V(A). Planned Program (Summary)

Program # 6
1. Name of the Planned Program

Human Health And Human Development

☑ Reporting on this Program

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>
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<tbody>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
<td>20%</td>
<td>20%</td>
<td></td>
<td></td>
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<tr>
<td>704</td>
<td>Nutrition and Hunger in the Population</td>
<td>20%</td>
<td>10%</td>
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<tr>
<td>724</td>
<td>Healthy Lifestyle</td>
<td>10%</td>
<td>20%</td>
<td></td>
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<tr>
<td>802</td>
<td>Human Development and Family Well-Being</td>
<td>20%</td>
<td>15%</td>
<td></td>
<td></td>
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<tr>
<td>803</td>
<td>Sociological and Technological Change Affecting Individuals, Families, and Communities</td>
<td>0%</td>
<td>10%</td>
<td></td>
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<td>805</td>
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<tr>
<td>806</td>
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<td><strong>Total</strong></td>
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<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
<td></td>
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</table>

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

<table>
<thead>
<tr>
<th>Year: 2015</th>
<th>Extension</th>
<th>Research</th>
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<tr>
<td></td>
<td>1862</td>
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<tr>
<td>Actual Volunteer</td>
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</table>

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

1. Brief description of the Activity

Activities included a study that seeks to better understand the protective factors that maintain relationship quality during the transitions to marriage and parenthood, a project utilizing data from the Pathways Project to examine parenting in immigrant Latino families, work to identify which nutrition labels are most effective at influencing consumers to make healthier choices, the development of a measurement tool that identifies stay-at-home father and mother families and their type [choice and nonchoice] and measures the reasons leading these families to such paid-work and care arrangements, the characteristics of these families, and their well-being at the individual, couple, and family levels, ongoing studies utilizing a translational pig model to provide direct evidence for the importance of perinatal choline status in neurodevelopment, the determination that a high-fat diet and obesity differentially contribute to changes in intestinal epithelial stem cell proliferation and differentiation, work to identify the frequency of high-risk alleles on genes related to the early onset obesity phenotype using data from two ongoing research cohorts [STRONG-KIDS and UP-AMIGOS], and a project that fulfills a need to establish an evidence-based and school-friendly intervention to prevent overweight and diabetes in adolescence as well as providing teacher support at a time when school resources are being dramatically cut.

Activities also included work to provide an in vivo assessment of the selective actions of botanical estrogens in preclinical mouse models relevant to the metabolic health of menopausal women and breast cancer survivors, research building upon an existing cohort study examining the potential for family mealtime practices to moderate biological risk for childhood obesity in the first year of life, the development of a new instrument to assess parent's ability to work together as they rear siblings, the development of a systematic approach that combines what we know about nutrition, healthy eating, and physical activity related to energy balance into an integrated approach to teach parents about their role in obesity prevention for their children [one desired outcome of this project is to translate the scientific energy balance evidence and parenting styles into practical and appropriate recommendations for training Extension health educators that work with parents], and ongoing work under the Child Development Laboratory Research Database Project [the intent of the CDL Research Database Project is to facilitate interdepartmental and cross-departmental investigations of child development].

Activities also included the development of an afterschool physical activity curriculum and template for implementation to effectively support healthy weight among Latino school children, ongoing work to complete Phase I and execute Phase II of the Multidimensional Cultural Identity Study [which is exploring the presence of, daily variations in, and well-being implications of multiple cultural identities among non-metropolitan youth ages 13-23], research to determine if individual differences in
caregiver/child attachment and child temperament are associated with obesogenic family routines, an exploration of the frequency of polymorphic variants in the beta-carotene monooxygenase 1 [BCMO1] gene and their association with risk factors for metabolic syndrome [recognition of genetic variants would allow identification of subjects in whom specific dietary interventions could have a positive effect in preventing obesity or cardiovascular disease], and a project with the overall goal of developing evaluation methods and criteria that support the identification of the highest quality nutrition education apps and then using these evaluation methods to test and compare attentiveness of two apps developed with high and low interactivity level.

Activities also included an exploration of the ecological changes in intestinal microbial communities that are induced with prebiotic and probiotic therapy in a parenterally-supported neonatal piglet model of intestinal failure, research that will contribute to our understanding of social-emotional development among young children from rural and suburban communities [because patterns of problematic interactions with peers begin to emerge during the preschool years and have implications for children's subsequent adjustment, it is important to pinpoint underlying processes that may contribute to children's peer difficulties], a study to see if graphically delivering information of select nutrients relative to a target would allow individuals to process the information in time-constrained settings more effectively than numerical information [objectives of the study are to determine the efficacy of the graphical method in improving memory of nutrient information and improving consumer purchasing behavior in a restaurant], a mixed methods study examining educator stress and resilience in addition to applying an intervention in a movement toward treatment of the epidemic of educator stress, work to identify methods for the fortification of staples in low-income countries [we conducted preliminary studies to characterize the use of a cast iron ingot as a method to fortify rice with iron; this method has been promoted in South East Asia for the fortification of rice with iron and has been shown to provide available iron for low-income populations], an investigation of the role dietary soy flour and purified isoflavones may play in treating breast cancer, a project to investigate the effects of a test meal ingested at the start of dialysis [with and without a subsequent bout of aerobic exercise] on dialysis efficiency and blood pressure during a dialysis session, and the identification of genetic factors influencing the accumulation of individual glucosinolates in broccoli florets to gain further insight into the regulation of glucosinolates in Brassica vegetables [and accelerate the development of vegetables with enhanced glucosinolate profiles tailored to promote human health].


For the past eight years Extension programming on brain health continued to be expanded and remains a major focus of Extension family life educators. A new program, Hold That Thought, was developed this past year to provide information on strategies and techniques for building a better memory and was
attended by 469 individuals. The delivery sites for a brain health series were expanded in 2015 to meet the needs of various audiences and included the following segments: [1] **Building a Better Memory for Everyday Life**; [2] **FIT WITS**; and [3] **Head Strong**. Coming of Age: Explore Your Future, another four-part series, continued to be offered and targeted to those who are considering retirement soon or are newly retired to help them examine the social aspects of retirement, to identify their strengths and interests, and to plan for post-retirement activities. Resources related to aging and retirement were also available through: [1] **Long-term Care: Talking, Deciding, Taking Action**, an educational series and website that includes both family life and financial management topics for helping individuals and families plan effectively for their needs as aging adults; and [2] **Plan Well, Retire Well**, a comprehensive website that includes blogs, e-news, and monthly news articles.

**Being Mindful in a Busy World** was developed this past year to define and identify the benefits of mindfulness meditation. **Share Your Life Story**, a multi-week series, continued to be offered to provide a therapeutic approach to life renewal. In addition, **Making a Meaningful Nursing Home Visit** and **Simplify Your Life: Clear the Clutter & Your Stress** workshops were conducted for multiple groups throughout Illinois.

This past year participation in the state webinar series based on the **Your Young Child** research-based curriculum experienced a growth in attendance. One hundred forty-seven [147] parents and caretakers of infants and toddlers learned how to manage seven difficult stages and behaviors that are linked to child abuse and neglect. For a second year family life Extension educators engaged in a partnership with Pennsylvania State University and the University of Nebraska at Lincoln through the U.S. Department of Defense as grantor to deliver the **Childcare and Youth Training and Technical Assistance Project** [CYTTAP] that reached over 1,000 childcare professionals offering additional modules that addressed enhancing play times, children's nutrition building blocks, and physical movement and the brain. **Parenting 24/7** is a one-stop source of research-based information on the web that includes articles, breaking news and commentary, links to other resources, and video clips of real parents of children from birth through the teen years and focuses on challenges and solutions. **Just in Time Parenting** is an age-paced electronic newsletter that is the product of the national eXtension network of parenting and child development experts who provide online support to parents and professionals and is distributed monthly from birth to 12 months, and then bi-monthly until the child is five years old. **Parenting Again** topic-based discussion guides were made available for grandparents raising grandchildren.

Most Extension activities that address healthy food choices to prevent childhood obesity were delivered by **Expanded Food and Nutrition Education Program** [EFNEP] staff and **Supplemental Nutrition Assistance Program Education** [SNAP-Ed] staff who conducted hands-on activities with children and their parents from limited income families. **SNAP-Ed** Extension staff members reached more than 774,430 youth who were taught healthy eating choices and 4,244 youth who were reached through **EFNEP** in 2015. The **SNAP-Ed** and **EFNEP** staff used the **CATCH** and **SPARK** curricula to educate elementary and preschool students in after-school and summer programs about healthy snacks, good nutrition, and the importance of physical activity. **OrganWise Guys** materials were used by **SNAP-Ed** staff with youth in K-2nd grade classrooms. For a second year interdisciplinary programming involving **4-H** in conjunction with the **Supplemental Nutrition Assistance Program Education** [SNAP-Ed] staff engaged teens to teach primarily fifth-grade youth to make healthy food choices through the program titled **4-H Food Smart Families** that was conducted in after school programs and summer camps.

