Improving Children's Nutrition and Health Through School-Based Agriculture Programs

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Outline

I. Current Health Trends of Children

II. Garden-based Nutrition Education

III. Farm to School Programs

IV. Multicomponent School-Based Nutrition and Agriculture Programs

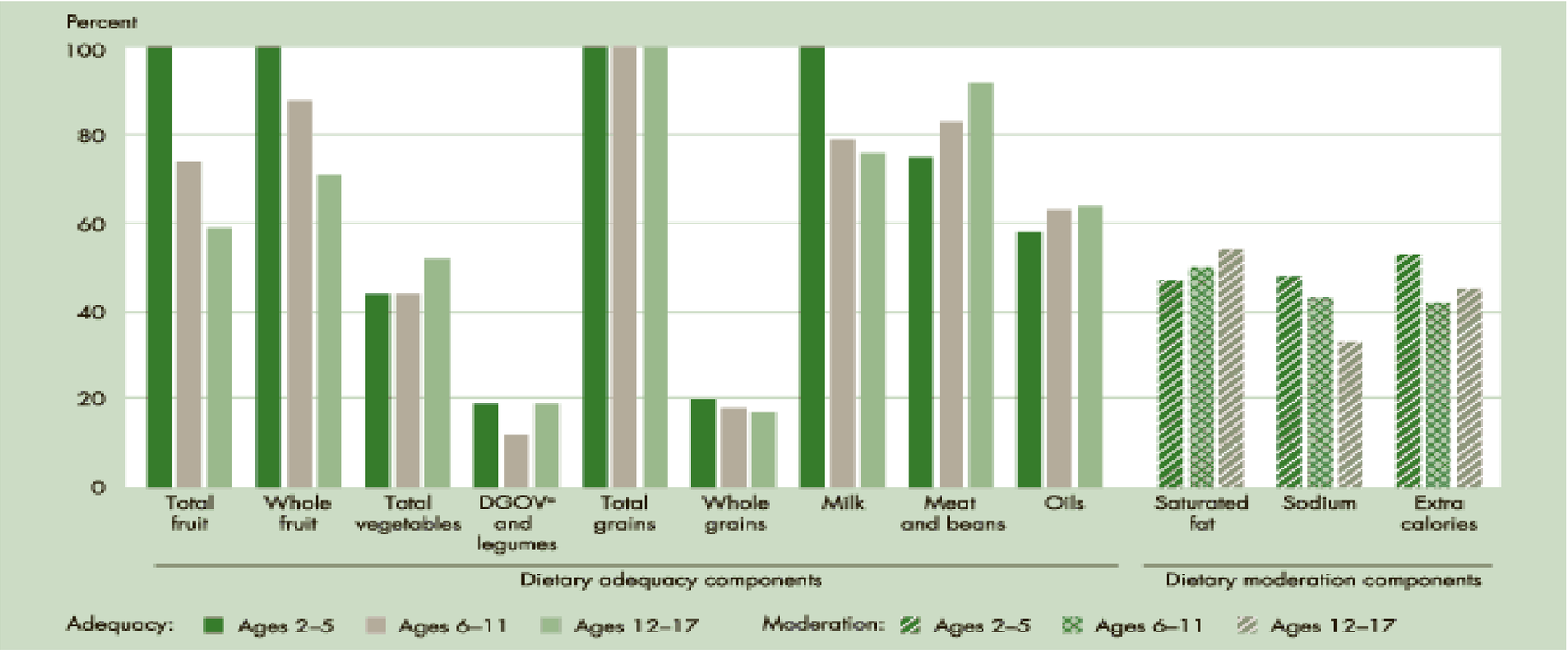
Health Trends
Children (2-19 years of age)

- Children's diets do not meet national US recommendations
- Desirable physical activity levels are not being met
- Obesity rates are increasing
  - Approximately 17% (or 12.5 million) of children and adolescents aged 2—19 years are obese.
- Adult diseases are showing up in children

Health Trends
Children (2-19 years of age)

- Children’s diets do not meet national US recommendations

INDICATOR HEALTH6: AVERAGE DIET SCORES FOR CHILDREN AGES 2–17, EXPRESSED AS A



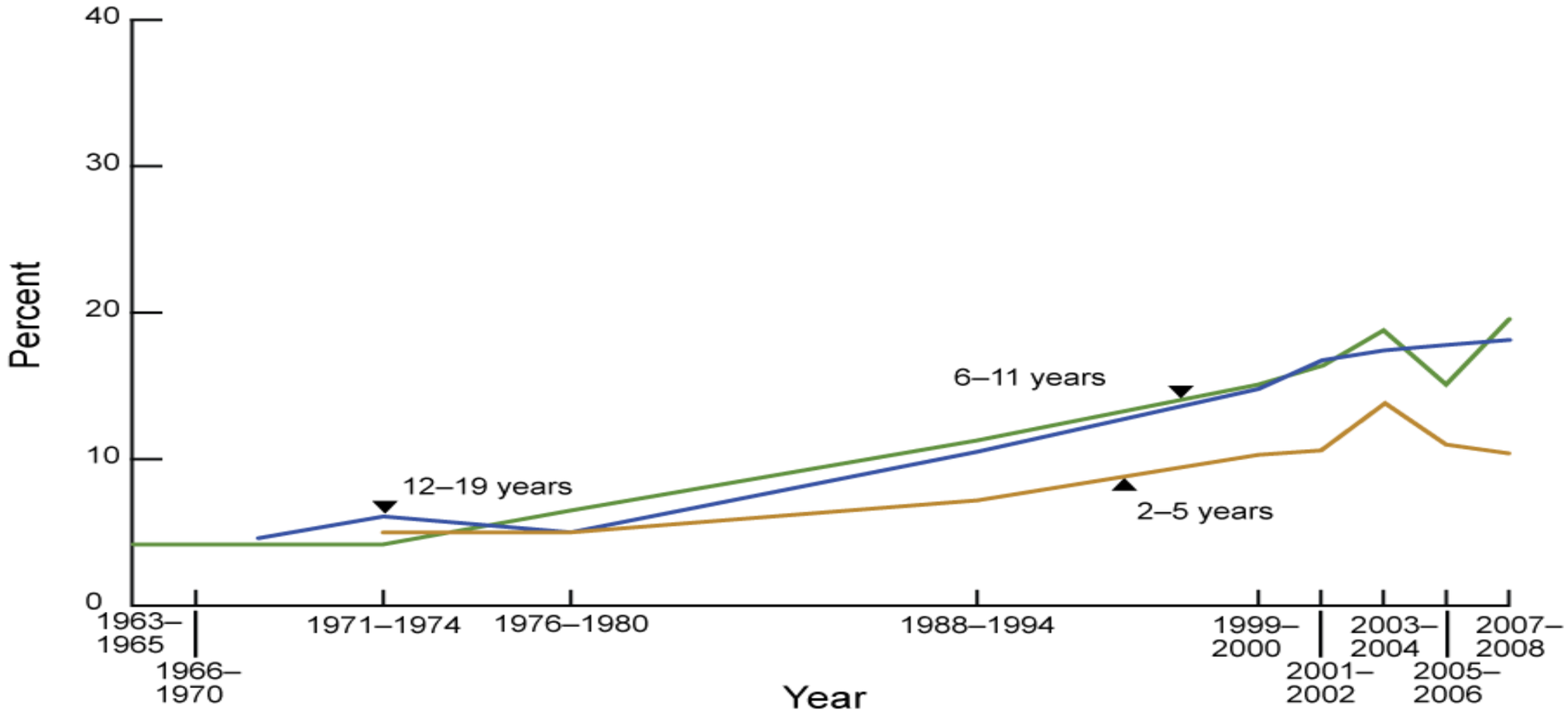
Health Trends
Children (2-19 years of age)

