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What Works in a Pediatric Obesity Treatment Program?

Mary Savoye
Yale University School of Medicine

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What Works in a Pediatric Obesity Treatment Program?

UMASS/Center for Clinical & Translational Science
May 22, 2012

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Pediatric Endocrinology &
Yale Center for Clinical Investigation
Yale University School of Medicine
Funding/Disclosure

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CTSA UL1 RR024139    R Sherwin
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R01 HD40787    S Caprio

Gifts:
Esther Gross Estate (Unrestricted)    M Savoye

Disclosure:
President, Smart Moves, LLC
Program Timeline

Each 12-week Session

- Exercise (2X wk)
  - Children

- Nutrition Education (1X wk)
  - Children & Parents

- Behavior Mod. (1X wk)
  - Children

- Parent Classes (1X wk)
  - Parents

*Members are encouraged to complete consecutive 12-wk sessions*
Smart Moves
Weight Management Curriculum

• 100-page workbook of nutrition & behavior modification topics for children
• Parent’s guide included in workbook
• Instructor’s manual to accompany workbook

A Look at Food Labels
Bag It!
Meals in the Fast Lane

Risky Business: Coping with High Risk Situations
Teasers, Bullies & Other Annoying People
Oops I Slipped!—Understanding a Relapse
Effects of a Weight Management Program on Body Composition and Metabolic Parameters in Overweight Children
A Randomized Controlled Trial

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Melissa Shaw, BS
James Dziura, PhD
William V. Tamborlane, MD
Paulina Rose, RD, CD-N, CDE
Cindy Guandalini, APRN
Rachel Goldberg-Gell, APRN
Tania S. Burgert, MD
Anna M. G. Cali, MD
Ram Weiss, MD, PhD
Sonia Caprio, MD

Context  Pediatric obesity has escalated to epidemic proportions, leading to an array of comorbidities, including type 2 diabetes in youth. Since most overweight children become overweight adults, this chronic condition results in serious metabolic complications by early adulthood. To curtail this major health issue, effective pediatric interventions are essential.

Objective  To compare effects of a weight management program, Bright Bodies, on adiposity and metabolic complications of overweight children with a control group.

Design  One-year randomized controlled trial conducted May 2002-September 2005.

Setting  Recruitment and follow-up conducted at Yale Pediatric Obesity Clinic in New Haven, Conn, and intervention at nearby school.

Participants  Random sample of 209 overweight children (body mass index [BMI] >95th percentile for age and sex), ages 8 to 16 years of mixed ethnic groups were recruited. A total of 135 participants (60%) completed 6 months of study, 119 (53%) completed 12 months.

Intervention  Participants were randomly assigned to either a control or weight management group. The control group (n=69) received traditional clinical weight man-
**Anthropometric Changes**

**Bright Bodies vs. Clinic**

At 6 and 12 months BB $n=105$, CC $n=69$  

*p* < 0.001, Error bars represent 95% CI

Change in Weight (kg)

- **6 Month**: BB $= -4.0$, CC $= -2.2$  
- **12 Month**: BB $= 3.3$, CC $= -0.9$  

**Change in BMI (kg/m²)**

- **6 Month**: BB $= -1.2$, CC $= -2.1$  
- **12 Month**: BB $= -0.3$, CC $= -1.5$  

**Diff = 3.3**

Anthropometric Changes
Bright Bodies vs. Clinic

Change in Body Fat (%)

Change in Body Fat Mass (kg)

At 6 and 12 months BB n=105, CC n=69  *p<0.001,   Error bars represent 95% CI

Insulin Sensitivity Changes
Bright Bodies vs. Clinic

Change in Fasting Insulin (µU/mL)

6 Month 12 Month

Change in HOMA-IR

6 Month 12 Month

At 6 and 12 months BB n=105, CC n=69  ***p<0.001,  Error bars represent 95% CI

Was the treatment effect sustained at 2-yr follow up?

Mean BMI

Treatment Effect = 2.96 (p < 0.05)
Long-term Results of an Obesity Program in an Ethnically Diverse Pediatric Population
Mary Savoye, Paulina Nowicka, Melissa Shaw, Sunkvung Yu, James Dziura, Georgia Chavent, Grace O'Malley, John B. Serrecchia, William V. Tamborlane and Sonia Caprio

*Pediatrics* 2011;127;402-410; originally published online Feb 7, 2011; DOI: 10.1542/peds.2010-0697
Changes from 6, 12, and 24 Months are from Baseline

Change in HOMA-IR (Insulin Sensitivity)

- 6 Mo
- 12 Mo
- 24 Mo

**Weight Management Group**

**Control Group**

Mary Savoye et al *Pediatrics* 2011;127;402-410
Current Work: Prevention of Type 2 Diabetes In Children with Lifestyle Intervention

- Pediatric & Medical Associates
- Children’s Medical Group
- Hill Health Center
- Fair Haven Community Health Center
- Yale Center for Clinical Investigation

Goal is to compare IGT status of adolescents in Bright Bodies after 6 months in comparison to Standard of Care treatment (controls).
Prevention of T2DM in Children – Aim 2 Flow

- Risk factors of IGT (obese & other)
- OGT (IGT screen)
- Yale OGT (IGT validation)
- Clinic or Clinic
- Yale
- Standard Education
- Randomization
- Bright Bodies
- 2x/week
- 2mo Clinic
- 4mo Clinic
- 6 Mo Yale OGT
But how much does all this cost?
# Program Expenses

