V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Childhood Obesity

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
610	Domestic Policy Analysis	8%		0%	
703	Nutrition Education and Behavior	42%		25%	
704	Nutrition and Hunger in the Population	4%		25%	
724	Healthy Lifestyle	11%		25%	
802	Human Development and Family Well-Being	6%		10%	
806	Youth Development	21%		15%	
901	Program and Project Design, and Statistics	4%		0%	
903	Communication, Education, and Information Delivery	4%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	3.0	0.0
Actual Paid	6.8	0.0	5.0	0.0
Actual Volunteer	417.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
136455	0	298591	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
136455	0	1943026	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
266112	0	620413	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

We will determine factors that drive the decisions of individuals and householders to adopt and maintain healthy lifestyle choices. Further, we will use a social-ecological framework to study how exposure and familiarity with more nutritional foods can increase incorporation of these foods into diets of various populations, as well as acceptability.

We will also:

• Conduct evidence-based educational programs and activities that are directed at parents, children, professionals, partner agencies, and other audiences.
• Develop or select new 4-H foods curricula that focus on the youth learning to prepare healthy, local foods.
• Develop a curriculum designed to help older youth become local advocates for healthy eating and physical activity in their communities. The curriculum will help young people learn how to conduct community assessments and lead community change efforts that focus on education, system building, and policy development.
• Develop research programs that can employ "learning by doing" approaches to allow parents and children to adopt healthy eating habits and promotion of exercise.

In summary, we will:
- Conduct surveys
- Conduct data analyses
- Conduct mixed-methods longitudinal research (interviews,
- Conduct Research Experiments
- Develop models
- Develop Products, Curriculum, Resources
- Provide Training.
- Assessments.
- Partnering
- Partnering.

2. Brief description of the target audience

- children, youth, and families across Oregon
- schools and others youth educators
- elderly residents
- urban and rural residents
- Latino populations
- economists.
- policy makers and agency personnel who work with children and families .

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6248	6340	3267	8166

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	6	5	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Conference Presentations

Year	Actual

2014	18

Output #2

Output Measure

- Number of Courses Developed that include the Planned Program and State Defined Outcomes as part of the curriculum

Year	Actual
2014	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Conceptual model will guide research to understand the factors & processes that account for physical activity and the associated health outcomes among youth across ethnic and class boundaries in the context changing communities
2	Knowledge gained for developing strategies for maximizing physical activity and physical and mental health of youths and adults
3	Improved outreach, education, and professional practice in serving the needs of low-income families, including programmatic interventions that reduce the physical inactivity and promotes well-being of lower-income and ethnic minority youth across America
4	Develop understanding of human health and nutritional behaviors * obesity intervention strategies * bio-behavioral markers * key parent-child relationships * family interactions * peer interactions * personal choices
5	Improved nutrition * schools offer/encourage healthful foods * More effective programs and student experiences * Markers and strategies become the standards of methods and measurement of childhood overweight and resiliency.
6	Identify tactics, strategies and factors that provide families, children, and youth access to healthy foods
7	Children practice healthy eating as defined by the current U.S. Dietary Guidelines for Americans (Percent of target audience indicating positive change in measured outcome)
8	Children engage in healthy levels of physical activity as defined by national physical activity guildeines (Percent of target audience indicating positive change in measured outcome)
9	Increases in positive levels of Knowledge, Attittude, Skills and Aspiration (KASA) outcomes, as per Bennett & Rockwell, 1995, related to goals of reducing obesity (Percent of target audience indicating positive change in measured outcome)

Outcome #1

1. Outcome Measures

Conceptual model will guide research to understand the factors & processes that account for physical activity and the associated health outcomes among youth across ethnic and class boundaries in the context changing communities

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Weight management is difficult for most individuals, as indicated by the high levels of overweight and obesity seen in the United States (US) and around the world (5). Currently, approximately 66% of the US adult population is either overweight and/or obese, with ~34% being obese (1,3). Unfortunately, the obesity epidemic is not limited to adults. Currently 32% of children and youth between the ages 2 and 19 are above the 85% percentile for body mass index (BMI, kg/m2) for age (4). Obesity prevention involves maintenance of current body weight within a healthy body weight range and/or the prevention of further weight gain (e.g. maintaining energy balance: energy intake = energy expenditure). If the goal is to lose weight, the static energy balance approach no longer applies since weight is changing. In this situation, energy balance is a dynamic process (2) and changing one factor on the energy intake side also impacts the energy expenditure side even if there was intentional effort to do so. Thus, numerous factors are working together to influence each side of the energy balance equation, which ultimately determines body weight.

