



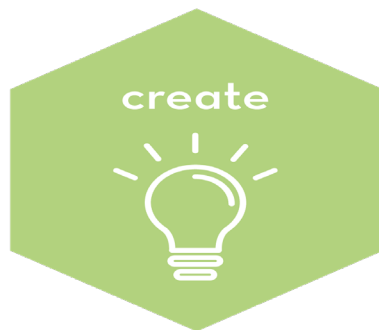
MICHAEL & SUSAN DELL CENTER *for* HEALTHY LIVING



Healthy children in a healthy world.

We advance health and healthy living for children and families through cutting-edge research, innovative community-based programs, and dissemination of evidence-based practices.

STRATEGIC PLAN GOALS



Funding for this webinar series provided by:



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Impact of School Nutrition and Gardening Programs on Health and Academics

Jaimie Davis, PhD, RD
Professor and Graduate Studies Chair
Department of Nutritional Sciences
The University of Texas at Austin
[www.https://www.edenut.org](https://www.edenut.org)

Gardening Programs Benefits on Health

- ❑ Increases a child's willingness to taste vegetables^{1,3}
- ❑ Increases preferences fruits and vegetables (FV)^{2, 3}
- ❑ Increase identification of fruits and vegetables (FV)^{3, 4}
- ❑ Improved attitudes toward FV³
- ❑ Increased self-efficacy to eat FV⁵
- ❑ Improved dietary knowledge⁶
- ❑ Increased physical fitness and physical activity⁶
- ❑ Increased student engagement⁵
- ❑ Increased science scores⁶
- ❑ **Increased consumption of FV⁷⁻¹¹**

2001  2014

NIH R21

□ Conducting RCT with:

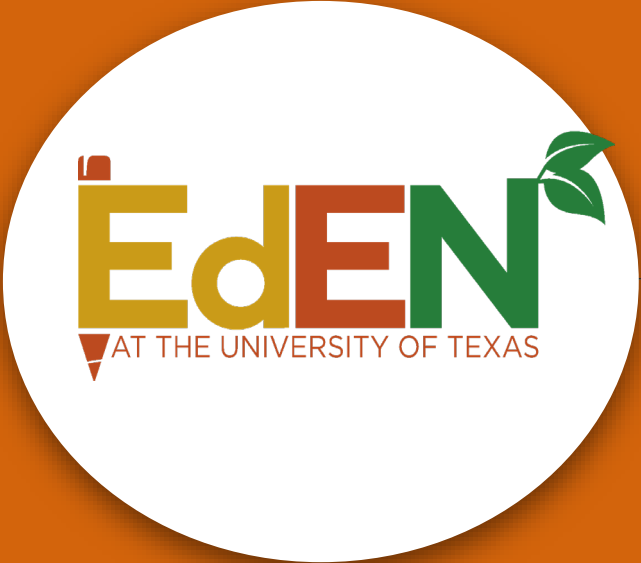
- 4 elementary schools randomized by region
 - 2 intervention schools (n=200)
 - 2 control schools with delayed intervention (n=200)
- 12-week afterschool nutrition, gardening, & cooking curriculum
- Bimonthly parental workshops
- Gardens built at school
- Added blood measure to assess glucose, insulin, and lipids



Conclusions from LA Sprouts

- **First RCT garden-based trial to result in:**
 - Reductions in obesity, waist circumference and Met Syndrome
 - Increased dietary fiber, vegetables and whole grain intake
 - Improved:
 - Self-efficacy to Eat FV
 - Nutrition/Gardening Knowledge
 - Motivation to Cook and Garden
 - Increased Gardening at Home

TX Sprouts
1.0

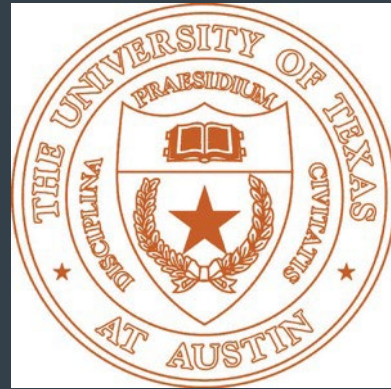
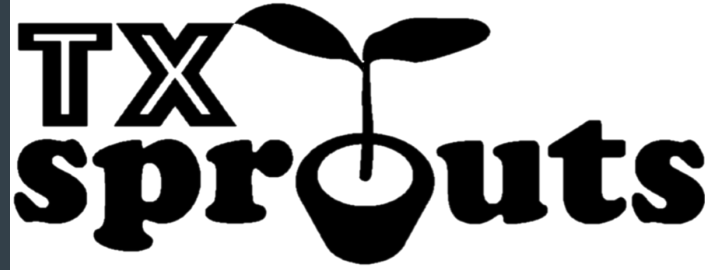


TX sprouts



To test the effects of a 1-year in-school gardening, nutrition, and cooking program on improving diet and reducing obesity measures in high-risk 3rd-5th graders and their families.

PI: Jaimie Davis, PhD, RD



- ❖ 16 schools randomized into either: TX Sprouts or Control (2016-2019)
- ❖ An edible garden was built at each school (~\$5K per site)
- ❖ 18 in-school garden/nutrition lessons taught to all 3rd-5th grade classrooms
- ❖ 9 parent/family classes taught monthly reflecting similar themes as student lessons



Measures

❖ In-person child evaluation measures:

- Anthropometrics (Height, weight, BMI, blood pressure, waist circumference, Tanita body fat percentage)
- Questionnaire packet
 - Dietary intake and related behaviors

❖ Phone Child Measures:

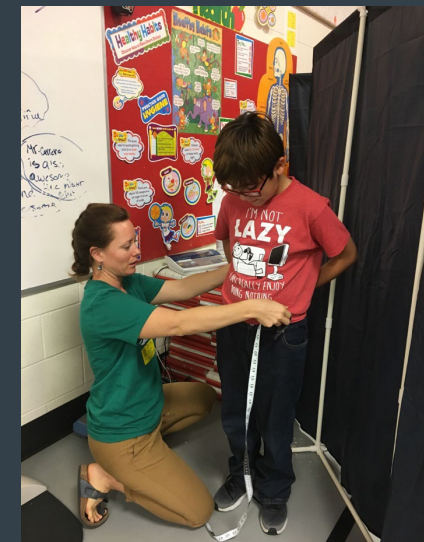
- Subsample of 24-hr diet recalls

❖ Blood Draw/Diabetes screening

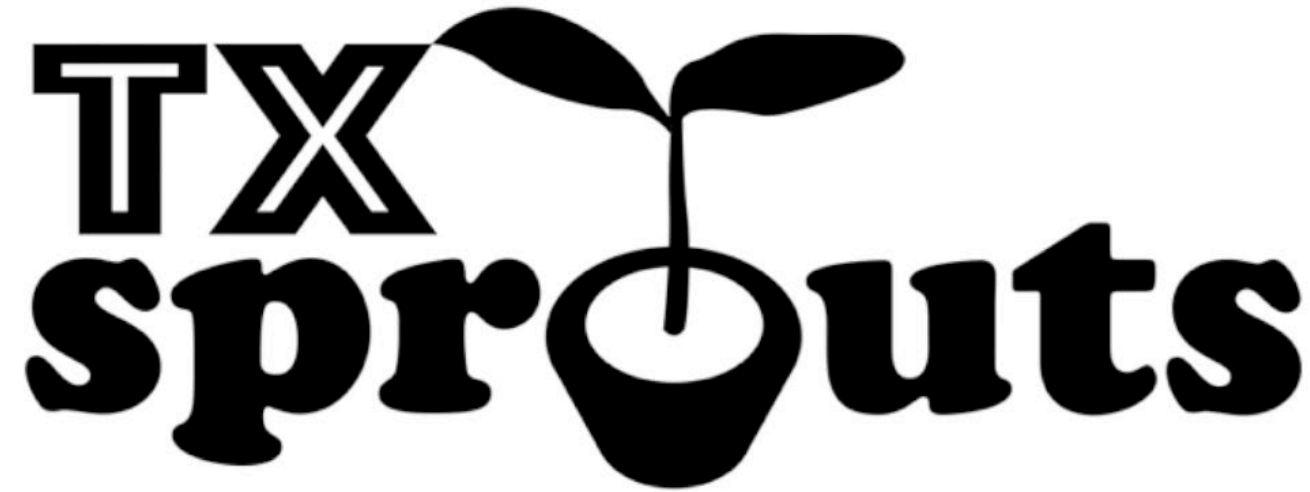
- Subsample of fasting blood draw

❖ Parent evaluation measures:

- Parent questionnaire packets
 - Diet, home environment, diet related behavior



Intervention Overview



Study Sample - Baseline

4239

eligible students for TX Sprouts at the 16 schools

78%

consented to be in the study (n=3303)

95%

children completed baseline clinical/survey measures (n=3135)

92%

parents completed baseline survey (n=2882)

35%

children completed baseline OPTIONAL blood draws (n=1112)

24%

children completed baseline OPTIONAL diet recalls (n=737)

Descriptive Statistics of Child Sample

3135 3rd-5th graders completed pre and post clinical measures

47% female

26% prediabetic

65% Hispanic

69% receiving FRL

9y average age

68% reported food insecurity

Study Sample - Post

91%

children completed post clinical/survey measures (n=2871)

45%

parents completed post surveys (n=1305)

