

(FS)²

Framingham State
Food Study

eat well. advance science.

Drs. Cara Ebbeling and David Ludwig
Principal Investigators

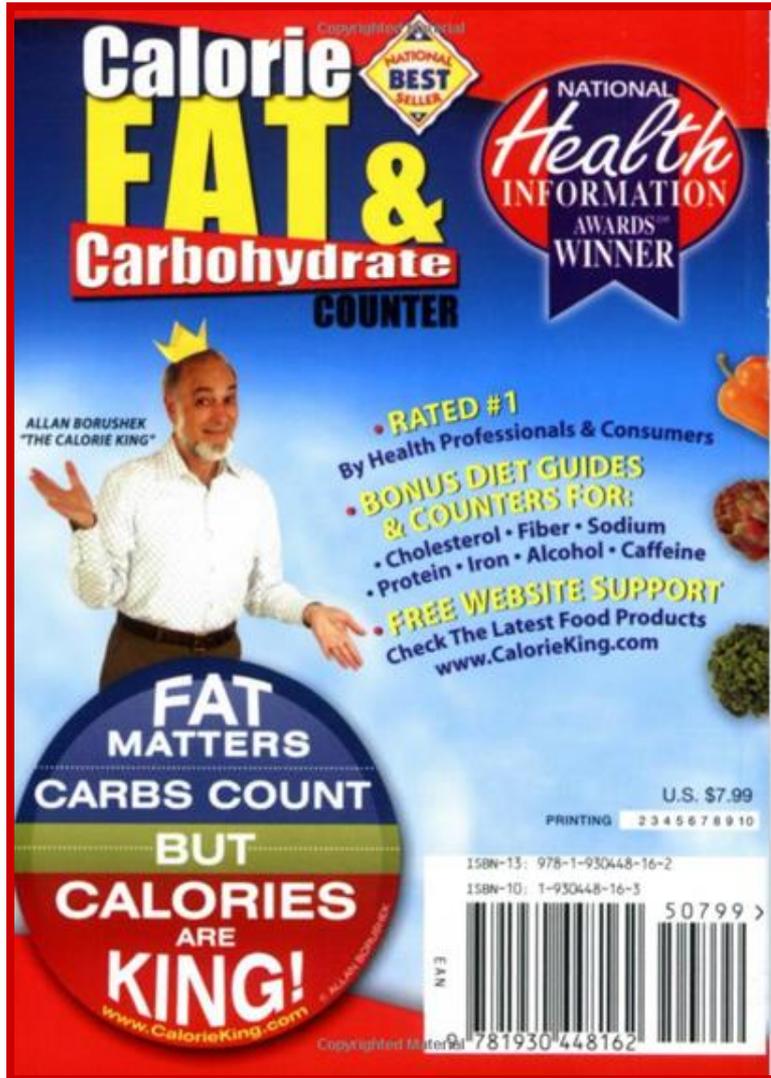


new balance FOUNDATION
Obesity Prevention Center
Boston Children's Hospital

Why did we contact FSU?

- Desire to conduct a “landmark” controlled nutrition study outside of a hospital setting
- Excellent reputation of the Food and Nutrition Department
- Proximity to Boston
- Possibility of working closely with a dining service, with access to a large and well-equipped commercial kitchen for production of high-quality controlled diets

Practically speaking, what are the research questions?