Under the leadership of the **4-H** youth development staff members, the **Health Jam** program was conducted for 5th grade youth and offered support related to exercise, wellness, nutrition, and health careers information using an experiential learning approach. Additional programming related to youth health and development included **Breaking the Code**, a research-based prevention simulation and guided
discussion for junior high and senior high youth supported by statistical research on bullying among teens. Newly added 4-H Health Rocks! programming, a national healthy living program aimed at 8-16 year olds with the goal of bringing youth, families, and communities together to reduce tobacco, alcohol, and drug use, was conducted for 398 youth.

Extension programs also focused on chronic diseases including heart disease and diabetes. **I on Diabetes** was taught as a four-part Extension program that combined lectures, food demonstrations, activities, and sampling of healthy foods. The **Meals for a Healthy Heart** program is a two-part series focused on increasing participant awareness of the risk factors of coronary heart disease, hypertension, high blood cholesterol, and other warning signs. Activity levels and weight management information, as well as food demonstrations, taste testing, and recipes were provided at each session. As a means to target overweight and obesity, Extension educators offered **Putting Wellness to Work**, a worksite wellness series covering important topics such as nutrition, food trends, fitness, stress management, and healthy relationships to benefit both employees and employers.

Additionally, Extension educators focusing on nutrition and wellness, family life, and consumer economics reached out to residents in counties statewide by offering similar older adult focused "healthy living" programs. For example, an interdisciplinary series of 54 programs titled **Learning is Timeless** continued to be delivered by staff located in Chicago who made 714 direct contacts with participants to assist them in developing skills in community health, family life, horticulture, and computer training.

### 2. Brief description of the target audience

Members of the target audience included academic, medical, veterinary, industrial, and professional scientists and clinicians, young adult and midlife women, nutrition and dietetics professionals, governmental organizations, commodity groups, families in Champaign-Urbana and in rural areas, gestating women and those breastfeeding newborns, students and researchers in the areas of human obesity and animal production, nutrition Extension specialists, product developers who are interested in improving the health benefits of their products through microencapsulation technology, parents of toddlers and young children, educators, mental health counselors and other professionals who work with families, research scientists interested in obesity prevention, early childhood educators, youth program administrators and front line practitioners, nutritionists, pork producers, scientists and graduate students specializing in the fields of child development, family studies, linguistics, and psychology, clinicians and practitioners who serve children and families, food industry scientists, and the international food and nutrition scientific community.

Individuals at-risk for or coping with diabetes, obesity, or heart disease will be a priority recipient of Extension programming, as will families living in low-income and high-risk neighborhoods where programming will be adapted to reach racially, ethnically, and culturally diverse audiences and youth. Other target audiences include parents and child care providers, grandparents responsible for young children, caregivers of aging adults, and adolescent youth. Extension also targeted youth, teachers, parents, grandparents, caregivers of adults, retirees, childcare providers for children of off-installation military families, individuals with chronic diseases, and working couples.

### 3. How was eXtension used?

Sixteen Extension faculty or staff are members of eXtension Communities of practice that include Alliance for Better Child Care, Families, Food, and Fitness, Families and Child Wellbeing Learning Network, Family Caregiving, Healthy Food Choices in School, Just in Time Parenting, and Military Families.

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

<table>
<thead>
<tr>
<th></th>
<th>Direct Contacts Adults</th>
<th>Indirect Contacts Adults</th>
<th>Direct Contacts Youth</th>
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<td>68533</td>
<td>30765</td>
<td>0</td>
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2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2015
Actual: 1

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

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<thead>
<tr>
<th></th>
<th>Extension</th>
<th>Research</th>
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</thead>
<tbody>
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<td>94</td>
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</table>

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number Of Completed Hatch Projects

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<tbody>
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### V(G). State Defined Outcomes

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

<table>
<thead>
<tr>
<th>O. No.</th>
<th>OUTCOME NAME</th>
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<tbody>
<tr>
<td>1</td>
<td>Number Of Research Projects Utilizing The Child Development Laboratory Research Database</td>
</tr>
<tr>
<td>2</td>
<td>Increased Knowledge Of Children's Behavior At A Given Stage Of Development And Parenting Practices To Foster That Behavior</td>
</tr>
<tr>
<td>3</td>
<td>Numbers Of Individuals Taking Recommended Actions To Manage Heart Disease And Diabetes Through Planning Menus/Choosing Foods Using The Food Guidance System</td>
</tr>
<tr>
<td>4</td>
<td>Number Of Children/Youth That Gained Knowledge About Eating Healthier Foods [Those Low In Fat And High In Fiber]</td>
</tr>
<tr>
<td>5</td>
<td>Number Of Children/Youth That Increased Physical Activity</td>
</tr>
<tr>
<td>6</td>
<td>Promoting Social And Emotional Health Among Young Children</td>
</tr>
<tr>
<td>7</td>
<td>Addressing Gaps In Student Achievement</td>
</tr>
<tr>
<td>8</td>
<td>Utilizing A Family Resiliency Framework To Address Childhood Obesity</td>
</tr>
<tr>
<td>9</td>
<td>Number Of Families/Caregivers That Gained Knowledge About Eating Healthier Foods [Those Low in Fat and High in Fiber]</td>
</tr>
<tr>
<td>10</td>
<td>Number Of Adults That Apply Skills As They Age In Maintaining Brain Fitness And Cognitive Health</td>
</tr>
<tr>
<td>11</td>
<td>Extension Of A Successful, Evidence-Based Approach For Strengthening Prosocial Sibling Relationships</td>
</tr>
<tr>
<td>12</td>
<td>An Evaluation Of The Effect Of Dietary Botanical Estrogens On Breast Cancer Growth And Progression</td>
</tr>
<tr>
<td>13</td>
<td>Development Of Dietary Strategies To Significantly Reduce Both The Incidence And Mortality Of Colon Cancer</td>
</tr>
<tr>
<td>14</td>
<td>Number Of Families/Caregivers That Gained Knowledge About Eating More Healthy Foods [Those Low In Fat Or High In Fiber]</td>
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<tr>
<td>15</td>
<td>Number OF Children And Youth Who Reported Eating More Of Healthy Foods</td>
</tr>
<tr>
<td>16</td>
<td>Preventing Weight Gain Through Nutrition Education</td>
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<td>17</td>
<td>Investigating The Ability Of Tomato Powder, Broccoli Powder, And Soy Germ To Reduce The Progression Of Prostate Cancer</td>
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</table>

Report Date 06/24/2016
### Comparing Protein Profiles Of Improved Common Bean Cultivars Grown In Mexico And Brazil

### Determining How Perinatal Choline Alters Gene Expression And Cognitive Behaviors

### The Use Of Bioactive Compounds Such As Resveratrol And Butyrate To Prevent And Alleviate Certain Disease States

### Improving The Quality Of Programs For High-School-Aged Youth Through A Better Understanding Of The Strategies Used By Effective Program Leaders

### Improving Our Understanding Of Social-Emotional Development Among Young Children From Rural And Suburban Communities

### Reducing Obesity Through Improved Utilization Of Nutrition Information

### Accelerating The Development Of Vegetables With Enhanced Glucosinolate Profiles Tailored To Promote Human Health

### Increased Knowledge Of Healthy Lifestyle Choices And Consequences Of Actions With Respect to Healthy Lifestyle Choices

### Number Of Youth That Increased Knowledge Of Bullying And Actions To Take In Dealing with A Bullying Situation

### Increased Practices Related To Aging

## Outcome #1

### 1. Outcome Measures

Number Of Research Projects Utilizing The Child Development Laboratory Research Database

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
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<tbody>
<tr>
<td>2015</td>
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</table>

### 3c. Qualitative Outcome or Impact Statement
Issue (Who cares and Why)
The purpose of this project is for the continuation of the Child Development Laboratory [CDL] Research Database at the University of Illinois at Urbana-Champaign. This project has been designed to facilitate an interdisciplinary, longitudinal, and programmatic research agenda at the Child Development Laboratory in the areas of child development and family studies. The following objectives will be addressed by the project: [1] To refine and further develop a longitudinal database on enrolled children and their families for the purpose of enhancing research projects being implemented at the CDL; [2] To promote long-term, interdisciplinary collaborations among faculty within the Department of Human Development and Family Studies and from across campus via reciprocal exchanges of data through the database project; and [3] To support systematic student involvement in interdisciplinary research.