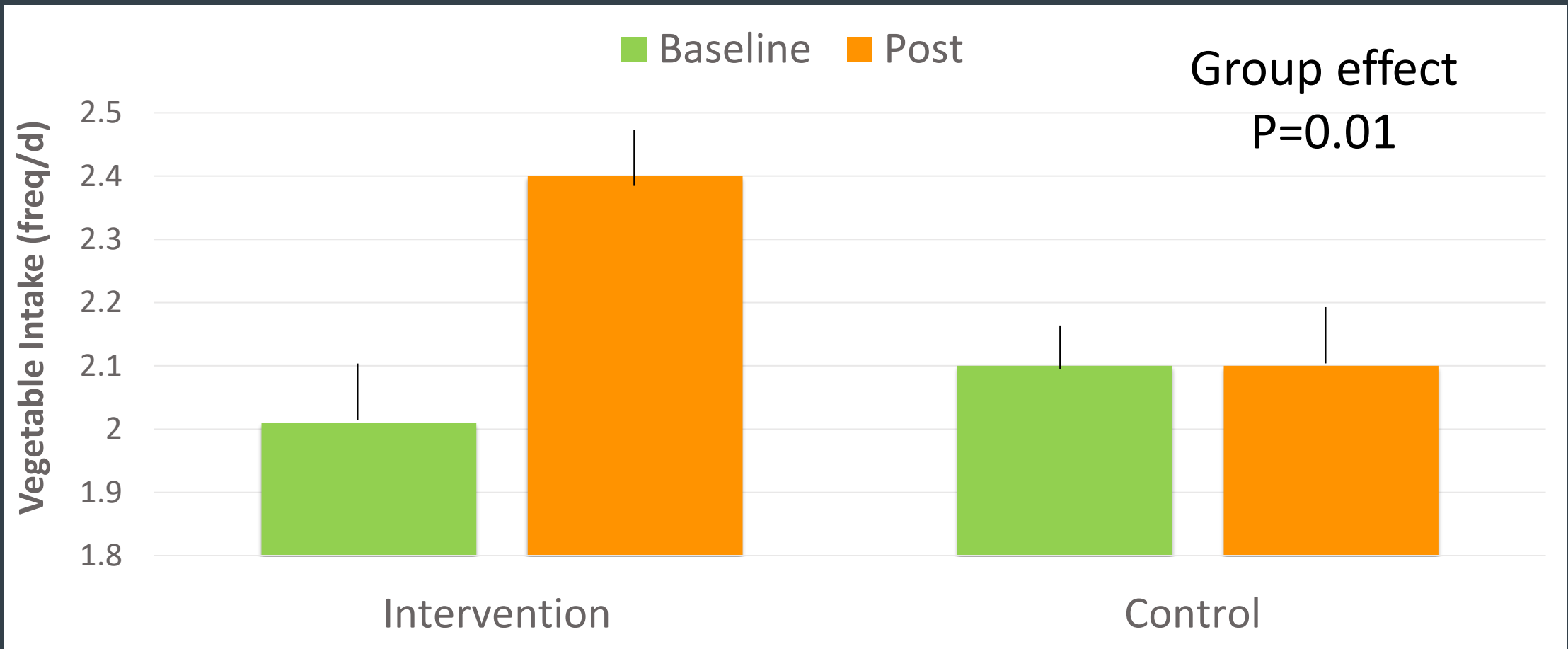
62%

children completed post OPTIONAL post blood draw (n=689)

64%

children completed post OPTIONAL post diet recalls (n=472)

Changes in Vegetable Intake



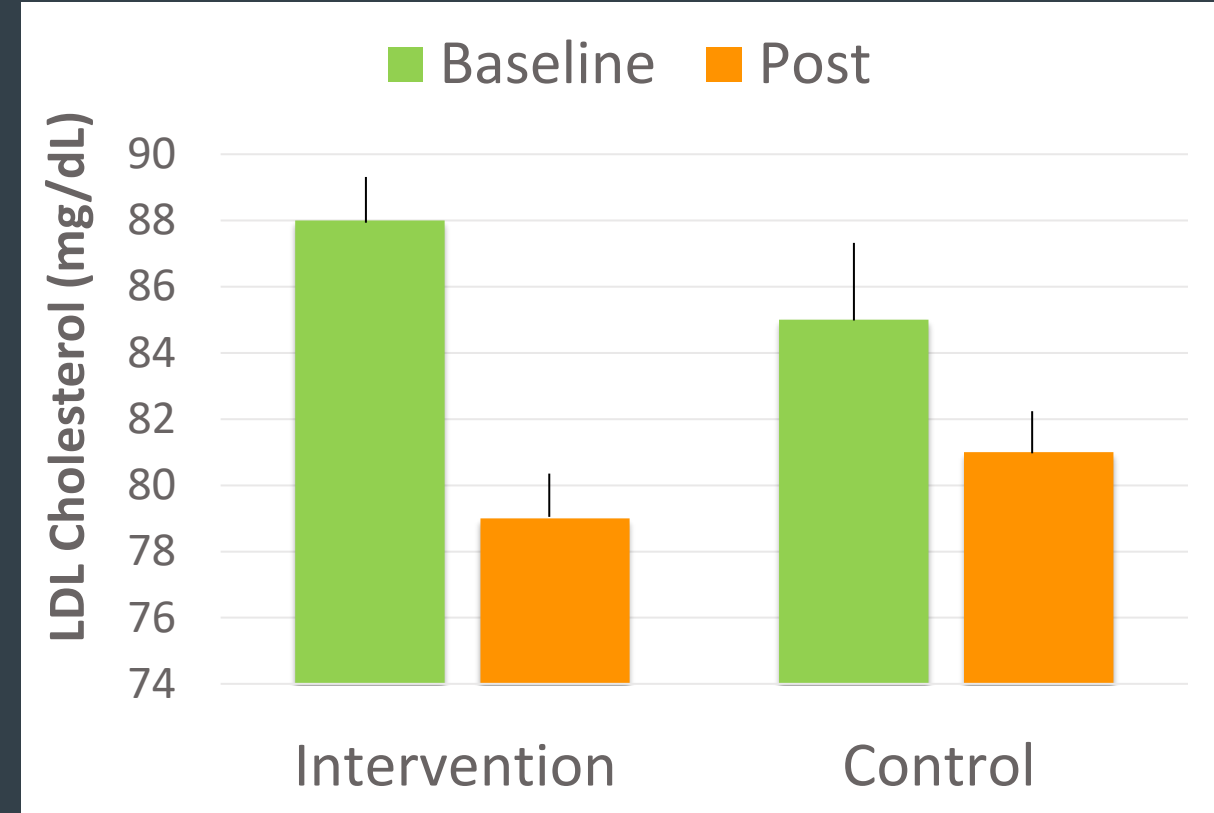
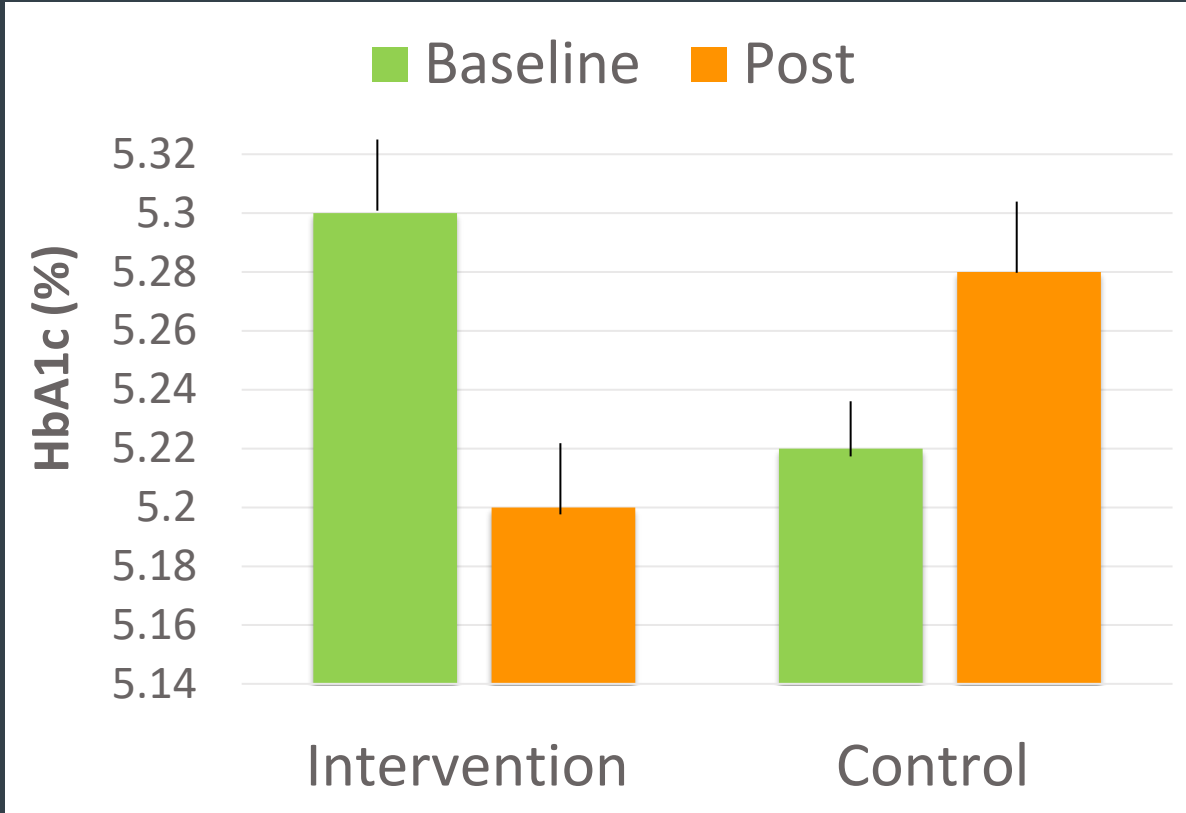
Changes in Healthy Eating Index

- No overall intervention effects of Healthy Eating Index
- HEI-Index Component Scores:
 - Intervention compared to control:
 - ↑ in Vegetable Score
 - ↑ Total Dairy
 - ↓ Fatty Acids
 - ↓ Refined Grains

