6 (0.8)</td>
</tr>
<tr>
<td>Physical Activity²</td>
<td>N (%)</td>
</tr>
<tr>
<td>Insufficiently Active</td>
<td>18 (81.8)</td>
</tr>
<tr>
<td>Sufficiently Active</td>
<td>4 (18.2)</td>
</tr>
<tr>
<td>Resistance ex 2x/wk</td>
<td>2 (0.09)</td>
</tr>
</tbody>
</table>
### QUALITY OF LIFE

#### PROMIS Domains

<table>
<thead>
<tr>
<th>Domain</th>
<th>AAPCS Mean (SD)</th>
<th>SEER PCS Mean (SD)</th>
<th>Gen’l Pop Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Function</td>
<td>45.3 (9.5)</td>
<td>50.2 (0.3)</td>
<td>50 (10)</td>
</tr>
<tr>
<td>Depression</td>
<td>49.1 (9.0)</td>
<td>45.4 (0.3)</td>
<td>50 (10)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>50.1 (7.1)</td>
<td>45.9 (0.3)</td>
<td>50 (10)</td>
</tr>
<tr>
<td>Fatigue</td>
<td>50.4 (10.8)</td>
<td>47.3 (0.3)</td>
<td>50 (10)</td>
</tr>
<tr>
<td>Sleep Disturbance</td>
<td>52.0 (7.4)</td>
<td>48.2 (0.3)</td>
<td>50 (10)</td>
</tr>
<tr>
<td>Ability to participate in Social Roles and Activities</td>
<td>51.0 (8.5)</td>
<td>55.1 (0.3)</td>
<td>50 (10)</td>
</tr>
<tr>
<td>Pain Interference</td>
<td>54.7 (9.7)</td>
<td>49.1 (0.3)</td>
<td>50 (10)</td>
</tr>
<tr>
<td>Social Isolation</td>
<td>43.9 (7.3)</td>
<td>NA</td>
<td>50 (10)</td>
</tr>
<tr>
<td>Sexual Functioning^2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest in Sexual Activity</td>
<td>41.6 (8.1)</td>
<td>NA</td>
<td>50 (10)</td>
</tr>
<tr>
<td>Erectile Functioning</td>
<td>43.6 (4.5)</td>
<td>NA</td>
<td>50 (10)</td>
</tr>
</tbody>
</table>

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1 US average = 50, SD=10;

2 Includes the 10 men who reported sexual activity (either with or without a partner);

**Note:** 3 point difference considered clinically meaningful
Test the effects of a guided vs self-guided nutrition and physical activity intervention on:

- Behavior (diet, physical activity – cardio + resistance training)
- Body Composition and strength – percent body fat, percent lean mass, strength
- Biomarkers - adiponectin, leptin, C-peptide, IGF-1, IGFBP-3, C-Reactive Protein, estradiol, testosterone and sex hormone binding globulin

- 16-week intervention
- Partnership with Milwaukee Public Rec – program to be held at North Division High School
• Aim 1. To adapt the Moving Forward weight loss intervention for overweight/obese Hispanic BCS.
• Aim 2. To conduct a randomized pilot with 40 to establish the feasibility and explore the effects of Avanzando Juntas on anthropometric, behavioral, psychosocial and biological outcomes.

Collaborators: Drs. Banerjee, Kamaraju, Young, Sheean (Loyola)
Partnership with United Community Center

National Cancer Institute R21CA155688
LIFESTYLE INTERVENTION FOR WOMEN WITH MBC

• Explore feasibility, safety and efficacy of 12-week coach-supported lifestyle intervention
• 40 women with stable metastatic breast cancer randomized to immediate intervention and wait list control
• Primary outcome: Quality of Life
• Secondary outcomes: Body composition, strength, biomarkers of inflammation, mitochondrial function
• Preliminary results:
  • Feasible and safe
  • Significant improvement in quality of life, strength, fatigue, mitochondrial function

Collaborators: Dr. Chitambar, Dr. Banerjee, Dr. Sheean (Loyola Chicago)
Funded by National Cancer Institute R21CA218888
IT TAKES A TEAM!

FACULTY COLLABORATORS:
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Paula Papanek, PhD Marquette University
Virginia Kaklamani, was at Northwestern now at University of Texas, San Antonio
MY WHY...THE SCIENCE...
THE SURVIVORS, THEIR STRENGTH AND THEIR STORIES
THANK YOU!

CANCER COLLABORATIVE
mcw.edu/departments/cancer-center
@MCWCancerCenter