100,000 Kids and Counting:

The Past, Present and Future of the CARDIAC Project

West Virginia Dietetics Association Meeting

William A. Neal, MD
April 13, 2011

CARDIAC’s 100,000th Celebration

Sherman Elementary
Boone County, WV
Impact of WW II on CVD Mortality

Mortality from Circulatory Diseases in Norway in 1927-1948, 1951


Creator of ‘K Rations’
Minnesota's Manhattan Project
(1946)

Memorial Stadium
University of Minnesota

Laboratory of Physiological Hygiene
(Under Gate 23)

Seven Countries Study
(1950's)

First Geographic Study
Keys, Delvecchio, Kemura, & White
Nicotera, Italy

Saturated fatty acids, serum cholesterol, and CHD
Margaret Albrink, MD

Obesity Trends* Among U.S. Adults
(*BMI ≥30, or about 30 lbs. overweight for 5’4” person)
More American Children Are Overweight Than Ever Before

OBESITY IN WEST VIRGINIA

- 94% WV citizens consider obesity our most serious health problem
- Obese individuals have 67% more chronic diseases than non-obese
- Annual cost to the state approximately $558,000,000
Prevalence of Diseases in WV

<table>
<thead>
<tr>
<th>Chronic Disease</th>
<th>%WV Prevalence</th>
<th>% US Prevalence</th>
<th>WV Rank in US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Attack</td>
<td>6.5%</td>
<td>4.0%</td>
<td>#1</td>
</tr>
<tr>
<td>Stroke</td>
<td>3.7%</td>
<td>2.5%</td>
<td>#4</td>
</tr>
<tr>
<td>Diabetes</td>
<td>12.4%</td>
<td>9.0%</td>
<td>#2</td>
</tr>
<tr>
<td>Asthma (current)</td>
<td>8.8%</td>
<td>8.4%</td>
<td>#27</td>
</tr>
<tr>
<td>Obesity</td>
<td>31.7%</td>
<td>27.4%</td>
<td>#6</td>
</tr>
</tbody>
</table>

2010 Indicator Report on Physical Activity (CDC)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>WV</th>
<th>Nationally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students grades 9-12 that have daily physical education</td>
<td>25.5%</td>
<td>30.3%</td>
</tr>
<tr>
<td>Students grades 9-12 report 1 hour of moderate-vigorous PA daily</td>
<td>26.3%</td>
<td>NA</td>
</tr>
<tr>
<td>Middle/High Schools that support active transport</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Youth have parks, community centers and sidewalks in neighborhood</td>
<td>27.2%</td>
<td>50%</td>
</tr>
<tr>
<td>Transportation and travel policy</td>
<td>No</td>
<td>36 states</td>
</tr>
<tr>
<td>%census block with park within ½ mile of boundary</td>
<td>5.6%</td>
<td>20.3%</td>
</tr>
</tbody>
</table>
The West Virginia CARDIAC Project

Coronary Artery Risk Detection In Appalachian Communities

“To reduce cardiovascular disease, diabetes, and other chronic illnesses in West Virginia through research and intervention in children.”

What does the CARDIAC Project Do?

• Offers CVD screening to all 20,000 5th grade students throughout West Virginia in the school setting

• Sends results home to parents with recommendations for lifestyle changes or referral to clinic

• Initiates interventional strategies
WHAT HAPPENS WHEN WE VISIT THE SCHOOL ON SCREENING DAY?

♥ We measure height and weight (in private)
♥ We calculate Body Mass Index (BMI)
♥ We check blood pressure
♥ We examine neck for Acanthosis Nigricans (AN)
♥ We measure blood cholesterol, glucose, and insulin

* Parents of children screened are also eligible for free cholesterol screening.

Health Care Professionals

Health Science Students

School Nurses

RHEP Coordinators

School Principals and Teachers
Within 5 years, CARDIAC began operating in all WV counties!