- Desirable physical activity levels are not being met
  - <40% meet current physical activity recommendations

- Youth Risk Behavior Surveillance System (YRBSS; http://www.cdc.gov/HealthyYouth/yrbs/), National Health and Nutrition Examination Survey (NHANES; http://www.cdc.gov/nchs/nhanes.htm), and the National Health Interview Survey (NHIS; http://www.cdc.gov/nchs/nhis.htm).

Health Trends
Children (2-19 years of age)

Figure 1. Trends in obesity among children and adolescents: United States, 1963–2008



NOTE: Obesity is defined as body mass index (BMI) greater than or equal to sex- and age-specific 95th percentile from the 2000 CDC Growth Charts.
SOURCES: CDC/NCHS, National Health Examination Surveys II (ages 6–11), III (ages 12–17), and National Health and Nutrition Examination Surveys (NHANES) I–III, and NHANES 1999–2000, 2001–2002, 2003–2004, 2005–2006, and 2007–2008.

What can be done?

The school setting is an ideal place for creating a healthy environment that supports physical activity and nutritious dietary habits.

Why schools? Why gardens?

- Today's children lack an understanding of the impact farming has on their lives.

- The incorporation of agriculture into the school environment and classroom curriculum can provide an avenue in which to discuss the importance of a healthy diet while creating a school environment that promotes healthy behaviors.

History of School Gardens

- Originated in Europe
- Arrived in US in the 1890s
- Increase in numbers in early 20th century
- Decrease in numbers in 1950s
- Recent surge in popularity

School-based nutrition, health and agriculture programs

- It is imperative to investigate creative and effective healthful eating initiatives
- Schools can provide a hub for networking with
  - Families
  - Health partners
  - Agricultural community
  - Other community members

Garden-Enhanced Nutrition Education:
Nutrition To Grow On (NTGO)

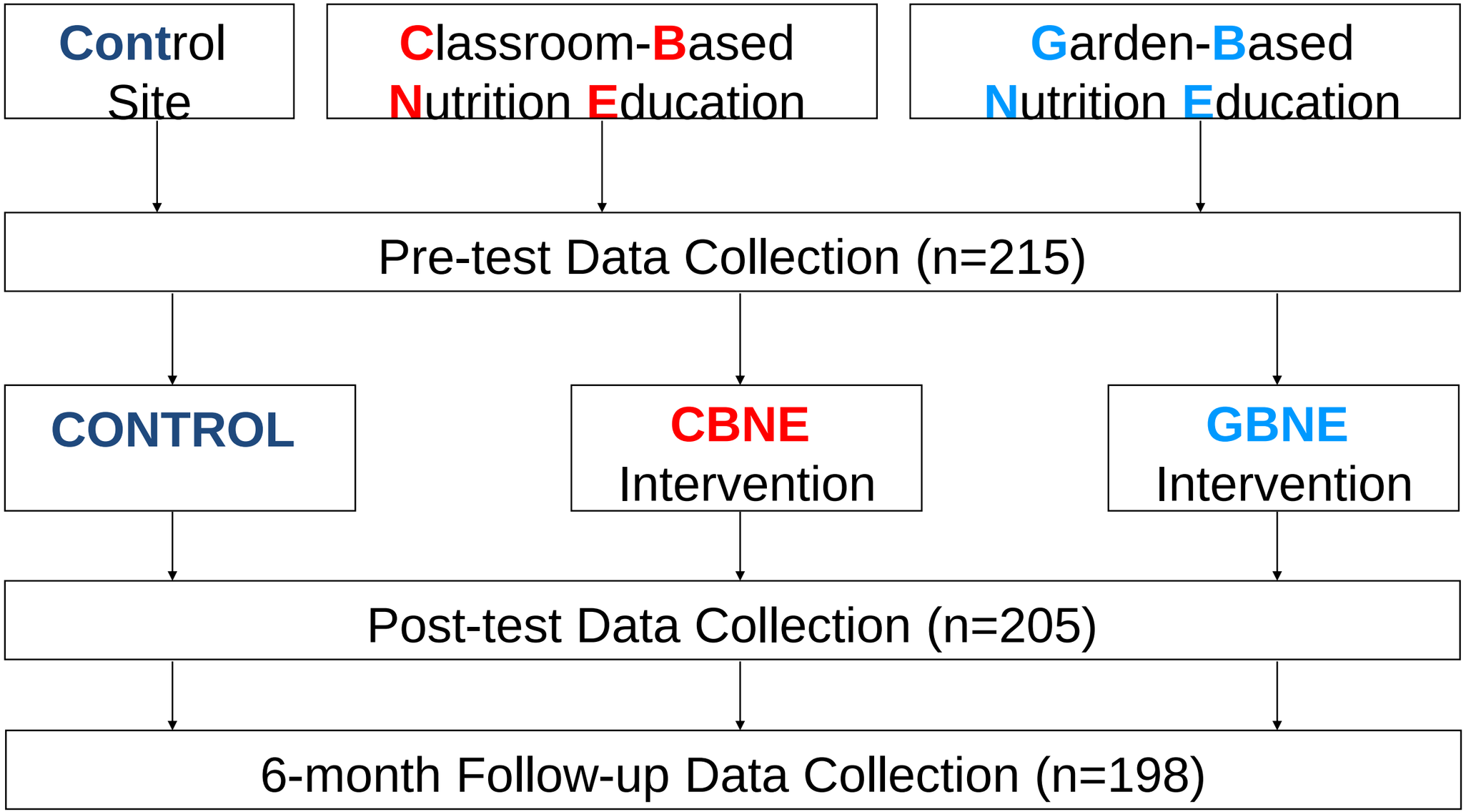
Objective: To develop a curriculum designed to improve the nutrition knowledge and vegetable preferences of upper-elementary school children.

