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Project Title: **The Rural Worksite Weight Management Project**

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National Institute for Occupational Safety and Health

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Report Date: 12/19/2012

## **Abstract**

This project proposed to test the effectiveness of an evidence-based weight management intervention adapted for use in the rural work site setting. "Aim for Healthy Weight" (AFHW) was originally developed and tested upon individual patients being seen in the setting of their primary care practitioners office. The first aim of this project was the modification of the AFHW materials and strategy for implementation in a workplace setting. The basic guide was rewritten and substantially expanded with a number of charts tools, references and supplemental materials. The second aim was the pilot testing of the revised AFHW in rural workplaces. Potential employers were stratified by type, size and known policies regarding onsite nutrition and physical exercise and then randomly assigned to intervention or control. Data were collected at baseline, 6 months, 12 months and 18 months. Additional weight and exercise data were collected from intervention participants at each of their biweekly visits. Follow up visits were monthly in months 7-12 and bimonthly in months 13-18. 274 subjects and 154 controls were recruited from eight intervention and eight control sites (schools, nursing homes and small manufacturing). At six months 178 subjects and 87 controls remained active with weight losses of 6.52 lbs and 0.6lbs respectively ( $p=0.0066$ ). At 12 months there remained 83 intervention subjects and 59 controls with losses of 10.5 lbs and 4.9 lbs respectively ( $p=0.0034$ ). The weight loss in those remaining active in the intervention group was significantly greater than controls and clinically meaningful. Substantial program attrition was evident throughout. AFHW can be adapted and effectively presented to workers in small rural employment sites.

## Section I

### Significant (Key) Findings.

#### **Aim 1: Modify the National Heart, Blood and Lung Institute's (NHLBI) "Aim for Healthy Weight"(AFHW) program for use in a work setting with employees at small rural worksites.**

The initial six months of this project focused upon adapting the structure and materials developed for the AFHW. This program was designed to provide individual counseling on weight control in the setting of the primary care practitioner's office. Subsequent follow up visits would build upon the education and counseling of previous sessions. In adapting this for rural worksites, we maintained the concept of serial brief check-in individual visits gradually building a knowledge base in healthy nutrition and exercise.

Beginning with AFHW materials, we developed an enhanced *Self-Help Guide* that included additional tools developed for the intervention such as a personal weight record, monthly weight management graphs, weekly food and activity diaries, calorie counting, and diet/behavior/physical activity goals. It also included suggested websites to help with goal setting for participants who preferred electronic tracking; and, to encourage participants to get together as a supportive group within the worksite, the guide included ideas about what a worksite group could do. We developed a schedule of topics to be covered in each of the two-weekly 10 minute check-in visits and materials that supported each of these topics.

#### **Aim 2: Undertake a controlled trial of AFHW in a group of small rural worksites.**

Based upon previous work with small rural employers, we had over 30 potential sites to consider for this pilot trial. Because HeartCheck questionnaires had been completed with each of these employers, a good deal was known about the health insurance, nutrition, vending, physical exercise and human resources policies of each of these employers. With a goal of eight intervention and eight matched control sites, we grouped employers into education, health care (mainly nursing homes) and manufacturing. Within these categories potential sites were paired based upon similarities in size and HeartCheck scores for nutrition and physical exercise. Once paired, the sites were randomly selected for intervention or control. Employers at each site provided a private space that could be used for the periodic visits by project staff. Employers helped publicize and endorse participation in the program with the recognition that they would receive no information on the identities of participants or any details regarding the data gathered on each. Subjects signed informed consent and underwent a baseline evaluation that involved both questionnaires and physical measures. Subjects' readiness for change was assessed along with current nutrition and exercise behaviors. Physical measures included height, weight, hip-waist measures and percent body fat (measured by electrical impedance).

Baseline measures were repeated at six months, 12 months and in the final visit at 18 months. Subsequent visits occurred every 2 weeks for the initial six months (weight loss phase), every month for next six months (weight maintenance phase) and once again at the end of 18 months (long-term maintenance phase). Visits lasted approximately 10 minutes. During this we: assessed subjects current level of enthusiasm / discouragement; weighed the subject; recorded pedometer totals; provided brief additional teaching and materials related to nutrition or exercise or related weight management strategies. Data from baseline and all subsequent interactions were recorded in an Access database.

### Translation of Findings.

The project described above is largely ready for implementation in rural work sites. It can be offered in any of a variety of work sites, if the employer is at least somewhat supportive. It resulted in significant weight loss that appeared to be sustained (and increasing) at 12 months. The extent of the weight loss documented is sufficient to have impact on risk for diabetes and likely upon risk for cardiovascular disease.

