

Ontario  
Greenhouse Project

2008-2009: The Progress Thus Far

by Daniel Lamb, Heather Carpentier,  
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# Conflicts of Interest

- During each phase of this project, snacks & coffee were generously provided by Novartis Oncology, the makers of Gleevec...

# Rural Health Clerkship & The Community Project

- Being Oregon's only allopathic medical school, 3rd year medical students from OHSU embark on a 5 week primary care clerkship in rural Oregon.
- In an effort to learn the importance of population-based health care first-hand, students complete a community project, the purpose of which is to propose a health care intervention that affects a segment of the rural community's population, and that engages the local health care providers with the other members of their community in the delivery of that care.
- In Ontario, OR, students working with Dr. Dunbrasky at Treasure Valley Pediatrics are coordinating their efforts to combat childhood obesity and improve nutritional education in a local grade school through the building of a greenhouse that will then be integrated into the curriculum.

# Oregon Greenhouse Project - Phases 1-5

- Phase 1, Daniel Lamb, MS4: assessed need for school-based intervention, feasibility of the OGP, ways to estimate successfulness
- Phase 2, Heather Carpentier, MS4: learning from other programs, estimated cost, ideas for community involvement
- Phase 3, Brenda Marsh, MS4: creation of presentations for teachers and parents, garnering local support through media
- Phase 4, Jennifer Brewer, MS4: Synthesis, Relocation, Curriculum, Design Ideas
- Phase 5, Gene Paek, MS3: Grant proposals and requests



The Problem:

CHILDHOOD  
OBESITY

# The Problem: Childhood Obesity

- Definitions
  - Overweight is > 85th percentile body weight
  - Obese is > 95th percentile body weight
- Prevalence
  - Nationally: 17% (up from 4% in 1971)
  - State of Oregon: 13%
  - Malheur County: 26%
- Associated with a variety of complications in childhood and adulthood...

# Complications of Childhood Obesity

System	Associated Disorders
Endocrine	<ul style="list-style-type: none"> <li>• Impaired glucose tolerance (predicts diabetes development)</li> <li>• Type II Diabetes mellitus</li> <li>• Metabolic syndrome (all are metabolic risk factors for type II DM and atherosclerotic cardiovascular disease): abdominal obesity, hyperglycemia, dyslipidemia, and hypertension</li> <li>• (Women Only) Hyperandrogenism and early onset PCOS</li> <li>• Accelerated, linear growth &amp; bone age</li> <li>• Disruption in normal sexual maturation (inconsistent literature; early onset in girls, delayed onset in boys)</li> </ul>
Cardiovascular	<ul style="list-style-type: none"> <li>• Hypertension</li> <li>• Hyperlipidemia</li> <li>• endothelial dysfunction</li> <li>• carotid intimal thickening</li> <li>• early aortic &amp; coronary arterial fatty streaks &amp; fibrous plaques</li> <li>• decreased arterial distensibility</li> <li>• increased left atrial diameter</li> </ul>
Gastrointestinal	<ul style="list-style-type: none"> <li>• Nonalcoholic fatty liver disease</li> <li>• Cholelithiasis</li> </ul>
Pulmonary	<ul style="list-style-type: none"> <li>• Obstructive sleep apnea</li> <li>• Obesity hypoventilation syndrome</li> </ul>
Orthopedic	<ul style="list-style-type: none"> <li>• Slipped capital femoral epiphysis (displacement of the capital femoral epiphysis from the femoral neck through the physeal plate)</li> <li>• Tibia vara (Blount disease) (progressive bowed legs &amp; tibial torsion)</li> </ul>
Neurologic	<ul style="list-style-type: none"> <li>• Idiopathic intracranial hypertension</li> </ul>
Dermatologic	<ul style="list-style-type: none"> <li>• Intertrigo</li> <li>• Furunculosis</li> </ul>
Psychosocial	<ul style="list-style-type: none"> <li>• Alienation</li> <li>• Distorted peer relationships</li> <li>• Poor self esteem</li> <li>• Distorted body image</li> <li>• Anxiety</li> <li>• Depression</li> <li>• Targets of discrimination</li> <li>• Negative self image that can persist into adulthood</li> </ul>