What has been done
The primary outcome of this project has been the research being generated by investigators that have accessed the CDL program and the CDL Research Database Project. The intent of the CDL Research Database Project is to facilitate interdepartmental and cross-departmental investigations of children's development. The infrastructure created as part of the project has been instrumental in the generation of new knowledge across a wide variety of disciplines [such as human development and family studies, curriculum and instruction, special education, community health, kinesiology, landscape architecture, speech and hearing sciences, communications, music education, nutritional sciences, and educational psychology].

Results
In accessing information from the CDL Research Database, investigators have been able to broaden the scope of their data collection procedures and enhance the type and quality of data they were able to gather. A secondary outcome of this project has been the increased understanding and appreciation of the research process that undergraduate students have been able to develop as a result of working with the baseline assessments conducted as part of the CDL Research Database project. These students developed a working understanding of the strengths and limitations of standardized assessments with young children, as well as competencies in how to use such tools when screening children. Such skills and understanding will serve them well as they begin careers providing support services to children and families. An additional secondary outcome of the project has been the multiple ways in which it has facilitated the generation of new knowledge broadly defined. This generation of knowledge took on many forms [such as undergraduate research, graduate student training, doctoral dissertation research, instrumentation projects, UIUC-industry collaboration, supporting of junior faculty investigators, pilot data collection/feasibility studies, and atypical disciplines supported]. Finally, children and families throughout Illinois and the U.S. have benefited from the knowledge being generated through research projects being conducted as part of this project and being disseminated in several formats [journal publications, technical reports, press releases, and conference presentations]. Over the life of the project a total of 67 research projects, 14,333 student observations and 7,480 student class projects were implemented at the CDL and benefited from the support and data provided by the CDL Research Database project.

4. Associated Knowledge Areas

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<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
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<tbody>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
</tr>
<tr>
<td>704</td>
<td>Nutrition and Hunger in the Population</td>
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Outcome #2

1. Outcome Measures

Increased Knowledge Of Children’s Behavior At A Given Stage Of Development And Parenting Practices To Foster That Behavior

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Numbers Of Individuals Taking Recommended Actions To Manage Heart Disease And Diabetes Through Planning Menus/Choosing Foods Using The Food Guidance System

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

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<tr>
<th>Year</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>73</td>
</tr>
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</table>

3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

Diabetes ranks as the seventh leading cause of death in Illinois according the Illinois Department of Public Health. In fact, more than 969,000 adults [9.2%] in the state have been diagnosed with diabetes according to National Center for Disease Control.

**What has been done**

University of Illinois Extension’s I on Diabetes is a series of face-to face sessions designed for anyone interested in preventing or managing diabetes. During the series held in Illinois this year, 99 participants received information on: [1] Diabetes treatment goals and self-monitoring; [2]
Managing carbohydrates, sodium, cholesterol and fat portions; [3] Planning meals; and [4] Reading food labels. Food demonstrations, taste testing, and recipes assisted participants in using artificial sweeteners, low-fat products, and herbs and spices. Participants also completed a program evaluation to determine the impact of the program. Participants were asked to provide answers to four series of questions prior to and after the I on Diabetes sessions.

**Results**
All but two of the participants who completed all or sections of the pre- and post-evaluations indicated increasing their confidence, skills, or practices in managing their diabetes. Specifically:

Using a four-part scale ranging from "strongly disagree" to "strongly agree", 69 of 82 participants [84%] who completed the series of questions indicated that they improved their ability to manage diabetes in one or more areas.

Using another four-part scale ranging from "not confident" to "very confident", 73 of 82 participants [89%] indicated that they improved their confidence in managing their diabetes in one or more areas.

Using a four-part scale ranging from "never" to "almost always", 76 of 82 participants [93%] reported increasing their frequency in taking at least one recommended action to manage their diabetes.

Additional information regarding specific areas of changes in skills, confidence, and practices related to participants management of diabetes are included in the evaluation results section of this planned program.

**4. Associated Knowledge Areas**

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
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<tbody>
<tr>
<td>703</td>
<td>Nutrition Education and Behavior</td>
</tr>
<tr>
<td>724</td>
<td>Healthy Lifestyle</td>
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**Outcome #4**

**1. Outcome Measures**

Number Of Children/Youth That Gained Knowledge About Eating Healthier Foods [Those Low In Fat And High In Fiber]

Not Reporting on this Outcome Measure
Outcome #5

1. Outcome Measures

   Number Of Children/Youth That Increased Physical Activity

   Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

   Promoting Social And Emotional Health Among Young Children

   Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

   Addressing Gaps In Student Achievement

   Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

   Utilizing A Family Resiliency Framework To Address Childhood Obesity

   Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

   Number Of Families/Caregivers That Gained Knowledge About Eating Healthier Foods [Those Low in Fat and High in Fiber]

   Not Reporting on this Outcome Measure
Outcome #10

1. Outcome Measures

Number Of Adults That Apply Skills As They Age In Maintaining Brain Fitness And Cognitive Health

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

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<tbody>
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3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

With continuing growth in this country's aging population, concerns about maintaining one's memory, as well as recognizing and managing brain disease, are issues of great interest to the aging and their families in maintaining their quality of life.

**What has been done**

Continuing to draw on research being done at the University of Illinois and other research institutions, University of Illinois Extension family life educators developed Hold That Thought, a new workshop on brain health that addresses techniques in maintaining one's memory. Four hundred and sixty-nine [469] participants attended one of the 13 Hold That Thought workshops held in various locations in Illinois in 2015. At the end of the program, participants were asked to complete a one page evaluation consisting of seven questions including several open-ended questions that required qualitative analysis.

**Results**

When asked what they plan to do as a result of what was shared during the program, responses indicated that 93% of the participants intended to implement a skill or strategy that they learned at the workshop. Most frequently mentioned were plans by nearly one-fifth of the participants to stay focused on one thing at a time/to pay attention. Other frequently mentioned actions encompassed plans to practice memory exercises that were shared during the program, verbalizing and repeating things out loud, writing notes or journaling, increasing mental or physical exercises, and trying new and challenging activities.

When asked what was the single most valuable thing they learned from the program, 364
participants responded. More than one-third [132] appreciated learning that forgetting is normal, that everyone forgets, that it's okay to forget, and that memories can be improved. Other responses included those mentioned in the responses to the above question on plans for taking memory enhancing actions.

Overall 431 [94%] of the participants rated the event as very good or excellent. All but nine [98%] of the 458 participants indicated that they had gained a deeper understanding of the brain health as a result of the workshop and all but ten [98%] had learned something new that will improve their quality of life. This participant feedback suggests that the series successfully addressed ways to alleviate concerns about aging and maintaining one's quality of life.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
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<tr>
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<td>Healthy Lifestyle</td>
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<td>Human Development and Family Well-Being</td>
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Outcome #11

1. Outcome Measures

Extension Of A Successful, Evidence-Based Approach For Strengthening Prosocial Sibling Relationships

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

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3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

A common concern raised by parents is how to help their children get along. Parents frequently report sibling conflict to be a matter of high concern that negatively impacts the quality of family life. Therefore, the current investigation will address these concerns by developing and testing an evidence-based set of resources for parents who aim to improve sibling relationship quality among their 4- to 8-year-old children.
Evidence is mounting that children who experience more positive relationships with a sibling are also more likely to enjoy better developmental outcomes. Conflicts among siblings are a prime source of dissatisfaction for most parents and children. Although a certain amount of conflict appears to be “normal” for siblings, these disputes can be disruptive to family life due to both their frequency and qualitative characteristics. In addition to being the most common type of family strife, sibling conflicts may be quite aggressive and even violent. Intractable conflict relations among young siblings have been shown to be predictive of later difficulties, such as antisocial and disturbed behaviors in adolescence and adulthood. These factors have led some investigators to refer to sibling relationships as potential “training grounds” for violence and for establishing chronic coercive interactions with others.

**What has been done**
Longitudinal research has revealed that without intervention, the quality of sibling interactions tends to be relatively consistent over the course of childhood and adolescence, thereby leaving siblings with poor quality relationships to be disadvantaged and at risk for poor developmental outcomes such as low self-worth. Thus, a key challenge is to help siblings develop positive relationships so that they can more fully reap the advantages of sibling support. Meeting such a challenge requires a clear understanding of the factors that promote supportive sibling relationships as well as knowledge of evidence-based strategies that have strong potential for enhancing sibling relationships during early childhood. Few validated tools currently exist to help parents promote positive relationships among their offspring.

