V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Childhood Obesity

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
<th>%1862 Extension</th>
<th>%1890 Extension</th>
<th>%1862 Research</th>
<th>%1890 Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>701</td>
<td>Nutrient Composition of Food</td>
<td>5%</td>
<td>5%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>702</td>
<td>Requirements and Function of Nutrients and Other Food Components</td>
<td>0%</td>
<td>0%</td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
<td>95%</td>
<td>95%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program


<table>
<thead>
<tr>
<th>Year: 2009</th>
<th>Extension</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1862</td>
<td>1890</td>
</tr>
<tr>
<td>Plan</td>
<td>143.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Actual</td>
<td>90.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

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


<table>
<thead>
<tr>
<th></th>
<th>Extension</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith-Lever 3b &amp; 3c</td>
<td>1655086</td>
<td>Hatch 152270</td>
</tr>
<tr>
<td>1890 Extension</td>
<td>528240</td>
<td></td>
</tr>
<tr>
<td>1862 Matching</td>
<td>7189041</td>
<td>1862 All Other</td>
</tr>
<tr>
<td>1890 Matching</td>
<td>528240</td>
<td>1890 All Other</td>
</tr>
<tr>
<td>1862 All Other</td>
<td>6610870</td>
<td>1890 All Other</td>
</tr>
<tr>
<td>1890 All Other</td>
<td>0</td>
<td>378473</td>
</tr>
</tbody>
</table>

V(D). Planned Program (Activity)

1. Brief description of the Activity

Obesity has reached epidemic proportions in Tennessee with two of three adults and four of ten school age children overweight or obese. Obesity is the leading risk factor for many chronic diseases such as diabetes, arthritis, heart disease, hypertension, and some types of cancer. The economic and psychosocial costs of obesity and the underlying health issues are impacting all of society. Medical care costs are escalating and creating an economic burden for families, employers, and insurance entities. It is important for Extension and Research to implement programs to reverse this trend.

2. Brief description of the target audience

This program targets children and youth and those who care for them, including parents, teachers, and child care providers.

V(E). Planned Program (Outputs)

1. Standard output measures
### 2. Number of Patent Applications Submitted (Standard Research Output)

**Patent Applications Submitted**

- **Year:** 2009
- **Plan:** 1
- **Actual:** 0

**Patents listed**

### 3. Publications (Standard General Output Measure)

**Number of Peer Reviewed Publications**

<table>
<thead>
<tr>
<th>2009</th>
<th>Extension</th>
<th>Research</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>0</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>Actual</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- Number of exhibits displayed to promote program awareness and participation.

<table>
<thead>
<tr>
<th>Year</th>
<th>Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>250</td>
<td>1410</td>
</tr>
</tbody>
</table>

**Output #2**

**Output Measure**

- Number of research-based publications distributed as part of this program.

<table>
<thead>
<tr>
<th>Year</th>
<th>Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>300</td>
<td>24229</td>
</tr>
</tbody>
</table>

**Output #3**

**Output Measure**

- If petroleum prices continue to increase, we may identify several applications for chitosan to replace cellulose in the pharmaceutical or plastics industries (Zivanovic).

Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

- Provide proof-of-concept for using casein micelles as controlled release carriers for antimicrobials in food (Harte).