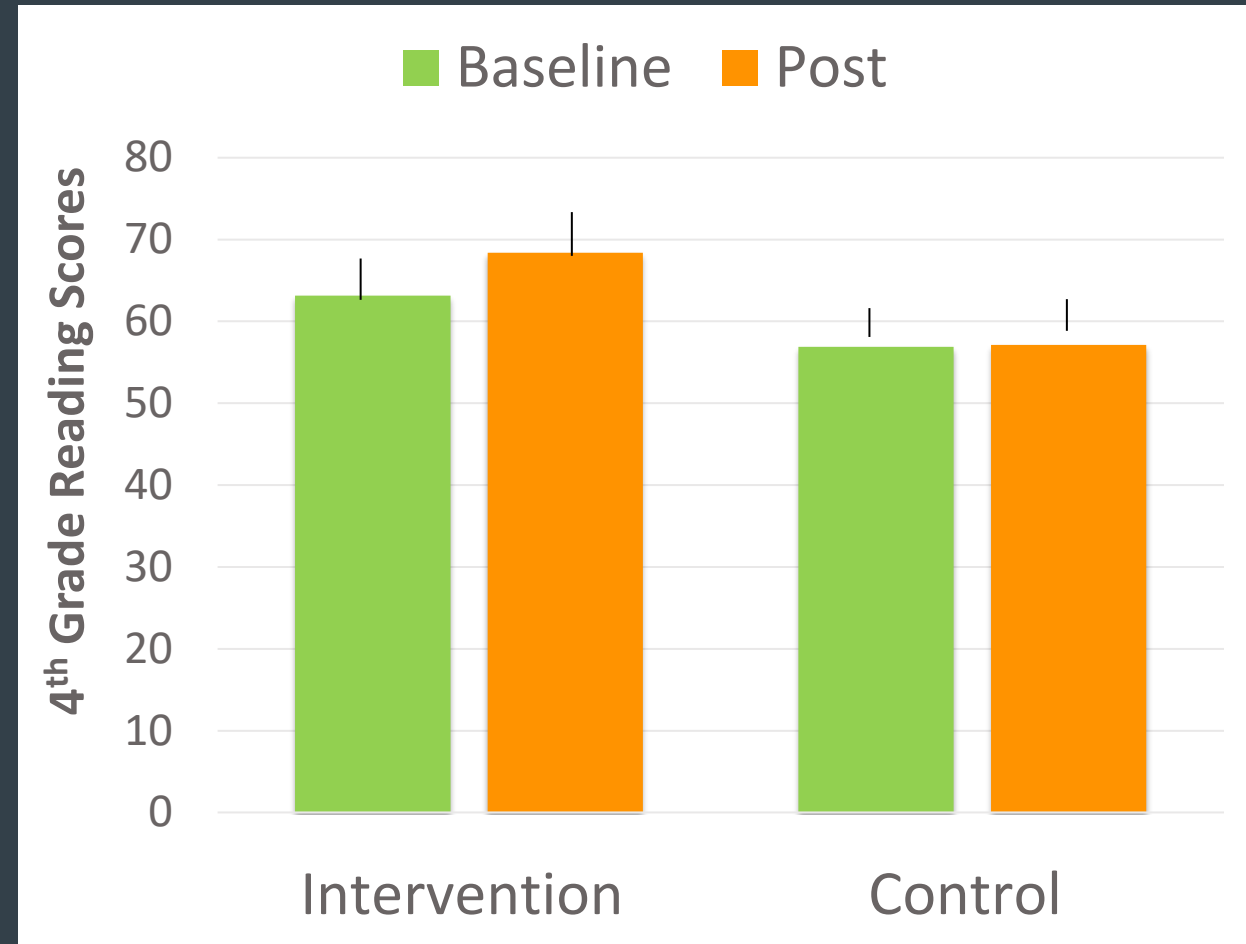
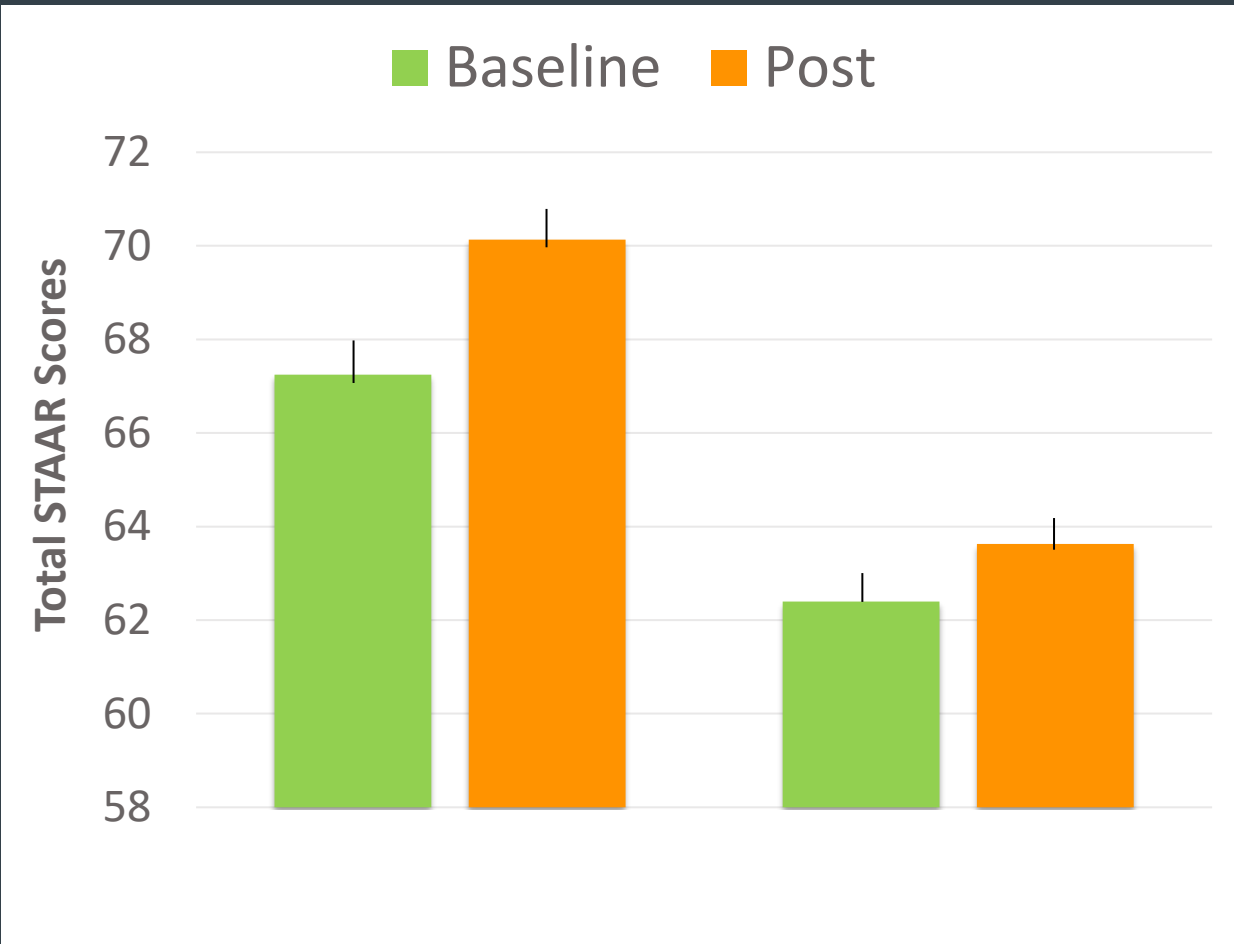


Dr. Matthew Landry
Asst Prof at UC Irvine

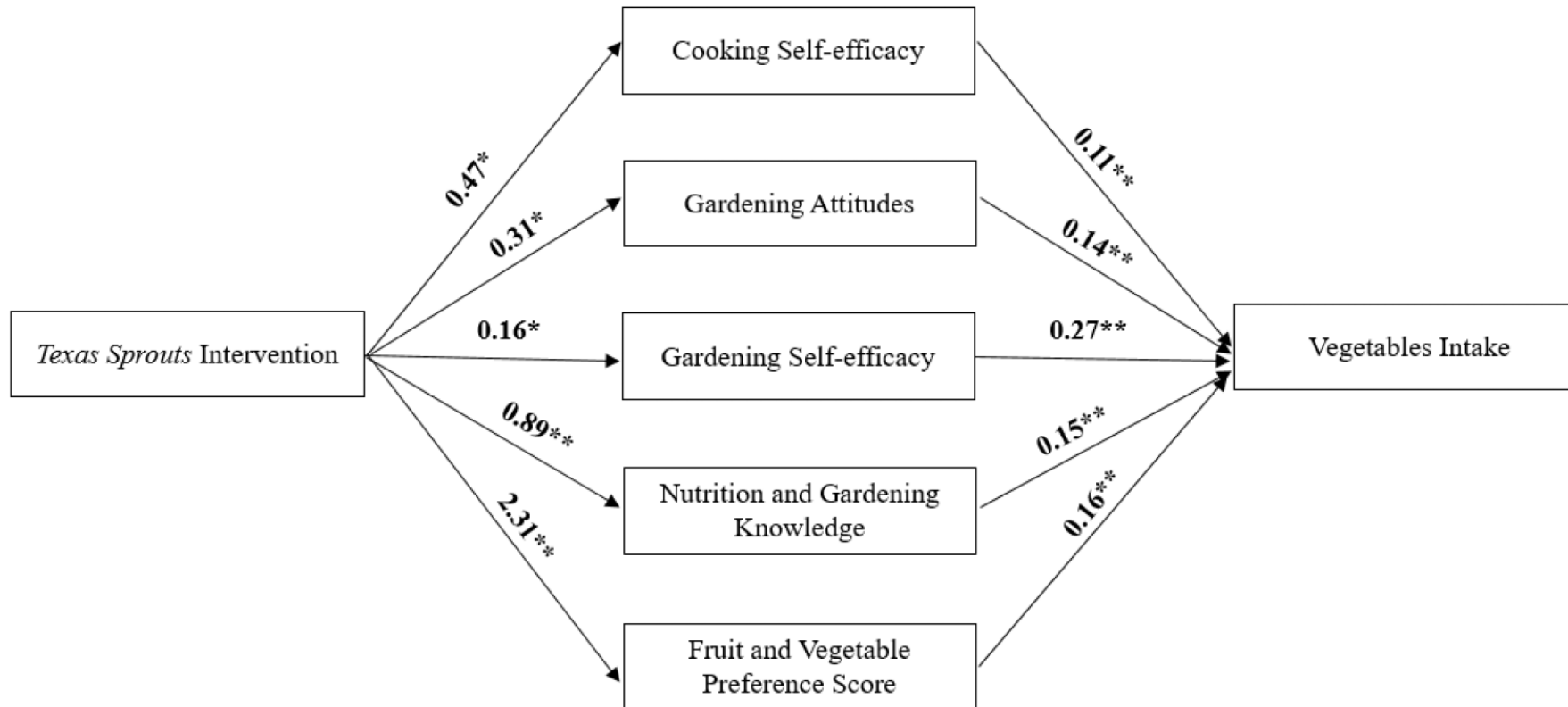
Changes in Metabolic Outcomes



Changes in Academic Performance



Mediation Effects of Dietary Behaviors



Postdoc – NYU
Dr. Sarvenaz
Vanyousefi



Dr. Matthew
Jeans;
Data Analyst at
iStation

Changes in UPF

NOVA FOOD CLASSIFICATION SYSTEM

Unprocessed or Minimally Processed Foods

- Legumes
- Roots & Tubers
- Vegetables
- Fruits and Freshly Squeezed Juice
- Meat
- Fish & Seafood
- Eggs
- Milk & Plain Yogurt
- Grains
- Pasta (Whole Wheat and Rice)



Processed Culinary Ingredients

- Sugar
- Plant Oils
- Animal Fats



Processed Foods

- Cheese
- Ham and Other Salted, Smoked, or Canned Meat & Fish
- Vegetables, Fruits, and Other Foods Preserved in Brine, Sugar, or Syrup