**Results**
Progress has been made in the construction of the website, the design of the four parent engagement modules, and the design of the research component to be carried out in Year Two which will assess the effectiveness of these parent resources for enhancing children's sibling relationships. A new instrument was also developed to assess the quality of parents' abilities to work together as they rear the siblings.

In Year Two we will complete the construction of the website which will house the parent engagement modules and the research instruments. In addition, the evaluation of the effectiveness of the parent engagement modules will commence.

### 4. Associated Knowledge Areas

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<td>Community Institutions, Health, and Social Services</td>
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<td>806</td>
<td>Youth Development</td>
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**Outcome #12**

1. **Outcome Measures**

   An Evaluation Of The Effect Of Dietary Botanical Estrogens On Breast Cancer Growth And Progression

2. **Associated Institution Types**
3a. **Outcome Type:**  
Change in Knowledge Outcome Measure

3b. **Quantitative Outcome**

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3c. **Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Soy flour diet [MS] prevented isoflavones from stimulating MCF-7 tumor growth in athymic nude mice, indicating that other bioactive compounds in soy can negate the estrogenic properties of isoflavones. The underlying signal transduction pathways to explain the protective effects of soy flour consumption were studied here.

**What has been done**
Ovariectomized athymic nude mice inoculated with MCF-7 human breast cancer cells were fed either MS or purified isoflavone mix [MI], both with equivalent amounts of genistein. Positive controls received estradiol pellets and negative controls received sham pellets. A GeneChip-Human-Genome-U133-Plus-2.0 Array platform was used to evaluate gene expressions, and results were analyzed using bioinformatics approaches.

Tumors in MS-fed mice exhibited higher expression of tumor-growth-suppressing genes ATP2A3 and BLNK, and lower expression of oncogene MYC. Tumors in MI-fed mice expressed higher levels of oncogene MYB and lower levels of MHC-I and MHC-II, allowing tumor cells to escape immunosurveillance. MS-induced gene expression alterations were predictive of prolonged survival among estrogen-receptor-positive breast cancer patients, while MI-induced gene changes were predictive of shortened survival.

**Results**
In summary, our findings suggest that dietary soy flour affects gene expression differently than purified isoflavones, which may explain why soy foods prevent isoflavones-induced stimulation of MCF-7 tumor growth in athymic nude mice. Therefore, the stimulatory in vivo effect observed with purified dietary isoflavones is likely different when the isoflavones are fed in a complex matrix such as defatted soy flour. The findings in the study need to be interpreted carefully for the consumption of purified dietary isoflavones by BC survivors.

These studies contribute to the understanding of how more complex dietary foods such as soy flour and purified dietary isoflavones impact BC tumor growth in a well characterized preclinical BC model. The impact of the studies suggests that soy flour containing diets have a different outcome than when the same level of purified dietary isoflavones are fed to mice.

4. **Associated Knowledge Areas**
KA Code  Knowledge Area
703      Nutrition Education and Behavior
704      Nutrition and Hunger in the Population
724      Healthy Lifestyle

Outcome #13

1. Outcome Measures

Development Of Dietary Strategies To Significantly Reduce Both The Incidence And Mortality Of Colon Cancer

Not Reporting on this Outcome Measure

Outcome #14

1. Outcome Measures

Number Of Families/Caregivers That Gained Knowledge About Eating More Healthy Foods [Those Low In Fat Or High In Fiber]

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

Number OF Children And Youth Who Reported Eating More Of Healthy Foods

Not Reporting on this Outcome Measure

Outcome #16

1. Outcome Measures

Preventing Weight Gain Through Nutrition Education

2. Associated Institution Types

• 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure
3b. Quantitative Outcome

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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The overarching aim of this research program is to prevent the burden of adult obesity among women. The specific purpose of this research project is to identify determinants of weight gain prevention as guided by Social Cognitive Theory. It is hypothesized that compared to a wait-list control group, women who undergo a weight gain prevention intervention designed to increase self-efficacy, self-regulation, outcome expectations, and family and social support regarding weight gain prevention will maintain current body weight over 12 months. Further, it is expected that women in an intervention group led by a registered dietitian will have lesser weight gain over 12 months compared to women in an intervention group led by a counselor.

What has been done
Major activities completed and experiments conducted include the enrollment of 87 women in the randomized controlled trial, with 81 women having completed the first week of the food-based intervention and 42 women having completed the 12-month food-based intervention. Women completed weekly nutrition education sessions that focused on nutrition education, intake of fruits and vegetables, and practical weight management skills. Fourteen women who were originally randomized to the wait-list control group are now undergoing the intervention phase. Data have been collected at baseline, month 3, month 6, month 9, and month 12. Variables include dietary intake, physical activity, anthropometric and blood pressure measurements, biochemical markers of health, eating behaviors and health perceptions, and mediators of behavior change. At baseline, women with higher grit have lower body weight and body mass index. Also at baseline, one in every five women misperceived their body weight classification. The entire group has been able to prevent weight gain, including women in the wait-list control group. Randomization to the registered dietitian or counselor group did not have any effect on weight gain prevention in this sample of women.

Results
The intervention has been completed, and the women who were in the wait-list control group are now undergoing the active intervention phase. Women have learned about vegetable consumption, planning ahead for food intake and portion control, and general nutrition information based on the 2010 Dietary Guidelines for Americans. A group of 81 women have prevented weight gain over one year of the study. Food and nutrition professionals have been made aware of this intervention and initial findings related to the relationship between grit and body mass and women’s susceptibility to body weight misclassification.

4. Associated Knowledge Areas

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</table>
1. Outcome Measures

Investigating The Ability Of Tomato Powder, Broccoli Powder, And Soy Germ To Reduce The Progression Of Prostate Cancer

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

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3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

Castration-resistant prostate cancer [CRPC] is an aggressive and lethal form of prostate cancer, which occurs after failure of androgen deprivation therapy [ADT] to treat metastatic or locally recurrent primary disease. This is often facilitated by CRPC cell's acquired capacity for local androgen synthesis. Our group has previously shown that dietary tomato can reduce prostatic expression of androgen biosynthetic genes. Therefore, we questioned whether dietary tomato might be effective in preventing or controlling the progression of CRPC.

**What has been done**

We hypothesized that lifelong dietary intake of tomato, as well as an adjuvant dietary tomato intervention, would reduce tumor burden and growth rate in a mouse model of CRPC. TRAMP mice [three weeks of age, n=79] were acclimated to a powdered, AIN-93G diet [CON] for one week and then randomized to consume CON [n=28] or 10% w/w lyophilized tomato paste [TP; n=27] from four weeks of age until sacrifice. A third group, modeling adjuvant dietary intervention, consumed CON from four weeks of age until twelve weeks of age, and then 10% w/w lyophilized tomato paste from week twelve until sacrifice [TP-I; n=25]. All animals were castrated at twelve weeks of age. Mice were monitored longitudinally with biweekly 3-D ultrasound scans for tumor detection beginning at ten weeks of age. Upon tumor detection, mice were imaged weekly four additional times for volumetric tumor measurement and determination of tumor growth rate. Animals without a tumor at thirty weeks of age were sacrificed. At sacrifice, tomato intervention [TP-I], but not lifelong consumption [TP], reduced tumor weight approximately 30%.

**Results**
Longitudinal 3-D ultrasound tumor area under the curve [AUC] was reduced nearly 50% by TP-I and approximately 25% by TP. Both patterns of tomato consumption reduced tumor burden in this mouse model of CRPC, with adjuvant dietary intervention demonstrating the strongest effects.

4. Associated Knowledge Areas

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Outcome #18

1. Outcome Measures

Comparing Protein Profiles Of Improved Common Bean Cultivars Grown In Mexico And Brazil

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Common bean [Phaseolus vulgaris L.] is a good source of protein, vitamins, minerals, and complex carbohydrates. The objective of this project is to compare protein profiles, including anti-nutrient proteins, and potential bioactive peptides of improved common bean cultivars grown in Mexico and Brazil.

What has been done

Bean protein isolates [BPI] were prepared from 15 common bean cultivars and hydrolyzed using pepsin/pancreatin. Thirteen proteins were identified by SDS-PAGE and protein in-gel tryptic-digestion-LC/MS. Protein profile was similar among common bean cultivars with high concentrations of defense-related proteins. Major identified proteins were phaseolin, lectin, protease, and alpha-amylase inhibitors.