Not reporting on this Output for this Annual Report
<table>
<thead>
<tr>
<th>O. No.</th>
<th>OUTCOME NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Safe Food Handling Practices for Consumers: Number of participants surveyed more often washed items that came in contact with raw meat, chicken or seafood with hot, soapy water before continuing to cook.</td>
</tr>
<tr>
<td>2</td>
<td>Safe Food Handling Practices for Consumers: Number of participants surveyed who more often washed their hands with soap and warm running water before eating.</td>
</tr>
<tr>
<td>3</td>
<td>Safe Food Handling Practices for Consumers: Number of participants surveyed who more often washed their hands with soap and warm running water before preparing food.</td>
</tr>
<tr>
<td>4</td>
<td>Tennessee Shapes Up: Number of participants who learned how to use the Healthy Plate to balance their diet.</td>
</tr>
<tr>
<td>5</td>
<td>Tennessee Shapes Up: Number of participants who decreased consumption of high-fat foods such as chips, fast food, fried foods, sausage, bacon, bologna, hot dogs, etc.</td>
</tr>
<tr>
<td>6</td>
<td>Tennessee Shapes Up: Number of participants who decreased consumption of high-sugar foods and sweetened beverages, such as soft drinks, Kool Aide type beverages, sweetened tea, etc.</td>
</tr>
<tr>
<td>7</td>
<td>Tennessee Shapes Up: Number of participants who increased consumption of dairy foods.</td>
</tr>
<tr>
<td>8</td>
<td>Tennessee Shapes Up: Number of participants who increased consumption of fruits.</td>
</tr>
<tr>
<td>9</td>
<td>Tennessee Shapes Up: Number of participants who increased consumption of vegetables.</td>
</tr>
<tr>
<td>10</td>
<td>Tennessee Shapes Up: Number of participants increased consumption of whole grains.</td>
</tr>
<tr>
<td>11</td>
<td>Tennessee Shapes Up: Number of participants who improved their blood sugar.</td>
</tr>
<tr>
<td>12</td>
<td>Tennessee Shapes Up: Number of participants who improved their cholesterol levels.</td>
</tr>
<tr>
<td>13</td>
<td>Pending chitosan being granted GRAS (Generally Recognized As Safe) status, our research will lead to applications in edible films and food additives with anti-microbial and thickening properties (Zivanovic).</td>
</tr>
<tr>
<td>14</td>
<td>Adoption of a homogenization pasteurization process as an alternative to thermal processing by small or mid-sized juice processors (Davidson).</td>
</tr>
<tr>
<td>15</td>
<td>Healthy Steps: Extension's Obesity Prevention Program for Tennessee Pre-School Students</td>
</tr>
<tr>
<td>16</td>
<td>Power U: Extension's Obesity Prevention Program for Tennessee 4th Grade Children</td>
</tr>
<tr>
<td>17</td>
<td>Demonstrated that Angiotensin II (a hypertensive hormone) increases fat synthesis and insulin signaling pathways in adipocytes (Moustaid-Moussa).</td>
</tr>
</tbody>
</table>
Outcome #1

1. Outcome Measures

Safe Food Handling Practices for Consumers: Number of participants surveyed more often washed items that came in contact with raw meat, chicken or seafood with hot, soapy water before continuing to cook.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Safe Food Handling Practices for Consumers: Number of participants surveyed who more often washed their hands with soap and warm running water before eating.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Safe Food Handling Practices for Consumers: Number of participants surveyed who more often washed their hands with soap and warm running water before preparing food.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Tennessee Shapes Up: Number of participants who learned how to use the Healthy Plate to balance their diet.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Tennessee Shapes Up: Number of participants who decreased consumption of high-fat foods such as chips, fast food, fried foods, sausage, bacon, bologna, hot dogs, etc.

2. Associated Institution Types

● 1862 Extension
● 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>6000</td>
<td>9195</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
What has been done

Results

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
</tr>
</tbody>
</table>

Outcome #6

1. Outcome Measures

Tennessee Shapes Up: Number of participants who decreased consumption of high-sugar foods and sweetened beverages, such as soft drinks, Kool Aide type beverages, sweetened tea, etc.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
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<td>10408</td>
</tr>
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</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
</tr>
</tbody>
</table>

Outcome #7

1. Outcome Measures

Tennessee Shapes Up: Number of participants who increased consumption of dairy foods.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure
3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
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<td>9297</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
What has been done
Results

4. Associated Knowledge Areas

KA Code  Knowledge Area
703       Nutrition Education and Behavior

Outcome #8

1. Outcome Measures

Tennessee Shapes Up: Number of participants who increased consumption of fruits.

2. Associated Institution Types

● 1862 Extension
● 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>6000</td>
<td>18838</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
What has been done
Results

4. Associated Knowledge Areas

KA Code  Knowledge Area
703       Nutrition Education and Behavior
Outcome #9

1. Outcome Measures

   Tennessee Shapes Up: Number of participants who increased consumption of vegetables.

2. Associated Institution Types

   ● 1862 Extension
   ● 1890 Extension

3a. Outcome Type:

   Change in Action Outcome Measure

3b. Quantitative Outcome

   Year    Quantitative Target    Actual
   2009    6000                18838

3c. Qualitative Outcome or Impact Statement

   Issue (Who cares and Why)
   What has been done
   Results

4. Associated Knowledge Areas

   KA Code   Knowledge Area
   703       Nutrition Education and Behavior

Outcome #10

1. Outcome Measures

   Tennessee Shapes Up: Number of participants increased consumption of whole grains.

2. Associated Institution Types

   ● 1862 Extension

3a. Outcome Type:

   Change in Action Outcome Measure

3b. Quantitative Outcome

   Year    Quantitative Target    Actual
   2009    6000                6700

3c. Qualitative Outcome or Impact Statement

   Issue (Who cares and Why)
What has been done

Results

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
</tr>
</tbody>
</table>

Outcome #11

1. Outcome Measures

Tennessee Shapes Up: Number of participants who improved their blood sugar.

