V(A). Planned Program (Summary)

Program # 5

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>501</td>
<td>New and Improved Food Processing Technologies</td>
<td>0%</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>701</td>
<td>Nutrient Composition of Food</td>
<td>0%</td>
<td>50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
<td>90%</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>704</td>
<td>Nutrition and Hunger in the Population</td>
<td>10%</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%</td>
<td>100%</td>
<td></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>17.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Actual</td>
<td>14.9</td>
<td>0.0</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>0</td>
<td>311084</td>
</tr>
<tr>
<td>200521</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1890 Matching</td>
<td>0</td>
<td>1811718</td>
</tr>
<tr>
<td>1207625</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1862 All Other</td>
<td>0</td>
<td>2247717</td>
</tr>
<tr>
<td>7685302</td>
<td></td>
<td></td>
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</table>

V(D). Planned Program (Activity)

1. Brief description of the Activity

Minnesota Agricultural Experiment Station research and Extension outreach combined is providing both reliable information and practical outreach to families and communities. MAES supports research to develop better understanding of the nutritional content and health benefits of foods, as well as to develop methods to help the food processing industry provide healthy food. Extension's nutrition education programs help people with limited income discover how to make healthy food choices while stretching food dollars. These programs are complemented by outreach to families, schools and communities for a more systemic approach to disease and obesity prevention. Some examples of program impact in 2009:

- An Extension nutrition program targeted Latino immigrants with community-based events which had a significant effect on participants' knowledge and increased intake of fruits and vegetables.
- Nutrition researchers worked with local school districts looking at whether kids will eat whole grains and other healthy foods, and how school nutrition directors can make meals healthier. They found that a gradual approach to improving children's diets can be successful both at school and home.
• Minnesota is home to the largest Somali immigrant population in the U.S. Extension nutrition education assistants have been teaching them how to create nutritious meals on a tight budget and help families work through new challenges such as children who embrace American fast food, and issues such as dealing with Muslim dietary restrictions in a foreign land.
• Researchers studied barriers to providing good food on the school lunch tray, how to overcome those barriers and how to duplicate school nutrition program successes on a larger scale. Other research looked at whether funding for school lunch programs is adequate to meet nutritional guidelines. It showed that even though healthier meals have higher labor costs, the actual ingredients may cost less.
• Researchers are developing knowledge on food choices to support human health, such as the impact of soy products on cardiovascular health and whole grains on diabetes. Extension outreach brings that information to producers, communities and families. For example, research on the cancer-fighting nutrients in fruits and vegetables grown in Minnesota may lead to a new market concept of a branded product line of produce certified to be high in disease-preventing compounds.

As children's health is supported within the context of a healthy family, MAES continued to support research into the nutritional benefits of foods on human health. Examples of research results in 2009:
• The completion of an animal study examining the effect of consumption of whole grain flours on diabetes control confirmed that eating whole grain food led to improved glucose control and insulin sensitivity early in the course of the development of diabetes. This emphasizes the importance of consuming whole grain products to help prevent the development of type 2 diabetes.
• Other research with implications for diabetes control looked at the metabolism of dietary fatty acids and determined that they are metabolized differently based on their chemical structures. The information gained from this research gives nutritionists better information to tailor dietary recommendations to support health.
• An analysis on changes in satiety and related hormones after gastric bypass surgery has produced information that has been included in education for dietitians, and could lead to a change in clinical practice in the dietary management of patients undergoing gastric bypass surgery.
• A study of the effects of the consumption of soy and seaweed on hormones in post menopausal breast cancer survivors showed that both had beneficial effects.
• MAES research had previously established the benefits of cruciferous vegetables on inhibiting colon cancer. Current research building on those results has improved a method for quantification of total glucosinolates in cruciferous vegetables, increasing the understanding of functional foods.
• A study of cancer health disparity in the Asian American immigrant community in Minnesota revealed a low level of cancer literacy and understanding of cancer prevention strategies. The results are being used to help customize messages and strategies on cancer prevention and screening to the most vulnerable subgroups of Asian American immigrants and refugees in Minnesota.

In 2009, two new evidence-based programs were developed to enrich Extension's outcomes related to childhood obesity. One effort, Go Wild with Fruits & Veggies!, is engaging youth in a school-based learning experience that positions fruits and vegetables as healthy, appealing and fun. An evaluation study described here gives evidence that the program does change eating habits, and so the team will begin replicating the program statewide in 2010. The curriculum is delivered by those teaching SNAP-ed or EFNEP in elementary schools with 50% free or reduced lunch participation. Additionally, schools will be offered training for parent volunteers or teachers to use the curriculum in schools that are not SNAP-ED eligible. Beyond face-to-face education, the program uses social marketing to promote healthy eating through posters, classroom activities and newsletters. The program contains activities for school food service personnel and family members, as well. These activities stimulate new predispositions toward fruits and vegetables within environments where children learn, play and eat.

