

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Human nutrition, wellbeing , health, and 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
701	Nutrient Composition of Food			10%	10%
702	Requirements and Function of Nutrients and Other Food Components			5%	5%
703	Nutrition Education and Behavior			10%	10%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources			5%	5%
724	Healthy Lifestyle			25%	25%
802	Human Development and Family Well-Being			10%	10%
805	Community Institutions, Health, and Social Services			5%	5%
806	Youth Development			25%	25%
903	Communication, Education, and Information Delivery			5%	5%
	Total			100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Auburn University

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	10.0	10.0
Actual Paid	0.0	0.0	6.4	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

Alabama A&M University

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	10.0	10.0
Actual Paid	0.0	0.0	0.0	3.4
Actual Volunteer	0.0	0.0	0.0	0.0

Tuskegee University

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	10.0	10.0
Actual Paid	0.0	0.0	0.0	4.7
Actual Volunteer	0.0	0.0	0.0	0.0

2. Institution Name: Auburn University

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	139595	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	139595	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

2. Institution Name: Alabama A&M University

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	180029
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	281809
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

2. Institution Name: Tuskegee University

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	226221
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	207851
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Childhood obesity program was expanded to include all human health-related issues. Research was conducted to study molecular and cellular mechanisms of obesity, surveys on lifestyle habits (food choice, exercise) of citizens, evaluation of underlying reasons for these habits, program development for improvement, and measuring adoption of improved diets and activity levels. Research was also conducted on animal production methods that result in healthier meat products. In addition, research activities explored non-traditional means of delivery of nutritive components. Research results were shared with extension personnel for further dissemination to county agents, consumers, and community leaders. Additional dissemination was through direct contact (e.g., survey participants and community gatherings), through publications (experiment station bulletins, on-line reports, press releases, and scientific journal articles), and may include non-traditional efforts, such as working through community and faith-based groups.

Highlights included using avatars as a part of a multi-faceted intervention program to prevent child hood obesity in Alabama; studies for linkages between identity development and romantic relationship beliefs and experiences in a sample of rural and urban African- American and white communities; studies that demonstrate sleep as a support for social, emotional, and cognitive development in children; and a number of studies of food additives, functional foods in prevention of diabetes and obesity. Studies assessed the

influence of forest cover on incidence of West Nile Virus (WNV) and related forest cover, climate variability, and mosquito vectored diseases such as WNV. West Nile virus has infected >3 million people, sickened at least 780,000 in the US since 1999, and has reached very high incidence in the southeastern US. Mosquitoes can reproduce in water quality levels associated with land use conversion from forest to urban and that transmission risk increases with increasing impervious cover and decreases as incomes rise. Mosquitoes can also transmit other diseases such as malaria which was endemic to Alabama. A specific cell-surface protein in mosquitoes is used during midgut invasion by Plasmodium falciparum but not by P. vivax, which are respectively the deadliest and most widespread parasite species responsible for human malaria. This result is critical for the design of malaria transmission-blocking therapeutics. G protein coupled receptor pathway(s) involved in regulation of insecticide resistance gene expression was identified. This discovery has significantly impacted on our understanding of molecular mechanisms governing the development of insecticide resistance in insects.

Research determined the relationship of snacking and overall diet quality among adults. Snacking was not associated with poorer overall diet quality, but was associated with a slightly more nutrient-dense diet. Total fruit, whole fruit, whole grains, milk, oils, and sodium component scores were positively associated with snacking frequency showing that snacking is positively associated with overall diet quality. Contrary to expectation, snacking was associated with a slightly more nutrient-dense diet. Much of the literature on snacking has focused on the contribution it may have on single nutrient intakes; however, this focus may overlook the total nutritional impact of snacking. At Tuskegee University, research into physical activities and healthy food choices is focused on pre-K and K students in underserved communities particularly in Black Belt counties. A Color Me Healthy curriculum is being implemented in the classes to learn about healthy food choices. Fruits and vegetable gardens planted by the students are used to provide practical lessons of healthy food choices.

2. Brief description of the target audience

All state citizens, particularly targeted groups of children and high-risk citizens. Students (K through 12; college groups). Food producers and marketers.

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	50000	200000	10000	60000

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	10	20	30

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- publications

Year	Actual
2014	30

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Optimal nutritional recommendations made available to citizens
2	Public awareness of the relationship of healthy food choices and wellbeing and obesity
3	Reduction in obesity and overweight rate (66.6% in 2008) in population and children, and reduction of the level of obesity
4	Health care cost will be lowered as a result of obesity reduction.