What has been done
The Oct, 2012 USDA, ACSM and AND Conference titled: Energy Balance at a Crossroads: Expert Panel Meeting has resulted in a publication in two organizational journals (Med Sci Sport Ex and J Academy of Nutrition and Dietetics), which will were published simultaneously in July, 2014. In addition, the PI is now chair of the Energy Balance Work Group (ACSM, USDA, AND) and they have a number of initatives that have come out of this meeting, which are moving forward including identifying physical activity experts for USDA to help with obesity prevention, joint credentially between ACSM and AND for professionals, survey of professinoals in both fields

to see what each tells clients regarding nutrition/PA. A push toward educating public school teachers about energy balance and the importance of nutrition and PA for obesity prevention.

Results

. We have completed an intervention examining the effect of two different levels of exercise on appetite, both objective and subjective assessments. We asked people to rate their level of hunger/appetite before and for designated times up to 24-h after each exercise. We also collected blood samples to measure gut appetite hormones to determine if these hormones changes before and over 60 minutes post exercise. Data have been collected and we are now in the process of analyzing data in conjunction with faculty at the U of Wyoming.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development
903	Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

Knowledge gained for developing strategies for maximizing physical activity and physical and mental health of youths and adults

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to a new study, there is no direct link between parents' own level of physical activity, and how much their child may exercise. In fact, parents' perceptions of their children's athleticism are what have a direct impact on the children's activity.

What has been done
The study by Oregon State University researchers , published in the journal Preventive Medicine, studied 268 children ages 2 to 5 in early childhood education center. Of these children, 156 parents or caregivers were surveyed on their parental practices, behaviors related to physical activity and demographic information.

The study suggests that parents' level of physical activity is not directly associated with their children, but instead that the direct link was between parental support and a child's level of physical activity.

Active parents were more likely to have active children because they encourage that behavior through the use of support systems and opportunities for physical activity. Conversely, there was no statistical evidence that a child is active simply because they see that their parents exercise.

Results
The study found that parents who think their children have some sort of athletic ability were much more likely than other parents to provide instrumental and emotional support for young children to be physically active. The results underscore the need for parents to provide emotional support, as well as opportunities for activity. Regardless of whether a child is athletic or is perceived to be physically gifted, all children need opportunities and encouragement of physical activity. Parental support of physical activity did not translate to a child's behavior once they were not in the home and were in a childcare setting. This adds to the body of research showing that both parents as well as childcare providers must provide support for physical activity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
610	Domestic Policy Analysis
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #3

1. Outcome Measures

Improved outreach, education, and professional practice in serving the needs of low-income families, including programmatic interventions that reduce the physical inactivity and promotes well-being of lower-income and ethnic minority youth across America

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
OSU researchers are working to establish youth gardens with the goal of increasing sustainability of fruit/vegetable intakes in low-income communities while also teaching youth how to garden and sell their products in the market place. Fruits/vegetables are low energy dense foods that are high in fiber, water and nutrients, and can help improve overall health and help maintain a healthy weight.

What has been done
The goal of this project was to bring together low-income youth transitioning to adulthood, members of faith-based communities in two Oregon towns, and university researchers, in a project designed to:

1) provide training, employment, and improve health outcomes for vulnerable youth,

2) offer opportunities for adults from faith-based congregations to address issues of social injustice, and

3) build community partnerships leading to a sustainable youth garden entrepreneurship program.

Using a Community-Based Participatory Research design, this project aimed to increase access to locally grown organic foods and promote physical activity while providing training and education for youth at risk.

Results
Results are currently being analyzed and two manuscripts are in preparation. Results will be presented in next year's ARA

4. Associated Knowledge Areas

KA Code	Knowledge Area
610	Domestic Policy Analysis

703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development
903	Communication, Education, and Information Delivery

Outcome #4

1. Outcome Measures

Develop understanding of human health and nutritional behaviors * obesity intervention strategies * bio-behavioral markers * key parent-child relationships * family interactions * peer interactions * personal choices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
OSU is examining the impact of a low-energy dense, high fiber food (e.g. barley) on appetite compared to oatmeal, a commonly consumed breakfast cereal that is also high in fiber. Barley is a crop grown in Oregon and she is working with faculty in the College of Agriculture to incorporate barley into breakfast to see if appetite is blunted and post-breakfast energy intake is blunted.

What has been done
Conducted an experiment analyzing the sensory and satiety acceptability of barley cereal in comparison to oatmeal. Study finalized August, 2014. Manuscript drafted but not submitted. This research benefited the project effort to identify the potential to develop barley foods and uses in US food culture. The results indicated that barley consumption increased satiety compared to oatmeal. Undergraduate students (N~35) learned how to develop and utilize barley and became more aware of the health benefits of barley and its soluble fiber content.

