MATCH-Motivating Adolescents with Technology to Choose HEALTH™

An Effective School-Based Childhood Obesity Intervention Educational Model

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Today's Objectives

- Brief historical perspective of NC obesity prevention efforts
- MATCH outcomes: BMI and aerobic fitness
- RTI projected Medicaid savings
- Overview of MATCH as an educational methodology
- Dr. Lazorick's evaluation

Charge of 2008 Task Force

- Evaluate obesity intervention efforts of DPH, DPI, and HWTF
- Report Recommendations framed with six initiatives
- Think Tank of Childhood Obesity grew out of Task Force
- MATCH was chosen as Middle School Intervention in Pilot

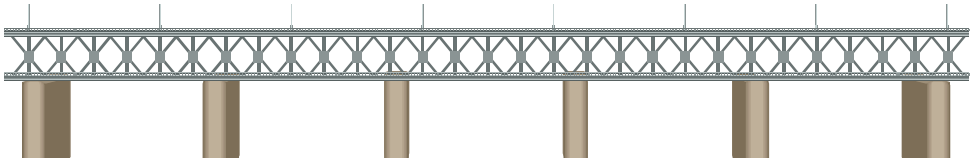
Interested Players

- DPI
- DPH
- HWTF
- RWJ
- CDC
- USDA
- AMA
- AHA

MATCH

Data-driven, Evidence-Based

"Educational Methodology"



1. Teacher Developed
2. Filters to prevent "Informational Overload"
3. Aligned with NCSCOS to teach EOG Test Skills
4. Interdisciplinary, relevant, fun!

Student

Behavior Modification

Factors influencing Childhood Obesity are so complex…

- So many angles to attack childhood obesity, from policy, planned environments, availability of healthier foods, more physical activity.
- It can be so complex, we attempt to do too much, in too many areas, and the effort becomes superficial…

the answer is simple….

- Individuals must CHOOSE to ***modify their behavior*** and be EDUCATED so they can make GOOD CHOICES.

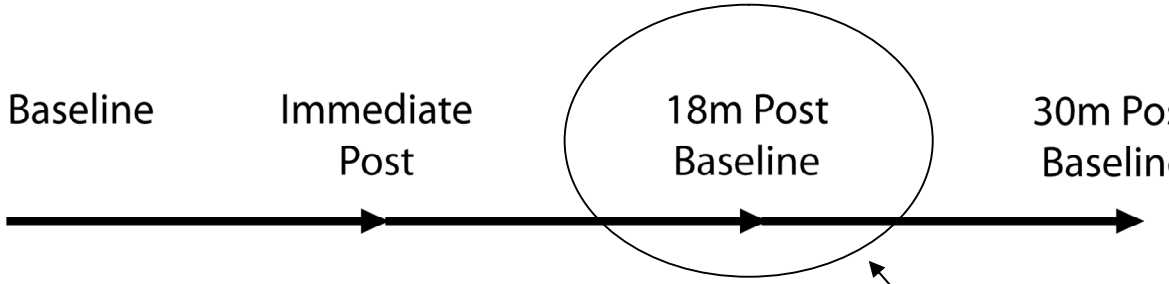
- Then, **agencies, policies, and programs** can be **supportive** to assist individuals in making **behavioral change**.

Which Programs Work?

If Programs cannot contribute too…

- **Measureable changes** in BMI that are **sustained**…
- We are not reducing health risks…
- And we are not SAVING MONEY!

MATCH Success Rates with Overweight/Obese Seventh Graders from Inception (decreased BMI Z-scores)



Cohort 1 2007 WMS	n=106 61% owob	70%	72%	75%
Cohort 2 2008 WMS	n=105 47% owob	66%	71%	
Cohort 3 2009 SBE Pilot	n=105 62% owob n=378 55% owob	66% (WMS)		

NOTE: at 18mo, 42% of those OW at baseline had decreased to Healthy Wt

(Pilot Schools decreased BMI Z-scores, $p<.05$)