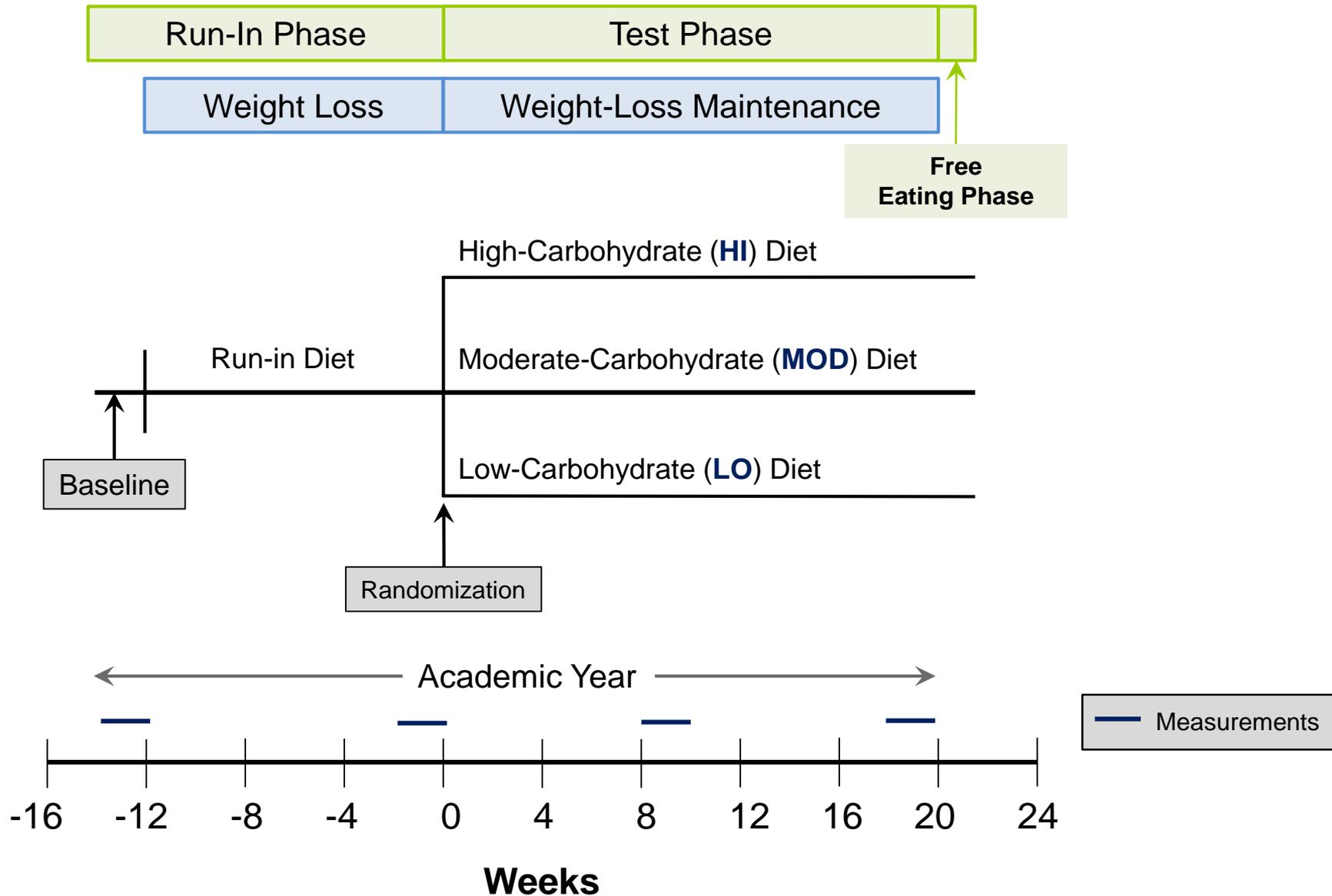


This suggests that calorie content of a diet is more important than composition.

Does it really matter whether calories come from carbohydrate or fat?

What are the best diets? Is one diet better than another for keeping weight off?

How will we answer these questions?



What are the test diets?

LO Carb

MOD Carb

HI Carb

Dinner

Herb Grilled Salmon
Leaf Spinach

Cheddar Cheese Cubes

Peanuts
Oranges
Milk

Herb Grilled Salmon
Leaf Spinach
Long Grain & Wild Rice
Cheddar Cheese Cubes

Whole Wheat Bread
Peanuts
Oranges
Milk

Herb Grilled Salmon
Leaf Spinach
Long Grain & Wild Rice

Vanilla Greek Yogurt w/ Craisins
Whole Wheat Bread

Oranges
Milk

Snack

Falafel Lettuce Wrap
w/ Lemon Tahini Sauce
String Cheese

Falafel Lettuce Wrap
w/ Lemon Tahini Sauce

Apricot Greek Yogurt

Falafel Pita
w/ Lemon Tahini Sauce

Vanilla Greek Yogurt

“Numbers” Behind the Diets

| Nutrient | Run-In Phase | Test Phase | | |
|----------------------------|--------------|-------------------|-----------------------|------------------|
| | Weight Loss | High-Carbohydrate | Moderate-Carbohydrate | Low-Carbohydrate |
| Energy (% of needs) | 60 | 100 | 100 | 100 |
| Carbohydrate (% energy) | 45 | 60 | 40 | 20 |
| Fat (% energy) | 30 | 20 | 40 | 60 |
| Protein (% energy) | 25 | 20 | 20 | 20 |

Collaboration with Dining Service

eat well.