# Environmental Causes of Obesity

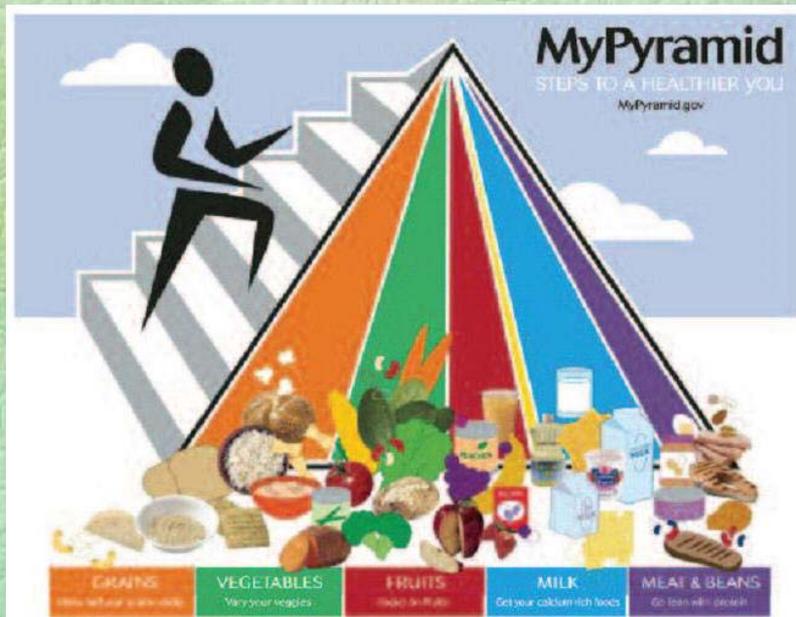
- Physical inactivity: potential causes include:
  - time spent in front of the television
  - time spent playing video games
- Excess intake: potential causes include:
  - food choices available at home
  - *food choices available in school cafeterias*
  - *lack of adequate nutritional education*

# Ontario, OR

- Malheur County's largest town
- 5 elementary schools, 1 middle school, 1 high school



# USDA MyPyramid



Age and Sex	USDA recommendation
All children 2-3 years old	Fruit: 1 cup Vegetables: 1 cup
All children 4-8 years old	Fruit: 1-1.5 cups Vegetables: 1.5 cups
Girls 9-13 years old	Fruit: 1.5 cups Vegetables: 2 cups
Girls 14-18 years old	Fruit: 1.5 cups Vegetables: 2.5 cups
Boys 9-13 years old	Fruit: 1.5 cups Vegetables: 2.5 cups
Boys 14-18 years old	Fruit: 2 cups Vegetables: 3 cups

# Nutritional & Exercise Habits Amongst Malheur County's Children

- Oregon 8th graders: 3 of 4 don't eat 5 or more servings fruits/vegetables daily
- Malheur 8th graders: 62.8 % report eating fruit less than once a day, 75.1% eat veggies less than once a day
- Oregon 8th graders: 1 in 5 don't meet CDC recommendations for physical activity

# Fruit & Vegetable Consumption Amongst Malheur County's Youth

- Does not meet USDA recommendations
- Mirrors rest of Oregon
- Fruits:
  - 62.8% ate < once per day
  - 12.6% ate none.
- Vegetables:
  - Green salad
    - 86.4% ate < once per day
    - 39.0% ate none
  - Carrots:
    - 89% ate < once per day
    - 49.0% ate none
  - Other Vegetables:
    - 75.1% ate < once per day
    - 17.1% reported eating none)

# Nutrition at Cairo Elementary School in Ontario, OR

- The rate of childhood obesity at Cairo mirrors the rest of Malheur County
- No / limited nutrition education in classroom
- Fruit bar at breakfast, fruit & veggie bar at lunch
- No candy or sodas, no vending machines
- Weekly entrée selections include:
  - Breakfast: waffles, muffins, French toast sticks
  - Lunch: hamburgers, pizza, hot dogs

Note: Cairo Elementary was the initial school chosen for the Greenhouse Project, but we had to change to Pioneer Elementary as Cairo was going through a transition period w/ new principal & staff



A Proposal:



**THE GREENHOUSE  
PROJECT**

# Why a Greenhouse?

- By introducing a greenhouse and gardening into the children's daily life at school, we are promoting healthy food choices and building life-long habits
- Secondly, Malheur county is a large agricultural center for the state of Oregon and having agriculture as part of the curriculum can instill a respect and potential interest in the culture of the county

## And While We're At It...

- With a greenhouse project, we can engage the larger community in its development and maintenance.
- Klemmer, et al, showed that 3rd-5th graders selected to participate in a school garden program scored significantly higher on science achievement tests than those who were not selected

# What the Literature Says About Classroom Nutrition Education

- Problems encountered during the review:
  - No standardization for evaluation of school-based nutrition education interventions
  - Outcomes are typically increases in nutrition education and in self-reported fruit & vegetable consumption

# What the Literature Says About Classroom Nutrition Education

## ■ Recommendations

- Increasing availability of fruits & vegetables
- Increasing accessibility of fruits & vegetables
- Increasing desirability of fruits & vegetables (i.e. augmenting taste preferences)
- Thus, having **just** classroom nutrition education or **just** increased fruit & vegetable options in the cafeteria alone would apparently not be enough to augment children's eating habits

# School Gardens: Not a New Concept

- 1917 – government sponsored U.S. School Garden Army-in LA alone children tended to 13,000 gardens
- USSGA dismantled after WWI
- 1930's Great Depression → poverty → school lunch program → reduced and free lunches → meals w/ poor nutritional value
- 2000 – Farm to School to bring it all back

# 'Farm to School' Program

- Connect schools with local farms
- Goals: serving healthy meals, educating children on nutrition, and supporting local farm industries
- 39 states with a program (Oregon is one of them)
- 2,007 Farm to school programs in the US
- 8,776 schools involved (53 in Oregon)
- 2,035 school districts involved (6 in Oregon)
- Currently, no schools in Malheur County are involved

# Learning from successful programs

## Planting Seeds of Change

### Lebanon, OR

- Who runs the program?
  - Coordinator: Nancy Kirks
  - The champions are a school teacher, the principal, the school district nutrition services director and local Master Gardeners
- What are some helpful resources they use?
  - Ecotrust, Farm to School, and Healthy Active Oregon

# Learning from successful programs

Garden of Wonders

Abernathy Elementary, Portland, OR

- 2005-2006 assessment compared to control
- **Profit-loss:** cost of goods cheaper, but labor more expensive
- **Nutrition:** nearly equal, Abernathy less total fat
- **Fruits/vegetables:** data not ready to compare, but servings that children chose from bars nearly doubled in a school year at Abernathy
- **Perception:** overall positive among students, teachers and parents

# Learning from successful programs

## The Multicultural Garden Atkinson Elementary, Portland, OR

- **Emphasis:** Cultural Education
- The Multicultural Garden is comprised of 30 raised garden beds, one for each teacher.
- These garden beds provide an opportunity to plant vegetables and flowers from every culture represented at Atkinson.
- Each teacher has a parent volunteer garden representative that works with the teacher to integrate the garden into their curriculum. Workshops and training sessions are provided by Portland State University for parents and teachers alike on how to use the garden in all the different subject areas
- Throughout the year, students are planting, thinning, harvesting, mulching and weeding.
- The food grown by students in the MCG is served on the school cafeteria salad bar.

# Learning from successful programs

## The Edible Schoolyard

### MLK Middle School, Berkeley, CA

- **Emphasis:** Healthy Eating Habits
- The mission of the Edible Schoolyard is to create and sustain an organic garden and landscape that is wholly integrated into the school's curriculum and lunch program.
- It involves the students in all aspects of farming the garden – along with preparing, serving and eating the food – as a means of awakening their senses and encouraging awareness and appreciation of the transformative values of nourishment, community, and stewardship of the land.
- An acre of beds is planted with seasonal produce, vines, berries and flowers and is surrounded by fruit trees. Subsequent additions have included an herb garden and a chicken coop!
- In addition to hands-on garden work, the Edible Schoolyard Program consists of:
  - Seasonal recipes prepared by students in the kitchen.
  - After school cooking classes
  - Composting of materials from the school cafeteria
  - A Holiday Wreath Sale, with wreaths made from garden materials and harvest vegetables
  - Free, healthy breakfasts for all students on statewide testing days
- The experience exposes children to food production, ecology, and nutrition, and fosters an appreciation of meaningful work, and of fresh and natural food.