RTI Projected Savings in 7th Grade Medicaid Expenditures for Overweight

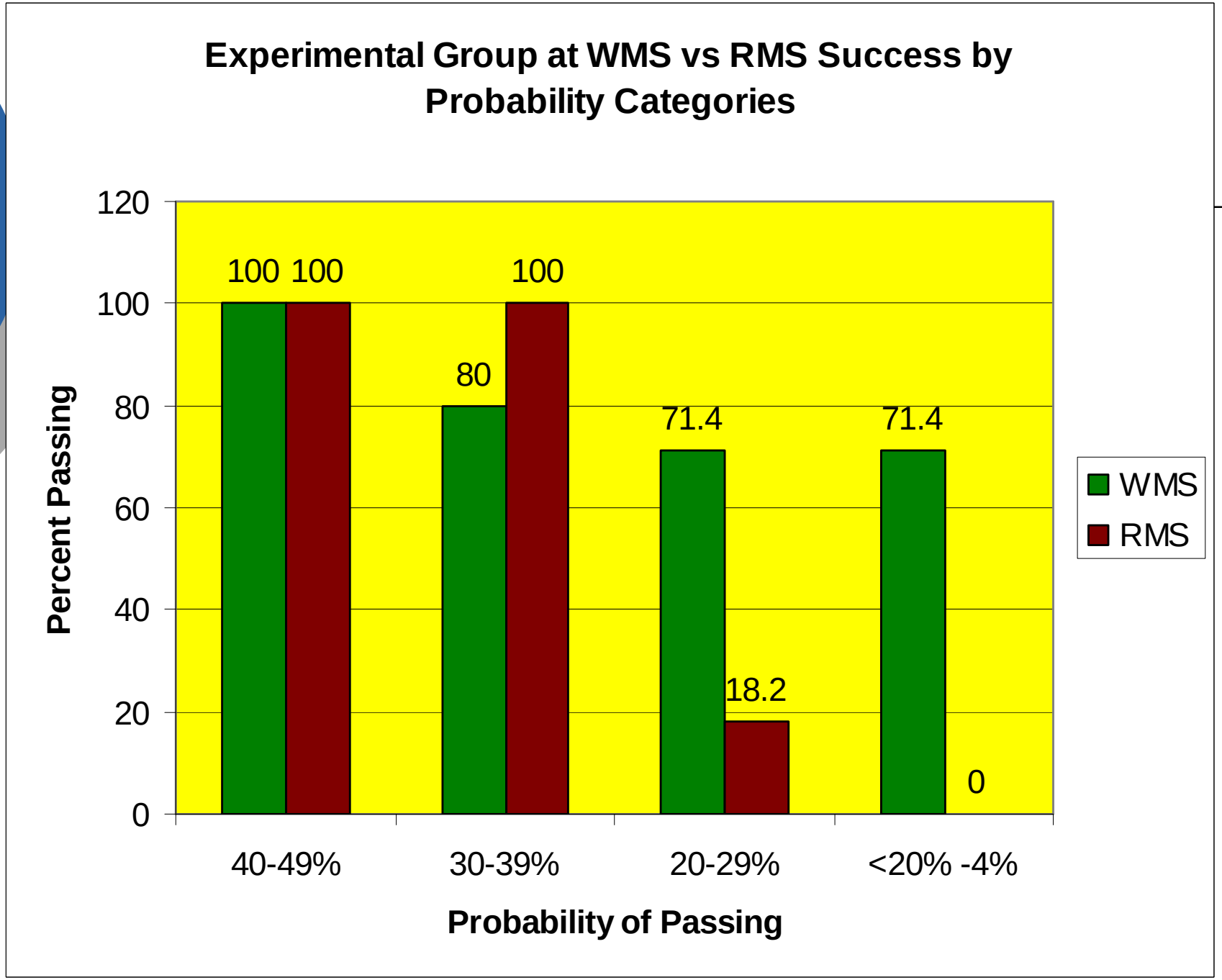
- Assuming one in four (25%) overweight adolescents will become normal weight adults
- 42% of the overweight (Cohort 1,2) moved in to normal weight.
- Intervention can be attributed to 17% of the change (low estimate)
- If MATCH were implemented statewide, would result in estimated range from 4-5,* up to 13-22,**million dollar savings per year.
- Savings would be cumulative per class per year (10 years would save in range of $230-460 m)

* Based on Buescher, *et al* 2008 (in 2003 dollars)

