## V(A). Planned Program (Summary)

**Program # 6**

**1. Name of the Planned Program**

HUMAN NUTRITION, HEALTH AND FOOD SAFETY

### V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---|---|---|---|---|---|
| 702 | Requirements and Function of Nutrients and Other Food Components | 10% | | 57% | |
| 703 | Nutrition Education and Behavior | 75% | | 8% | |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins | 15% | | 35% | |
| | **Total** | 100% | | 100% | |

## V(C). Planned Program (Inputs)

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

| Year: 2010 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 9.0 | 0.0 | 9.0 | 0.0 |
| Actual | 9.0 | 0.0 | 7.0 | 0.0 |

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

| Extension | | Research | |
|---|---|---|---|
| Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| 76271 | 0 | 19687 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 460549 | 0 | 139285 | 0 |
| **1862 All Other** | **1890 All Other** | **1862 All Other** | **1890 All Other** |
| 0 | 0 | 0 | 0 |

## V(D). Planned Program (Activity)

**1. Brief description of the Activity**

**Issue**

Foodborne diseases are a widespread and growing public health problem, both in developed and developing countries. In the United States, for example, around 76 million cases of foodborne diseases, resulting in 325,000 hospitalizations and 5,000 deaths, are estimated to occur each year. Detecting waterborne and foodborne contaminants usually involves collecting a water or food sample, sending it to a laboratory and waiting for the samples to be filtered, incubated, tested and identified under a microscope. If a critical infection is suspected, say for highly dangerous E. coli O157:H7, the pathogen may already have multiplied and spread before the report arrives days later.

**What has been done**

A series of "lab- on-a-chip" (LOC) applications in development at the Biosensors Laboratory at the University of Arizona can identify pathogens in minutes rather than days, using a simple device that delivers results locally. The LOC has microchannels filled with antibody-conjugated submicro- or nanoparticles that grow in size upon the presence of pathogens in a drop of water or food samples. The LOC is encased in a portable system that runs on a 9-V battery with no external computer. Testing pathogens involves minimal liquid handling--no centrifuging, micro-filtering or plating. One of the tests in development can detect pathogens--E. coli, Salmonella and potentially Cryptosporidium--in drinking water networks, irrigation systems, or wastewater recycling facilities and in food samples (lettuce, spinach or ground beef). A prototype handheld device has recently been fabricated that successfully detects near-single-cell E. coli from iceberg lettuce samples, as low as 10 cells per milliliter of "lettuce juice."

**Impact**

Laboratory studies show that the LOC test is faster than conventional testing methods, taking an average of less than five minutes to deliver results on location. The degree of accuracy is three orders of magnitude greater than for conventional real-time or rapid tests (close to a single cell level). The method can be used to monitor early spread of pathogens, rather than being used after the outbreaks, thus potentially saving lives and money. The annual cost for foodborne illness in the U.S. is estimated to be $152 billion, according to a new report by Pew Charitable Trusts and Georgetown University.

**Issue**

According to the Centers for Disease Control, only 10 percent of all cases of food poisoning are reported. Proper food handling and storage helps prevent food poisoning from Campylobacter, Salmonella, Cryptosporidium, Yersinia, E. coli 0157 and other pathogens. Safe Food 2010 is a multi-year, comprehensive food safety education project coordinated through Arizona Cooperative Extension. The program is a partnership with state and county health departments, local and state organizations, and groups interested in improving the safety of food for Arizona families and consumers. Safe Food 2010 seeks to reduce the number and severity of foodborne illnesses by providing current, accurate information on nutrition and food safety through the media and through classes. Reported cases of foodborne illness in Arizona declined from 5,200 in 1995 to 1,073 cases in 2009. Arizona Cooperative Extension in Maricopa County is one of 25 members of the Arizona Food Safety Task Force that meets periodically to identify critical issues for action statewide.

**What has been done**

Safe Food 2010 encompasses a wide range of programs and resources, including workshops on food preservation and on food safety for occasional quantity cooks; "Germ City" sessions on correct hand washing; a food safety course for high-risk groups; the 8th Safe Food, two-day conference in November 2010 on Food Safety from Farm to Table that attracted 86 food professionals; and continuing statewide food safety listserv with state health department for 132 food professionals. The Master Consumer Advisors program continues the educational outreach of Extension in food safety and consumer issues to clientele who call or email. Many of these programs are offered in other counties in Arizona, in addition to Maricopa County. The Safe Food 2010 website features HACCP classes--Hazard Analysis of Critical Control Points--and information on other downloadable or satellite classes and upcoming events. Faculty consulted with 14 food companies and food professionals by phone, while volunteers and part-time staff answered calls from five other Arizona counties and five states--Illinois, California, Nevada, Colorado and New Mexico.

**Impact**

In 2010, the 85 participants in the food preservation class completed a pre-test with an average of 51.4 percent correct answers and a post-test average of 78.4 percent correct, with a 34 percent increase in knowledge about food safety. Nearly 1,600 people downloaded two or more of the five HACCP lessons from the Safe Food 2010 website in 2010. Safe Food 2010 conference participants rated the conference at 4.6 (5 being excellent). Of the 86 participants, 20 reported they would be training other professionals with the information, 32 with their staff, 6 will be teaching students and 18 will teach consumers.