Weight Status of WV Youth

Boys
- <85th: 21%
- 85-95th: 53.1%
- >95th: 26.9%

Girls
- <85th: 20.7%
- 85-95th: 55.9%
- >95th: 23.4%

CARDIAC Project, 1998-2010
### 2009-2010 CARDIAC Project Body Mass Index (BMI) Screening Results

<table>
<thead>
<tr>
<th>Grade</th>
<th>#Screened</th>
<th>% Overweight</th>
<th>%Obese</th>
<th>Total % Overweight or Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>5th Grade</td>
<td>6,540</td>
<td>19%</td>
<td>28.5%</td>
<td>47.5%</td>
</tr>
<tr>
<td>2nd Grade</td>
<td>10,817</td>
<td>16.2%</td>
<td>22.5%</td>
<td>38.7%</td>
</tr>
<tr>
<td>Kindergarten</td>
<td>1,071</td>
<td>19.2%</td>
<td>18.8%</td>
<td>38.1%</td>
</tr>
</tbody>
</table>

### Risk Factor Clustering Among Obese Children

<table>
<thead>
<tr>
<th>SBP</th>
<th>DBP</th>
<th>TC</th>
<th>HDL-C</th>
<th>Odds Ratio (95% C.I.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>1</td>
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</tr>
</tbody>
</table>

- SBP: Systolic Blood Pressure
- DBP: Diastolic Blood Pressure
- TC: Total Cholesterol
- HDL-C: High-Density Lipoprotein Cholesterol
Exploring the Morbidly Obese Diagnosis

<table>
<thead>
<tr>
<th>RISK FACTOR</th>
<th>NORMAL OR UNDERWEIGHT</th>
<th>OVERWEIGHT</th>
<th>OBSESE</th>
<th>MORBIDLY OBSESE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated Blood Pressure</td>
<td>14.4%</td>
<td>20.8%</td>
<td>29.8%</td>
<td>51.0%</td>
</tr>
<tr>
<td>Low HDL</td>
<td>9.7%</td>
<td>18.7%</td>
<td>30.5%</td>
<td>42.7%</td>
</tr>
<tr>
<td>Elevated LDL</td>
<td>5.9%</td>
<td>10.2%</td>
<td>13.3%</td>
<td>11.4%</td>
</tr>
<tr>
<td>Elevated Triglycerides</td>
<td>4.4%</td>
<td>12.4%</td>
<td>25.0%</td>
<td>31.3%</td>
</tr>
<tr>
<td>Positive for AN</td>
<td>.9%</td>
<td>3.5%</td>
<td>13.6%</td>
<td>39.6%</td>
</tr>
</tbody>
</table>

* Ice et al., International Journal of Pediatric Obesity, 2009

Percent Asthmatics By BMI Category for Overall Sample
GENOMICS AND PUBLIC HEALTH (CDC)

Targets disease prevention and health promotion efforts among individuals at high risk of disease because of their genetic makeup.
Universal versus Selective Screening: Testing Current NCEP Guidelines

20,266 Subjects Tested (5th Graders)

14,468 met NCEP screening Guidelines (71.4%)
5,798 did not meet NCEP Screening guidelines (28.6%)

170 warrant pharmacologic tx (1.2% of those who met NCEP guidelines)
98 warrant pharmacologic tx (1.7% of those who did not Meet NCEP guidelines)

Children’s Lipid Clinics

Youth Treatment Guidelines (AAP ’09)

- At least 8 years age
- LDL >160 mg/dl with positive family history of premature CHD (<age 55 yrs)
- LDL >190 mg/dl
- Additional risk factors for CHD
Obesity Prevention & Treatment: The Medical Home and Chronic Care Model

Community Resources and Policies

Health Systems
Organization and Health Care

Informed, Activated Patient

Productive Interactions

Prepared, Proactive Practice Team

Improved Outcomes
The Greenbrier Project

Clinical Component (Individual/Interpersonal)
- Physical Activity and Nutrition Behaviors
- Health Outcomes

School-Based Intervention (Organizational)
- Improvements to Physical Education and Physical Activity Opportunities

After School Physical Activity/Nutrition Education Program (Community)

504 Rehabilitation Act of 1973 (Public Policy)

Universal Assessment of Obesity Risk: Steps to Prevention and Treatment

CARDIAC 2009-2010 screening results

1,240 5th grade
1,752 2nd grade
206 Kinder
Total: 3,198

1,860 5th grade
2,434 2nd grade
201 Kinder
Total: 4,495

Barlow, S. E. et al. Pediatrics 2007;120:S164-S192
AAP 5-2-1-0 Campaign

1. Coordinated School Wellness Programs

5 2 1 0
Section 504 Rehabilitation Act of 1973

Section 504 has provided opportunities for children with disabilities in education and allows for **reasonable accommodations**.