Another effort, Operation Frontline, is engaging low-income communities in hands-on learning experiences with volunteer chefs who demonstrate that low-cost food can be delicious and healthy. Volunteer and sponsor development led to a kick-off in the Twin Cities in November of 2009. The program is already growing in popularity, and so replication around the state is happening sooner than expected.

2. Brief description of the target audience

MAES research in childhood obesity and human health is addressed to human health and nutrition professionals, the food industry, students and faculty in health and nutrition, applied economics, and family development, state and local policy makers and governments, directors of school lunch programs, the food and food service industries, and consumers.

Childhood Obesity is addressed at Extension through its Nutrition Education programs. These programs reach out to people on limited incomes with nutrition and food budgeting challenges. In order to reach children where they learn, play and eat, nutrition education provides information to parents, schools and communities. By making these institutions more aware of nutrition, children are provided models of healthy lifetime habits.

V(E). Planned Program (Outputs)
1. Standard output measures

<table>
<thead>
<tr>
<th>2009</th>
<th>Direct Contacts Adults</th>
<th>Indirect Contacts Adults</th>
<th>Direct Contacts Youth</th>
<th>Indirect Contacts Youth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>22330</td>
<td>1456600</td>
<td>29500</td>
<td>69700</td>
</tr>
<tr>
<td>Actual</td>
<td>37912</td>
<td>0</td>
<td>55889</td>
<td>0</td>
</tr>
</tbody>
</table>

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

Patent Applications Submitted

Year: 2009  
Plan: 0  
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>27</td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>7</td>
<td>33</td>
<td>40</td>
</tr>
</tbody>
</table>

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

• Classes will be provided in individual and group settings that teach about diet quality, food safety, food resource management and food security. (Target expressed as number of workshops/classes taught.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Target</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>3075</td>
<td>4034</td>
</tr>
</tbody>
</table>

Output #2

Output Measure

• School Food Service Institutes will be held for school food service workers and managers so that they implement healthy food service programs for Minnesota's public schools. (Target expressed as number of institutes held each year.)

Not reporting on this Output for this Annual Report
### V(G). State Defined Outcomes

**V. State Defined Outcomes Table of Content**

<table>
<thead>
<tr>
<th>O. No.</th>
<th>OUTCOME NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>An increased number of individuals will use research-based information from Extension to improve their intake of healthful foods. (Target expressed as percentage of participants who self-report change.)</td>
</tr>
<tr>
<td>2</td>
<td>Food service personnel will use research-based information from Extension to improve students' healthy eating. (Target expressed as percentage of workshop participants reporting use of materials.)</td>
</tr>
<tr>
<td>3</td>
<td>Program participants will increase human nutrition knowledge. (Target expressed as percentage of participants who report knowledge change.)</td>
</tr>
<tr>
<td>4</td>
<td>Program participants will increase their skills in selecting and buying food that satisfies nutritional needs, managing food budgets and preparing affordable foods within the food groups. (Target expressed as percentage of participants who reported learning these skills.)</td>
</tr>
<tr>
<td>5</td>
<td>Research will provide information to improve the nutrition of school lunch programs.</td>
</tr>
</tbody>
</table>
Outcome #1

1. Outcome Measures

An increased number of individuals will use research-based information from Extension to improve their intake of healthful foods. (Target expressed as percentage of participants who self-report change.)

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>50</td>
<td>79</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Childhood obesity and its negative effects threaten low-income families disproportionately because of the cost structures of food, the availability of healthy foods, and poor choices that happen because of lack of information.

What has been done
Classes, workshops and hands-on demonstrations are offered to people on limited incomes with nutrition and food budgeting challenges.

Results
Retrospective pre-post end-of-session evaluations, as well as 24-hour diet recall tests at the beginning and end of multiple session courses, demonstrated that 79% of individuals had improved their intake of healthful foods.

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 #2

1. Outcome Measures

Food service personnel will use research-based information from Extension to improve students' healthy eating. (Target expressed as percentage of workshop participants reporting use of materials.)

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Program participants will increase human nutrition knowledge. (Target expressed as percentage of participants who report knowledge change.)

