Reversing Early Mortality Due To Obesity and Cardiovascular Risk Factors In Mental Illness:

*What Works In Changing Health Behaviors?*

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Disclosures

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- NIMH
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- HRSA
- Endowment for Health
- Bosch Healthcare
- CMS

Consultant:
- Substance Abuse and Mental Health Services Administration
- National Association of State Mental Health Program Directors
Overview

• Obesity risk factors and cardiovascular mortality
• Findings from the research literature on physical activity and weight loss interventions for persons with mental illness
• What is more (and less) likely to work
• Recommendations
Poll Questions
The Bottom Line

- Both obesity and poor fitness are killers
- Changing health behaviors is HARD work but essential to improving health and life expectancy
- The best studies demonstrate modest results in reducing obesity but better results in improving fitness
- What works better? Intensive manualized programs that combine coached physical activity and dietary change lasting at least 6 months (or more)
- Clinically significant weight loss is likely to be achieved by some, but improved fitness by more…..and both are important for heart health
HOW WE GOT HERE.........
An “Epidemic” of Early Mortality: Mean Years of Potential Life Lost

<table>
<thead>
<tr>
<th>Year</th>
<th>AZ</th>
<th>MO</th>
<th>OK</th>
<th>RI</th>
<th>TX</th>
<th>UT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>26.3</td>
<td>25.1</td>
<td>28.5</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1998</td>
<td>27.3</td>
<td>25.1</td>
<td>28.8</td>
<td>29.3</td>
<td></td>
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<tr>
<td>1999</td>
<td>32.2</td>
<td>26.8</td>
<td>26.3</td>
<td>29.3</td>
<td>26.9</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>31.8</td>
<td>27.9</td>
<td>24.9</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Compared with the general population, persons with major mental illness lose 25-30 years of normal life span

Colton CW, Manderscheid RW. Prev Chronic Dis [serial online] 2006 Apr [date cited]. Available at: http://www.cdc.gov/pcd/issues/2006/apr/05_0180.htm
Cardiovascular Disease Is Primary Cause of Death in Persons with Mental Illness*

According to the chart, Cardiovascular Disease accounts for a significant percentage of deaths in persons with mental illness. The chart indicates the percentage of deaths attributed to various causes across different states (MO, OK, RI, TX, UT, VA), with Cardiovascular Disease being the most prominent cause. The chart also includes other causes such as Cancer, Cerebrovascular, Accidents, Chronic Respiratory, Diabetes, Influenza/Pneumonia, and Suicide. The percentages are displayed as bars, allowing for easy comparison between states.
Mean Change in Weight With Antipsychotics

Estimated Weight Change at 10 Weeks on “Standard” Dose

Determinants of Health

- What Factors Account for Health?
- What Factors Account for Premature Mortality?
- How Much is Due to Health Care?
- How Much is Due to Other Factors
  - Genetics, Socioeconomic Factors, Environment, Health Behaviors, etc.
## Selected Risk Factors Attributable to Premature Mortality Worldwide

<table>
<thead>
<tr>
<th>Attributable Risk Factor</th>
<th>% of Annual Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>High blood pressure</td>
<td>12.8%</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>8.7%</td>
</tr>
<tr>
<td>High blood glucose</td>
<td>5.8%</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>5.5%</td>
</tr>
<tr>
<td>Overweight &amp; obesity</td>
<td>4.8%</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>4.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>42.1%</strong></td>
</tr>
</tbody>
</table>

# Cardiovascular Disease (CVD) Risk Factors

<table>
<thead>
<tr>
<th>Modifiable Risk Factors</th>
<th>Estimated Prevalence and Relative Risk (RR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Schizophrenia</td>
</tr>
<tr>
<td></td>
<td>Bipolar Disorder</td>
</tr>
<tr>
<td>Obesity</td>
<td>45–55%, 1.5-2X RR (^1)</td>
</tr>
<tr>
<td></td>
<td>26% (^5)</td>
</tr>
<tr>
<td>Smoking</td>
<td>50–80%, 2-3X RR (^2)</td>
</tr>
<tr>
<td></td>
<td>55% (^6)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>10–14%, 2X RR (^3)</td>
</tr>
<tr>
<td></td>
<td>10% (^7)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>≥18% (^4)</td>
</tr>
<tr>
<td></td>
<td>15% (^5)</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>Up to 5X RR (^8)</td>
</tr>
</tbody>
</table>

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**www.integration.samhsa.gov**
Obesity Risk Factors for Persons with SMI

- Obesity: > 42% (vs. 28% gen pop)
- 3-6X greater risk of metabolic syndrome
- Regular Moderate Exercise < 20%
- Compared to the general population:
  - Fewer fruits and vegetables
  - More calories and saturated fats
Cardiovascular Risk Factors
Add UP! The “Perfect Storm”
Factors Affecting Premature Death in the Population:

**Health Behaviors**

4X **Health Care**


www.integration.samhsa.gov
Determinants Of Health
(World Health Organization)

Lifestyle 5X
Health Care
The Good News: Reducing Risks of Cardiovascular Disease

- Maintenance of ideal body weight (BMI = 18.5-25)
  - 35%-55% ↓ in CVD
- Maintenance of active lifestyle (~30-min walk daily)
  - 35%-55% ↓ in CVD
- Cigarette smoking cessation
  - ~ 50% ↓ in CVD

Hennekens CH. *Circulation* 1998;97:1095-1102.
What is the Effectiveness of Health Promotion Programs for Persons with Serious Mental Illness?