Results
Lectin [159.2 to 357.9 mg lectin/g BPI], Kunitz trypsin inhibitor [inh] [4.3 to 75.5 mg trypsin inh/g BPI], Bowman-Birk inhibitor [5.4 to 14.3 micrograms trypsin-chymotrypsin inh/g BPI], and alpha-amylase inhibitor activity [2.5 to 14.9 inh relative to acarbose/mg BPI] were higher in Mexican beans compared to Brazilian beans. Abundant peptides were identified by HPLC-MS/MS with molecular masses ranging from 300 to 1,500 Da and significant sequences were SGAM, DSSG, LLAH, YVAT, EPTE, and KPKL. Potential bioactivities of sequenced peptides were angiotensin converting enzyme inhibitor [ACE], dipeptidyl peptidase IV inhibitor [DPP-IV], and antioxidant capacity. Peptides from common bean proteins presented potential biological activities related to control of hypertension and type-2 diabetes.

4. Associated Knowledge Areas

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Outcome #19

1. Outcome Measures

Determining How Perinatal Choline Alters Gene Expression And Cognitive Behaviors

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

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3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

Research was conducted in a translational pig model to provide direct evidence for the importance of perinatal choline status in neurodevelopment. Data generated included hippocampus mRNA expression profiles of genes in four week old pigs exposed to the full factorial combination of prenatal and postnatal choline status. Pigs exposed to these treatments were also subjected to a spatial task of learning and memory involving the T-maze at the same age to provide a functional measure of neurodevelopment.

**What has been done**
All combinations of prenatal and postnatal choline statuses were used in these studies, so we were able to delineate which period was most important for brain development. Our findings suggest that prenatal choline deficiency causes greater deficits in hippocampal gene expression and performance on behavioral tasks compared with choline deficiency during the postnatal phase. Differences in cognitive processing due to prenatal choline status were not only evident at four weeks of age, but remained through twelve weeks of age in growing pigs. Of note was the decreased hippocampal expression of nerve growth factor [NGF], a classically-described gene integral in the growth, maintenance, proliferation, and survival of neurons, due to the main effect of prenatal choline status. Pigs exposed to prenatal choline deficiency also exhibited lower performance during the reversal phase of a hippocampal-mediated spatial T-maze behavioral task. Taken together, these data indicate that neurodevelopment was altered due to choline status, with the most dramatic effects being exhibited in pigs that received insufficient choline in utero.

**Results**

We experienced a change in knowledge as our data suggested that prenatal choline status is more important than postnatal choline status. Moreover, postnatal choline supplementation was unable to rescue pigs from the effects caused by prenatal choline deficiency, and this point has direct implications in the human clinical realm. Thus, as with folate, it appears that women of childbearing age need to be receiving adequate choline throughout pregnancy to ensure that proper neurodevelopment of the infant occurs. Finally, these studies have caused a change in action in that greater focus should be placed on choline status at the time of conception, because even minor alterations of the earliest neurodevelopmental events are magnified throughout the lifespan.

**4. Associated Knowledge Areas**

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**Outcome #20**

**1. Outcome Measures**

The Use Of Bioactive Compounds Such As Resveratrol And Butyrate To Prevent And Alleviate Certain Disease States

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure
3b. Quantitative Outcome

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3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Microencapsulation technology is a very promising area to incorporate bioactive compounds into foods. Bioactive compounds, such as resveratrol and butyrate, can help to prevent and alleviate certain disease states. The incorporation of these compounds into food products can provide a convenient means to disseminate functional food health benefits to consumers. Microencapsulation can also help to stabilize the compounds during processing, storage, and digestion and minimize negative sensory properties of the compounds.

**What has been done**
Butyric acid is an important short-chain fatty acid for intestinal health and has been shown to improve certain intestinal disease states. A triglyceride containing three butyric acid esters, tributyrin [TB], can serve as a source of butyric acid. However, the need to target intestinal delivery and mitigate unpleasant sensory qualities has limited its use in food. Microencapsulation, the entrapment of one or more cores within an isolating matrix, may provide a solution to the challenges mentioned above. This research primarily focused on the influence of: [1] Wall material: Whey protein and soy protein isolate [WPI and SPI, respectively] and gamma-cyclodextrin [GCD]; [2] Wall additives: Inulin of varying chain length; and [3] Processing method: Spray or oven drying [SD or OD, respectively] on the morphological properties and volatile retention of tributyrin within microcapsules.

**Results**
SPI-based microcapsules retained significantly less [p<0.001] TB compared to WPI-based microcapsules as measured by gas chromatography. The inclusion of inulin in the SD WPI-based microcapsules significantly [p<0.001] increased TB retention over WPI-based microcapsules without inulin. Inulin inclusion into WPI-based microcapsules resulted in a smoother, minimally-dented, circular morphology as compared to non-inulin containing WPI-based microcapsules as shown by scanning electron microscopy. The GCD and TB OD microcapsules retained significantly more [p<0.001] TB [94.5%] than all other WPI, WPI-inulin, and GCD TB SD microcapsules. When spray dried, the GCD-based microcapsules exhibited significantly less [p<0.001] TB retention than all other microcapsules, indicating the GCD may be unsuitable for spray drying. These findings demonstrate that microencapsulated TB in GCD can lead to minimal TB losses during processing that could be utilized in functional food applications.

4. Associated Knowledge Areas

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Outcome #21

1. Outcome Measures

Improving The Quality Of Programs For High-School-Aged Youth Through A Better Understanding Of The Strategies Used By Effective Program Leaders

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adolescents in the 21st century need to develop career and life skills for navigating complex and unstructured real-world situations. Organized programs for high-school-aged youth, such as 4-H programs and other community programs, help youth learn these skills by engaging them in large individual or group projects that require them to set goals, plan, and deal with real-world challenges. The question of this research is how program leaders can best support youth’s learning in these projects. Our objective is to identify the types of challenges and dilemmas that leaders encounter and the strategies experienced leaders used to address these dilemmas. The aim is to generate knowledge to help new program leaders better support youth’s learning processes. This study will draw on data from a larger research project that focused on positive youth development among high-school-aged youth. Longitudinal data are being collected from twelve programs in three geographic regions: Central Illinois, Chicago, and Minneapolis. Five programs are in rural areas [two are 4-H programs]. All engage youth in projects, including technology, leadership, and the arts. Six serve Latino adolescents.

What has been done
In previous years, we completed data collection with 26 leaders of 14 programs for middle-school-aged youth. This included 4 structured interviews with nearly all leaders [97 total interviews] and 28 observations of the leaders in action. This sample of leaders was chosen to be approximately similar to the 25 leaders of programs for high-school-aged youth for whom we already had data [the Pathways sample]. The two samples of programs come from the same three regional locations and have similar range of content [leadership, arts, and STEM]. The two samples of leaders are similar in ethnicity and serve approximately the same ethnic and SES mix. These additional leader interviews doubled the sample size for our analyses of leader practices, which
greatly strengthens our ability to inform the field of youth practice. It also is allowing us to compare the practices and pedagogical strategies leaders employ in running programs for younger versus older adolescents.

Results
We have studied teens' work on projects in youth programs because they provide real-world-like contexts for understanding development of these skills. Our findings demonstrate how leader support facilitates youths' learning to anticipate the particularities of the contexts and people involved in reaching a goal and learning general "meta" concepts and strategies that apply across situations such as formulating plans that take uncertainties into account.

We sought to understand the processes through which youths' trust in leaders influences their program experiences. Data came from interviews with 108 ethnically diverse youth [ages 12-19] participating in 13 arts, leadership, and STEM programs. We found that trust: [1] Increased youths' confidence in a leader's guidance in program activities; [2] Increased youths' motivation in these activities; [3] Increased youths' use of leaders for mentoring on personal issues; and [4] Provided a useful model of a well-functioning relationship.

In the youth development field, it is often assumed that a strong inverse relationship exists between adult leaders' exercise of authority and youths' experience of agency. This assumption can lead novices into difficult situations. In this study we examined why, when, and how experienced practitioners yield and exert authority in daily practice through targeted interview questions with the 25 Pathways leaders. Analyses showed that these veteran leaders experienced - and enacted - a more nuanced relationship between authority and youth agency. They limited their use of authority but also employed it in intentional ways aimed at strengthening youths' agency and skills for agency.