** Based on Pennington, *et al*, (personal communication, study in progress from 2007 Medicaid chart review by DHHS)

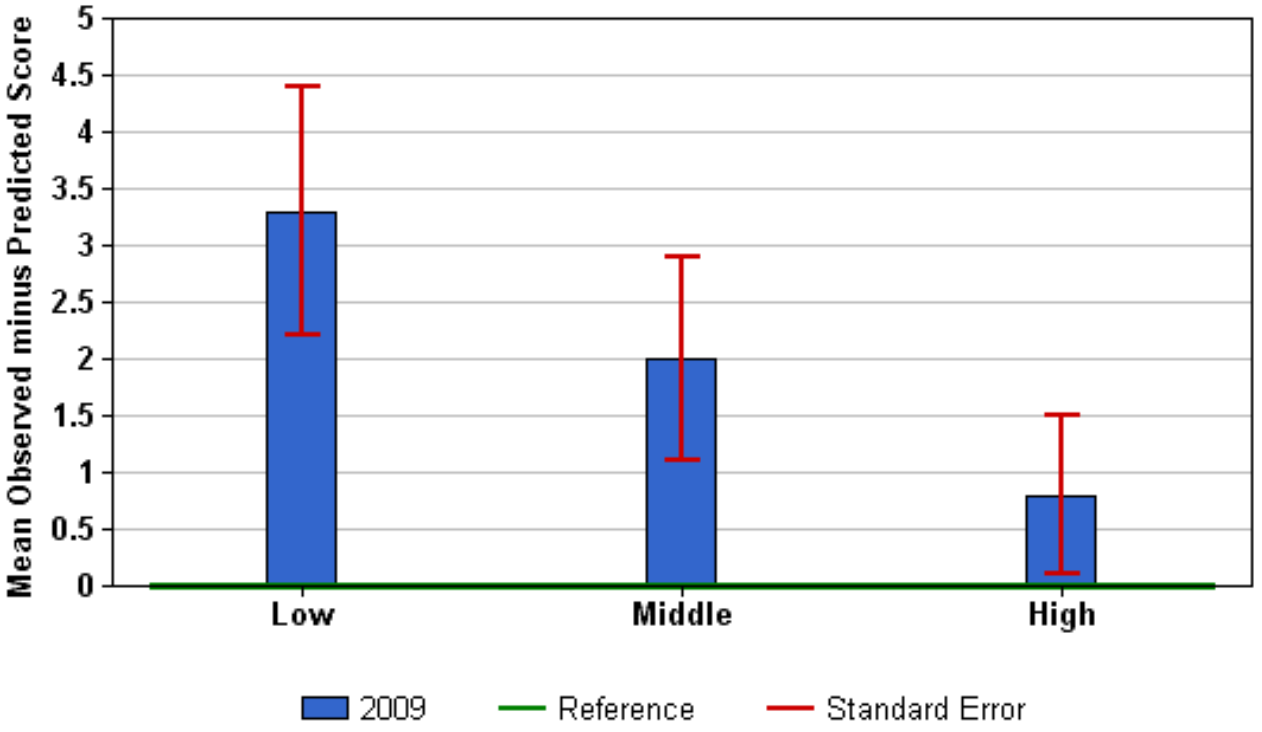