What works more?
What works less?
728 Articles (excluding duplicates)

Title/abstract selection: 52

Review articles: 8

Excluded following full text evaluation: 2

Review articles: 6

Excluded following full text evaluation: 17

Excluded – weight gain prevention study: 3

Trials included in analysis: 24

Randomized controlled trials: 12

Non-randomized comparison: 6

Pre-post outcome studies: 6
Health Promotion and Serious Mental Illness

24 Studies

Randomized Controlled Trials
N=12
- Nutrition Only n=3
  Education n=2
  Activity n=0
  Education + Activity n=1
- Exercise Only n=1
  Education n=0
  Activity n=1
  Education + Activity n=0
- Nutrition + Exercise n=8
  Education n=4
  Activity n=1
  Education + Activity n=3

Non-randomized Comparison Studies
N=6
- Nutrition Only n=0
  Education n=0
  Activity n=0
  Education + Activity n=0
- Exercise Only n=0
  Education n=0
  Activity n=0
  Education + Activity n=0
- Nutrition + Exercise n=6
  Education n=1
  Activity n=0
  Education + Activity n=5

Pre-post Outcome Studies
N=6
- Nutrition Only n=1
  Education n=0
  Activity n=0
  Education + Activity n=1
- Exercise Only n=0
  Education n=0
  Activity n=0
  Education + Activity n=0
- Nutrition + Exercise n=5
  Education n=1
  Activity n=0
  Education + Activity n=4
Results

- 12 RCTs: Median weight loss: 5.5 lbs
- 18 Controlled Comparison Studies:
  - 55% (10/18) statistically significant weight loss
  - Median % weight loss: 2.6%
  - NONE of the community-based trials achieved clinically significant (5%) weight loss
  - One study 38% of participants > 5% weight loss
### Characteristics of Studies with Significant Positive Findings (n = 16)

<table>
<thead>
<tr>
<th>Main Component</th>
<th>Education</th>
<th>Activity</th>
<th>Education + Activity</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nutrition + Exercise</td>
<td>4</td>
<td>1</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>5</strong></td>
<td><strong>1</strong></td>
<td><strong>10</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>
Characteristics of Studies with Statistically Significant Results

- Duration $\geq$ 24 weeks
- BOTH Education and Activity
- BOTH Diet & Exercise
- Manualized & intensive programs
- Ongoing Measurement and Feedback of Success (e.g., Monitoring Physical Activity, Nutrition Change, Weekly Weights)
Limitations

- To date, clinically significant mean weight loss (>5%) has been elusive.
- Studies generally limited to brief duration (3-6 months)
- Small study samples
- Few well-designed RCTs
What Do We Know About What Works?

BREAK:
Question & Discussion
What Do We Know About What Works?
IN SHAPE Health Promotion Program

- Individualized fitness and healthy lifestyle assessment
- Individual Meetings with a “Health Mentor”
- Membership Vouchers to Local Fitness Centers
- Group Health Education/Motivational “Celebrations“
- Nurse Evaluation and Consultation

Promoting Health and Functioning in Persons with SMI: CDC - R01 DD000140 (PI: Bartels)
Health Promotion and Fitness for Younger and Older Adults With SMI: R01 MH078052-01 (PI: Bartels)
The In SHAPE Health Promotion Intervention

- Participants spend time each week with personal mentors working out, taking walks, in classes or working on nutrition plans.

- Mentors help participants to track their progress, set goals, and stay motivated.
The In SHAPE Health Mentor Program
Body Mass Index

- Normal: 17%
- Overweight: 19%
- Obese: 64%

Average weight = 204 pounds
Do you Exercise Regularly?

- Exercising > 6 months: 8%
- Exercising < 6 months: 12%
- Pre-contemplation: 3%
- Thinking about it: 18%
- Planning to do it: 59%
In SHAPE Pilot Study:
Hours of Exercise (n=76)

- Initial Baseline (BL)
- 3 Months (3Mon)
- 6 Months (6Mon)
- 9 Months (9Mon)

(p<.01)
In SHAPE Pilot Study
Waist Circumference (n=76)

Waist Circumference (cm)