Culture, race, and family background profoundly shape adolescents' identities, expectations, and how they interpret experiences. Yet research on youth programs often fails to recognize the unique challenges faced by youth of color and recommendations for youth practice often ignore culture. In analysis of interview data from the 51 program leaders in the two studies, we first discovered four frequent cultural challenges occurring in leader's daily work [such as youth making culturally offensive remarks or conflicts between program and family practices]. Second, leaders differed in how directly they engaged with the cultural issues at stake. The analysis identified three types of responses: [1] Proactive engagement; [2] Limited engagement; and [3] Disengagement. Proactive engagement corresponds closely with best practices identified by research in education. These findings are important because they identify the types of cultural issues that should be included in staff training. They also indicate that this training should help trainees develop not just skills but the emotional comfort to address these cultural issues directly.

4. Associated Knowledge Areas

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**Outcome #22**

1. **Outcome Measures**
   
   Improving Our Understanding Of Social-Emotional Development Among Young Children From Rural And Suburban Communities

2. **Associated Institution Types**
   
   ● 1862 Research

3a. **Outcome Type:**
   
   Change in Knowledge Outcome Measure

3b. **Quantitative Outcome**

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3c. **Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

A notable transformation takes place in children's understanding of people during the preschool period. That is, children come to understand that individuals have minds and that behavior is a predictable function of mental states, such as intentions, beliefs, desires, and emotions. Having a theory of mind is central to the successful navigation of social interactions and relationships. Notably, previous research has highlighted the familial antecedents or peer outcomes associated with individual differences in children's theory-of-mind understanding, yet few studies have brought together these two lines of research. This project aimed to address this gap in the literature. Because patterns of problematic interactions with peers begin to emerge during the preschool years and have implications for children's subsequent adjustment, it is important to pinpoint risk factors and the underlying processes that may contribute to children's peer difficulties.

**What has been done**

Our first primary objective was to assess the extent to which child-mother attachment security at 32 months predicted theory-of-mind understanding from 3 to 5 years. To address this objective, a 3 [time point: 40, 54, 62 months] x 2 [gender] repeated measures ANCOVA was conducted with time as the repeated factor, gender as the between-subject factor, child-mother attachment security and child language at 32 months as continuous predictors, and theory-of-mind understanding as the dependent variable.

Our second main objective was to examine theory-of-mind [ToM] understanding as a predictor of children's observed friendship quality at 56 and 62 months of age. Child-friend dyads were observed in identical play sessions at 56 and 62 months and child-friend interaction was coded for coordinated social play, shared positive affect, and conflict intensity. A series of repeated
measures ANCOVAs were conducted to examine longitudinal associations between ToM and each of the friendship interaction measures over the two time points, with 40-month ToM predicting observed friendship interaction at 56 and 62 months.

Our final objective was to test theory-of-mind understanding as a mechanism through which early child-mother attachment security was related to children's later friendship quality. Structural equation modeling was utilized to test the hypothesized indirect effects. Given the above findings that: [1] Attachment security was related to both ToM and emotion understanding; and [2] That ToM and emotion understanding were related to friendship quality, albeit different aspects of interaction, we tested ToM and emotion understanding as dual mechanisms in the same model. Moreover, we included child-friend coordinated play, shared positive affect, and conflict as outcome variables in the same model [error terms among these dependent variables were allowed to covary].

Results
A significant main effect of child-mother attachment security emerged, above and beyond a significant main effect of child language ability. Greater child-mother attachment security was associated with more advanced theory-of-mind understanding across the three assessment time points. The main effect of gender and the attachment security x time interaction were non-significant. Thus, we found support for our hypothesis that greater attachment security would be associated with more advanced theory-of-mind understanding.

Finally, with respect to Objective 1, in addition to considering children's theory-of-mind understanding, we examined child-mother attachment security as a predictor of children's emotion understanding at 40 months. A univariate ANOVA with child gender as the between-subjects factor and child-mother attachment security and child language at 32 months as continuous predictors indicated a significant main effect of attachment security. Greater attachment security at 32 months was related to greater emotional understanding at 40 months, and this association emerged above and beyond a significant main effect of child expressive language.

For Objective 2, we found that ToM made a significant contribution to child-friend coordinated play at both time points and a marginally significant contribution to child-friend conflict intensity, but only at the 54-month time point. These associations emerged above and beyond contributions of child expressive language and child gender. As expected, greater ToM was related to higher levels of coordinated social play between friends and less intense child-friend conflict. ToM was a non-significant predictor of shared positive affect between children and their friends. Complementing these analyses, we also assessed children's emotional understanding of child-friend interaction at 56 and 62 months and found that emotion understanding significantly predicted children's shared positive affect, but not child-friend coordinated play or conflict intensity. Thus, the contribution of ToM at 40 months to the quality of children's friendship interaction tends to be distinct from the contribution made by children's emotional understanding assessed at 40 months.

For Objective 3, we utilized the bootstrap procedure in Mplus 6.0 to examine bias-corrected confidence intervals [Clbc] to assess indirect effects, and results indicated a significant indirect effect from child-mother attachment security to child-friend coordinated play at 54 and 62 months via children's theory of mind understanding. The indirect effects of attachment security on child-friend conflict via ToM was also significant, but only with respect to child-friend conflict at the 56-month time point. Parallel tests of indirect effects of attachment-friend associations via emotional understanding at 40 months were all non-significant.
4. Associated Knowledge Areas

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<td>806</td>
<td>Youth Development</td>
</tr>
</tbody>
</table>

Outcome #23

1. Outcome Measures

Reducing Obesity Through Improved Utilization Of Nutrition Information

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>0</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumers have difficulty utilizing nutrition information. We hypothesized that graphically delivering information of select nutrients relative to a target would allow individuals to process information in time-constrained settings more effectively than numerical information. Objectives of the study were to determine the efficacy of the graphical method in: [1] Improving memory of nutrient information; and [2] Improving consumer purchasing behavior in a restaurant. Values of fiber and protein per calorie were two-dimensionally plotted alongside a target box.

What has been done
First, a randomized cued recall experiment was conducted [n=63]. Recall accuracy of nutrition information improved by up to 43% when shown graphically instead of numerically. Second, the impact of graphical nutrition signposting on diner choices was tested in a cafeteria. Saturated fat and sodium information were also presented using color coding. Nutrient content of meals [n = 362] was compared between three signposting phases: [1] Graphical; [2] Nutrition facts panels [NFP]; or [3] No nutrition label.

Results
Graphical signposting improved nutrient content of purchases in the intended direction, while NFP
had no effect compared to the baseline. Calories ordered from total meals, entrées, and sides were significantly less during graphical signposting than no label and NFP periods. For total meals and entrées, protein per calorie purchased was significantly higher and saturated fat significantly lower during graphical signposting than the other phases. Graphical signposting remained a predictor of calories and protein per calorie purchased in regression modeling. These findings demonstrate that graphically presenting nutrition information makes that information more available for decision making and influences behavior change in a realistic setting.

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>
<tr>
<td>704</td>
<td>Nutrition and Hunger in the Population</td>
</tr>
<tr>
<td>724</td>
<td>Healthy Lifestyle</td>
</tr>
</tbody>
</table>

Outcome #24

1. Outcome Measures

Accelerating The Development Of Vegetables With Enhanced Glucosinolate Profiles Tailored To Promote Human Health

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>0</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

Two classes of secondary metabolites found in Brassica crops are of particular importance for eliciting human health benefits: [1] Phenolic compounds; and [2] Glucosinolate hydrolysis products. These compounds have been demonstrated [among other things] to induce detoxification enzymes, mitigate inflammation, lower the risk of type II diabetes, and decrease cancer risk.

**What has been done**

In order to better utilize plants for the promotion of human health, a coordinated effort of advancement is needed in all related fields, including the genetic and environmental regulation of
plant secondary product biosynthesis and the in vivo targets and mechanisms of action of phytochemicals in humans. This research addresses the genetic control of glucosinolate metabolism and phenolic compound accumulation in broccoli [Brassica oleracea L. var. italica]. Gas chromatography was utilized to quantify glucosinolate hydrolysis products in the broccoli mapping population VI-158. The same population was also evaluated for phenolic compound accumulation with three chemical assays: [1] Total phenolic content; [2] ABTS radical scavenging capacity; and [3] DPPH radical scavenging capacity. Quantitative trait loci analysis was employed for each of these phenotypes to identify genetic loci associated with variation in glucosinolate hydrolysis and phenolic compound accumulation. The genetic linkage map used for this analysis was saturated with single nucleotide polymorphism [SNP] markers anchored to the B. oleracea reference genome TO1000. Physical markers were utilized to identify putative candidate genes underlying the QTL effects.