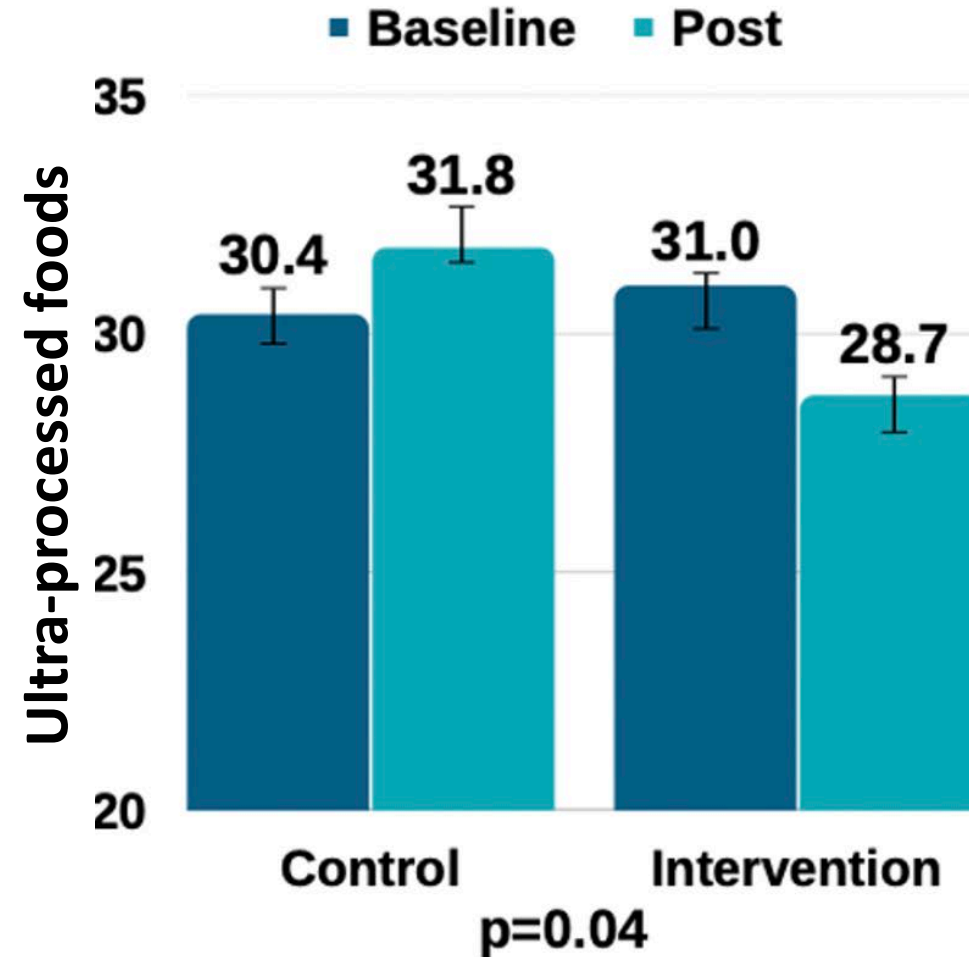
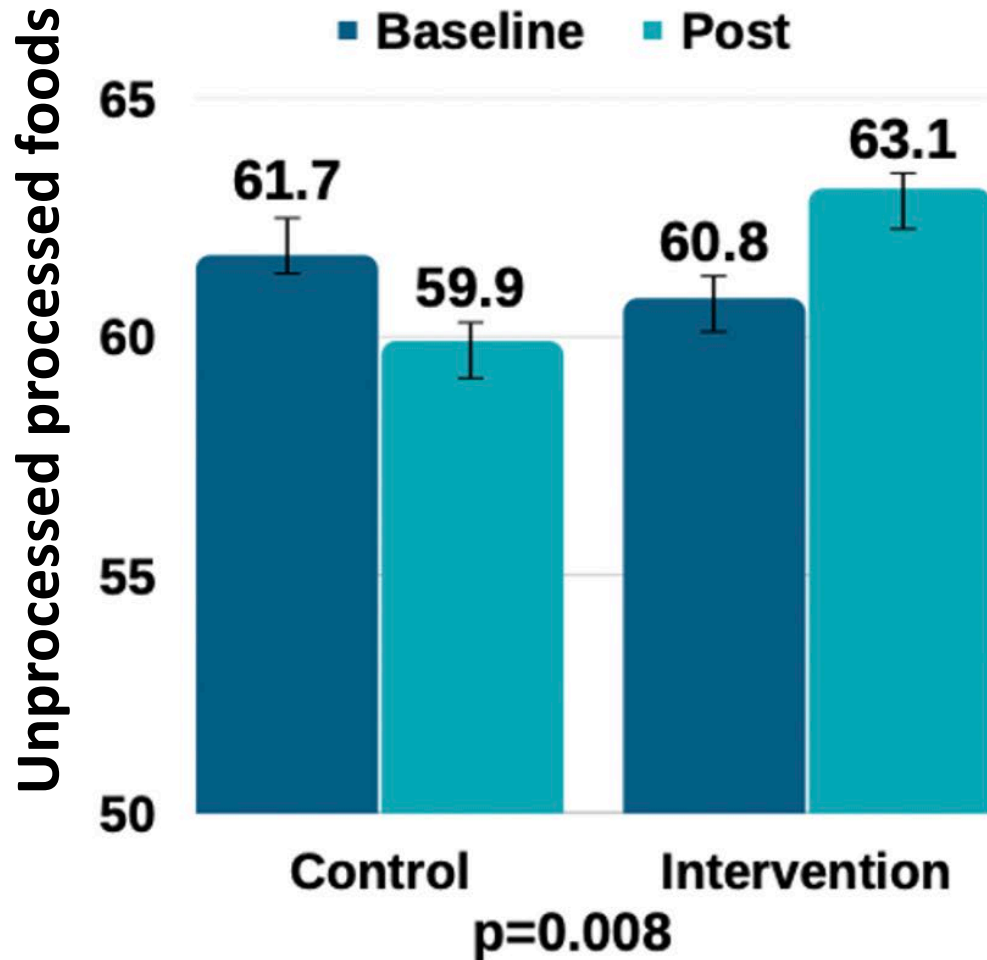


Ultra-Processed Foods

- Reconstituted Meat or Fish
- Breads
- Cakes, Cookies, and Pies
- Ice Cream, Ice Pops, and Frozen Yogurts
- Desserts & Other Sugary Products
- Breakfast Cereals
- Salty Snacks
- Sweet Snacks
- Frozen Meals
- Pizza
- Sandwiches & Hamburgers on Bun
- French Fries & Other Potato Products
- Instant & Canned Soups
- Sauces, Dressings, and Gravies
- Milk-Based Drinks
- Soft Drinks
- Other SSBs



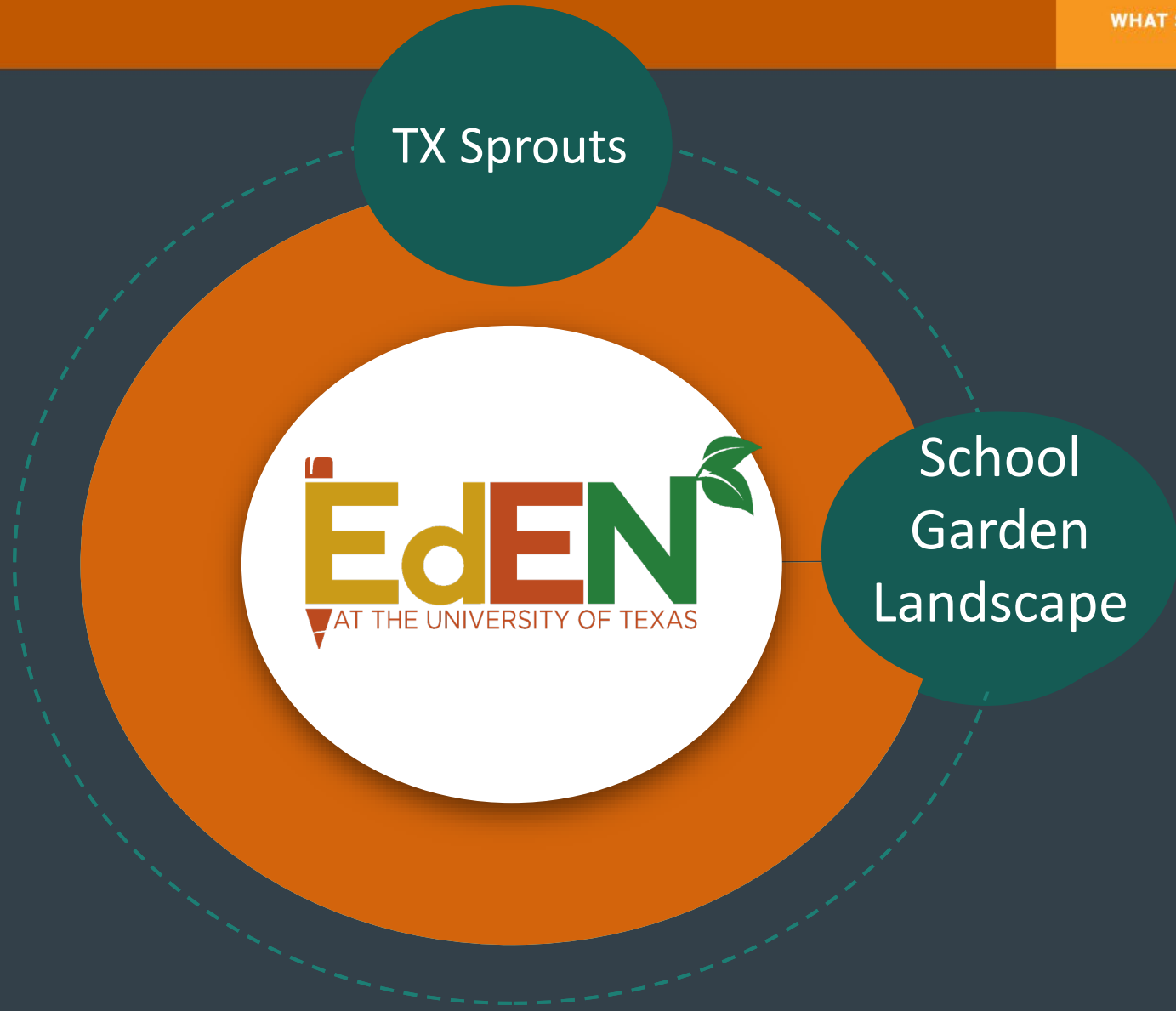
Intervention Effects on Processed Foods



Key TX Sprouts Findings To Date

School Gardening Programs compared to control:

- ✓ Increase vegetable intake
- ✓ Improved dietary quality
- ✓ Reduced UPF and increased MPF
- ✓ Improve glucose control
- ✓ Reduced Lipids
- ✓ Improved Academic Performance
- ✓ Cooking and gardening self efficacy and attitudes mediated improvements in vegetable intake



TX Sprouts

School
Garden
Landscape

Austin School Garden Landscape Project

- To Identify barriers and strategies used to sustain and maintain school garden programs
- Survey developed from Burt's GREEN tool
 - 4 Domains:
 - Resources and Support
 - Physical Garden
 - Student Experience
 - School Community
 - Panel of 10 experts rank schools: Thriving schools