Morris, J.L., and Zidenberg-Cherr, S. *Garden-Enhanced Nutrition Curriculum Improves Fourth-Grade School Children's Knowledge of Nutrition and Preferences for Some Vegetables*, JADA 102(1): 91 - 93

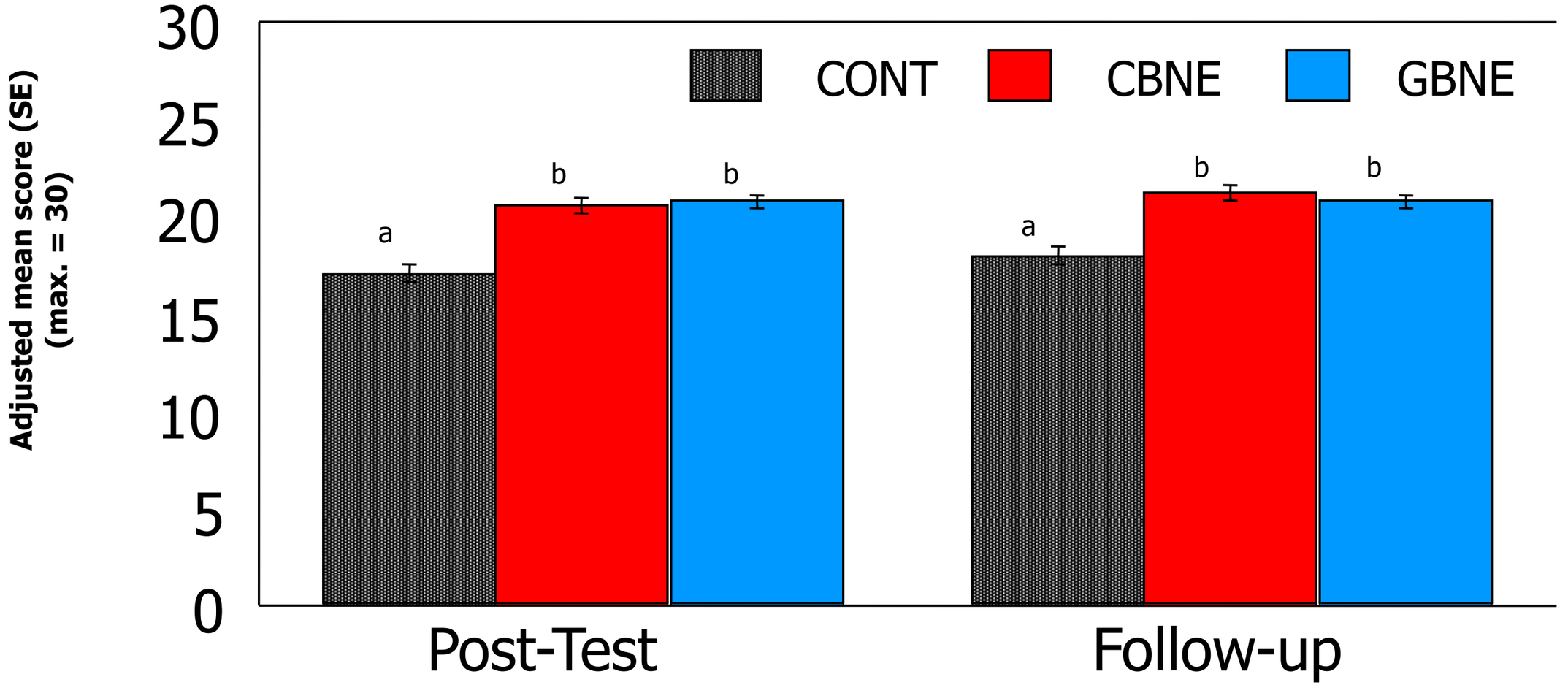
Nutrition to Grow On: Content

- Lesson Topics
  - Plant Parts
  - Nutrients
  - Food Guide Pyramid
  - Servings Sizes
  - Food Label
  - Physical Activity
  - Goal Setting
  - Consumerism
  - Snack Preparation
- Gardening Component
  - Linked to Each Topic
  - In-class Discussion
  - Hands-on Activity