Hospital-based study

- Difficulty imposed on subjects traveling to a research center every day
- Inability to provide freshly prepared meals 3 times a day
- Limited kitchen space

FSU-based study

- Meals available where students, faculty, and staff spend a lot of time
- Fresh food prepared close to the time of service
- Exceptional capability for ensuring that foods not only meet nutrient specifications (to answer the research questions) but also look, smell, and taste great



Where do participants get their food?

(FS)²K – McCarthy Center



What are the measurements?

advance science.

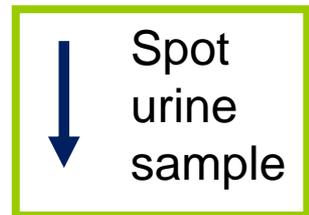
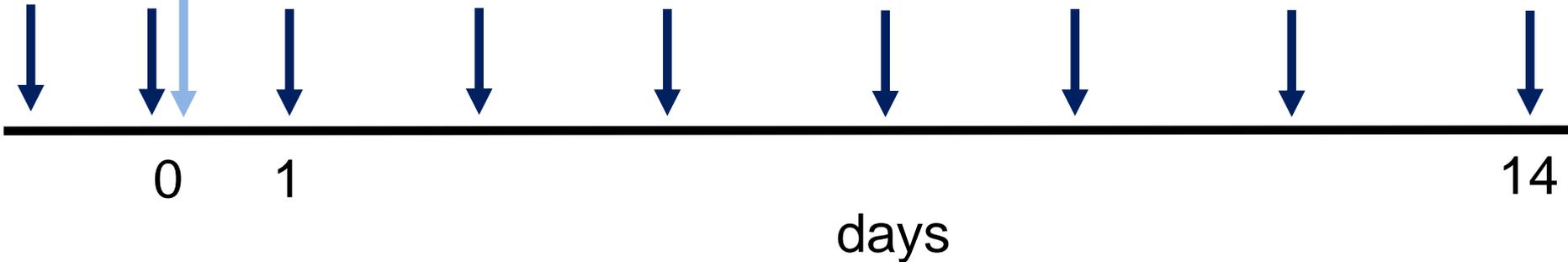
- Height and Weight
- Blood Pressure
- Total Energy Expenditure (calories burned) *
- Resting Energy Expenditure (calories burned at rest) *
- Exercise Test (calories burned while cycling) *
- Blood Draw (risk factors for disease)
- Oral Glucose Tolerance Test *
- Physical Activity *
- Urine Sample (stress hormone)
- Body Fat *

Accommodation for Class and Work Schedules (as much as possible)

Total Energy Expenditure (Calories Burned)



Dose of “doubly-labeled water”



What is doubly labeled water?

| Element | Mass Number | % Natural Abundance | Doubly Labeled Water |
|---------|-------------|---------------------|---------------------------------|
| H | 1 | 99.985 | ${}^2\text{H}_2{}^{18}\text{O}$ |
| | 2 | 0.015 | |
| O | 16 | 99.76 | |
| | 18 | 0.204 | |

Mass number: protons + neutrons in an atom (higher number, more neutrons)

- When the water molecule is labeled with the less abundant forms of both hydrogen and oxygen, it is said to be “doubly labeled.”
- Because the number of neutrons does not affect how water is used by the body, this enrichment allows us to “trace” metabolism and calculate energy expenditure based on the ${}^2\text{H}$ and ${}^{18}\text{O}$ in the urine.
- Drinking doubly labeled water is completely safe.

Energy Expenditure (Calories Burned)

Resting

Cycling



Oral Glucose Tolerance Test



75 grams
of "sugar"



Heated Hand Box



Physical Activity



Actigraph
(worn under clothing, if desired)