Unexpected Outcomes…

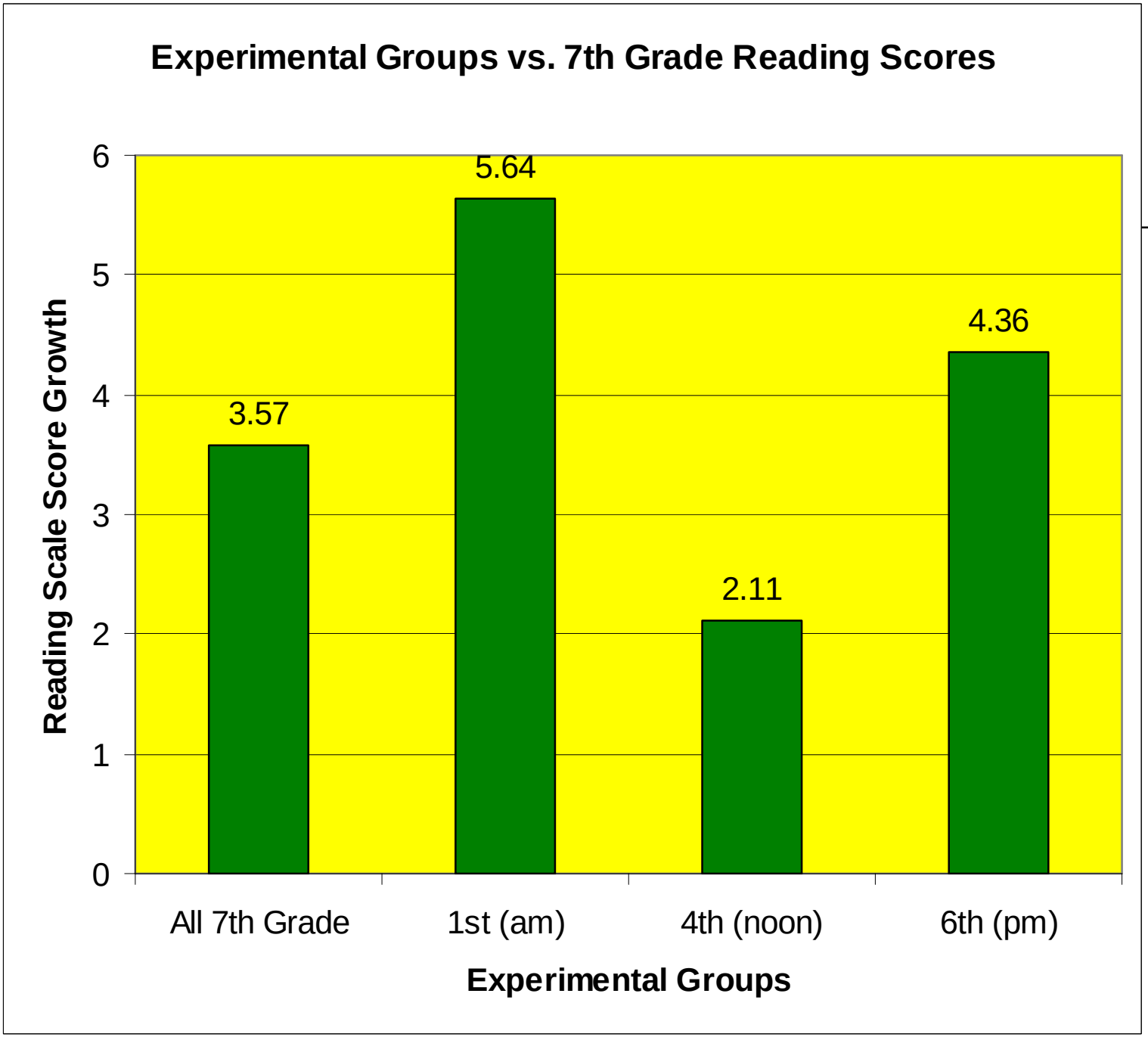
Do all students really need 90 minutes of math daily to improve?