Garden Enhanced Nutrition Education

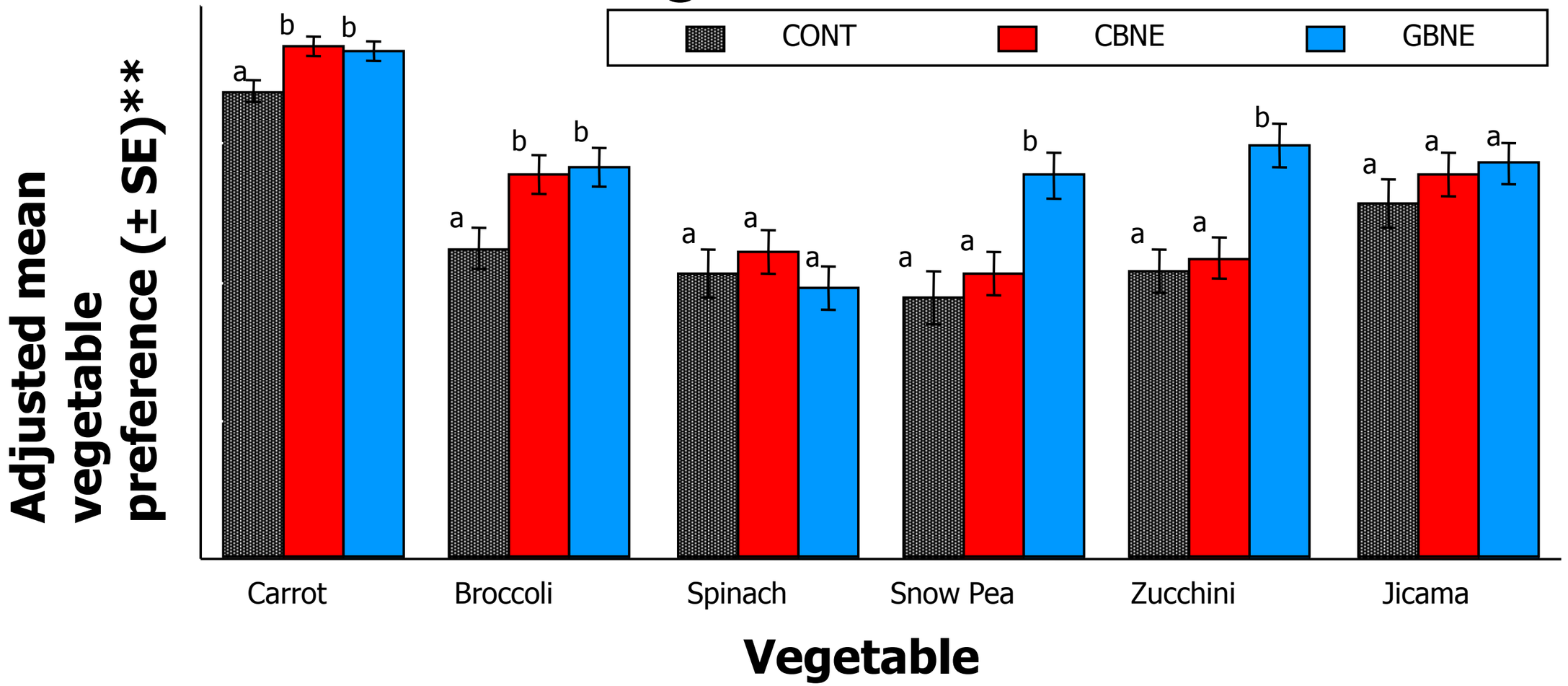


Mean nutrition knowledge score *



* Means are adjusted for pre-test values. Means with a superscript in common within each time point are not significantly different ($p < 0.01$).

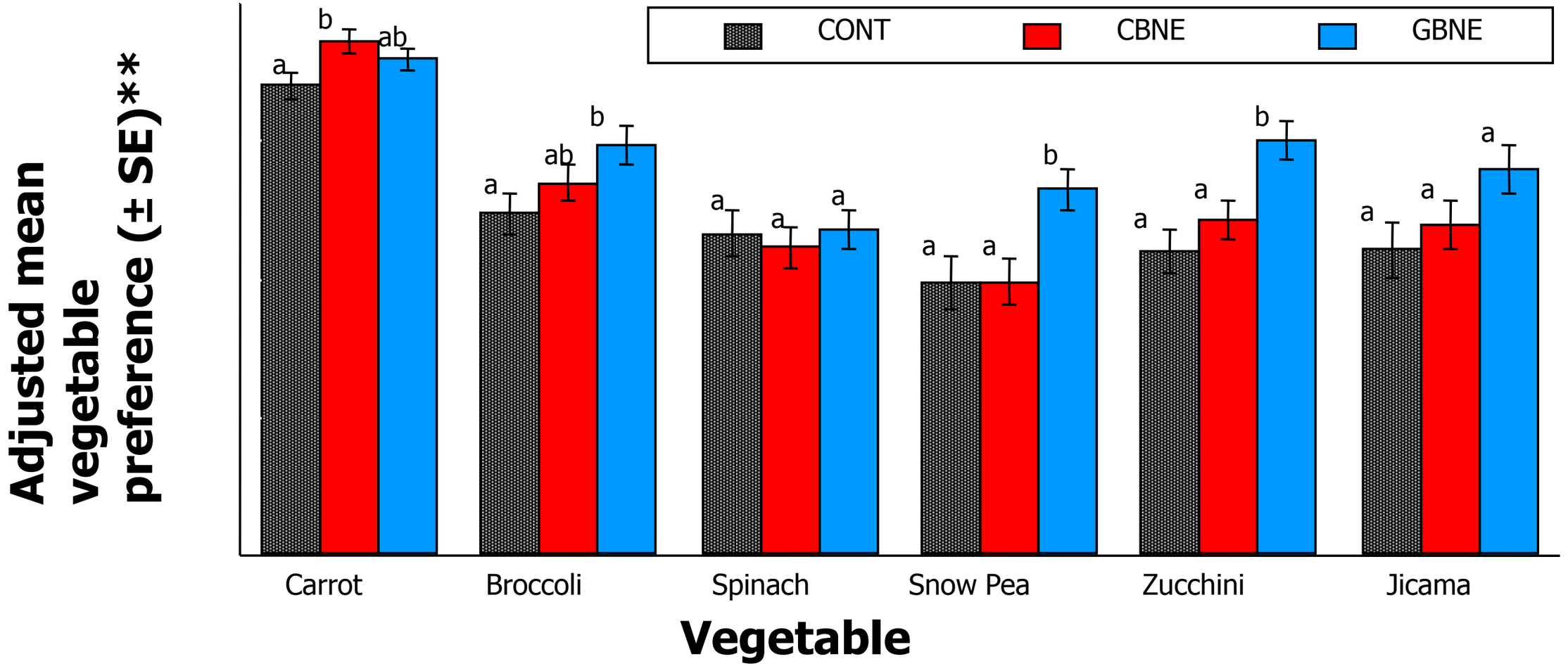
Students' preferences for vegetables immediately following intervention*



* Mean scores are adjusted for pretest values. Means with a superscript in common within each vegetable are not significantly different ($p < 0.01$).