Edwin Marty
Director of Sustainability
City of Austin

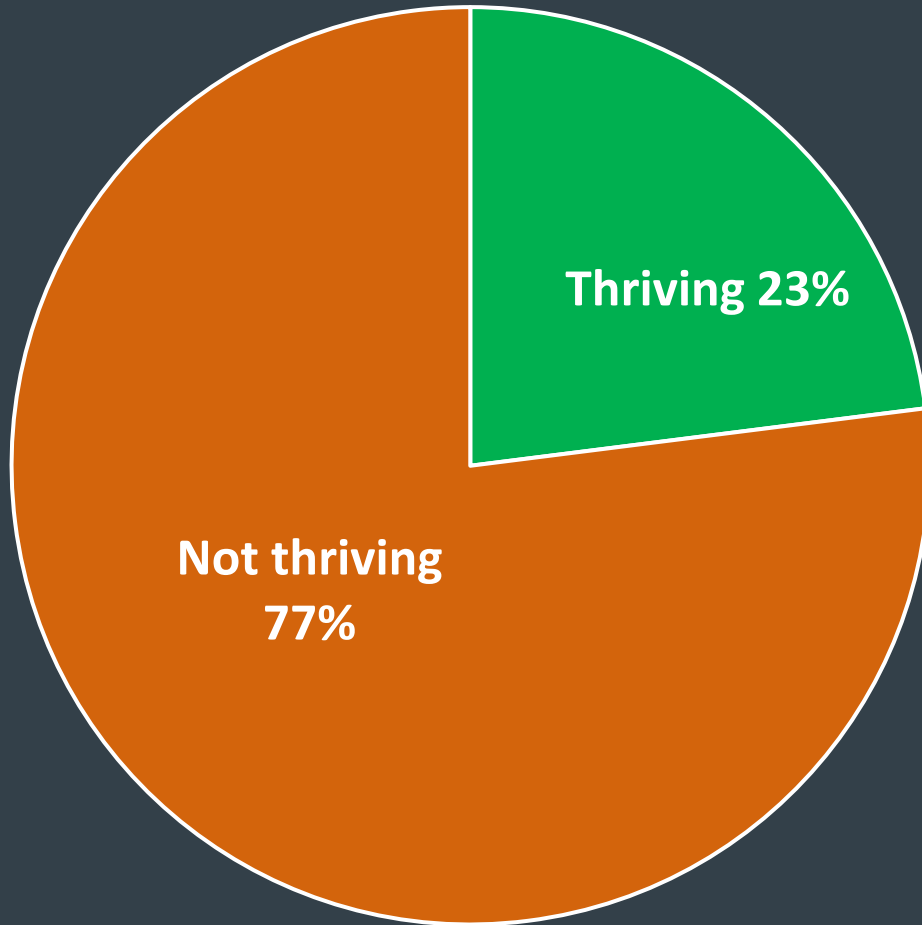


Anne Muller,
AISD Outdoor Learning
Specialist

Austin School Garden Landscape Project

- **Data collected on school gardens across Greater Austin area:**
 - 523 schoolteachers 174 school administrators from 109 schools from 8 different ISDs across the Greater Austin area
 - 63% Eligibility of FRL
 - 61% Hispanic
 - 68% Elementary schools
 - **23% schools were identified as THRIVING from expert panel**

Predictors of a Thriving Garden



RESULTS:

- Having funding – 3 fold ↑
- Having Community Partners – 3 fold ↑
- Having Teacher Training – 5 fold ↑
- Garden Leadership Committee – 5 fold ↑
- Having Garden Curriculum – 5 fold ↑
- Having administrator support – 12 fold ↑

National School Garden Sustainability Survey

- **Met with experts to modify survey – 65 items, ~15 mins**
- **Release of Scorecard for each survey in April 2022**
- **Survey disseminated nationwide - SGSO**
 - Integrated on EdEN Website
 - ~500 completed surveys – 48 states
- **Scorecard results developed and created for schools at Growing School Gardens Summit**



School Garden Sustainability Survey - Scorecard

School Garden Scorecard

Your results are below. Each domain is scored based on your answers and ordered based on where the most improvements are needed.

Needs Most Support



Needs Least Support

STUDENT EXPERIENCE



Help! Needs significant improvement

Improvements needed

<p>(Lowest scored question) Question text goes here?</p> <p>Your Answer: Answer goes here.</p> <p>Suggestions: lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum</p>	<p>(Second Lowest scored question) Question text goes here?</p> <p>Your Answer: Answer goes here.</p> <p>Suggestions: lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum</p>
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SCHOOL COMMUNITY



Ok: Needs improvement in multiple areas

Improvements needed

<p>(Lowest scored question) Question text goes here?</p> <p>Your Answer: Answer goes here.</p> <p>Suggestions: lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum</p>	<p>(Second Lowest scored question) Question text goes here?</p> <p>Your Answer: Answer goes here.</p> <p>Suggestions: lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum lorem ipsum</p>
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RESOURCES AND SUPPORT



Doing well: Needs some improvement in certain areas

PHYSICAL GARDEN



Your school garden is thriving! Little improvement required

RED FLAGS

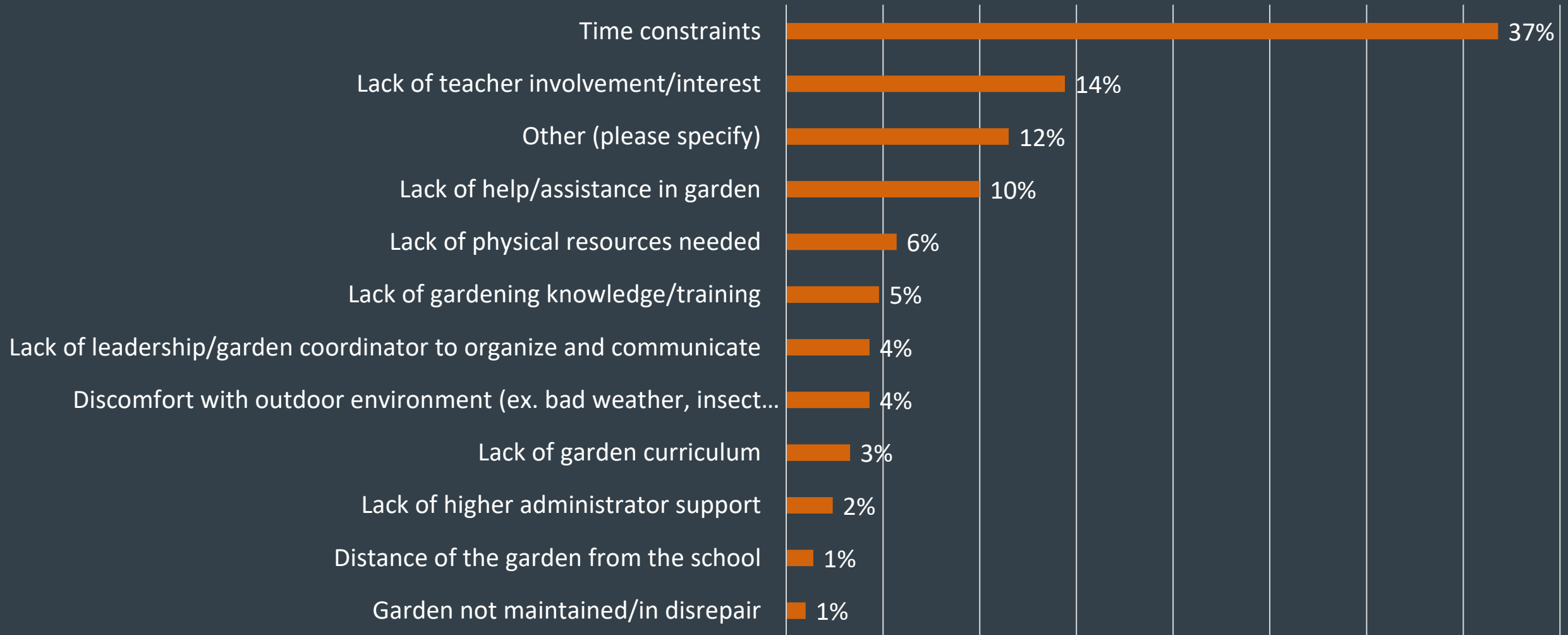
Some important things to consider based on your answers

 Red flag question text goes here?
You answered: (Answer goes here.)

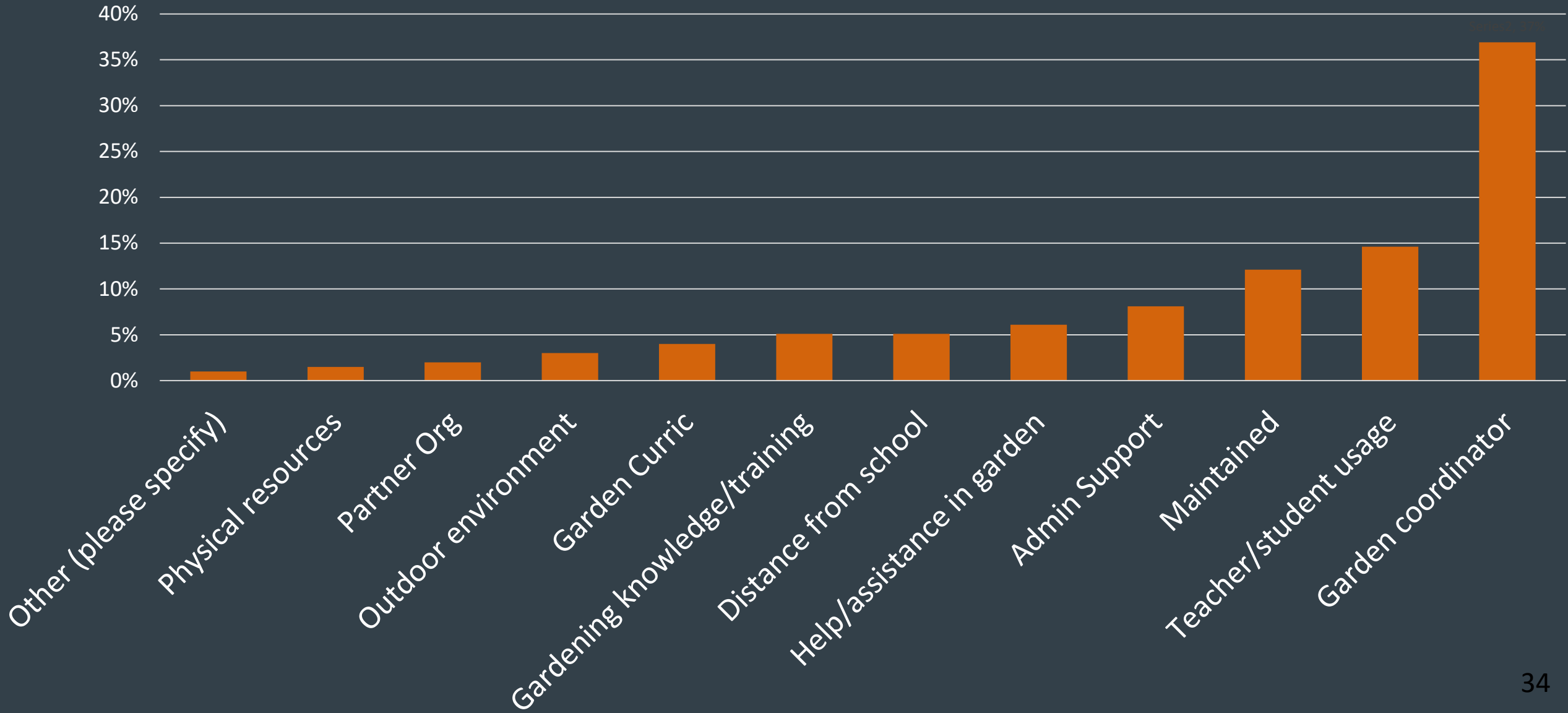
Because you answered in this way we suggest:

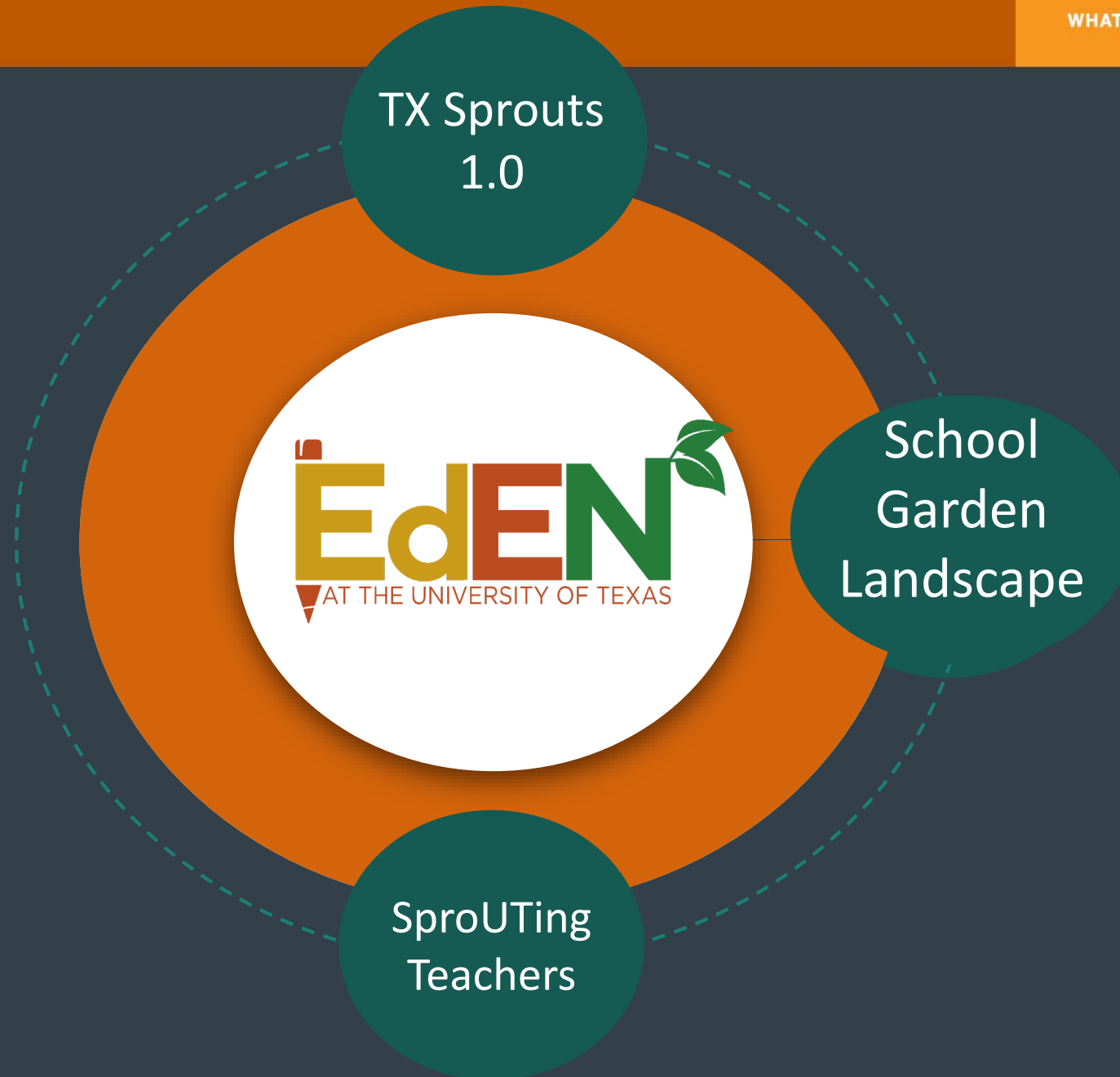
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Barriers



Biggest Contributor to Success





TX Sprouts
1.0

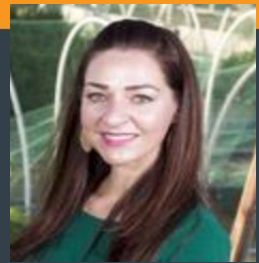
School
Garden
Landscape

SproUTing
Teachers

- **2018-2023 – SHFC has given >\$1M in funding**
- **Garden-based trainings to over 370 teachers**
 - ✘ 6 sessions - 2 virtual + 4 in person
 - ✘ Adapt current curriculum to teach in garden
- **Trainings to 62 Garden Leadership Committees (GLCs):**
 - ✘ 6 sessions – 2 virtual + 4 in person;
 - ✘ Maintenance / sustainability of physical garden
- **Current Reach = 50 schools across 28 school districts across across 9 states; ~10,000 children reached by this programming**



Katie Nikah,
Lab
Manager



Lyndsey Waugh
Executive Director
Sprouts Foundation



Instructional
Coach:
Valerie Cordes



Instructional
Coach: Bonnie
Martin



Instructional Coach:
Laura Thomas

- **Pilot – provide \$2K stipends to 2-3 teachers serving on GLC (n=30) – compare to schools w/o stipend**
- **Pilot – Provide Cooking kits to classrooms:**
 - 10 teachers – 3 lessons each
 - Kits include: ingredients, cooking supplies, and recipes
 - Putting this on Sprouts Website – automate process - Instacart delivers

Evaluation

Teacher Outcomes:

- Student usage / exposure
- Student behavioral issues
- Acceptability / barriers
- Adaptations / maintenance strategies

Administrative Outcomes:

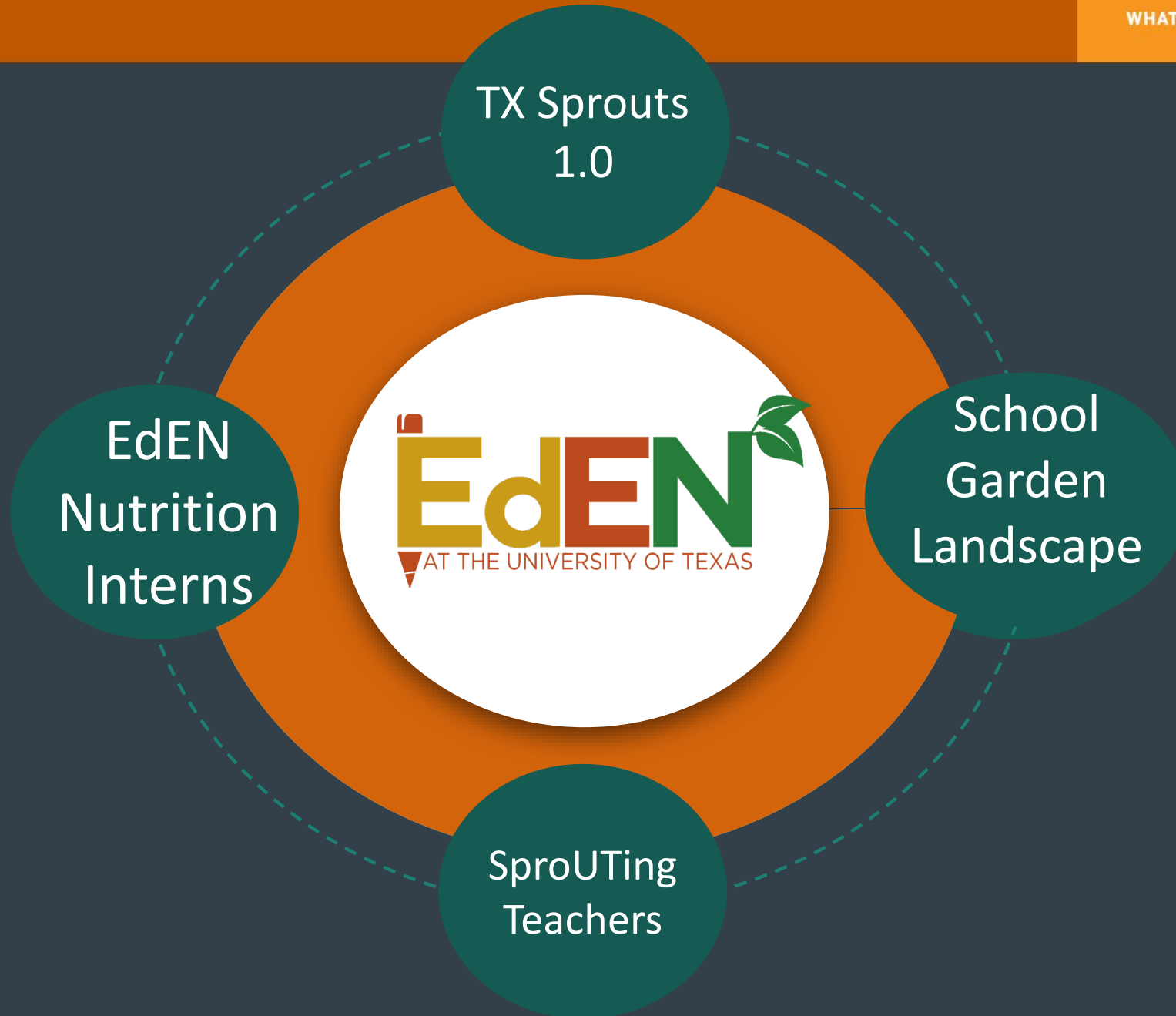
- Support strategies for teachers
- School culture
- Training
- Funding/resources provided

Child Outcomes:

- Dietary intake
- Food and nutrition security
- Social emotional learning
- STEM and eco-literacy outcomes

Parent Outcomes

- Access/availability of FV in home
- Home gardening



TX Sprouts
1.0

School
Garden
Landscape

SproUTing
Teachers

EdEN
Nutrition
Interns

 **EdEN Interns**
GARDEN & NUTRITION EDUCATION

- >350 undergrad UT students volunteered (each >100 hrs) on TX Sprouts
- 2-semester course: Principles and Applications of Community Engagement
- UT nutrition students (*Interns*) + elementary teachers (*Preceptors*)
- Nine outdoor lessons: Gardening, nutrition and cooking