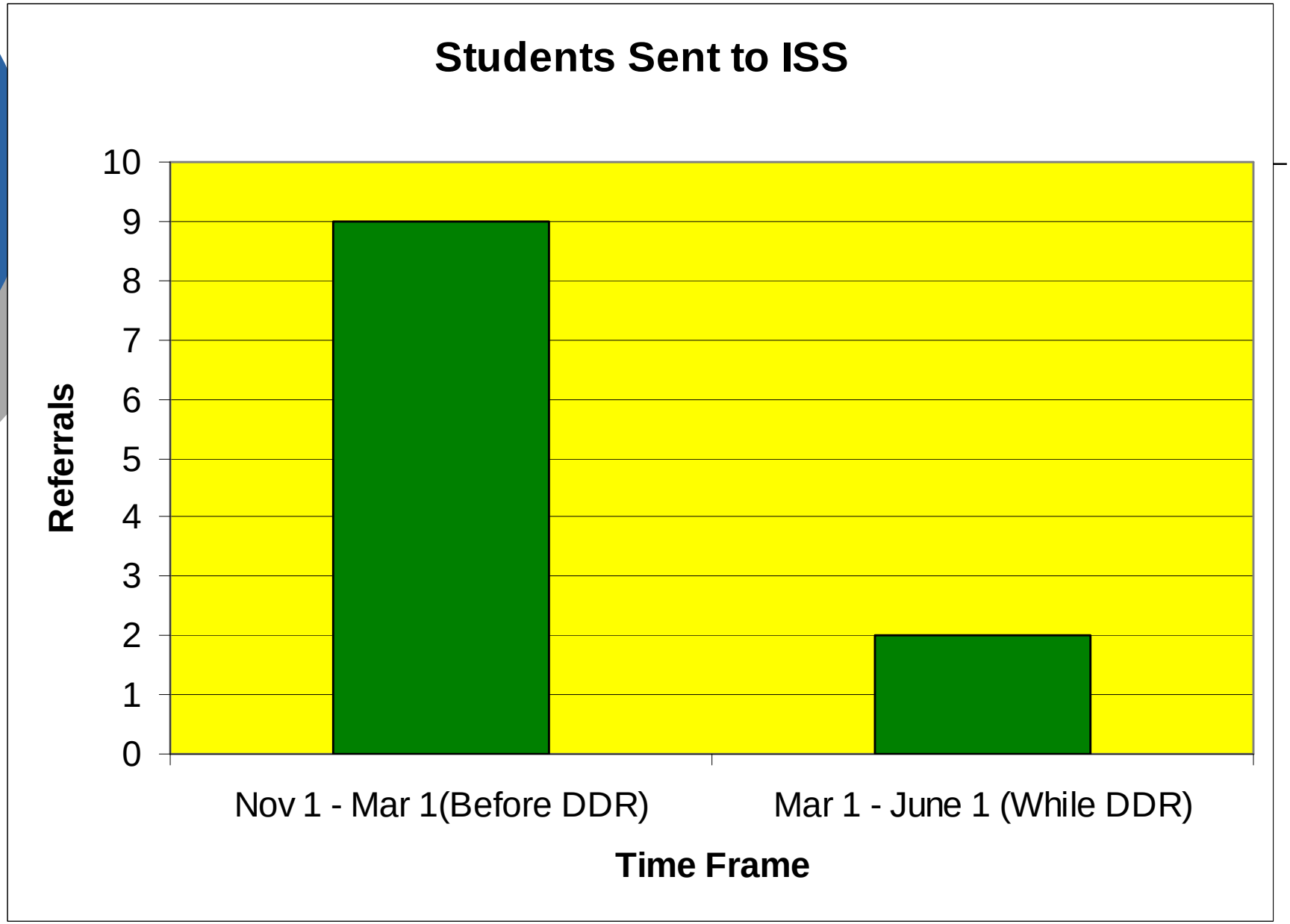

Experimental Group at WMS vs RMS Success by Probability Categories
Percent Passing
120
100
80
60
40
20
0
100
100
80
100
71.4
18.2
71.4
0
40-49%
30-39%
20-29%
<20% -4%
Probability of Passing
WMS
RMS

	EVASS Probability Ranges of Scoring Level 3 (Proficient) on Math EOG			
School	**40-49%**	**30-39%**	**20-29%**	**<20% to >4%**
WMS				
N	3	5	7	7
Sum of Probability (Expected)	1.37	1.84	1.69	0.78
Observed (pass)	3 (100.0%)	4 (80.0%)	5 (71.4%)	5 (71.4%)
Efficiency Ratio	**2.19**	**2.18**	**3.31**	**6.45**
RMS **Control**				
N	5	9	11	6
Sum of Probability (Expected)	1.86	3.23	2.64	.71
Observed (pass)	5 (100.0%)	11 (100.0%)	2 (18.2%)	0 (0.0%)
Efficiency Ratio	**2.69**	**2.78**	**0.76**	**0.00**

Lower Half at WMS Exceeds EVASS Projections




Experimental Groups vs. 7th Grade Reading Scores
Reading Scale Score Growth
0
1
2
3
4
5
6
3.57
5.64
2.11
4.36
All 7th Grade
1st (am)
4th (noon)
6th (pm)
Experimental Groups


Students Sent to ISS
Referrals
10
9
8
7
6
5
4
3
2
1
0
Nov 1 - Mar 1(Before DDR)
Mar 1 - June 1 (While DDR)
Time Frame

MATCH with Dropout Prevention Implications

- Potential savings increased tests scores, fewer retentions and discipline problems
- Improvement in areas which are predictors of students at risk for dropout
- Currently, each class of dropouts in NC (23,000) cost $169 million, and will cost the state $8 billion over their working lifetime.

MATCH

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*… a personal **Wellness Program** for Students*

What Educators are thinking…

EOG’s are a part AYP and NCLB

BMI’s are not!

MATCH… a personal wellness program for students

- Encompasses objectives of CSHP, ESMM, HAC working with SHAC's
- Lessons and activities aligned with the NC Standard Course of Study
- Develops EOG Test Skills
- Developed to work with NCWISE
- Aligned with AMA Recommendations
- Provides early identification of "at risk" students for health issues.