** 5 = I really liked it a lot; 4 = I liked it; 3 = It was OK; 2 = I did not like it; 1 = I really did not like it.

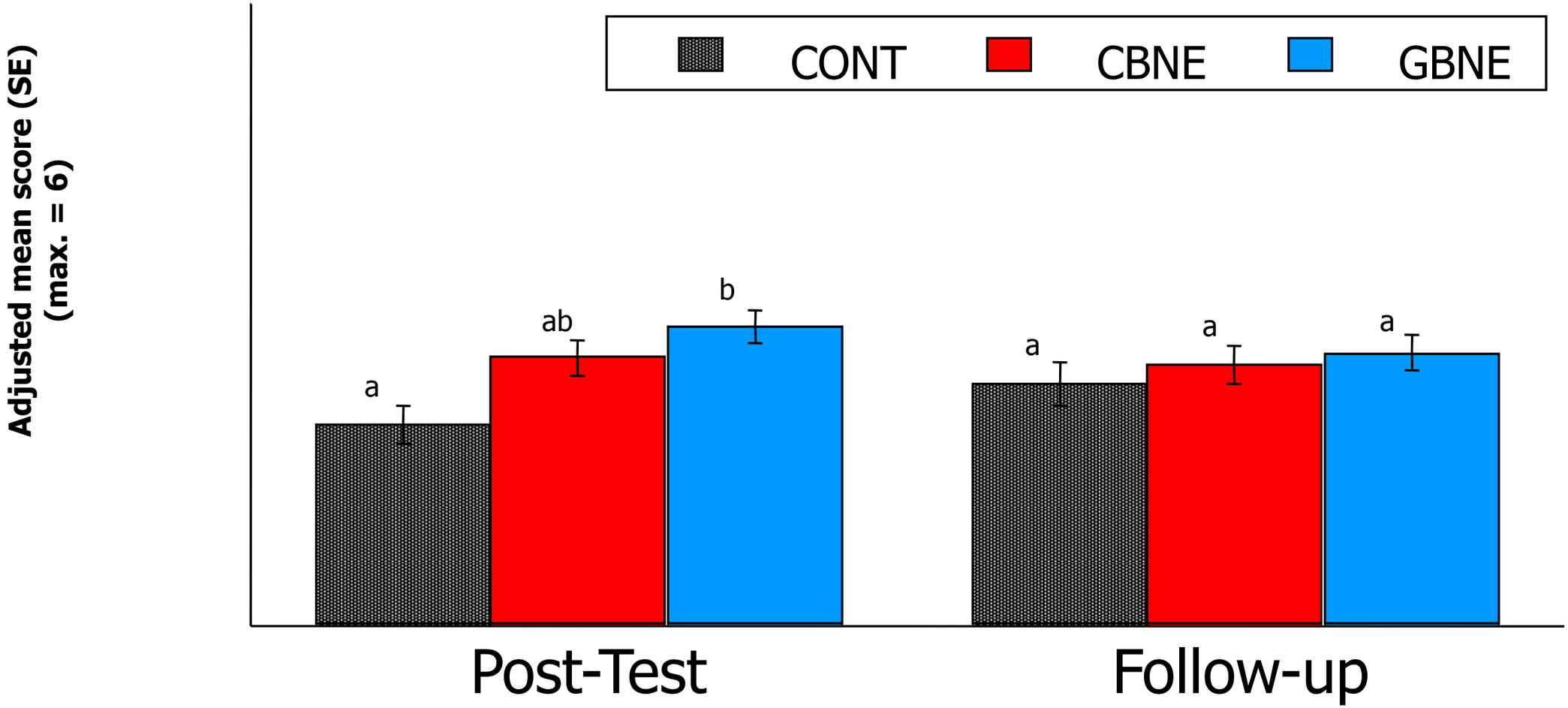
Students' preferences for vegetables six months after intervention*



* Mean scores are adjusted for pretest values. Means with a superscript in common within each vegetable are not significantly different ($p < 0.05$).

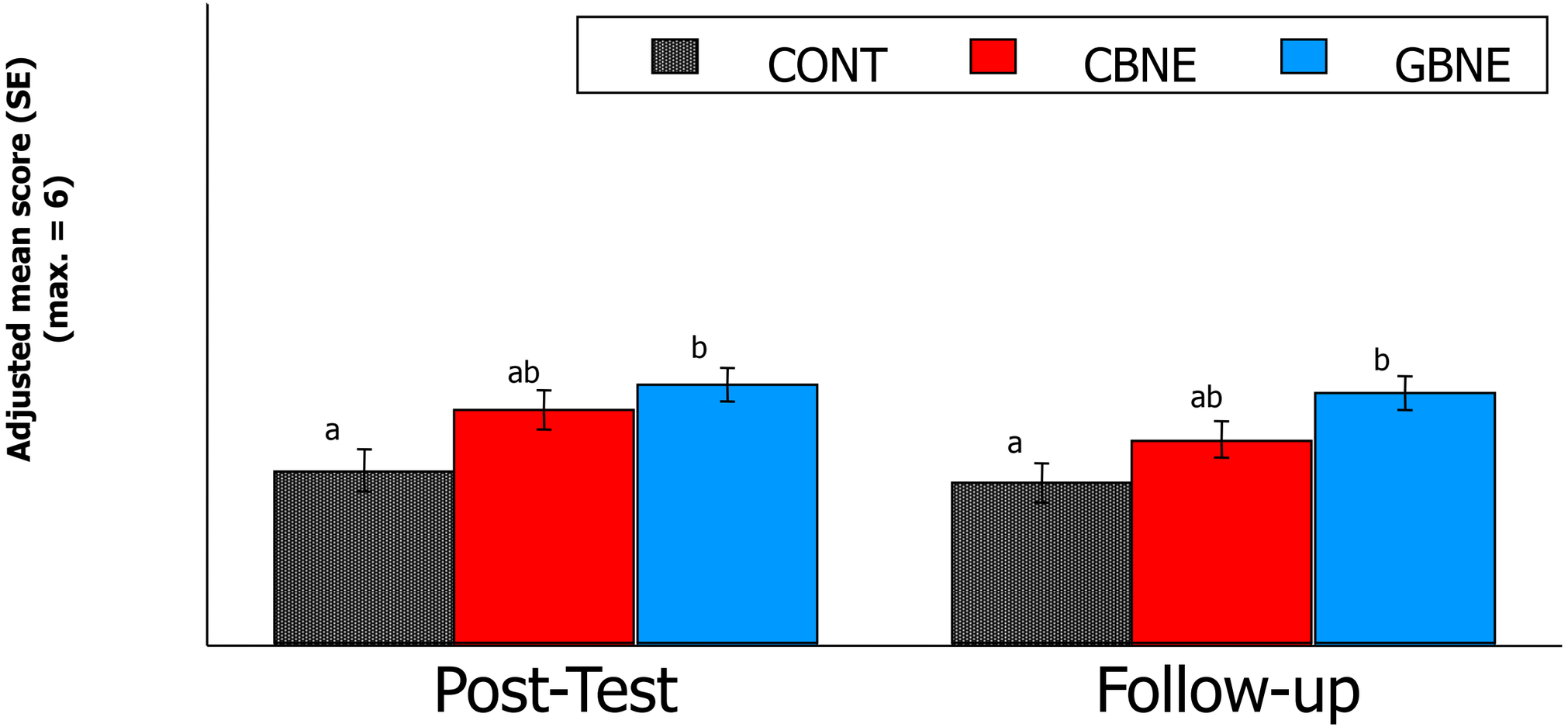
** 5 = I really liked it a lot; 4 = I liked it; 3 = It was OK; 2 = I did not like it; 1 = I really did not like it.

Students' willingness to ask a family member to buy vegetables *



* Means are adjusted for pre-test values. Means with a superscript in common within each time point are not significantly different ($p < 0.005$).