Results

For the Barley study, data was gathered and analyzed comparing subjects' sensory acceptability ratings and self-reported satiety following consumption of a barley versus oatmeal meal. Total intake following consumption of barley versus oatmeal breakfast cereal resulted in significantly lower caloric intake at the following lunch meal. This important result suggests that barley may result in decreased total food intake and facilitate weight management. This research is in preparation for publication. For the Farm to Cafeteria project, viewers of the poster were able to understand how a collaborative effort in promoting barley was possible that included farmers, undergraduate and graduate students, research can work together to promote barley.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development
901	Program and Project Design, and Statistics
903	Communication, Education, and Information Delivery

Outcome #5

1. Outcome Measures

Improved nutrition * schools offer/encourage healthful foods * More effective programs and student experiences * Markers and strategies become the standards of methods and measurement of childhood overweight and resiliency.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Barley may provide an important replacement for wheat derived foods. The nutritional value of barley is much better than wheat and barley exhibits properties that suggest it is an effective deterrent to overeating and obesity. This project seeks to develop recipes for the use of barley

and to test its effectiveness in meeting satiety and public acceptance - particularly in school nutrition programs.

What has been done
Researchers developed 12 barley recipes for use in homes and institutions. Nutritional information was also written.The recipes were taken to school food operation and to a long term care facility for acceptability. The school recipes have not been incorporated due to limitations in purchasing requirements limiting the ability to acquire barley. The LTC facility recipes were tested but they were not popular, as the dishes had to be able to be able to "hold" during service time to maintain optimal texture. This is an area for additional research. Students liked the sensory qualities of the barley products produced.

Results
During 2014, more work on testing experimentally, the acceptability of barley products was conducted among college students. We are considering conducting a new study that looks at consumption of barley over a longer period of time to see if in a 3-5 day pattern of food consumption with barley; total caloric intake decreases. We plan to continue to develop healthy recipes which focus on other whole grains.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being
901	Program and Project Design, and Statistics
903	Communication, Education, and Information Delivery

Outcome #6

1. Outcome Measures

Identify tactics, strategies and factors that provide families, children, and youth access to healthy foods

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A high fiber diet is key to good nutrition, prevention of obesity, and is key to preventing other diseases such as colon cancer, diabetes, and heart disease. Fiber derived from the by products of grape and apple processing provide a unique opportunity to incorporate these high fiber byproducts (skins and seeds) into the food supply while simultaneously eliminating a waste stream from the processing of these foods.

What has been done
Research conducted at OSU has developed a process of converting fruit waste products (seeds and skins of grapes and apples) into a phytofiber product that can be used in the wet or dry form and incorporated into typical food products (e.g. granola bars, muffins, bread). This phytofiber is high in soluble fiber and phytonutrients. The wet phytofiber may be an excellent addition to a whole grain ?breakfast bar?, which would blunt appetite, yet provide a quick, easy breakfast for busy people. This product has yet to be tested to see if it blunts appetite and subsequent energy intake. However, incorporation of the product in yogurt and salad dressings has been tested with promising results.

Results
This study demonstrated that Pinot Noir wine grape pomace may be utilized as an alternative source of antioxidant dietary fibre to fortify yogurt and salad dressing for not only increasing dietary fibre and total phenolic content but also delaying lipid oxidation of samples during refrigeration storage. Although products fortified with the pomace extracts (liquid and freeze dried) obtained the most similar physicochemical properties to the control (no pomace added), those fortified with dried whole pomace powders (WP) had higher dietary fibre content. Unfortunately, total phenolic content (TPC) and DPPH radical scavenging activity (RSA) of fortified sam- ples decreased during storage, in which more reduction was ob- served in yogurt than that in salad dressings, probably due to the interactions between proteins in yogurt and phenolic compounds in pomace. Therefore, it is necessary to further investigate the mechanisms and methods of retention of TPC and RSA in the prod- ucts in the future studies by using chromatographic techniques to profile the change of pheonolic compounds. Based on the balance in DF and TPC contents, RSA value, physicochemical qualities and consumer acceptance, the best received products were 1% (w/w) WP fortified yogurt, 0.5% (w/w) WP fortified Italian dressing, and 1% (w/w) WP fortified Thousand Island dressing.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

903 Communication, Education, and Information Delivery

Outcome #7

1. Outcome Measures

Children practice healthy eating as defined by the current U.S. Dietary Guidelines for Americans (Percent of target audience indicating positive change in measured outcome)

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Children engage in healthy levels of physical activity as defined by national physical activity guildeines (Percent of target audience indicating positive change in measured outcome)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Obesity is caused by unhealthy eating habits and a lack of physical activity. Researchers at OSU developed an intervention program in three Oregon counties ? Marion, Polk and Yamhill to teach students about creating a healthy lifestyle.