However, this occurred in the minority of the initial participants, as attrition from the program was over 30% with each successive six-month period. Clearly much remains to be learned regarding: 1) the determinants of attrition; 2) how proper identification of optimal candidates might enhance the overall efficiency of the program; 3) what motivation efforts might enhance continued participation; 4) how the program is best presented to those employees most in need of it.

### Outcomes/ Impact.

Of the 274 intervention subjects and 154 control subjects initially enrolled, there were 178 and 87 active at six months with weight losses of 6.52 lbs and 0.6lbs respectively ( $p=0.0066$ ). At 12 months there remained 83 intervention subjects and 59 controls with losses of 10.5 lbs and 4.9 lbs respectively ( $p=0.0034$ ). Substantial program attrition was evident throughout. The extent of the weight loss documented is sufficient to have impact on risk for diabetes and likely upon risk for cardiovascular disease.

These end outcomes, if sustained, will have substantial impact upon employer health expenditures and upon the financial costs of "presenteeism" – the participation in the workplace of workers functioning at sub-optimal status. With the current program design, this can be achieved in a minority of interested employees with relatively modest investments of time and program costs by the employer.

## **Section II. Scientific report**

TITLE: Effectiveness of a Weight Management Intervention in Rural Worksites in Upstate New York

### INTRODUCTION

The high prevalence of overweight and obesity in the United States has been documented in representative samples of the adult population, and examination of trends between 1999-2000 and 2009-2010 indicates a continued increase in mean and median BMI during this period (1, 2). Reports of geographic variation in the frequency of adult obesity have consistently found higher prevalence in rural populations compared to suburban and urban populations (3, 4), and this pattern has been confirmed in recent data from the National Health Interview Survey (1) and the Behavioral Risk Factor Surveillance System (5). These findings underscore the importance of developing effective interventions for weight loss in rural settings.

Work sites have generally been recognized as a positive setting for community-based interventions to promote healthy behaviors. Factors which favor intervention at the work site include the substantial proportion of adults who are employed and spend multiple hours at work, opportunities to modify workplace policies and environment to influence employees' health-related behaviors and the potential benefit of peer support among co-workers participating in the intervention (6). Successful work site interventions may result in increased employee satisfaction and productivity as well as decreased health care costs.

Rural work sites may present specific difficulties for implementation of wellness programs due to the smaller average size of the workforce and reduced availability of financial and human resources for developing and providing programs (7, 8). A qualitative study of rural workers emphasized the challenge of limited resources: if cafeterias, vending machines, facilities for physical activity and on-site wellness programs do not exist at these work sites, they cannot be used to promote healthy eating and being more active. However, it was also noted that a greater sense of community may be present within the relatively smaller workforce of rural businesses, and that wellness programs may benefit from the more direct and personal expressions of support by managers and supervisors as well as the more pronounced supportive influences among participants in the programs. Based on these considerations, a weight management program that had been developed for use within primary care practices was modified for implementation in small rural work sites. The purpose of this study, which followed a Feasibility Pilot Study that had been conducted in 2004, was to conduct an initial evaluation of the impact of this program on weight loss and maintenance of weight loss.

### METHODS

#### *Enrollment of Work Sites and Employees*

Rural work sites were recruited to participate in the study during the first four months of 2010. A network of small rural work sites in a seven county region in central upstate New York had been established between 2004 and 2008 for the Rural Partners Healthy Heart Program, which was designed to promote employee wellness through changes in health-related

employer policies and resources at the work site. Letters providing background information and a project description were sent to 33 Rural Partners work sites selected on the basis of their preliminary statement of interest in the study, business type, number of employees, proximity to the location of project staff and geographic distance from each other. After follow up phone calls and work site visits, a total of 16 work sites (in 22 locations) agreed to be in the study. For each participating work site, the policies and resources related to promotion of physical activity and healthy diet had been assessed using HeartCheck, an in-person survey designed to measure workplace environmental supports for heart health (9). The 16 work sites were matched by type of industry and HeartCheck subscores for nutrition and physical activity; within each matched set, work sites were randomly assigned to intervention or control.

Eligibility for the study was principally determined by BMI, and any employee could be screened. Employees with a BMI  $\geq 25$  were eligible for the study, employees with a BMI ranging from 23.1 – 24.9 were eligible for limited weight loss (though their data were not considered in the analyses of the study), and employees with a BMI  $\leq 23$  were ineligible. Enrollment began with an initial information session covering facts about excess weight and a summary of the program. A total of 513 employees from the 16 work sites expressed interest in being in the study and were screened. From those who were screened, 428 (83.3%) met the BMI criterion for eligibility and completed the consent form and baseline data collection for the study. This included 274 employees at intervention work sites and 154 employees at control work sites. The number of participants at a worksite ranged from 11 to 58. Intervention activities began in May of 2010.