Students' willingness to eat vegetables as a snack *

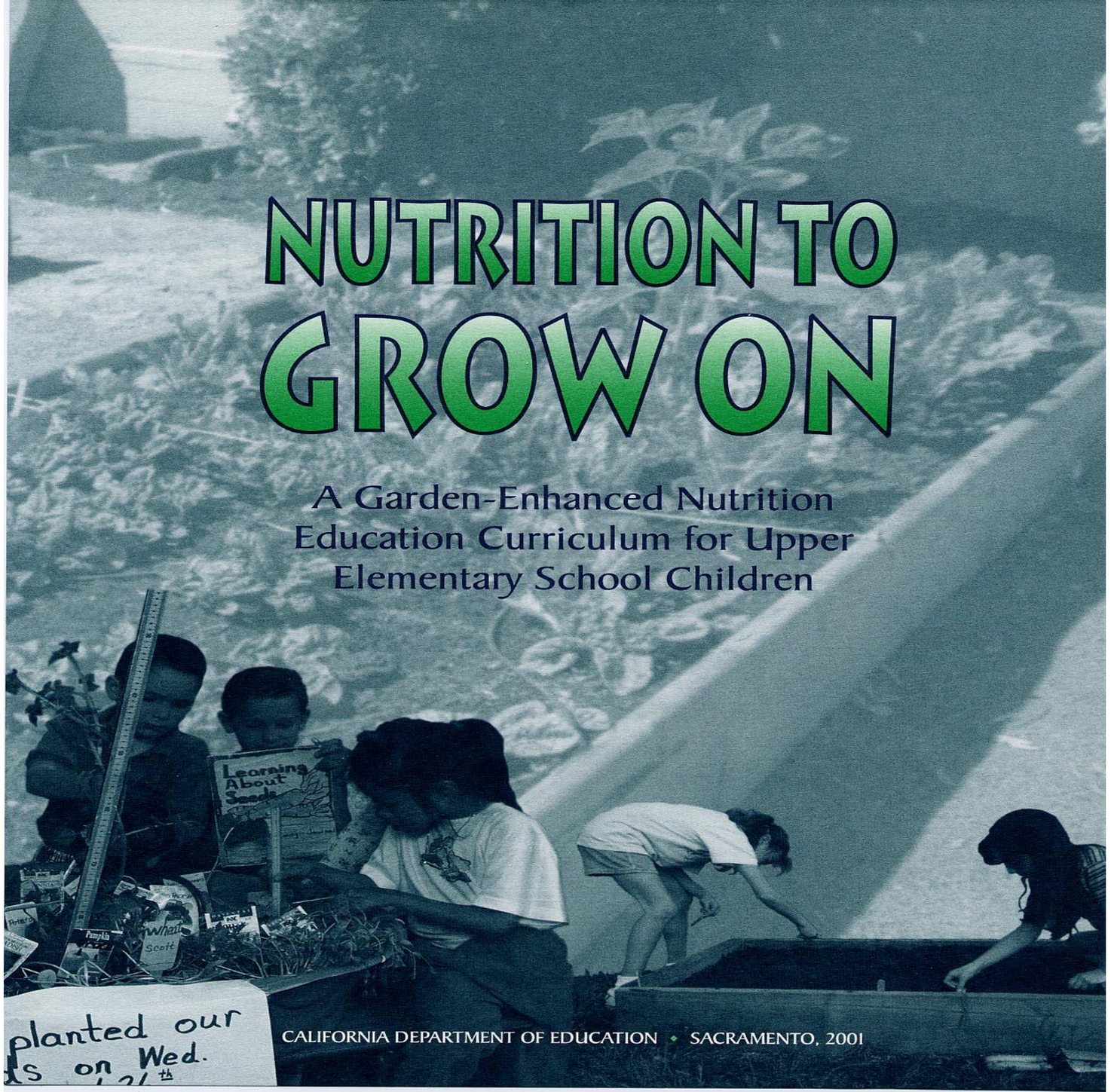


* Means are adjusted for pre-test values. Means with a superscript in common within each time point are not significantly different ($p < 0.01$).

NTGO: Conclusions

This garden-enhanced nutrition education program is effective at improving fourth graders':

- Nutrition knowledge
- Preferences for vegetables
- Willingness to ask family to buy vegetables
- Willingness to eat vegetables as a snack



Nutrition To Grow On:

A Garden Enhanced Nutrition Education Curriculum for Upper-Elementary Schoolchildren

(CDE Press, 2001, 2012)

http://cns.ucdavis.edu

Research to Build On

Select garden-enhanced education programs are effective at improving students':

- Nutrition knowledge[1]
- Consumption of vegetables [3, 4]
- Preferences for vegetables [1]
- Willingness to ask family to buy vegetables [1]
- Willingness to eat vegetables as a snack [1]

1. Morris, J.L. and S. Zidenberg-Cherr. (2002). "Garden-enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables." J Am Diet Assoc. 102: 91-93.
2. McAleese, J.D. and L.L. Rankin. (2007). "Garden-based nutrition education affects fruit and vegetable consumption in sixth-grade adolescents." J Am Diet Assoc. 107: 662-665.
3. Ratliffe et al (2011). "The effects of school garden experiences on middle school-aged students knowledge, attitudes, and behaviors associated with vegetable consumption. Health Promotion and Practice 12: 36-43.

School Gardens

- Engaging environment for use in comprehensive school health programs
- Enhanced communication among students, families and their community
- Link schools with families and communities to promote healthy lifestyle and prevent disease

School Gardens: Benefits for Children

- Academic Achievement
- Health and Nutrition Education
- Environmental Stewardship
- Community and Social Development

Significantly Higher Scores, Science Achievement Tests

- Lieberman & Hoody. (1998). “Closing the Achievement Gap”
- C.D. Klemmer, Waliczek & Zajicek. (2005). Temple, Texas study of science achievement (647 students, Gr. 3-5) “Compared conventional science delivery to science with garden-based learning”
- Smith & Motsenbocker. (2005). Inner city low income public school in Baton Rouge, LA “Used hands-on gardening activities with experimental group vs. none with control group”

Personal and Social Development

Texas Master Gardener classroom garden project showed improvement in:

- Self-esteem
- Sense of ownership and responsibility
- Family relationships
- Parental involvement

Alexander, J., and D. Hendren. (1998). Bexar County Master Gardener Classroom Garden Research Project: Final Report. San Antonio, Texas.

Improving Children's Health through Farming, Food and Fitness

The CHF3 program:

1. Established salad bars
2. Incorporated nutrition education into classroom lessons
3. Created a garden
4. Developed a food waste composting system

Heneman, K., Junge, S.K., Schneider, C., Zidenberg-Cherr, S. *Pilot Implementation of the Improving Children's Health through Farming, Food, and Fitness program in select California schools.* Journal of Child Nutrition and Management.; 32 (1).

Improving Children's Health through Farming, Food and Fitness

Children at both Rock Creek and American Union Elementary Schools increased their nutrition knowledge.

Heneman, K., Junge, S.K., Schneider, C., Zidenberg-Cherr, S. *Pilot Implementation of the Improving Children's Health through Farming, Food, and Fitness program in select California schools.* Journal of Child Nutrition and Management.; 32 (1).

Pilot Study Results

Quotes from the school staff…..

The CHF3 program is “opening a window for the children.”

Students participating in the program “like the new veggies and fruit each week and all are trying things for the first time and learning so much.”