What has been done
About 500 teens ages 15 to 19 will engage in three different life skills programs developed by OSU. One of the programs will be a real-world scenario where teens will learn about growing their own food, cooking healthy, preparing inexpensive meals at home, and staying active.The other two programs use new cutting-edge technology to create virtual environments, where teens will practice these same skills but as an avatar in a 3-D virtual world. One virtual world will be ?realistic,? based on the real environment; the other will be a fantasy world where anything is possible. The approach seeks to tap into technology that kids spend a lot of time with it, and develop a program that can be used both at home and in the classroom to encourage healthy

behavior. The goal is to see how teens who are already physically active due to involvement in team sports can develop lifestyle skills that will stay with them past school age. Part of the intervention will include working with the young people?s parents or primary caregivers to ensure they understand about proper nutrition and exercise.

Results
At the end of the five-year project, an OSU biostatistician will lead the researchers to examine the data to see which of the three programs, the real world, the virtual world, and the virtual fantasy world, resulted in better outcomes. The research team will measure the teens' body mass index, physical activity levels (using sensor and cloud infrastructure developed by OSU engineering faculty), and their ability to meet USDA's Choose MyPlate recommendations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development
901	Program and Project Design, and Statistics
903	Communication, Education, and Information Delivery

Outcome #9

1. Outcome Measures

Increases in positive levels of Knowledge, Attittude, Skills and Aspiration (KASA) outcomes, as per Bennett & Rockwell, 1995, related to goals of reducing obesity (Percent of target audience indicating positive change in measured outcome)

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Barley recipes for use in institutional settings, e.g., school cafeterias need further development as the palatability of the recipes decline as the food is "held" while making preparations to feed large number of students. Subsequent recipes developed during the project will be evaluated to overcome this property.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Obesity is multi-factorial, involving complex interactions between physiological, behavioral, social, and environmental variables. While obesity has been increasing among adults, it is also becoming more prevalent in children. Currently, ~ 32% of children and adolescents aged 2-19 years if age are overweight, while 17% are obese. The increasing number of youth experiencing weight problems is troubling, since it puts them at risk for one or more chronic diseases earlier in life. The project team is applying a social-ecological framework to study how exposure and familiarity with more nutritional foods can increase incorporation of these foods into diets of various populations, as well as increase acceptability. The study is also determining if the greater exposure and familiarity with whole grains, vegetables and fruits increases the selection and incorporation of these foods into typical dietary patterns at home and in school lunches as well as among seniors in residential retirement communities. The project has examined what environmental and social factors predict how groups (e.g. communities, schools, families) and/or individuals (e.g. mothers, family food providers, etc.) make long-term positive changes in dietary patterns, healthy eating and physical activity (PA) behaviors for obesity prevention and reduction of chronic disease risk. Finally, we determining the impact of diet (types of foods) and levels of PA intensity on appetite, food selection and weight management.

Key Items of Evaluation

Research is needed to determine strategies to increase taste preference or liking for low energy dense foods, especially vegetables and whole grains. Decreased rates of home meal consumption and cooking, and increased popularity of non-vegetable snacks, sweetened beverages, and processed grains have diminished the incorporation of these healthy foods into our diets. In addition, children's lack of exposure or familiarity with these foods, limited opportunity to gain experience in developing likeness, and an unwillingness to try

healthy food options also reduce intake. Encouraging these foods will require increasing awareness of preparation that meets time and cost limitations of families, is culturally acceptable, and that can be readily incorporated into meals and snacks. This includes having healthy foods consumption role modeled within households and among peers, and having access and availability of those foods in the household and at school.

Families also live in communities, where the opportunities to be active and grow and select healthy foods are important. Rural communities provide an excellent context in which to examine the fruit and vegetable consumption patterns of youth at risk while also engaging youth in productive work within their own communities. By engaging low-income youth in the construction and maintenance of gardens and in harvesting and marketing organically grown produce, we have found that youth not only consume more produce, but they also become more visible and engaged in their communities. Although youth garden projects initially may not produce enough vegetables to provide a living wage for more than one or two youth, the Producing for the Future Project has found that the increased visibility of the youth participants at the local farmers market can lead to other economic opportunities for youth. Further, mentorship from supportive adults within their own community can encourage youth at risk to stay in school and may even open avenues to higher education.

Community youth gardens may be both a strategy for developing collaborations in rural communities while also providing exposure to produce, nutrient dense foods that can serve to prevent the development of overweight and obese in our youth. Familiarity with the process of growing vegetables potentially increases the consumption of such items. Developing gardens that target low-income youth within communities has the potential to foster supportive adult-youth collaborations that are beneficial for the health of vulnerable residents and the vitality of the community.