MATCH

- Behavior modification program
- Uses incentive-based rewards based on personal goals
- Teaches students life-skills to make healthy decisions
- Health and choices are the focus- NOT “Weight”

Five “-ates” of MATCH

- Evaluate
- Educate
- Motivate
- Participate
- Celebrate

MATCH "5-ates": Evaluate-MATCH Measures

- Height and Weight
  - BMI calculation
- Blood pressure
- Physical Fitness
- Self report questionnaires
  - Physical Activity
  - Eating Habits: Quantity and Quality
  - Technology/screen Time Usage

MATCH "5-ates": Evaluate- Fitness Testing using Fitnessgram

- Cardio-Respiratory Endurance- PACER TEST
- Body Composition- BMI
- Low-back Flexibility- Sit-and-Reach Test
- Abdominal Endurance- Curl-ups
- Shoulder Endurance- Modified Pullups

Educational Components

- HORIZONTAL ALIGNMENT has characteristics of “thematic units”
- Relevant topics reinforced across curriculum with aligned lessons for skill development
- Opportunity for content-based writing.
- Computer Skills applied to classroom lessons using student’s own data.
- Applies principles of Brain-Based Learning
- Incorporates multiple learning theories

MATCH "5-ates": **Educate-** Science Class

- "Body Systems" approach to wellness
- Teach aspects of exercise, nutrition, and related diseases while teaching corresponding body systems.
- This progression frames MATCH activities and other lessons
- Students evaluate current behavior patterns compared to desired healthy behaviors.

MATCH "5-ates": Educate

- Math- BMI calculation, percentages, formulas, ratio and proportion, caloric balance (check book skills)
- Language Arts- persuasive writing, journaling, contracts, non-fiction reading
- Technology Skills- database, spreadsheet, multimedia presentation skills,
- Healthful Living, fitness testing, personal fitness plans, nutrition education.

MATCH "5-ates": Motivate

- Individual plans
- Goal-setting
- Incentives, rewards and recognition based on progress
- Graphical analysis of personal results
- Accountability- taking personal responsibility for decisions and actions.

MATCH "5-ates": Participate

- Participation in a variety of age-appropriate programs to increase PA
- Behavioral skills to make informed, healthy decision, when presented "choices"
- Support system necessary to achieve success.
- This school has designated 30 minute noon physical activity program

Physical Activity Programs

- Walk to Raleigh
- 10-K Every Day
- Jump Rope "Throwdown"
- MATCH "Dance Off"
- Bikes, Blades, & Boards
- Relay for Life
- "Aerobic Dance
- 3 on 3 Basketball Tourneys
- "After-School Walk and Talk"
- Intramurals
- DDR
- Wii Fit, Wii Sport (grant funded 2008-9)

ECU Evaluation and Summary

- Evidence base for MATCH approach
- Explanation of results and limitations
- Policy implications
- Summary

National scientific review and academic dissemination

- Results have been/will be presented at:
  - American College of Preventive Medicine (2009)
  - Pediatric Academic Societies (2009,10)
  - National Initiative for Children's Healthcare Quality (2009,10)
  - CDC Weight of the Nation Conference (2009)
- Dr. Lazorick funded by Robert Wood Johnson Foundation to study MATCH
- Manuscript to be submitted next month to Journal of Pediatrics and Adolescent Medicine