Students “now realize how important it is to be active, eat healthy, and learn about the food we eat.”

Improving Children's Health through Farming, Food and Fitness

School	Finding	Significance
Rock Creek Elementary School	Decreased soda consumption	P= 0.041 60% pre vs. 35% post
Rock Creek Elementary School	Decreased computer use	P= 0.011 0.81 hrs pre vs. 0.33 hrs post
American Union Elementary School	Increase consumption of fruit	P= 0.044 88% pre vs. 97% post
American Union Elementary School	Decreased consumption of cookies	P= 0.00 88% pre vs. 56% post

Heneman, K., Junge, S.K., Schneider, C., Zidenberg-Cherr, S. *Pilot Implementation of the Improving Children's Health through Farming, Food, and Fitness program in select California schools.* Journal of Child Nutrition and Management.; 32 (1).

Eating Healthy From Farm to Fork

Garden Enhanced Nutrition Education for Kindergarten, 1st and 2nd grade

Farm to School

Any programming that connects schools (K-12) and local farms with the objective of serving local and healthy foods in school cafeterias or classrooms.

Common goals:

- Improving student nutrition
- Providing agricultural, health and nutrition education opportunities
- Supporting small and mid-sized local and regional farms

Farm to School

- School foods are purchased directly from farmers
- Experiential learning opportunities are provided, such as
  - farm visits, gardening and recycling programs;
- Farmers participate in programs to educate children about
  - the food system,
  - agriculture, and
  - local foods.

Farm to School: Evaluation

- “Do Farm-to School Programs Make a Difference? Findings and Future Research Needs”
  - Anupama Joshi, Andrea Misako Azuma, and Gail Feenstra, J Hunger and Environmental Nutrition 3: 229-246; 2008

Farm to School: Evaluation

- Farm to School programs are increasing in number across the US yet evaluations published in peer-reviewed journals are limited.
    - Fruit and vegetable consumption from salad bar
    - School lunch participation
    - Student knowledge and attitudes
    - Food service behaviors
    - Farmer behaviors
    - Parent behaviors
- “Further evaluation and research are needed to improve practice and assist programs in meeting their goals”

Farm to School: Evaluation

Willamette Farm and Food Coalition (WFFC)
Springfield School District, Oregon

Integrated educational activities
- HOM
- Farm field trips
- Garden sessions
- Nutrition lessons
- Tasting tables
- Harvest days

- www.farmtoschool.org

Farm to School: Evaluation

Willamette Farm and Food Coalition (WFFC)
Springfield School District, Oregon

Results (not published):

Student's fruit consumption increased > 0.5 servings per day

Student showed an increase in knowledge about Oregon-grown foods and agricultural processes

Perspectives of educators and farmers shared for future projects

- www.farmtoschool.org

Farm to School: Evaluation

Riverside Unified School District, California

Schools received salad bars without any educational activities

“Salad bar eaters” consumed 2 times more fruit servings and 1.66 times more vegetable servings than hot bar eaters

Program created a stable market for produce grown by relatively small farmers

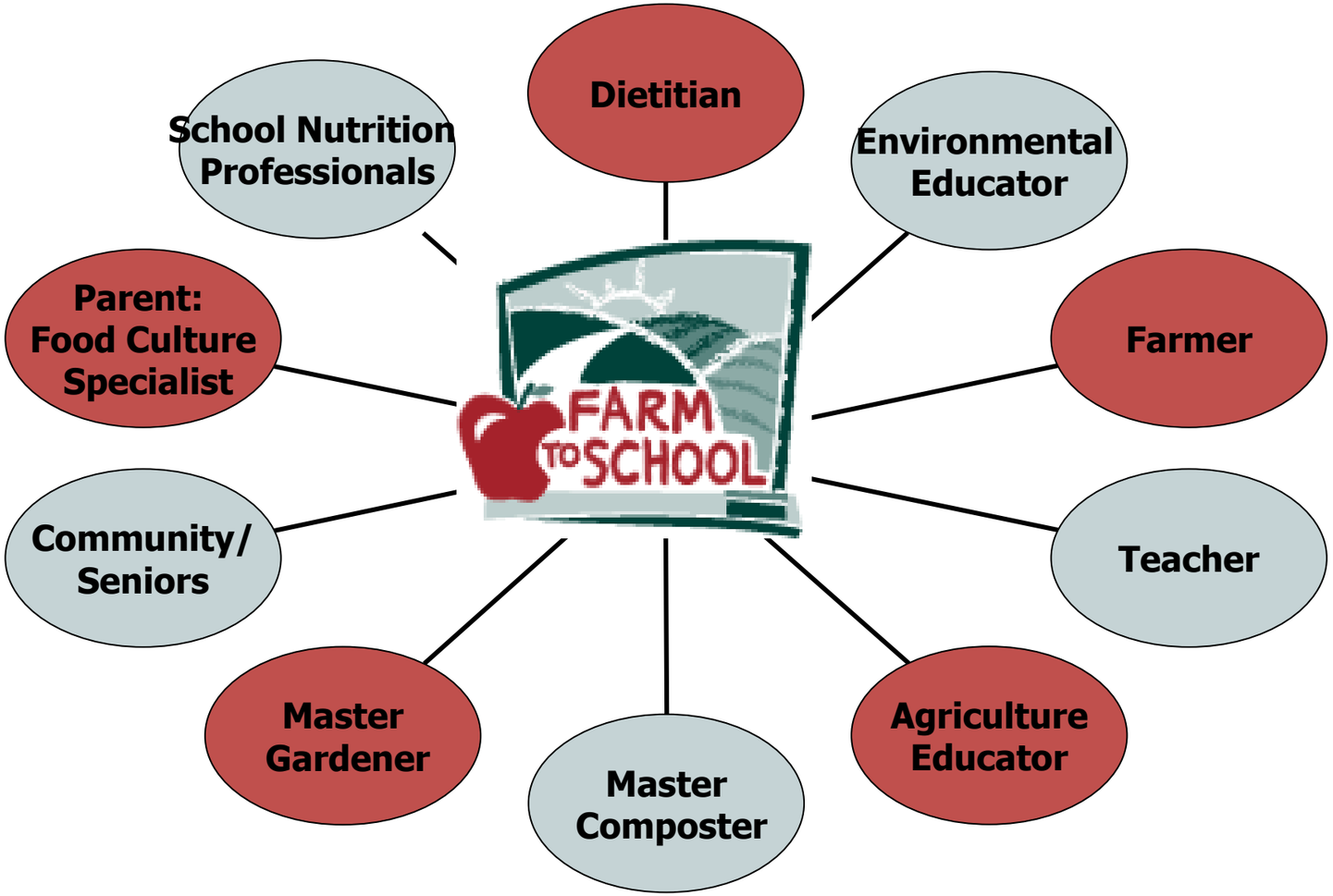
Program facilitated the formation of a farmer cooperative, supporting a more regional food system

- www.farmtoschool.org

What Are the Potential Benefits?