**Results**

This work reveals several questions for further investigation and the potential challenge of improving metabolites that are responsive to environmental conditions, but also highlights potential target genes for breeding Brassica cultivars with greater health-promoting potential.

### 4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>704</td>
<td>Nutrition and Hunger in the Population</td>
</tr>
</tbody>
</table>

**Outcome #25**

1. **Outcome Measures**

   Increased Knowledge Of Healthy Lifestyle Choices And Consequences Of Actions With Respect to Healthy Lifestyle Choices

2. **Associated Institution Types**

   - 1862 Extension

3a. **Outcome Type:**

   Change in Knowledge Outcome Measure

3b. **Quantitative Outcome**

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
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<td>154</td>
</tr>
</tbody>
</table>

3c. **Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Recent statistics confirm what parents, teachers, and other concerned adults suspect - that children and teens continue to use tobacco, alcohol, and drugs in significant numbers.
What has been done
University of Illinois Extension youth development staff implemented delivery of 4-H Health Rocks!, a national healthy living program aimed at 8-16 year olds, with the goal of bringing youth, families, and communities together to reduce tobacco, alcohol, and drug use. The program was conducted at 9 sites. Trained teens and staff provided ten or more hours of educational hands-on activities in school classrooms, summer youth programs, and after school programs. In addition to learning the facts about drugs and the consequences of taking them, the youth engaged in educational activities that encompassed building life skills such as showing concern for others, making healthy life styles choices, managing stress, and developing refusal skills. A total of 312 of the 398 youth participants completed the 10 hours of required training. Two hundred and twenty-three [223] youth completed the retrospective post-pre evaluation comprised of seventeen items.

Results
At the last session of 4-H Health Rocks! youth were asked to rate the strength of their agreement with thirteen statements regarding drug usage and life skill development using a scale of 1-4 with 1 = "strongly disagree" and 4 = "strongly agree". They were instructed to provide a rating that reflected their increased agreement after the program and then provide a rating of their agreement before the program. One hundred fifty-four youth [69%] increased their agreement with at least one of the statements when comparing post-training ratings with pre-training ratings. One-third of the youth increased their agreement with the following statements: [1] Once you start smoking, it is hard to stop; [2] People who use drugs sometimes see or hear things that are not really there; [3] If a friend wanted to try drugs, I can talk them out of it [concern for others life skill]; and [4] Using drugs can ruin my relationship with my family and friends [knowledge of the consequences of actions]. In response to the final set of four questions regarding program satisfaction and experience, 3.69 was the average rating on the four-part scale for the statement "I learned a lot during the training". Complete findings can be found in the evaluation section of this planned program.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>724</td>
<td>Healthy Lifestyle</td>
</tr>
<tr>
<td>803</td>
<td>Sociological and Technological Change Affecting Individuals, Families, and Communities</td>
</tr>
<tr>
<td>806</td>
<td>Youth Development</td>
</tr>
</tbody>
</table>

Outcome #26

1. Outcome Measures

Number Of Youth That Increased Knowledge Of Bullying And Actions To Take In Dealing with A Bullying Situation

2. Associated Institution Types
3a. **Outcome Type:**

Change in Knowledge Outcome Measure

3b. **Quantitative Outcome**

<table>
<thead>
<tr>
<th>Year</th>
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</tr>
</thead>
<tbody>
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<td>2015</td>
<td>388</td>
</tr>
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</table>

3c. **Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**
Violence and bullying in schools is increasing among teens in the U.S. There is a scarcity of materials focused on bystanders and targeted for junior high and high school students.

**What has been done**
A team of current and now-retired educators developed a research-based prevention simulation and guided discussions for junior high and senior high youth, supported by statistical research on bullying among teens in the U.S. The Breaking the Code (BTC) program objectives are that youth will: [1] See the effects of bullying and understand the power of their decisions as bystanders in a bullying situation; [2] Identify options for responding to bullying; and [3] Be motivated to take a stand against bullying. BTC is a simulation that tells the story of youth observing everyday situations where bullying occurs. Eight 30-minute scenarios are played out in either narrator or skit form. Bystanders begin to realize the choices they make have a big impact on the victim, the normalcy and acceptance of bullying, and the social climate of their school. Guided discussion assists students to process the experience.

**Results**
Data from a subset of 460 students who completed both pre- and post-program evaluations in 2014 have continued to show increases in the number of students who definitely would: [1] Ask an adult for help - 237 [52%] additional students checked this on the post-test; [2] Confront a bully - 204 [44%] additional students checked this on the post-test; [3] Help someone who is being bullied - 194 [45%] additional students checked this on the post-test; and [4] Know actions I can take that will help with bullying situations when I encounter them - 151 [33%] additional students checked this on the post-test. Sample responses when asked what they will do differently included "Thank you, you showed me that bystanders are the most powerful" and "I think that bullying should stop from what I've heard in Breaking the Code and at school. It helps me stop bullying".

4. **Associated Knowledge Areas**

<table>
<thead>
<tr>
<th>KA Code</th>
<th>Knowledge Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>802</td>
<td>Human Development and Family Well-Being</td>
</tr>
<tr>
<td>806</td>
<td>Youth Development</td>
</tr>
</tbody>
</table>
Outcome #27

1. Outcome Measures

   Increased Practices Related To Aging

2. Associated Institution Types

   ● 1862 Extension

3a. Outcome Type:

   Change in Action Outcome Measure

3b. Quantitative Outcome

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
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<td>2015</td>
<td>46</td>
</tr>
</tbody>
</table>

3c. Qualitative Outcome or Impact Statement

   Issue (Who cares and Why)
   The U.S. Census Bureau estimates that all baby boomers will have reached age 65 or older by 2029. Consequently, in that year one in five Americans would be 65 or older, up from one in seven in 2015. The 2010 census reports that 13.9 percent of Illinois’ population is age 65 or older.

   What has been done
   A new four-part program series Explore Your Future was designed for individuals who are considering retirement soon or are newly retired and was offered by Extension family life educators in April at three locations in Illinois. Participants spent the day examining the social aspects of retirement by identifying their strengths and interests and developed a game plan regarding whether they will volunteer, pursue a second career, or explore new activities. The average age of the 52 participants who provided data was 61.67 years old. At the end of the program, participants were asked to complete a survey designed to assess program quality with respect to improving the program, determining if the program met participant's expectations, and assessing knowledge gained. Forty-nine [49] participants completed this survey.

   Results
   When asked what the participants learned, more than one-third referenced learning about S.M.A.R.T. goals and goal planning, while many others mentioned learning new ideas and resources they could "tap" to explore their future. When asked what they liked about the program, more than one-third indicated benefiting from group interactions, self-disclosures, experiences, and stories that were shared. Nearly as many mentioned activities and tools that were used.

   In response to six statements regarding their ability to relate to their sense of personal self-efficacy, the 46 respondents average group ratings were between "agreed" and "strongly agreed" with the highest being their belief in their ability to "always manage to solve difficult problems if..."
they tried hard enough”. When asked to rate statements related to their likelihood of applying/using what they learned during the workshop experience, the average group score was more than 4.00 with respect to believing they could implement the activity/action plan they developed during the program. Additional results can be found in the evaluation section of this planned program.

4. Associated Knowledge Areas

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>724</td>
<td>Healthy Lifestyle</td>
</tr>
<tr>
<td>802</td>
<td>Human Development and Family Well-Being</td>
</tr>
</tbody>
</table>

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Economy
- Appropriations changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

**I on Diabetes Chronic Disease Management**

In 2015, pre- and post-evaluations consisting of four sections of questions were collected from 82 participants at the beginning and again at the end of **I on Diabetes** programs conducted in nine counties in Illinois. **I on Diabetes** is a series of 2 ½-3 hour face-to face sessions designed for anyone interested in preventing or managing diabetes. Content of the program series addresses diabetes treatment goals and self-monitoring, managing carbohydrates, sodium, cholesterol and fat portions, planning meals, and reading food labels. Food demonstrations, taste testing, and recipes assisted participants in using artificial sweeteners, low-fat products, and herbs and spices.

All of the 82 participants who completed all or some of the sections of the evaluation indicated increasing their confidence, skills, or practices in managing their diabetes.

**Improved Ability To Manage Diabetes**

Sixty-nine [69] of 82 participants [84%] who completed the series of questions indicated that they improved their ability to manage diabetes in one or more areas. Using a four-part scale ranging from "strongly disagree" to "strongly agree", 48 [59%] reported they could now more easily select foods that fit their meal plan, 48 of 82 participants [59%] who completed the evaluations indicated they improved their ability to select healthier choices.
when dining out, and 38 [46%] indicated they could more easily prepare healthy foods. Thirty-seven [37] of 82 [45%] increased agreement that healthy foods taste good. Only 28 of 82 [34%] of the participants indicated increasing their ability to manage portion sizes and only 14 [17%] indicated feeling they had improved their ability to easily talk to the doctor about their diabetes.