# Summary of what we've learned from other school's examples

- They appear to have successfully integrated a garden/greenhouse with classroom learning & cafeteria options
- They appear to be successfully maintaining their programs through sales of extra produce, grant funding, and community involvement



# The Plan:

## PUTTING THE GREENHOUSE PROJECT INTO ACTION

### Part 1: Community Involvement

# Community Involvement

- Will be necessary because neither the school or school district can carry financial burden of building or maintaining the greenhouse

# Community Involvement

- Pam Suyematsu, Nutrition Services Director  
Ontario School District
  - Very interested in project
  - Already working a fruits/vegetables grant, for which this information was helpful
  - Interested in being a core member in this project

# Community Involvement

- Holy Rosary Medical Center
  - Ontario's Hospital
  - Will include info in newsletter to encourage employees to help -- at the least, this goes to the hospital's 500 employees

# Community Involvement

- OSU's Malheur County Experiment Station
  - Help with blueprints for greenhouse
  - Initially educate teachers during set-up of greenhouse
  - Staff may volunteer due to their passion for agriculture

# Community Involvement

- Local Agricultural Resources
  - About 50% of Cairo children connected to local agriculture -- their parents can volunteer?
  - Malheur county dairy production ranks 5th in Oregon amongst all counties
  - Local agricultural workers should be interested in participating b/c this program will introduce the younger generation to their industry

# Community Involvement

- Flyer to solicit involvement from community members

## Healthy Kids, Healthy Communities: The Ontario Greenhouse Project



Childhood obesity is on the rise in Malheur County- more than 1 in 4 children in our community are obese, almost twice the national average. And childhood obesity can lead to life-long health problems involving the heart, lungs, and brain.

The problem of obesity can be directly related to the food our children eat. State health statistics show that children in Malheur county eat far less than the recommended daily amount of fruits and vegetables.

Schools around Oregon are successfully improving healthy eating habits among children with school gardens and greenhouse programs. These programs get kids involved in growing fruits and vegetables and teach them about nutrition. As a result, kids develop better eating habits, healthier lives, and even improve their school performance.

The Ontario Greenhouse Project is beginning a similar program in our community and needs your help in making the project a success.

The goal of the Ontario Greenhouse Project is to improve the health of Ontario's children by establishing life-long healthy eating habits. Children will participate in all aspects of growing fruits and vegetables in their school greenhouse and enjoy the harvest in their school cafeteria. Along the way they will learn about nutrition, harvesting, and community.

### How you can help

The cost of a 20x30ft greenhouse is estimated at \$5-6,000, but with help from the community, the cost can be significantly reduced.

### Current needs include:

- Donations: building material, seeds, soil and tools
- Volunteer labor for construction
- Volunteer gardeners

If you have any question or would like to help, please contact the Ontario Greenhouse Project at \_\_\_\_\_

# Community Involvement

- Presentation to be Given at PTA Meeting, Outlining Ideas for Parent Contributions & Future Needs:
  - Become a Greenhouse Champion
    - Sit on the OGP advisory board and help plan and organize the project
  - Donate funds and supplies for the greenhouse
  - Help design the greenhouse
    - We have tentative plans but need construction experts to finalize
  - Build the greenhouse
    - A project the whole family can participate in!
  - Donate seeds, soil, tools and other supplies



# The Plan:

## PUTTING THE GREENHOUSE PROJECT INTO ACTION

### Part 2: Funding the Project

# Funding the Project

- Cost of Building a Greenhouse
  - 20x30x7 greenhouse w/ Plexiglas \$3-4K, additional \$1-2K depending ventilation
    - Dimensions based on Lebanon's greenhouse
  - Greenhouse kit \$2.5-20K depending on size
  - Soil, seed, trays, and starter plants: less than \$1K

# Funding the Project - Grants

- AeroGrow Growing Kids Awards
- Bayer Advanced “Grow Together with Roses” School Garden Award
- CATCH grant
- Child Health Foundation
- Hansen’s Natural and Native School Garden Grant
- Healthy Sprouts Award
- Heinz Wholesome Memories Intergenerational Garden Award
- Hooked on Hydroponics Awards
- Love Your Veggies Grant
- Lowes Toolbox for Education
- Make A Difference Grant
- Mantis Award
- Melinda Gray Ardia Grant
- Organically Grown Company Grant
- School Based Interventions to Prevent Obesity
- Tom’s of Maine
- Youth Garden Grants
- US Dept of Education
- Welch Harvest Grants