In anticipation of attrition challenges, pro-active retention measures included motivational interviewing techniques utilized during intervention check-in visits and gift raffle incentives for those continuing in both cohorts. As an added incentive to use the pedometer and reporting of steps, a 'Walk across America' (destination: Las Vegas) was mapped for participants at each intervention worksite. As well, the study design offered a limited, 6 month intervention with health screening component for control 'completers' after 12-months as an added incentive for participating in the baseline, 6- and 12-month control assessments.

### The Weight Management Program

#### *Intervention sites*

Participants at the intervention worksites received a *Self-Help Guide* at screening/enrollment that was an enhanced modification of the Aim for a Healthy Weight (AFHW) program. The guide differed from the self-help packet utilized for a prior 2004 Feasibility Pilot Study in that it included additional tools developed for the intervention such as a personal weight record, monthly weight management graphs, weekly food and activity diaries, calorie counting, and diet/behavior/physical activity goals. It also included suggested websites to help with goal setting for participants who preferred electronic tracking; and, to encourage participants to get together as a supportive group within the worksite, the guide included ideas about what a worksite group could do. At the screening/enrollment visit, participants also received a) a log to note check-in visit dates, b) an Accusplit AE120XL-xBX pedometer plus information on how to use it, and c) *FYI Issue #1: Calorie Counting* which included NIH information about estimating portion sizes.

Subsequent to screening/enrollment, employees at each of the intervention sites were encouraged to visit with program staff every two weeks over the initial six months (“weight loss phase”) of the program. Visits were typically ten minutes in length and consisted of a brief questionnaire on the subject’s current view of progress and level of enthusiasm for continued participation followed by a weigh-in and documentation of pedometer mileage. Motivational interviewing was utilized when a participant’s enthusiasm level appeared to be trending low; and brief discussions concerning aspects of healthy nutrition, exercise or other healthy behaviors occurred when requested. This pattern continued into the second six month period (“weight maintenance phase”) when participants met with program staff on a monthly basis for the same type of visits as described above. Participants were encouraged to continue participation through the long-term maintenance phase (months 12-18) and check-in every other month for a total of 3 weigh-in visits. Additional self-help materials were provided at some of the check-in visit that took place at the worksite subsequent to the screening / enrollment.

Raffle incentive gift card prizes for participants at the intervention worksites continued throughout the maintenance phase, increasing in value according to the number of weeks the program had been running. Prizes were awarded when all intervention worksite/locations had reached 32 weeks (Maintenance Check 2), 40 weeks (Maintenance Check 4), and 48 weeks (Maintenance Check 6). Once in the long-term maintenance phase, raffle incentive prizes continued were awarded at 56 weeks (LTM1), 64 weeks (LTM2), and 72 weeks (LTM3) which marked the end of the program

### Control sites

At the time of enrollment into the study, participants at control work sites received information packets with recommendations related to nutrition and physical activity. At six months, participants were entered in a gift card incentive raffle across all control worksite/locations as an incentive to participate in follow-up data collection.

At twelve months, active control participants were offered a limited, 6-month version of the worksite weight management program that included a health screening component. The limited intervention differed from the study intervention in that it did not include check-in visits. For this reason, the health screening was added as an incentive for control participants to continue with the study. Health screening had not been offered to intervention participants. Eligible control participants received all materials developed for the study intervention and two complimentary health screenings—an initial screening and a follow-up screening at the end of the limited intervention. The following tests were conducted during the health screening: total and HDL cholesterol, blood sugar, BMI, waist-to-hip ratio, resting blood pressure, tobacco use (carbon monoxide breath test). Individual test results included an overall wellness score, health risk factors and health improvement opportunities. Site-specific raffles were also conducted at this check-in visit.

At 18 months, a final \$100.00 gift card raffle incentive prize toward a gym membership or a sporting goods store purchase will be drawn for active control participants across all worksite/locations. At the time of this report, not all control worksite/locations have completed the 18-month mark and data is still outstanding.

### Data Collection

At both intervention and control work sites, data collection at baseline and at six and twelve months after baseline (i.e. at the end of the weight loss and weight maintenance phases of the study) included the following physical measurements: height, weight, waist circumference and percent body fat as measured by bioelectric impedance. For participants at intervention worksites who did not attend the six or twelve month follow-up data collection, a weight measurement at an intervention session within two months of those dates was used for calculating weight change from baseline. These values served as the six month weight for 26 study participants and the twelve month weight for 12 study participants.

A brief survey was also completed at baseline with questions about the respondent's general health status, reasons for seeking a healthier weight, specific plans for achieving a healthier weight, readiness to improve eating habits and physical activity and sense of self-efficacy for attaining a healthier weight. At six and twelve months after baseline another brief survey was administered to monitor progress in self-efficacy and readiness for changing weight-related behaviors as well as the degree to which strategies identified at baseline were being used.