Improved Confidence In Diabetes Self-Management

A second series of questions on the evaluation was designed to identify increases in the confidence of the participants to manage their diabetes using another four-part scale ranging from "not confident" to "very confident". Seventy-three [73] of 82 participants [89%] indicated that they improved their confidence in managing their diabetes. More than three-fifths of the 82 who answered these questions indicated an increased confidence in the following: [1] Estimating the amount of food you should eat [59 or 72%]; [2] Selecting foods that will reduce the risk for heart disease [58 or 71%]; [3] Knowing which foods have carbohydrates [58 or 71%]; [4] Following a healthy diabetes meal plan [54 or 66%]; and [5] Preparing foods that fit into their meal plan [52 or 63%]. Only 26 [32%] increased confidence in talking with their doctor about their health.

Increased Frequency Of Recommended Actions To Manage Diabetes

A final series of questions explored increased frequency in using recommended practices by the participants. Using a four-part scale ranging from "never" to "almost always", 76 of 82 participants [92%] reported increasing their frequency in taking at least one recommended action.

More than half of the participants revealed increasing the following practices: [1] Setting goals to help manage their diabetes [58 or 70%]; [2] Keeping track of the amount of foods with carbohydrates they eat each day [57 or 69%]; [3] Following a meal plan to help manage diabetes [52 or 63%]; [4] Using food labels to plan their meals [52 or 63%]; and [5] Trying to limit fat intake [48 or 58%].

Approximately forty percent indicated increasing their frequency in taking the following actions: [1] Trying to limit salt intake [35 or 42%]; [2] Increase physical activity [35 or 42%]; [3] Eating at least three regularly spaced meals a day [34 or 41%]; [4] Reading food labels [34 or 41%]; and [5] Trying to limit salt intake [19 or 32%].

4-H Health Rocks

Two hundred twenty-three [223] of the 398 youth participants in 4-H Health Rocks!, a national healthy living program aimed at 8-16 year olds with the goal of bringing youth, families, and communities together to reduce tobacco, alcohol, and drug use, completed a retrospective post-pre evaluation comprised of seventeen items. In addition to learning the facts about drugs and the consequences of taking them, the educational activities encompassed building life skills such as showing concern for others, making healthy lifestyle choices, managing stress, and developing refusal skills. Thirteen of the 17 evaluation items addressed these skills using a scale of 1-4 with 1 = "strongly disagree" and 4 = "strongly agree". The youth were instructed to provide a rating that reflected their level of agreement after the program and then reflect back and provide a rating of their
level of agreement before the program. One hundred fifty-four youth [69\%] increased their agreement with at least one of the statements when comparing post training ratings and pre-training ratings. It should be noted that this evaluation tool has been designed for use nationally.

Data regarding the increases between before and after the program follow in the order of highest to lowest number of youth who increased their level of agreement with each of the thirteen statements:

1. [91 of the 223 [41\%] increased agreement that "Once you start smoking, it is hard to stop";]
2. [84 [37\%] increased agreement that "People who use drugs sometimes see or hear things that are not really there";]
3. [79 [35\%] increased agreement that "If a friend wanted to try drugs, I can talk them out of it";]
4. [71 [32\%] increased agreement that "Using drugs can ruin my relationship with my family and friends";]
5. [66 [29\%] increased agreement that "When I feel stressed I am able to talk about it with people I trust";]
6. [57 [25\%] increased agreement that "I need to think about how my choices will affect my future";]
7. [51 [23\%] increased agreement that "I would help other kids like me to stay away from alcohol or other drugs";]
8. [46 [20\%] increased agreement that "I feel good about myself";]
9. [45 [20\%] increased agreement that "I have goals for myself";]
10. [45 [20\%] increased agreement that "I am able to say no if others offered me cigarettes";]
11. [40 [18\%] increased agreement that "It is important for me to stay focused on learning at school";]
12. [39 [17\%] increased agreement that "I don't have to drink or smoke even if some other young people do it".

In response to the final set of four questions regarding program satisfaction and experience, 3.275 was the average rating on the four-part scale for the statement "I learned a lot during the training".

**Explore Your Future**

All of the 52 participants in the **Explore Your Future** program designed for those who are considering retirement soon or are newly retired completed a pre-program survey and 49 completed a post-program survey. The pre-program survey was designed to collect information regarding the participants’ demographics and work background or status and their perceptions of retirement by rating their degree of agreement with 20 statements. At the end of the program 49 participants responded to questions that addressed program quality/improvement, whether the program met their expectations, and assessing knowledge changed.

Two primary reasons participants cited for attending the program were: [1] To search for ideas for things to do now that they were retired; and [2] Their interest in developing a plan, strategy, or goals for retirement. With respect to program quality, 90\% of the 49 participants who completed the post evaluation agreed or strongly agreed that the program met their expectations and that the activities in the program were helpful to achieve their purpose in attending.

When asked what they learned, more than one-third referenced learning about S.M.A.R.T. [specific, measurable, agreed upon, realistic, and timed] goals and goal planning, while many others mentioned learning new ideas and resources they could "tap" to explore their future.
Participants were asked to rate six statements regarding their personal self-efficacy using a 5-part scale with 1 = "strongly disagree", 2 = "disagree", 3 = "neutral", 4 = "agree", and 5 = "strongly agree". A summary of responses follows.

The following six statements average group rating scores ranged from 3.56 to 3.87 and are listed from the highest to lowest average: [1] 3.87 rating "I can always manage to solve difficult problems if I try hard enough"; [2] 3.83 rating "I can remain calm when facing difficulties because I can rely on my coping abilities"; [3] 3.80 rating "I am confident that I could deal efficiently with unexpected events"; [4] 3.74 rating "Thanks to my resourcefulness, I know how to handle unforeseen situations"; [5] 3.49 rating "It is easy for me to stick to my aims and accomplish my goals"; and [6] 3.46 rating "If someone opposes me, I can find the means and ways to get what I want".

Key Items of Evaluation

I On Diabetes Chronic Disease Management

All of the 82 participants who completed all or some of the sections of the evaluation indicated increasing their confidence, skills, or practices in managing their diabetes, especially with respect to selecting healthy food choices and following a healthier meal plan to manage their diabetes.

All but two of the participants who completed all or sections of the pre- and post-evaluations indicated increasing their confidence, skills, or practices in managing their diabetes. Specifically: [1] Using a four-part scale ranging from "strongly disagree" to "strongly agree", 69 of 82 participants [84%] who completed the series of questions indicated that they improved their ability to manage diabetes in one or more areas; [2] Using another four-part scale ranging from "not confident" to "very confident", 73 of 82 participants [89%] indicated that they improved their confidence in managing their diabetes in one or more areas; and [3] Using a four-part scale ranging from "never" to "almost always", 76 of 82 participants [92%] reported increasing their frequency in taking at least one recommended action to manage their diabetes.

The results of evaluations comparing responses to the same questions at the beginning and at the end of participation in I on Diabetes strongly suggest that the program was impacting participant's management of diabetes.

Health Rocks

One hundred and fifty-four youth [64%] increased their agreement with at least one of the statements regarding learning facts about drugs and the consequences of taking them and building life skills such as showing concern for others, making healthy lifestyle choices, managing stress, and developing refusal skills when comparing post training ratings and pre-training ratings. It is worth noting that an examination of the data suggests that youth are challenged with using the post-pre evaluation format. Greater effort will need to be made by instructors to help them understand how to complete the ratings form.

Explore Your Future
When asked what the participants learned, more than one-third referenced learning about S.M.A.R.T. goals and goal planning, while multiple others mentioned learning new ideas and resources they could “tap” to explore their future. When asked what they liked about the program, more than one-third indicated benefiting from group interactions, self-disclosures, experiences, and stories that were shared. Nearly as many mentioned activities and tools that were used.

In response to six statements regarding their ability to relate to their sense of personal self-efficacy, the 46 respondents average group ratings were between "agreed" and "strongly agreed" with the highest being their belief in their ability to “always manage to solve difficult problems if they tried hard enough”. When asked to rate statements related to their likelihood of applying/using what they learned during the workshop experience, the average group score was more than 4.00 with respect to believing they could implement the activity/action plan they developed during the program.