# The Plan:

## PUTTING THE GREENHOUSE PROJECT INTO ACTION

### Part 3: Curriculum Integration

# Ideas for Curriculum Integration

- Growing in the Greenhouse
  - Kindergartners through 5th graders can participate in age-appropriate tasks:
    - Composting
    - Preparing soil
    - Planting
    - Weeding
    - Transplanting
    - Harvesting
    - Preparing foods

# Ideas for Curriculum Integration

- Learning in the Greenhouse - A few examples of garden-based lessons:
  - Kindergarten and 1st grade:
    - **Gifts from the Earth:** Plant Based Crafts
  - 2nd and 3rd grade:
    - **Getting to Know your Garden:** Preparation, Tools & Equipment
    - **Digging in:** Soil, Weather, and Seasons
    - **Harvest:** Seed Saving, Food Storage and Processing
    - **Garden Habitat:** Critters, Beneficial Insects and Pest Control

# Ideas for Curriculum Integration

- Learning in the Greenhouse - A few examples of garden-based lessons:
  - 4th & 5th graders
    - **Seeds and Planting:** Propagation, Germination, Transplanting
    - **The Growing Plant:** Botany, Reproduction, Pollination, and Life cycles
    - **Garden Stewardship:** Watering, Weeding, Erosion, and Crop Maintenance
    - **Composting:** Recycling, Organic Gardening, and Soil Amendment
    - **From Farm to Table:** Food Systems at Work

# Ideas for Curriculum Integration

- Learning in the Classroom
  - Kindergarten through 5th grade:
    - **Cooking and Eating for Healthy Living:** Eat Well for Nutrition
    - **Food Around the World:** Origins, History, and Cultural Uses of Foods

# Ideas for Curriculum Integration

- Eating in the Lunchroom
  - The food the children have grown in their greenhouse can be prepared & served in their lunchroom



# Timeline for Further Development, Sustainability, & Assessment

# Timeline for Implementation

- Starting July 2009: Apply for Catch Grant through AAP; apply for other grants
  - Will be handled by OHSU Med students & Dr. Dunbrasky
- Dec 2009: Start obtaining funding (hopefully)
- July 2009 – Apr 2010: Begin raising public awareness and support
- April 2010: Begin obtaining materials

# Timeline for Implementation

- June 2010: Construction begins
  - Anticipate one weekend for building the frame, one weekend to set up the inside if a pre-made kit is used.
  - Volunteers from the community, especially parents and family of students, should be the workforce.
- July-Aug 2010: Staff training
  - New curriculum
  - Integrating parents/volunteers
- Sept 2010: Curriculum begins

# Sustaining the Project

- Financial Sustainability
  - Growing crops of things that can be sold; i.e. extra vegetables, flowers, seeds, plants, etc.
  - This fundraising can help purchase tools, soil, seeds, etc to keep the greenhouse functioning year round

# Sustaining the Project

- Sustaining Community Involvement
  - Call the public health department for issues surrounding serving greenhouse food in cafeteria
  - Send a team to the annual Healthy Active Oregon training & subscribe to their listserv
  - Work with local farms and dairies
  - Talk with the local newspaper and radio station

# Assessment of Efficacy

- Ideas for assessment of how efficacious this greenhouse will be in creating healthy eating habits:
  - Survey each child at the beginning and end of the year about eating habits
  - Health fair - BMI measurements and percentile comparisons



# In Summary

# In Summary

- In Malheur County, prevalence of childhood obesity double the national average & children/adolescents have lower than recommended fruit & veggie consumption.
- Greenhouse w/ curriculum integration has been shown at other schools to effectively augment students' eating habits, which will hopefully combat obesity problem
- So far we have assessed the feasibility of the project, avenues for community involvement, potential sources of funding, possible curriculum integration ideas, and methods for sustaining and augmenting greenhouse project once it has been developed
- Dr. Dunbrasky & past medical student participants in this project have & will continue to foster its further development by future rural clerkship students

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