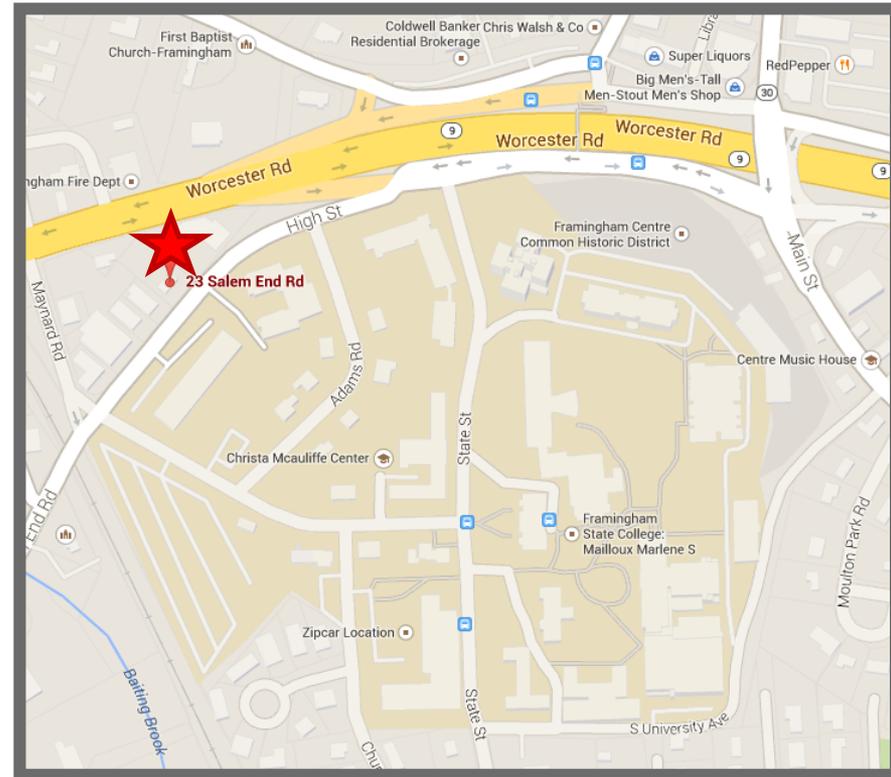


Where will participants go for measurements?

“The (FS)² House”



23 Salem End Road



Body Composition

Dwight Hall



Who will be the study participants?

Students, Faculty, and Staff

- 18 to 65 years of age
- Interested in healthful weight loss
- Willing not to drink alcohol during the study
- Planning to be part of the FSU community for the academic year

Enrollment (evaluation of eligibility criteria)

- Telephone conversation
- Informational visit
- Screening visit

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If I am not eligible to participate, how can I be involved in the study?

- Work as a research assistant (students)
- Show enthusiasm for the study by wearing your **(FS)²** t-shirt on campus
- Provide encouragement to study participants!

-
- Faculty: several ancillary studies underway

What is the compensation for study participants?

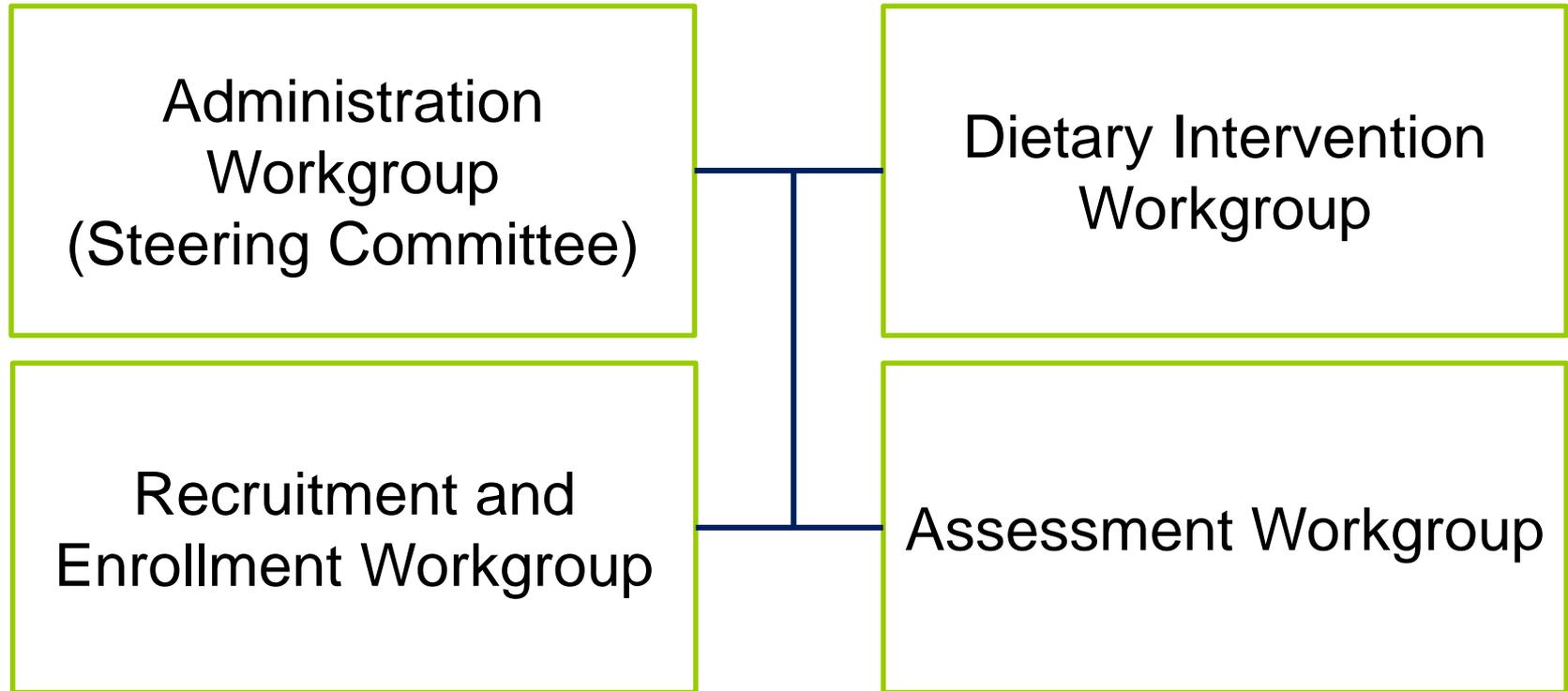
- Stipend (compensation) up to \$3,280
- Reimbursement to resident students for a meal plan, up to \$3,220
- Maximum total value of \$6,500