105 104 103 102 101 100 99 98 97 96 95

BL 3Mon 6Mon 9Mon

(p<.001)
In SHAPE RCT # 1: Exercise Capacity - 6 Minute Walk Test

p=.01 Base 3 Mo 6 Mo 9 Mo 12 Mo

C In S C Con
In SHAPE RCT #1:
Time Exercising (n=133)

\[ \text{Time Exercising (n=133)} \]

\[ \text{Comparison} \]
\[ \text{Inshape} \]

\[ p=0.09 \]
Second RCT of In SHAPE

Health Promotion and Fitness for Younger and Older Adults With SMI

RCT (n=200) comparing In SHAPE to health club membership: overweight/obese adults with SMI
Longer duration (12 mo intervention, 18mo f/u)
Greater emphasis on nutritional component in conjunction with physical activity
N=210 randomized

PI: Bartels  NIMH R01MH078052
In SHAPE RCT #2: Interim Results:
6 Month Walk Test (n=210)
In SHAPE RCT #2: Interim Results:
Mean Weight Change (n=210)

Comparison

InShape
Bridging the Gap from Community to Research to Population Health

Community Development
- Identification of Need, Community Coalition
- Development of In SHAPE Model

Research
- Academic Research Partnership, 1st Pilot Study
- Effectiveness RCT Studies (CDC, NIMH)

Implementation
- State Medicaid Policy Change Supporting Sustainability
- Statewide Implementation and Evaluation
Implementation Science: What Does it Take to Successfully Implement Integrated Health Promotion?

Two Federally Funded Initiatives to Support State-wide Implementation of In SHAPE in New Hampshire:

- **Statewide Implementation Study**: Training, supervision and technical assistance for organizational change, leadership, and In SHAPE health mentor training
- **CMS Medicaid Wellness Incentive Program**: Vouchers for fitness facilities and weight loss programs rewards for attendance at fitness facilities and smoking cessation
SUMMARY:

- Most of the studies showed statistically significant weight loss.
- Among the few studies reporting the proportion of individuals achieving clinically significant (>5%) weight loss as many as 38% met this goal.
- Among the few studies reporting fitness (6MWT) even more achieved clinically significant improved fitness.
The Good News On Fitness

Gen. Pop. independent of obesity, smoking and age:
8 year f/u:
  vigorous activity group (22%) mortality = 4.2%
  remaining (78%) 2X mortality = 8.2%
16 year f/u:
  compared to lowest one-third activity gp
    Middle third = 23% reduced mortality
    Highest third = 32% reduced mortality
Recommendation:

1. Most likely to be effective:
   - Longer duration
   - Manualized combined education and activity-based approach
   - Both nutrition and physical exercise
   - Evidence-based (proven effective by RCTs)
Recommendation:

2. **Less likely to be successful:**

- Briefer duration interventions
- General wellness or health promotion education-only programs
- Non-intensive, unstructured, or non-manualized interventions
- Programs limited to nutrition only or exercise only (as opposed to combined nutrition and exercise).
Recommendation:

3. *If weight loss is a primary goal:*

- The nutritional component is critical and is more likely to be successful if it incorporates active weight management.
- Monitoring weight, changing diet and keeping track.
Recommendation:

4. If physical fitness is a primary goal:

- (+) Activity based programs that provide active and intensive exercise and monitoring of physical activity

- (-) Programs solely providing education, encouragement, or support for engaging in physical activity.
Recommendation:

5. Integration of Evidence-based Health Promotion as a Core Service:

- Evidence-based health promotion consisting of combined physical fitness and nutrition programs should be an integrated component of mental health services supporting wellness and recovery.
Recommendation:

6. Pursuing Weight loss vs. Fitness

➢ Aggressively pursue dietary reform and weight management but also support the value of physical activity in achieving fitness independent of obesity.
Recommendation:

7. Measuring Outcomes and Fidelity

- Physical fitness and weight outcomes and program fidelity should be objectively and reliably measured as a core indicator of quality mental health services.
Recommendation:

8. Selecting a Health Promotion Program for Implementation:

- Evidence-based: supported by rigorous outcome research (preferably RCTs)
- Manualized with training and supervision
- Feasible: Demonstrated track record of successful implementation and sustainability
Future Research Directions?

- Financial incentives
- Use of smartphone and other technology for prompting, monitoring, and support of wellness
- Engaging families and social networks
- Peer led and peer supported interventions
- Ethnically and culturally tailored interventions
- Combined pharmacological and behavioral interventions
- Integrating smoking cessation and substance abuse Rx
Conclusions: The Bottom Line

- Both obesity and poor fitness are killers.
- Changing health behaviors is HARD work but essential to improving health and life expectancy.
- The best studies demonstrate modest results in reducing obesity but better results in improving fitness.
Conclusions: The Bottom Line

➢ What works better? Intensive manualized programs that combine coached physical activity and dietary change lasting at least 6 months (or more).

➢ Clinically significant weight loss is likely to be achieved by some, but improved fitness by more….. both are important for heart health.
Conclusions: The Bottom Line

- Integrated health promotion interventions are feasible as a core component of mental health services for persons with SMI.
- Reducing obesity and improving fitness in adults with SMI is challenging but possible, and requires a multi-component, intensive, evidence-based approach.
- Successful implementation: leadership, culture change, fidelity, financing, training and TA.
Questions and Discussion

Recommendations for Implementing Integrated Evidence-based Models

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