2. Associated Institution Types
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>75</td>
<td>80</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Childhood obesity and its negative effects threaten low-income families disproportionately because of the cost structures of food, the availability of healthy foods, and poor choices that happen because of lack of information.

What has been done
Classes, workshops and hands-on demonstrations are offered to people on limited incomes with nutrition and food budgeting challenges.

Results
Restrospective pre-then post evaluations demonstrated that 80% of participants had increased their knowledge about human nutrition.

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 #4

1. Outcome Measures

Program participants will increase their skills in selecting and buying food that satisfies nutritional needs, managing food budgets and preparing affordable foods within the food groups. (Target expressed as percentage of participants who reported learning these skills.)

2. Associated Institution Types

- 1862 Extension

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>50</td>
<td>73</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Household budget managers can make a significant difference in their household’s diet by selecting and buying food that satisfies nutritional needs. This is difficult with tight budgets, limited food availability, and histories of poor diet choices.
What has been done
Nutrition education programs blended nutrition education and family resource management education to help household food buyers manage their food-buying budgets.

Results
Among participants who attended a minimum of six nutrition education sessions, 73% reported they had learned important skills in food budget management in a post-series evaluation report.

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 #5

1. Outcome Measures

Research will provide information to improve the nutrition of school lunch programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

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)
MAES research in childhood obesity and human health is addressed to human health and nutrition professionals, the food industry, students and faculty in health and nutrition, applied economics, and family development, state and local policy makers and governments, directors of school lunch programs, the food and food service industries, and consumers.

What has been done
A study of the economics of school lunch program showed that even though healthier meals have higher labor costs--because more preparation is involved than with convenience foods--the actual ingredients may cost less. Researchers looked at the rates paid to schools and whether they should be adjusted. At the same time UMN food science researchers have worked with local school districts to track students' acceptance of healthier foods on the school lunch tray, including whole grains. Those studies have shown that gradual introduction of healthier food choices can be successful.

Results
School food research is bringing scientists from many disciplines, the food industry and government working cooperatively to help people eat healthy, affordable, appealing food. The school lunch research has influenced the 2009 National Academies of Sciences, Institute of Medicine report on School Meals: Building Blocks for Healthy Children. The economic analysis is informing policy makers at a particularly important time since Congress will reauthorize the Child Nutrition Act in 2010, which will include revisions affecting the school lunch program.

4. Associated Knowledge Areas
KA Code  Knowledge Area
701  Nutrient Composition of Food
703  Nutrition Education and Behavior

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Economy
- Appropriations changes
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation
This year, economic hard times for low-income families increased demand for the program.

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

1. Evaluation Studies Planned
   - Retrospective (post program)
   - Before-After (before and after program)
   - Time series (multiple points before and after program)
   - Comparisons between program participants (individuals, group, organizations) and non-participants

Evaluation Results

A nutrition education curriculum was designed to use engaging cartoon animal characters to teach children (third through sixth grades) about the importance of eating fruits and vegetables, especially highlighting local foods. The curriculum was piloted in three schools in an urban school district. A quasi-experimental pre/post design included two intervention schools and a control school. The percentage of minority enrollment in the schools ranged from 63% to 82% and the percentage of children eligible for free or reduced-price school meals ranged from 65% to 87%.

Two Nutrition Education Assistants implemented the program in classrooms as part of physical education classes or as an enrichment to regular classes on a weekly basis for seven weeks. A pre-post questionnaire was used to evaluate change in students’ like of fruits and vegetables, willingness to try new fruits and vegetables, frequency of preparing vegetables for meals and snacks, and knowledge gains. Change in intake of fruits and vegetables was measured using 24-hour dietary recalls obtained before and after the lessons were implemented. Physical activity was also assessed.

Pre and post responses were completed by 132 children in 7 classrooms in the 2 intervention schools and by 121 children in 6 classrooms in the control school. Results indicated that vegetable intake increased in the intervention group, but decreased in the control group. Fiber and fat intake improved for the intervention group but not in the control group (p<.05), based on pre-post 24-hour dietary recall. There was no significant difference between intervention and control in terms of fruit intake or physical activity levels. The study indicated there were slight increases in physical activity and decrease in sedentary activities for the intervention group, but the differences were not statistically significant.

Key Items of Evaluation

A school-based curriculum nutrition education effort that used cartoon animal characters to teach children about eating fruits and vegetables demonstrated success in changing diets among children. Results indicated that vegetable intake increased in the intervention group but decreased in the control group; fiber and fat intake improved for the intervention group but not in the control group (p<.05).