- *Children* start the habit of eating more fresh, locally-produced food early in life, especially when their eating is supported by food and farm education activities including gardening;
- *Farmers* develop new markets with often higher returns for their goods; and
- *Communities* gain understanding of the importance of local agriculture, environmental protection, and farmland conservation.

Farm to School: Opportunity for Collaboration

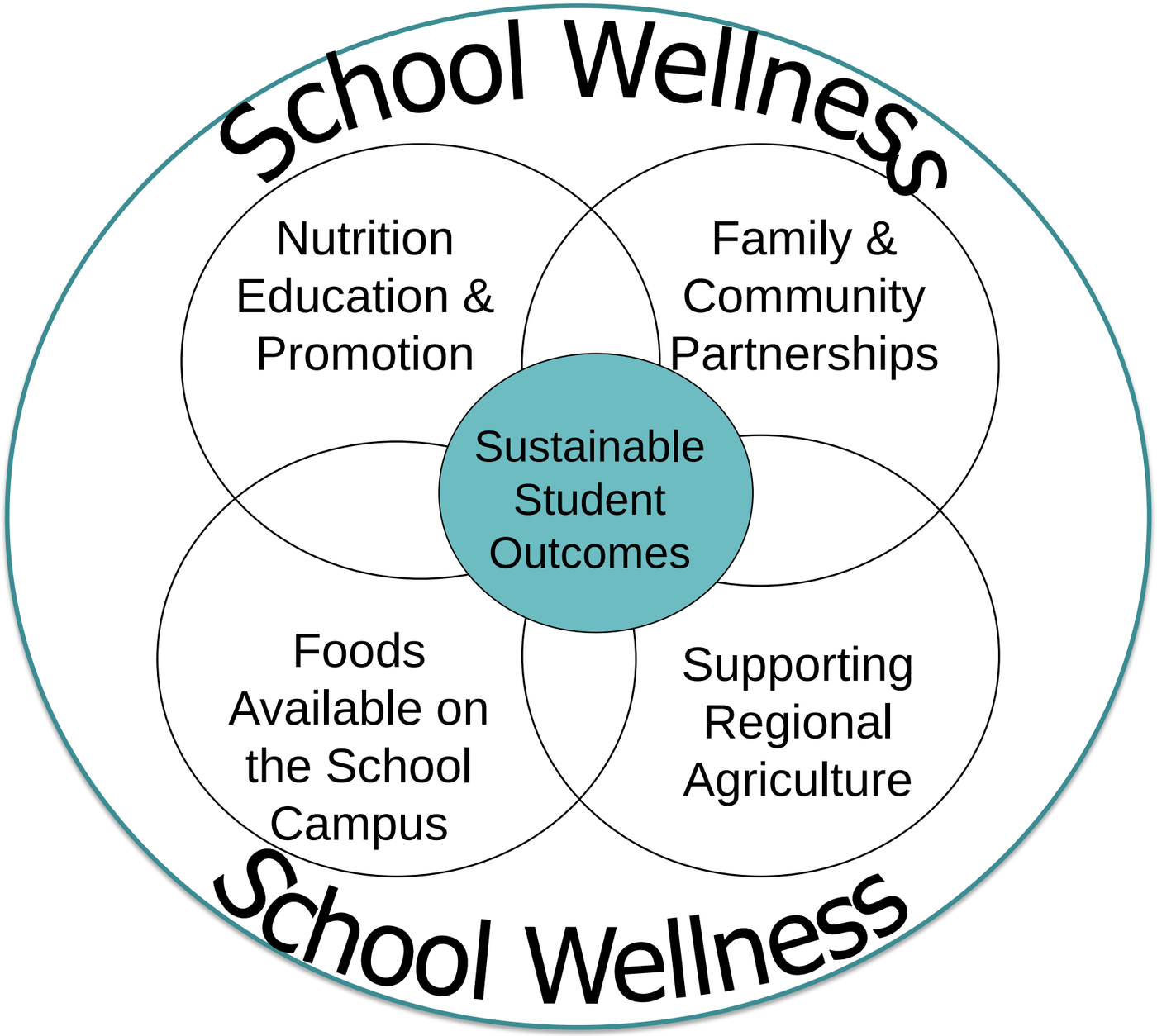


Shaping Healthy Choices Program (SHCP)

UC Davis
- Department of Nutrition
- Department of Human and Community Development
- Agricultural Sustainability Institute
- Foods for Health Institute
- School of Veterinary Medicine
- School of Nursing

UCCE
- Alameda, Butte, Amador/Calaveras, Merced/Stanislaus, Shasta, Sacramento

The Shaping Healthy Choices Program



Objectives:

1. Increase availability, consumption, and enjoyment of fruits and vegetables;
2. Improve dietary and exercise patterns;
3. Improve critical thinking skills;
4. Promote positive changes in the school environment;
5. Facilitate development of an infrastructure to sustain the program

Shaping Healthy Choices Program

- Component 1:
  - Nutrition Education and Promotion
    - Classroom education
      - Curriculum development-inquiry based (NTGO)
      - School garden
      - Healthy cooking demonstrations
      - Physical Activity
      - Science (Critical thinking skills)

Shaping Healthy Choices Program

- Component 2:
  - Family and Community Partnerships
    - Family newsletters
    - School wellness policy leaders
    - Parent and community volunteers
    - Physical activity events
    - Out-of-school programs (4H)
    - Health promotion activities

Shaping Healthy Choices Program

- Component 3:
  - Supporting regional agriculture
    - Procurement strategies developed
      - Plans developed between school nutrition program (SNP) directors/regional distributors/local farmers
    - Professional development for SNP personnel
      - Enhance integration of school meals, nutrition education, school gardens and classroom lessons
      - Trainings on culinary techniques and flavor development strategies; menu descriptors that make vegetables more appealing

Shaping Healthy Choices Program

- Component 4:
  - Foods available on campus
    - Classroom cooking demonstrations linked with SNP
    - Salad bars
      - Regional growers
      - School gardens

Shaping Healthy Choices Program

- Component 5:
  - School wellness policy
    - Meet with school wellness advisory committee
      - Needs assessment to identify gaps in achieving stated goals and methods to address each concern
      - Evaluation by SCAN rubric

Evaluation

- Process evaluation
  - Work in partnership to develop a “how to” manual
    - ie. Component 3: guide of “Food Hubs” available to local sites
  - Continual monitoring of program plan
- Impact evaluation
  - Control versus experimental sites
  - Specific outcome measures


Thank you