Outcome #1

1. Outcome Measures

Optimal nutritional recommendations made available to citizens

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Public awareness of the relationship of healthy food choices and wellbeing and obesity

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	101000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The public need to know the relationship between the food they consume and obesity.

What has been done

A series of research projects, educational programs and extension programs were developed to provide awareness in an effort to reduce obesity.

Results

Alabama is still one of the most obese states in the country. However, public awareness has been enhanced. A number of educational and outreach programs targeted to reduce obesity in the state have been extremely successful.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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701	Nutrient Composition of Food
703	Nutrition Education and Behavior
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
724	Healthy Lifestyle
802	Human Development and Family Well-Being
805	Community Institutions, Health, and Social Services
806	Youth Development
903	Communication, Education, and Information Delivery

Outcome #3

1. Outcome Measures

Reduction in obesity and overweight rate (66.6% in 2008) in population and children, and reduction of the level of obesity

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Health care cost will be lowered as a result of obesity reduction.

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.)
- Other (catastrophic food poisoning)

Brief Explanation

The economic down turn may have had a negative impact on human health, well-being, and happiness, which may have increased the level of obesity.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Research has allowed a better understanding of the factors that influence human health, well-being, and happiness. Other than nutrition, a number of social factors are critical to child development and their eventual success. Specifically, a number of studies have documented the impact of stress, child relationship with day care, sleep and other factors on success of the children.

Seniors increasingly need to engage with Internet technology. Internet use among the majority of the older population has been limited. Physical, cognitive, and social issues lead to impediments in technology usability among older users. Web-based interfaces with innovative virtual agent technology that reduce older users' physical, cognitive, and social barriers to Internet adoption have been developed to improve quality of life by fostering greater independence and empowerment, facilitating social interactions and communications, and bolstering self-efficacy and morale among seniors.

Associations between individuals' frequency of meals and snacks and total energy intake were found. Obesity prevalence was especially high among those with low-incomes and having a low-income is a critical determinant of food insecurity (absence of access to enough food for an active healthy life).

Children in full-day preschool/daycare programs are suffering sleep deficit during the work week (when they attend childcare programs); this deficit is not made up by daytime naps. Sleep disturbances (in duration or overall sleep quality and organization) interfere with children's adaptive functioning in the preschool setting.

Training sessions for youth to develop competencies in nutrition and healthy living showed that majority of the students after the training programs have shown willingness to make positive change in their eating habits and healthy life style. Children who had less overall night time sleep had lower vocabulary test scores, were less accepted by their peers, understood less about the causes of emotion states in others, and were described by their teachers as less well-adjusted in the classroom, compared with children who had relatively more night time sleep.

Children who experience harsh or insensitive care are at greater risk for development of social, psychiatric, and physical health disorders. Stress-response systems, including the hypothalamic-pituitary-adrenal (HPA) axis, translate behavior to the production of the stress hormone cortisol. Poor care in early childhood leads to dysregulation of the HPA axis, which in turn triggers a wide range of maladaptive processes. This work is important because the most important sources of stress in young children are poor quality relationships with caregivers. There is increased risk for children who grow up in persistent poverty or with harsh or insensitive parents, particularly if those adverse circumstances are present very early in the child's life. Researchers are identifying the biological processes that link early adversity to life-long health. Research linking parent-child and teacher-child relationships with key components of the stress response will elucidate the relationship between biochemistry and social success.

Key Items of Evaluation

Research at Auburn in this program area has focused on the relationship of a number of factors affecting human health, wellbeing, and obesity. In particular, researchers have focused on eating habits such as individuals' frequency of eating occasions (meals and snacks) and their total energy intake, sleep patterns and health, stress and social development, and the adoption of the Internet communications with the happiness and wellbeing of the elderly. The following are some of the key findings: The prevalence of obesity was especially high among those individuals with low-incomes and subsequently having a low-income is one of the most important determinants of food insecurity (the absence of access at all times to enough food for an active, healthy life). Children in full-day preschool/daycare programs are (on average) suffering a sleep deficit during the workweek (i.e., when they would be attending the child care program) and this deficit is not made up by daytime naps.

Children's overall sleep organization (e.g., duration, time awake while in bed, number of times waking after initial sleep onset) are significantly correlated (that is, children with less optimal night time sleep tended to have less optimal daytime sleep as well). Importantly, sleep disturbances (either in duration or in overall sleep quality and organization) interfere with children's adaptive functioning in the preschool setting. Children whose sleep quality- sleep organization is disturbed at night were less able to organize story narratives in a coherent and meaningful way than were children whose night time sleep was less disturbed. Children who had less overall night time sleep received lower scores on standard tests of vocabulary knowledge, were less accepted by their peers, and understood less about the causes of emotion.