At one middle school, 208 teachers taught proper hand-washing to 4,000 students in their classrooms as a result of Safe Food 2010 training, hand-washing curricula and student incentives. The Germ City unit was used at schools as part of the Supplemental Nutritional Assistance Program (SNAP-Ed) in Maricopa, Pinal, Pima and Santa Cruz Counties, with more than 740 downloads of online Germ City teaching resources from the website. Ninety percent of the SNAP-Ed teachers at Isaac Middle School said, "My students washed their hands more often," as a result of the program.

During 2010, 32 Master Consumer volunteers gave 916 hours service valued at $19,098 according to the 2009 independent sector data rate of $20.85/hour.

Customer Response Cards were sent to people with publications in 2010. The returned responses rated Cooperative Extension's information and help as 9.6 with 10 being excellent and 1 being poor. Comments included: "We love knowing we have somewhere to go for help." and "Information was just what I needed to know." The Safe Food 2010 website had 128,000 visitors with 4.2 million hits in 2010. Twenty four percent (17,770 sessions) came from Google searches. There were more than 21,800 visitors from 11 foreign countries. More than 10,725 pdf files were downloaded from the Maricopa County Family and Consumer Sciences website.

**Issue**

Osteoporosis -a silent disease that causes porous bones that break easily--is both treatable and preventable. Yet it is the number 1 crippler of women. One in 2 women and one in 5 men will have osteoporosis fractures in their lifetime. The November 2010 report from the Institute of Medicine states adolescents need 1,300 milligrams of calcium per day to support bone growth, women ages 19 through 50 and men up to 71 require on average 800 milligrams daily. Women over 50 and both men and women 71 and older should take in 1,000 milligrams per day on average to ensure they are meeting their daily needs for strong, healthy bones. Yet the 2001 (most recent data) Arizona Behavior Risk Surveillance Survey found over half (51.4 percent) of Arizonans consume less than two of the three recommended) servings of milk or milk products per day. More than half of Arizona's population is in Maricopa County, where there is the highest total number at risk. The U.S. Surgeon General warned in his 2004 report that by 2020, half of all American citizens older than 50 will be at risk for fractures from osteoporosis and low bone mass if no immediate action is taken.

**What has been done**

The Bone Builders program teaches women of all ages, young adolescent girls, and older men in Arizona how to change their dietary and exercise habits to reduce the risks of osteoporosis and improve bone health. It is a partnership with University of Arizona Cooperative Extension, UA College of Medicine, the Arizona Department of Health Services, Arizona Osteoporosis Coalition and more than 60 partners including county health departments, health providers and interested citizens. The program uses volunteer educators, community classes, the Bone Builders Physical Activity Program, health fairs and a social marketing campaign to spread the message of osteoporosis prevention on Twitter and Facebook.

**Impact**

In 2010, Basic Bone Builders classes were taught for 91 Maricopa County community groups with 918 participants, along with 120 one-on-one sessions. Bone Builders displays and education programs at 18 health and community fairs directly reached about 1,120 women. In one assessment, 347 people attending classes rated their knowledge of osteoporosis risk and prevention an average of 1.12 before the sessions and 4.79 after, out of a 5 point scale with 5 high, a 415 percent increase in knowledge. They rated class quality as 4.95. More than 1,000 'Like Mother, Like Daughter' flyers and 40 posters have been distributed through businesses, doctor offices, day care centers, churches and school districts.

· For pre-teens, a health educator taught "No Bones About It" to 703 students at middle schools, while "Best Bones Forever" materials were distributed for 1,200 students at another. "No Bones About It" students increased their knowledge through an average of 2.5 MORE correct answers out of 15 questions from the pre- to the post-test.

· In 2009 Bone Builders, the Arizona Osteoporosis Coalition and Pinal County Cooperative Extension were selected for a national pilot of the BodyWorks/Best Bones Forever (BBF) program. The partnership did BBF outreach at 14 community events with 4,460 individuals. Many included bone density screening. Thirty-seven parents and daughters completed the 10-week Bodyworks classes. Final Bodyworks/Best Bones Forever evaluations are not available because they are still being compiled by the national funder, but participants did express increased knowledge when questioned verbally and 100 percent of daughters expressed excitement about doing weight-bearing exercise.

· Nine seniors completed at least one fitness assessment for the Bone Builders Physical Activity Program, while six seniors completed the whole series plus the pre-post assessments. All seniors completing the 9 week physical activity class improved in at least 1 out of 6 fitness assessments. Seniors improved from 10 percent to 90 percent on individual tests.

· During the past 6 years, Bone Builders and its partners completed 2,832 ultrasound screenings with education. In 2009, of the 460 women tested, 180 had low bone density, 47 had osteopenia and 16 had osteoporosis. The average age was under 60 years old, when many do not even think about osteoporosis. Of people who completed 386 ultrasound screenings plus education in 2010, 43 had osteopenia and 4 had osteoporosis. If ONE hip fracture can be prevented from early screening/education it would save $81,000 in health costs.