Evidence base for MATCH methodology

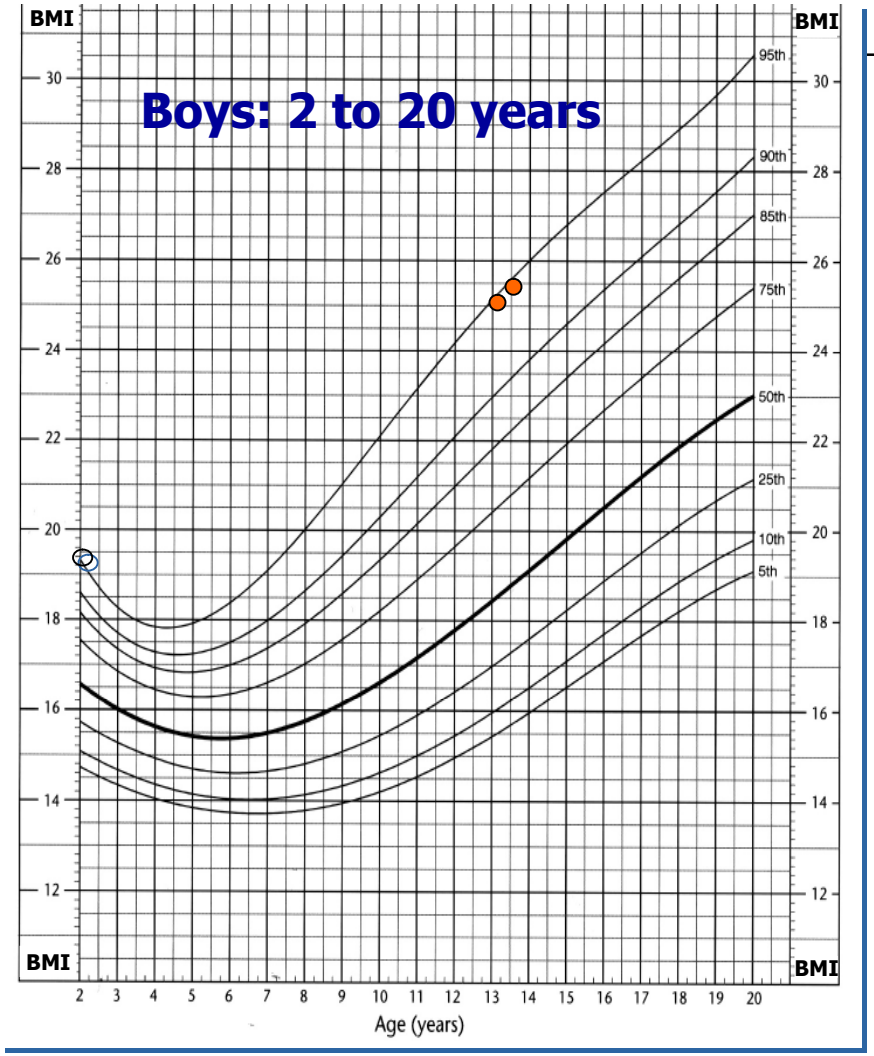
- Combines group education with strategies for individual behavior change
- Based on Social Cognitive Theory- the basis of effective clinical treatment
  - Goal setting, tracking, rewards
  - Social support
- Developmentally appropriate
- Aligned with the 2007 AMA Expert Panel Recommendations*

*Barlow S. Expert Committee Recommendations Regarding the Prevention, Assessment and Treatment of Child and Adolescent Overweight and Obesity: Summary Report, (2007). *Pediatrics, 120*.

Explanation of MATCH Outcomes

- Body Mass Index
  - What is an appropriate "outcome measure" in a short term intervention in adolescents?
  - Weight, Height and Body Mass Index are all still increasing at this age
- Fitness measures-
  - Cardiovascular Fitness, PACER test (*Fitnessgram*®)