Not Reporting on this Outcome Measure

Outcome #12

1. Outcome Measures

Tennessee Shapes Up: Number of participants who improved their cholesterol levels.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
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<td>7077</td>
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</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
</tr>
</tbody>
</table>
Outcome #13

1. Outcome Measures

Pending chitosan being granted GRAS (Generally Recognized As Safe) status, our research will lead to applications in edible films and food additives with anti-microbial and thickening properties (Zivanovic).

Not Reporting on this Outcome Measure

Outcome #14

1. Outcome Measures

Adoption of a homogenization pasteurization process as an alternative to thermal processing by small or mid-sized juice processors (Davidson).

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

Healthy Steps: Extension's Obesity Prevention Program for Tennessee Pre-School Students

2. Associated Institution Types

● 1862 Extension
● 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>{No Data Entered}</td>
<td>0</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Too many young children are gaining unhealthy amounts of weight leading to chronic disease at increasingly younger ages.

**What has been done**
Healthy Steps, a nutrition and physical activity curriculum was implemented in 35 Tennessee counties in 2009. 4,473 direct contacts were made in Voluntary Pre-K, Head Start and center-based classrooms; 141,675 indirect contacts were made through exhibits, newspaper articles, publications and television. In addition 1,553 preschool teachers and volunteers delivered education.

**Results**
Surveys were completed by teachers at the end of the program to document program outcomes.
*192 of 209 (92%) of teachers surveyed reported preschool children in their classes were more actively engaged in physical activity.
*152 of 157 (97%) of teachers reported preschool children in their classes were more willing to taste fruit.
*193 of 214 (90%) of teachers reported preschool children in their classes were more willing to taste vegetables.
*129 of 154 (84%) of teachers reported preschool children in their classes were more willing to taste whole-grain foods.
*120 of 135 (89%) of teachers reported using nutrition educational activities from Healthy Steps at least once a
week.
*116 of 144 (81%) of teachers reported using physical activities from Healthy Steps at least three times per week.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
</tr>
</tbody>
</table>

Outcome #16

1. Outcome Measures

Power U: Extension's Obesity Prevention Program for Tennessee 4th Grade Children

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>{No Data Entered}</td>
<td>0</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Tennessee youth are among the most obese in the nation. This has serious health consequences and may impact their ability to be productive members of society.

What has been done

The Power U program was implemented in 29 Tennessee Counties. This included 161 classrooms implementing Power U. There were a total of 700 group meetings with 15,285 educational contacts. There were an additional 10,992 educational contacts through exhibits, newspaper articles, TV and radio programs, and other promotional items.

Results

Impact data was collected using a behavior checklist survey and through teacher and parent comment: 72% (n=2752) increased intake of whole grains; 71% (2830) decreased their intake of high-sugar foods including beverages; 88% (2890) increased the time they spent in physical activity; 87% (3087) increased their intake of fruit and vegetables. Exposure to a variety of fruits and vegetables at a young age increases their likelihood of the food's adoption and is important for healthy prevention of obesity. Increasing physical activity and decreasing intake of sugar helps maintain caloric balance essential for healthy weight.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
</tr>
</tbody>
</table>

Report Date  06/03/2010
Outcome #17

1. Outcome Measures

Demonstrated that Angiotensin II (a hypertensive hormone) increases fat synthesis and insulin signaling pathways in adipocytes (Moustaid-Moussa).

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantitative Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>(No Data Entered)</td>
<td>0</td>
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</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>702</td>
<td>Requirements and Function of Nutrients and Other Food Components</td>
</tr>
</tbody>
</table>

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

(No Data Entered)

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)

Evaluation Results

Impact data was collected using a behavior checklist survey and through teacher and parent comment: 72% (n= 2752) increased intake of whole grains; 71% (2830) decreased their intake of high-sugar foods including beverages; 88% (2890) increased the time they spent in physical activity; 87% (3087) increased their intake of fruit and vegetables. Exposure to a variety of fruits and vegetables at a young age increases their likelihood of the food’s adoption and is important for healthy prevention of obesity. Increasing physical activity and
decreasing intake of sugar helps maintain caloric balance essential for healthy weight.

**Key Items of Evaluation**

Impact data was collected using a behavior checklist survey and through teacher and parent comment: 72% (n= 2752) increased intake of whole grains; 71% (2830) decreased their intake of high-sugar foods including beverages; 88% (2890) increased the time they spent in physical activity; 87% (3087) increased their intake of fruit and vegetables. Exposure to a variety of fruits and vegetables at a young age increases their likelihood of the food's adoption and is important for healthy prevention of obesity. Increasing physical activity and decreasing intake of sugar helps maintain caloric balance essential for healthy weight.