· BoneBuilders.org had 19,000 visitors in 2010, although data are still incomplete. More than 34,000 people visited the page on high calcium foods; the page on weight-bearing exercise had 32,000 visitors. Referral sources included 530 visitors from the Foundation for Osteoporosis Research & Education; website visitors from other countries included Sweden (592 visitors), Russia (469) and Australia (678). The Bone Builders program received requests for materials from four states and the United Kingdom.

· Over the past twelve years (1998-2010) Bone Builders staff and volunteers have taught 2,192 classes to 45,000 participants and reached 131,375 people at 687 health fairs. More than 680 volunteers have completed a 2-day workshop taught face-to-face or by live videoconference, simultaneously in Phoenix and Tucson over the past 12 years. The Bone Builders program and its Arizona Cooperative Extension team members were recognized with the 2010 Western Extension Directors Association Award of Excellence in 2010.

**Issue**

The SNAP-Ed program is a federal/state partnership supporting nutrition education for people eligible for the Supplemental Nutrition Assistance Program (SNAP--formerly known as Food Stamp Nutrition Education). In Arizona, the USDA-funded program is associated with the Arizona Nutrition Network, which partners with the University of Arizona Cooperative Extension. The program's mission is to shape food consumption in a positive way, to promote health, and to reduce disease among all people living in Arizona. Nutrition messages have been integrated into food safety, obesity and disease prevention, physical activity, and gardening activities.The number of people receiving food stamp benefits increased by 41.5 percent (121,219 people), from October 2008 to October 2009.

**What has been done**

Arizona Cooperative Extension faculty, in partnership with local social service agencies, county health departments and other community organizations in the Arizona Nutrition Network taught a variety of programs to food stamp-eligible families throughout the state. During 2010 all low income people eligible for food stamps were targeted for nutrition education. The theme for the year was "Champions for Change"-healthy eating, eating more fruits and vegetables, using 1% or less fat milk, and increasing daily physical activity.The SNAP-ed program was implemented in eight Arizona counties using matching funds from county faculty and staff, in schools with more than 50 percent free and reduced lunches; with parks and recreation and YMCA partner staff operating in low income areas; and with senior centers and food banks. Nutrition education delivery sites included 3 community centers, 2 emergency food assistance sites, 3 shelters, 1 SNAP office, 2 public housing, 1 Head Start, 4 Parks and Recreation and 185 public schools. Local staff and volunteers distributed educational materials through classes, workshops, health fairs, after school programs, parents' groups, community and wellness centers, food banks and other venues.

**Impact**

In 2010, Arizona Cooperative Extension faculty, staff and volunteers made the following numbers of direct education contacts with SNAP-Ed participants, by age: 5 years and under--13; 5-17 years (grades K-12)--97,948; 18-59 years--675; and ages 60 and older--288, for a grand total of 98,924 for all ages combined. Thousands of educational brochures on various topics were distributed. For instance, food safety publications were distributed to 171,101 people in the SNAP-ed program and at various health fairs.

**2. Brief description of the target audience**

General public, educators, health professionals, extension educators

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 25000 | 25000 | 600 | 20000 |
| **Actual** | 22000 | 26000 | 500 | 21000 |

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

**Patent Applications Submitted**

Year: 2010
Plan: 1
Actual: 2

**Patents listed**
Small Molecule Inhibitors of the Pleckstrin Homology Domain and Methods for Using Same
Identification of a Novel Chemical Scaffold Targeting the PH Domain of ECT2

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

**Number of Peer Reviewed Publications**

| 2010 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 9 | 27 | |
| **Actual** | 9 | 27 | 36 |

**V(F). State Defined Outputs**

**Output Target**

## Output #1

### Output Measure

- Effectiveness of the research program will be based on publications, external grant support, and integration into existing extension programs

| Year | Target | Actual |
|---|---|---|
| 2010 | 1 | 1 |

**V(G). State Defined Outcomes**

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Create awareness and increase knowledge |
| 2 | Number of individuals adopting recommendations for nutrition and health |

## Outcome #1

### 1. Outcome Measures

Create awareness and increase knowledge

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2010 | 2000 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Awareness by clientele

**What has been done**
Over 100,000 individuals participated in the SNAP-Ed and EFNEP programs conducted by the University of Arizona

**Results**
80+ percent of all participants indicated changed behavior after participation in these programs. There were changes in food purchasing patterns and adoption of healthier eating habits.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 702 | Requirements and Function of Nutrients and Other Food Components |
| 703 | Nutrition Education and Behavior |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins |

**Outcome #2**

**1. Outcome Measures**

Number of individuals adopting recommendations for nutrition and health

Not Reporting on this Outcome Measure

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

**Brief Explanation**

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

**1. Evaluation Studies Planned**

- After Only (post program)

**Evaluation Results**

**Key Items of Evaluation**