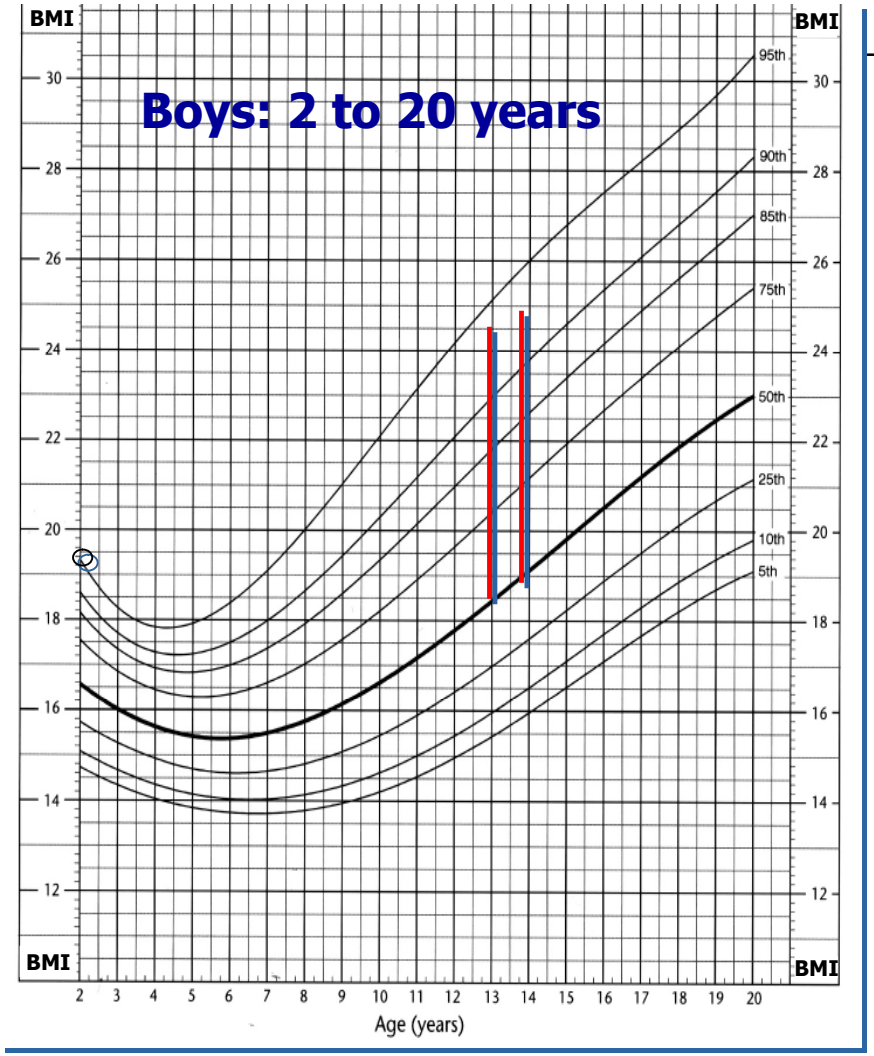
For Children, BMI Changes with Age



- Between age 12-14 years, BMI will increase with <u>normal growth</u>.

- Expected BMI increase:
  - 14 weeks: 0.25
  - At 18 months: 1.5

BMI Z-Score



- To detect change over a short time period, BMI Z-score is the best measure*
- Z-Score is the number of standard deviations from the mean (50th%ile) BMI

*Ref: Paluch, R.A., Epstein, L.A., & Roemmich, J.H. (2007). *Am J Human Biol, 19*, 487-494.

Example of detecting change with BMI Z-score

	Ht (in)	Wt (lbs)	BMI	BMI %ile	BMI Z-Score
Baseline	63	168	29.76	97	1.98
Follow-up	63.5	171.5	29.9	97	1.89

Therefore- in MATCH we defined "success" as *any decrease* in BMI Z score for the overweight or obese students

BMI results- Overweight

	Cohort 1 (n=23; 21 at 1 year)		Cohort 2 (n=16; 15 at 1 year)	
	Post-MATCH	One-yr later	Post-MATCH	One-yr later
BMI Z-score change	-0.13 (<0.01)	-0.13 (0.12)	-0.14 (<0.001)	-0.17 (=0.03)
BMI %ile change	-2.58 (<0.01)	-3.8 (0.061)	-2.83 (<0.001)	-4.41 (=0.04)

Weight category results after 1 year- Overweight subgroup

- Cohort 1: Of 20 overweight at start, 7 were Healthy Weight at 1 year
- Cohort 2: Of 15 overweight at start, 8 were Healthy Weight at 1 year
- **Combined: 42.8% (15/35) of Overweight students achieved Healthy Weight after 1 year**

Cardiovascular Fitness Results- Cohort 3 (4 schools)

Schools	PACER Mean Change from Baseline (SD)
Williamston Middle	**5.6** (12.7)**
Roanoke Middle	**7.9* (30.4)**
Washington County Union	**4.7** (10.7)**
Ayden Middle	**4.3* (12.2)**

*Indicates Significance at the p<.05 Level
**Indicates Significance at the p<.001 Level

Teacher feedback

- Surveys and focus groups completed spring 2009 with all 7th grade teachers from 4 schools
- Teachers (n=22) say MATCH curriculum
  - fits within NCSCOS (91% yes)
  - takes same or less time to prepare lessons (81%)
  - should be expanded to other schools (100%)
  - is likely to achieve its goals (91%)
  - provided the teacher with better understanding of obesity (82%)

Limitations

- Follow up data are from single site intervention (small numbers) without control group
- Medicaid savings estimates based on limited information
  - Economist had few data sources for children to use to project cost/savings

Policy Implications

- Accountability for existing Healthful Living curriculum in Middle School
- Enforcement of existing 30 min daily physical activity in middle schools- as per HAC
- Optimizing time in PE class
- Enhancing school facilities for age-appropriate PA
- Improving nutritional offerings to support healthy choices

Summary

- **More study is needed, but after 3 years of development and evaluation, MATCH:**
  - Appears to be effective for obesity prevention **and for intervention** for kids already overweight
  - may have positive academic effects
  - can be implemented largely using existing resources
  - is ready for web-based roll out
  - is feasible to and recommended by administrators and teachers

For more information

on MATCH

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