What makes this project a “Landmark” Study?

- Designed to answer long-standing questions about calorie sources
- Widespread public health significance
- Research in a “real-life” setting
- Collaboration with a highly reputable dining service
- Novel infrastructure to accommodate a large number of study participants
- Longer duration than most controlled nutrition research studies
- State-of-the-art measurements
- Generous funding

Nobody has ever before done a study quite like this!

Workgroups



Workgroup Members

Administration / Steering

Dr. Linda Vaden-Goad
Dr. Dale Hamel
Dr. Susanne Conley
Rita Colucci, Esq
Dr. Janet Schwartz
Dr. Susan Mullaney
Jonathan Lee
Ralph Eddy, Sodexo
Rachel Trant
Glenn Cochran
Dr. Margaret Carroll
Erin Anseth, Student
Dr. David Ludwig, BCH
Dr. Cara Ebbeling, BCH

All Groups

Dr. Pat Luoto
Gloria Klein, BCH

Recruitment / Enrollment

Dr. Susanne Conley
Dr. Marian Cohen
Debra Altsher
Dan Magazu
Jeremy Spencer
Maureen Kelly-Gonsalves
Mari Amaral
Kaitlyn Shannon, Student
Cathy Matero, BCH

Assessment

Dr. Mark Nicholas
Dr. Cindy Bechtel
Mark Powers
Dr. Mike Crosier
Dr. Ann Johnson
Dr. Amy Knapp
Ilene Hofrenning
Margaret Conley, Student
Dr. Cara Ebbeling, BCH
Dr. Henry Feldman, BCH
Cathy Matero, BCH

Dietary Intervention

Dr. Marian Cohen
Dr. Sue Dargan
Dr. Melinda Stoops
Ralph Eddy, Sodexo
Beth Winthrop, Sodexo
Glenn Cochran
Dr. Pam Ludemann
Dr. Andrea Gorman
Dr. Monos Apostolitis
Claire Ostrander
Tim DeLeo, Student
Dr. Cara Ebbeling, BCH
Lisa Bielak, BCH
Dr. Julia Wong, BCH



Framingham
State University





Areas for Discussion

- School/facility utilization:
 - Culinary arts kitchen
 - Times kitchen currently utilized?
 - Preparing 3 meals/day plus weekend meals
 - Logistics: breakfast and lunch for faculty and staff; dinner for community participants?
 - Monday thru Friday and weekends?
 - Service—similar to metabolic kitchen
 - Restaurant area for dining
 - Space for counseling?
 - Calendar—begin in summer?

Areas for Discussion

- Staff opportunities
 - Chef
 - Responsibilities:
 - Hire and supervise students, professional staff
 - Ordering
 - Food preparation and service
 - We will provide site manager plus RD
- Student work opportunities/considerations:
 - Academic week and shop week
 - Theory days
 - Coop schedule

Areas for Discussion

- Procurement
 - Access same vendors as Sodexo (nutrient analysis)
 - Computerized production system?
- Storage:
 - Ample refrigeration for meals, prep, and take out meals
 - Smallwares including serving dishes
 - Delivery boxes

Benefits—WIIFU?

- Community Resource
- Beliefs: “to prepare students to enter the work force with marketable occupational skills upon leaving high school.”
- “Flexible opportunities and varied programs for adults enrich the educational experience of all students.”—
Assabet After Dark
- Additional income for faculty and possibly students