2019-2020: 7 schools, 26 UT interns, 14 preceptors

2020-2021 (virtual lessons): 6 schools, 25 UT interns, 18 preceptors

2021-2022: 6 schools, 27 UT interns, 14 preceptors

2023 (Spring only): 6 schools, 30 UT interns, 16 preceptors

2023-2024: 8 schools, 26 UT interns, 13 preceptors

Total: 15 schools, 133 UT interns, 51 preceptors, >1200 elementary students

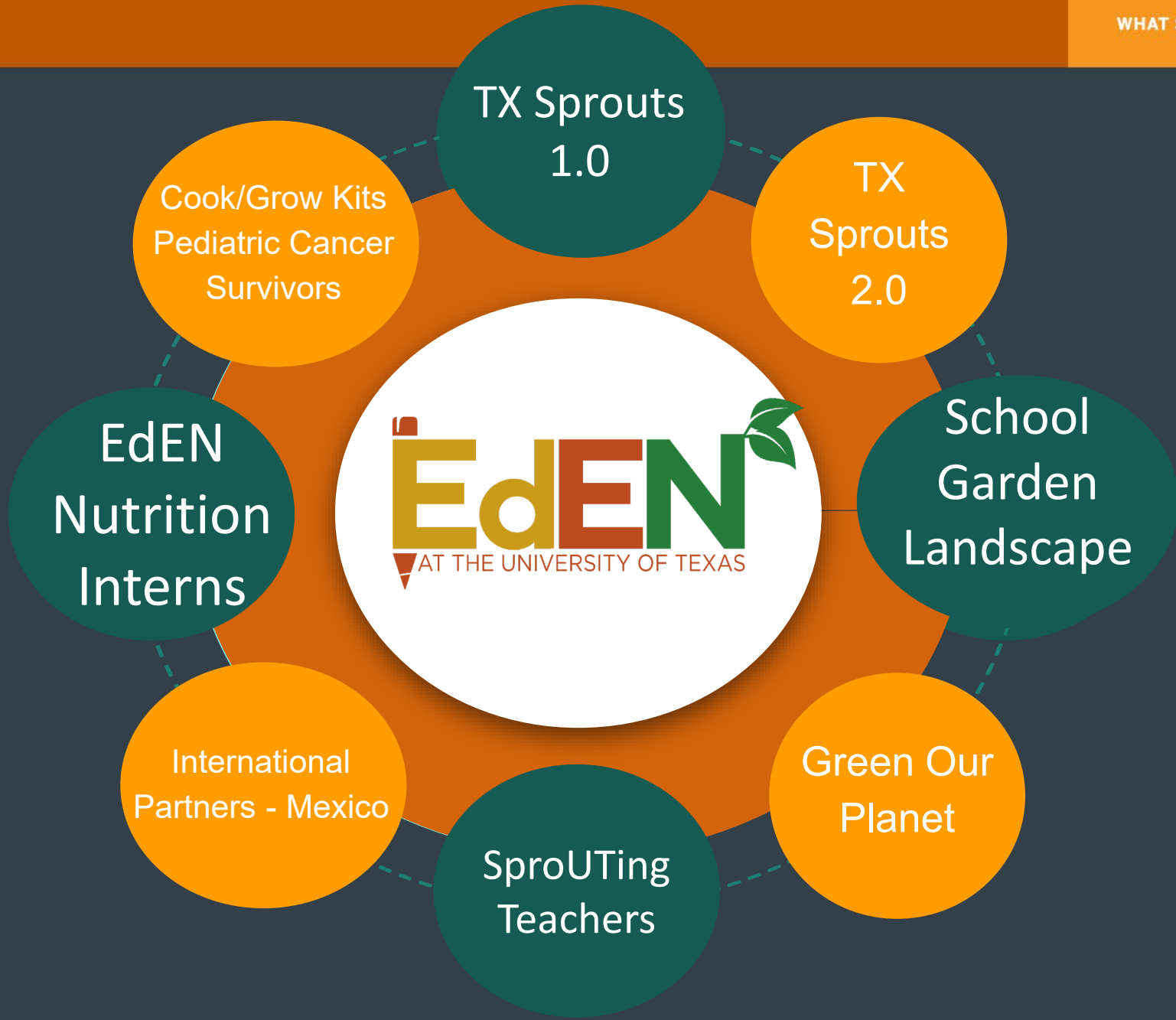


NTR 365
coordinator:
Michelle Hockett
Cooper

Evaluation - Results

Students had significant increases in the following domains from baseline to end of school year:

- Food and nutrition knowledge
- Communication, marketing, and cultural sensitivity
- Advocacy and education
- Policy, systems, and environmental change
- Research and evaluation
- Management and leadership



TX Sprouts 2.0

- NIH R01 submission— fundable score – awaiting council/funding
- Adapt and expand TX Sprouts 1.0 into TX Sprouts 2.0
 - Community Advisory Board
 - Extension Agents train teachers
 - GLC and administrator trainings + teacher stipends
 - Delivery of cook kits
 - Access to robust web-based platform
 - Local master gardeners partnerships
 - Measure reach, dose, adoption, cost, fidelity, acceptability, feasibility, and maintenance
 - RCT – evaluate TX Sprouts 2.0 on child and parent health outcomes
 - 9- and 21 months follow-up



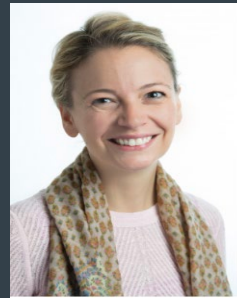
Alexandra (Sandra)
van Den Berg, UTSPH



Deanna
Hoelscher,
UTSPH



Rebecca Seguin-
Fowler, Texas
A&M AgriLife



MARRISA
Burgermaster
UT-Austin



Nalini Ranjit,
UTSPH

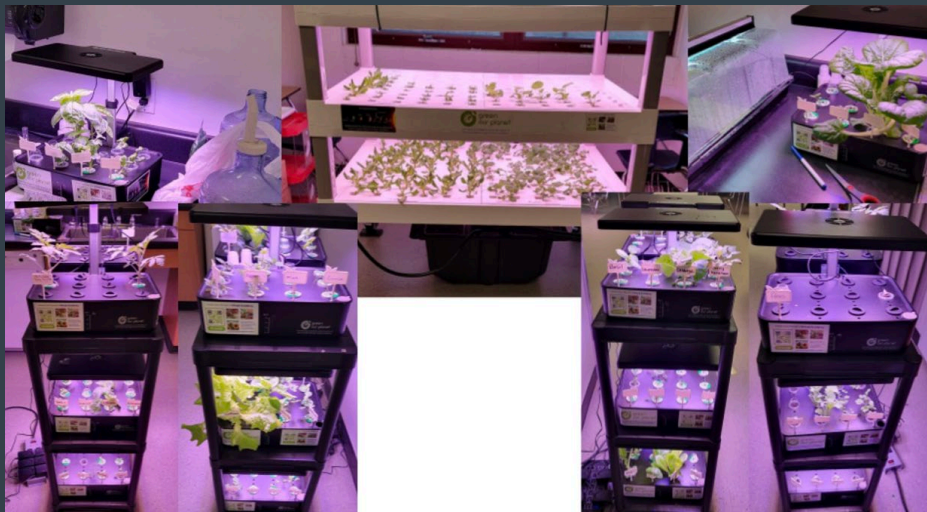


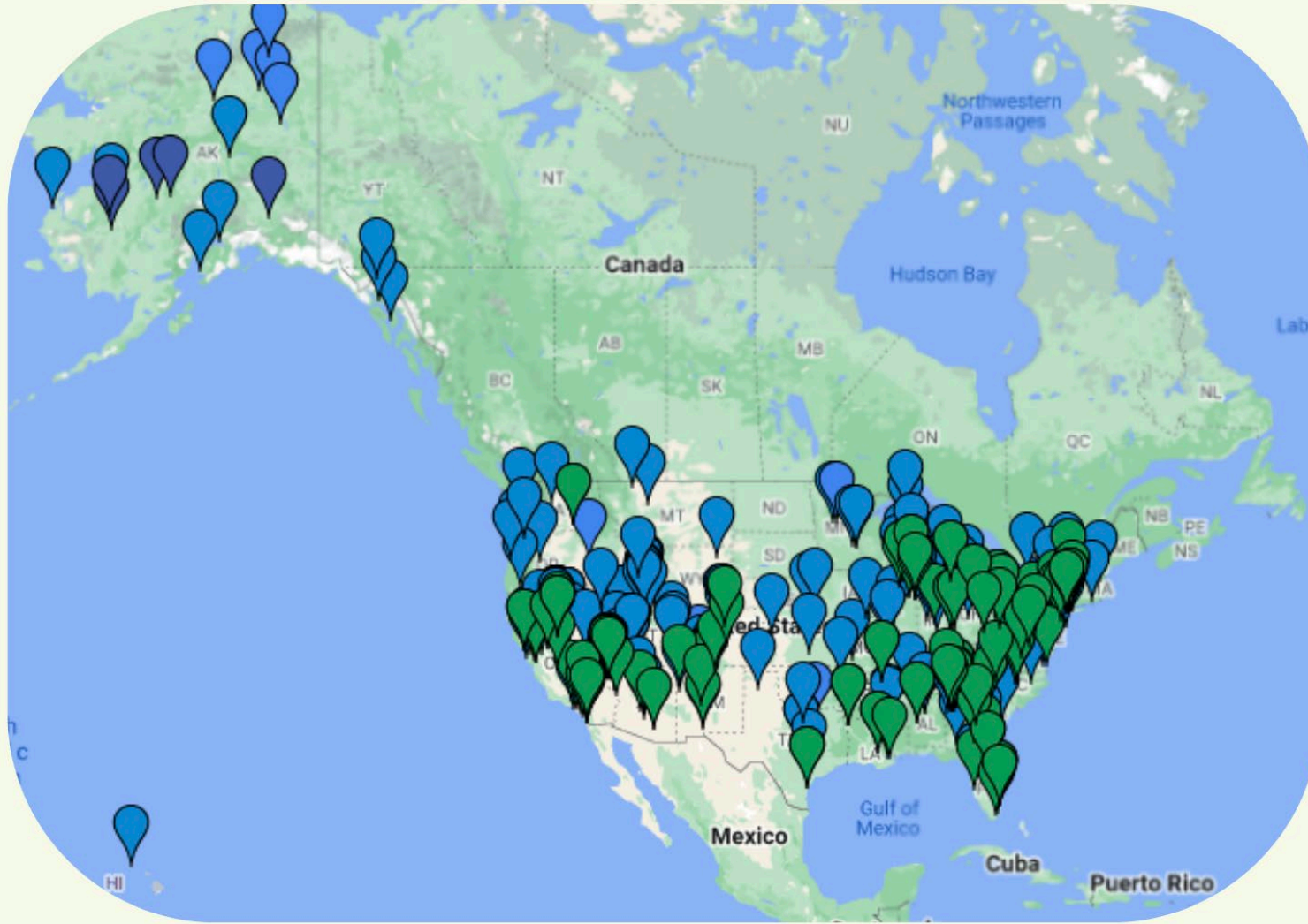
Henry "Shelton"
Brown, UTSPH



Hydroponics Background:

- Saves 70-90% more water than soil;
- Enhanced produce yield
- Suitable for all climates
- Direct exposure in classrooms





HydroConnect 

GardenConnect 



HydroConnect

Our Hydroponics Program

Large Commercial Unit (1)



Small Tabletop Unit (19)



Content

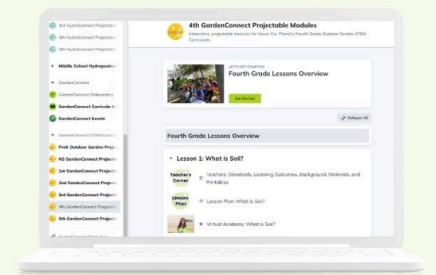
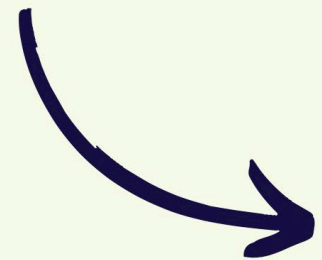
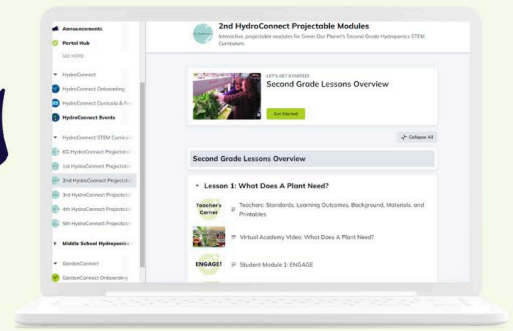
HydroConnect Our Hydroponics Program

GardenConnect Our Outdoor Garden Program





-  Nineteen 12-pod Small Tabletop Deep Water Culture Hydroponics Systems
-  One Large Commercial Hydroponics System (216 Planting Pods)
-  Green Our Planet's K-12 Hydroponics STEM Curriculum & Culturally Responsive Hydroponics Curriculum Framework
Aligned to Common Core, NGSS, Nevada State Standards



 Green Our Planet's PreK-5 Outdoor Garden STEM Curriculum
Aligned to Common Core, NGSS, Nevada State Standards



Both Programs Include:

-  MS-HS Health Curriculum
-  K-12 Financial Literacy Lessons
Aligned to Council for Economic Education National Financial Literacy Standards
-  Access to Green Our Planet's Virtual Academy Video Lessons
-  A digital library of resources, guides, printables, and more



GOP and UT partnership

- **Quasi-Experimental Design – Fall 2024**
 - Control (onboarding schools; n=8 schools)
 - GardenConnect (n=8 schools)
 - Hydroconnect (n=8 schools)
 - GardenConnect + Hydroconnect (n=8 schools)
- **Location = Austin and San Antonio ?**
- **Evaluation at child, parent, teacher, admin level**
- **Program implementation metrics – all tracked via GOP platform**

WHAT IS NEEDED!



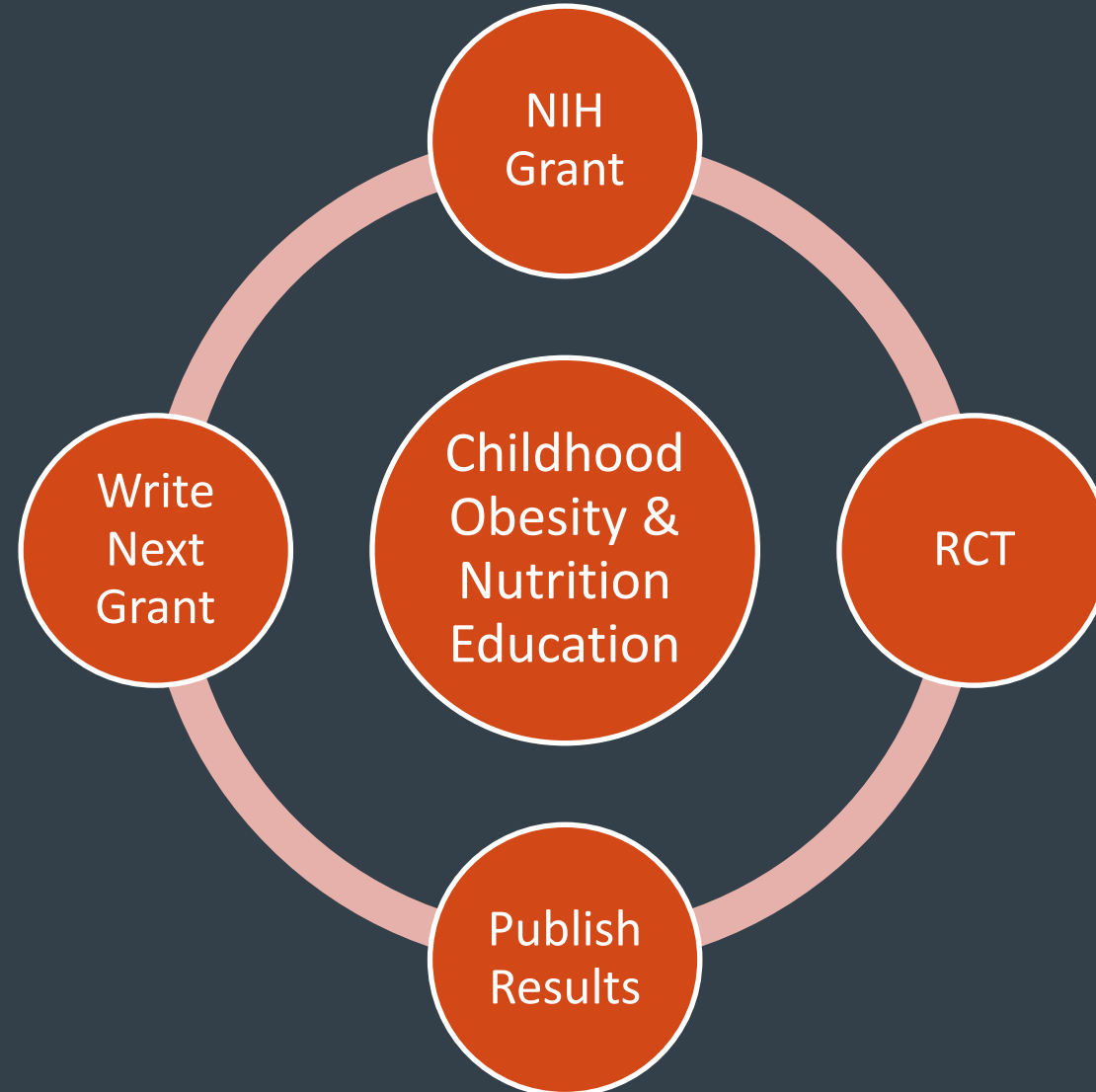
**INDIVIDUAL, FAMILY, SCHOOL,
COMMUNITY**



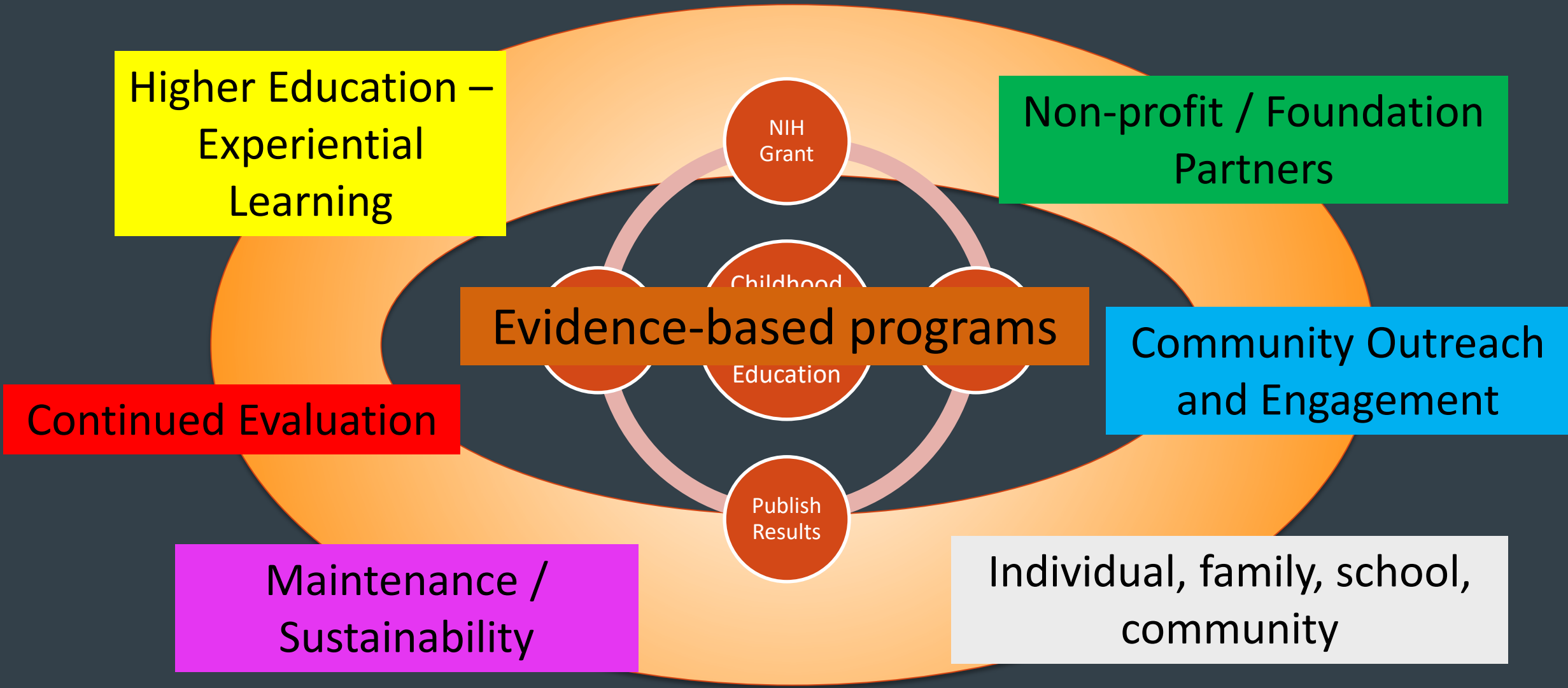
**ACCESS AND AVAILABILITY OF
HEALTHY FOODS FOR ALL**



Current Academic Cycle



Breaking Academic Cycle





WHAT STARTS HERE CHANGES THE WORLD



EdEN Website

- **Research and Evaluation:** <https://www.edenut.org/research>
- **Resources:** <https://www.edenut.org/resources>
 - ◆ Top requested
 - ◆ Curated curriculum, programs, lessons
- **Videos:**
 - ◆ Lessons, activities, tastings
 - ◆ Free past webinars



Jaimie.davis@Austin.utexas.edu

<https://www.edenut.org>

Thank you!



View our Center's webinars