## Salaries

<table>
<thead>
<tr>
<th>Position</th>
<th>Hours/Week</th>
<th>FTE Status</th>
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</thead>
<tbody>
<tr>
<td>Director/Dietitian</td>
<td>15 hr/wk</td>
<td>40% FTE</td>
</tr>
<tr>
<td>Coordinator</td>
<td>15 hr/wk</td>
<td>40% FTE</td>
</tr>
<tr>
<td>Ex Physiologist A</td>
<td>6 hrs/wk</td>
<td></td>
</tr>
<tr>
<td>Ex Physiologist B</td>
<td>3 hrs/wk (or student)</td>
<td></td>
</tr>
<tr>
<td>Ex Physiologist C</td>
<td>student</td>
<td></td>
</tr>
<tr>
<td>Dietitian B</td>
<td>2 hrs/wk</td>
<td></td>
</tr>
<tr>
<td>Social Worker</td>
<td>2 hrs/wk</td>
<td></td>
</tr>
<tr>
<td>Technician</td>
<td>2 hrs/wk (or student)</td>
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</table>

**Total Salary Expense**: $63,000.
Program Expenses

Space $0.
(Celentano School, New Haven)

Supplies (first aid kit, prizes, etc.) $1,400.

Equipment
- Tanita Scale, Stadiometer, HR Monitors
- Balls, Cones, Flags, Jump Ropes
- Resistant Tubing, Stretch Mats

$3,700.

Total Expenses $68,100.
Cost-Benefit Analysis

• $756 – 1,135 per child (cost ÷ 60-90 children/year) to decrease BMI -1.7 unit.

• $756 – 1,135 per child to decrease HOMA -1.52. If we use case-by-case analysis, ½ of the children went from IR to non-IR. The expense incurred if IR is not resolved in a child is much more per year.

• Most people with type 2 diabetes have underlying IR.
So What Works?

- Parent Involvement (family approach) vs afterschool model
- A non-diet approach that offers long-term, life skills
- Inclusion of behavior modification topics
- Standardized, culturally-sensitive curriculum
- Professional staff with the help of students in related field

- Challenges: use of school vs own space, lack of or limited insurance reimbursement, transportation
Lessons Learned

- A comprehensive, well-established program takes YEARS to develop and show positive results.
- Kids want to have fun exercising, not sit on a treadmill.
- Kids want to be separated from their parents when talking about eating triggers, self image, other beh mod topics.
- Kids do not want to be on a diet (like their parents).
- Transportation is an ongoing issue! Include transportation in your budget.
References


Special Thanks

Bright Bodies & clinic group families

Sonia Caprio, MD
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Lindsey Ertel, DPT
Esther Gross Estate

William V. Tamborlane, MD
Nicola Santoro, MD
Melissa Shaw, BS
Enit Colon
Brad Serrecchia, BS
Cindy Guandalini, APRN
Katie Marotto, BS
Mimmo Giannini, MD
National Institute of Health
Extra Slides
## Baseline Characteristics of Children Randomized to Weight Management and Control Group

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>WMG</th>
<th>CG</th>
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<tbody>
<tr>
<td>Non-hisp, white</td>
<td>40 (38.1)</td>
<td>24 (34.8)</td>
</tr>
<tr>
<td>Non-hisp, black</td>
<td>40 (38.1)</td>
<td>27 (39.1)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>25 (23.8)</td>
<td>18 (26.1)</td>
</tr>
<tr>
<td>Female</td>
<td>59 (56.2)</td>
<td>47 (68.1)</td>
</tr>
<tr>
<td>Male</td>
<td>46 (43.8)</td>
<td>22 (31.8)</td>
</tr>
<tr>
<td>Age (yr)</td>
<td>11.9 (2.5)</td>
<td>12.4 (2.3)</td>
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<tr>
<td>Weight (kg)</td>
<td>87.0 (25.1)</td>
<td>91.2 (23.3)</td>
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<tr>
<td>Height (cm)</td>
<td>155.2 (11.6)</td>
<td>157.7 (11.6)</td>
</tr>
<tr>
<td>BMI</td>
<td>35.8 (7.6)</td>
<td>36.2 (6.2)</td>
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<tr>
<td>Body fat %</td>
<td>47.0 (8.7)</td>
<td>45.8 (7.2)</td>
</tr>
<tr>
<td>Body Mass (kg)</td>
<td>42.1 (18.1)</td>
<td>42.4 (14.9)</td>
</tr>
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</table>
## Baseline Characteristics (continued)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>WMG</th>
<th>CG</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B Pressure (mm Hg)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic</td>
<td>123 (13.6)</td>
<td>122 (14.0)</td>
</tr>
<tr>
<td>Diastolic</td>
<td>66 (9.5)</td>
<td>67 (11.1)</td>
</tr>
<tr>
<td><strong>Cholesterol (mg/dL)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>167 (34.5)</td>
<td>158 (35.5)</td>
</tr>
<tr>
<td>HDL</td>
<td>44 (10.8)</td>
<td>43 (16.5)</td>
</tr>
<tr>
<td>LDL</td>
<td>98 (33.4)</td>
<td>92 (27.9)</td>
</tr>
<tr>
<td>Triglycerides (mg/dL)</td>
<td>104 (1.8)</td>
<td>101 (1.6)</td>
</tr>
<tr>
<td>Glucose (mg/dL)</td>
<td>92 (8.3)</td>
<td>90 (8.5)</td>
</tr>
<tr>
<td>Insulin (µIU/mL)</td>
<td>23 (1.8)</td>
<td>24 (1.7)</td>
</tr>
<tr>
<td>HOMA-IR</td>
<td>5.1 (1.9)</td>
<td>5.2 (1.7)</td>
</tr>
</tbody>
</table>