U.S. Department of Education defines an ‘individual with handicaps’ as any person who has a **physical or mental impairment which substantially limits one or more major life activities or any physiological disorder or condition affecting one or more of the following body systems**:

- Neurological
- Musculoskeletal
- Respiratory/pulmonary
- Cardiovascular
- Reproductive
- Digestive
- Genitourinary
- Endocrine

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**Medicaid's Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) Program**

- Medicaid's comprehensive and preventive child health program for individuals under the age of 21.

- Includes periodic screening of vision, dental, hearing, growth, nutritional status and requires that **any medically necessary health care service** be provided to an EPSDT recipient.

- Assure that the health problems found are diagnosed and treated early, before they become more complex and their treatment more costly.
Impact

Policy Analysis

Healthy Lifestyle Act 2005

IOM School Nutrition Standards

Childhood Obesity Alliance

Current Integration/Training

Multidisciplinary Treatment
• 9% of providers have access to a dietitian
• 2% have access to an exercise specialist
• 12% have access to a social worker

Training
• 85% of providers and 99% of dietitians surveyed would like to receive specialized childhood obesity training

• Only 8% of dietitians surveyed were certified in Child and Adolescent Weight Management
School Nurses: Current Strategies and Needs for Addressing High Risk Students

Current Follow Up Practices:
- Send home results with child (53%)
- Call parents (43%)
- Referral (38%)
- Face to face education with parent/child (25%)
- Nothing (19%)
- Arrange for school programs (11%)
- Don’t know who to be concerned about (9%)

Resource Needs:
- Educational materials/resources (62%)
- Referral database of local professionals/programs (55%)
- Professional education opportunities (47%)
- Programming opportunities in schools (47%)
- Individual counseling for high risk students (45%)
Provider Centered Interventions: A Need for Training and Integration

**Stage 1. Prevention Plus protocol**
- Primary care physician or allied healthcare provider
- Some training in pediatric weight management/behavioral counseling.

**Stage 2. Structured Weight Management protocol**
- Primary care physician or allied healthcare
- Highly trained in weight management.

**Stage 3. Comprehensive Multidisciplinary protocol**
- Multidisciplinary obesity care team.

**Stage 4. Tertiary Care protocol**
- Multidisciplinary team with expertise in childhood obesity
- Designed protocol.

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Assessing the Needs of Healthcare Providers: CARDIAC Provider Survey Results

<table>
<thead>
<tr>
<th>Treatment Proficiency</th>
<th>Pediatrics/Family Practice (n=99)</th>
<th>Dietitians (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assessment of Degree Overweight (64.3%)</td>
<td>1. Assessment of Degree of Overweight (76%)</td>
<td></td>
</tr>
<tr>
<td>2. Counseling on Increasing Physical Activity (56.1%)</td>
<td>2. Counseling on Improving Eating Practices (76%)</td>
<td></td>
</tr>
<tr>
<td>3. Reducing Sedentary Behavior (51%)</td>
<td>3. Counseling on Increasing Physical Activity (56%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Barriers to Treatment</th>
<th>Pediatrics/Family Practice (n=99)</th>
<th>Dietitians (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lack of Support Services (74.2%)</td>
<td>1. Lack of Parent Involvement (69%)</td>
<td></td>
</tr>
<tr>
<td>2. Lack of Patient Motivation (69%)</td>
<td>2. Lack of Support Services (66.6%)</td>
<td></td>
</tr>
<tr>
<td>3. Lack of Reimbursement (55.7%)</td>
<td>3. Lack of Patient Motivation (64%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Training Interest</th>
<th>Pediatrics/Family Practice (n=99)</th>
<th>Dietitians (n=25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Parenting Techniques (42.9%)</td>
<td>1. Motivational Interviewing (56%)</td>
<td></td>
</tr>
<tr>
<td>2. Behavioral Management Strategies (40.8%)</td>
<td>2. Behavioral Management Strategies (52%)</td>
<td></td>
</tr>
<tr>
<td>3. Motivational Interviewing (35.7%)</td>
<td>3. Parenting Techniques (52%)</td>
<td></td>
</tr>
</tbody>
</table>
CARDIAC Nutrition Research: Parent Feeding Style

Beyond what we feed our children, to how we feed our children may impact dietary intake and future obesity.

Parent Feeding Styles
• Disengaged
• Permissive
• Authoritarian
• Authoritative

Mean BMI percentiles

Parenting style

CARDIAC TEAM