### Data Analysis

The primary outcome, change in weight, was evaluated after six months (the end of the intervention's weight loss phase) and twelve months (the end of the intervention's weight maintenance phase). For the analysis of change at six months, the weights of participants from the intervention and control work sites across the two points in time were compared using a 2 by 2 mixed analysis of variance (ANOVA) with adjustment for clustering by work site. The analysis of the weight maintenance phase employed a 2 by 3 mixed ANOVA to accommodate measurement of weight at the third time point, twelve months. For the tests of group (intervention versus control) differences in the slope for weight over time, p values of 0.05 and less were considered statistically significant.

## RESULTS

Table 1: Baseline Characteristics of Employees in Intervention and Control Groups – Rural Worksite Weight Management Program

	<b>Intervention</b>	<b>Control</b>
N	274	154
% Female	83.9%	82.5%
Age	47.2 $\pm$ 10.1	49.2 $\pm$ 11.1
Weight	198.9 $\pm$ 42.8	201.1 $\pm$ 45.1
BMI	33.0 $\pm$ 6.3	33.6 $\pm$ 6.6
% BMI $\geq$ 30	60.6%	61.7%
% Hypertension	23.7%	33.8%
% Diabetes	5.5%	10.4%

Descriptive characteristics of employees from the intervention and control work sites are shown in Table 1. In both groups over 80% of employees were women with similar mean ages. Due to eligibility criteria, all study participants had a BMI of 25 or greater at baseline; within this range of overweight and obesity, the employees in the control group had a higher initial weight and were more likely to have a BMI at baseline of 30 or more. Prevalence of self-reported diabetes, hypertension and hypercholesterolemia were also somewhat higher in the control group at baseline compared to the intervention group.

Figure 1 shows the results for the weight loss phase of the study. For individuals with follow-up measurement of weight after this phase (178 employees receiving the intervention, 87 employees at control work sites), there was less than one pound decline in the control group and a loss of 6.5 pounds in the intervention group. The test of the group by time interaction was statistically significant ( $p=0.007$ ).

Figure 1: Weight Change After Weight Loss Phase of the Rural Work Site Weight Management Program

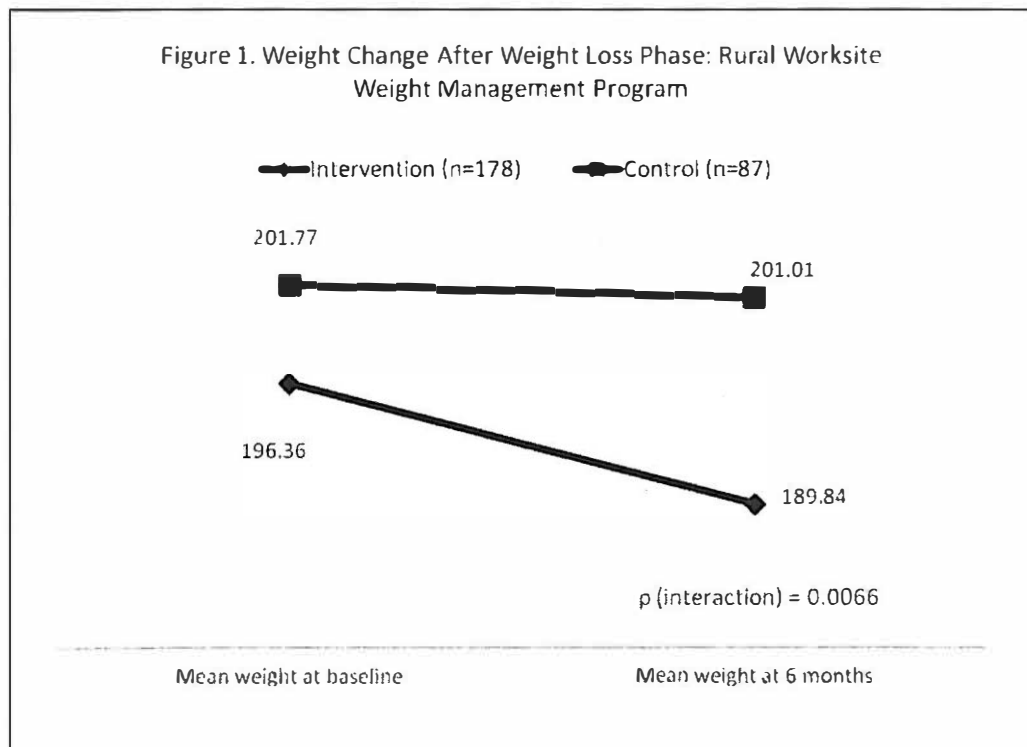
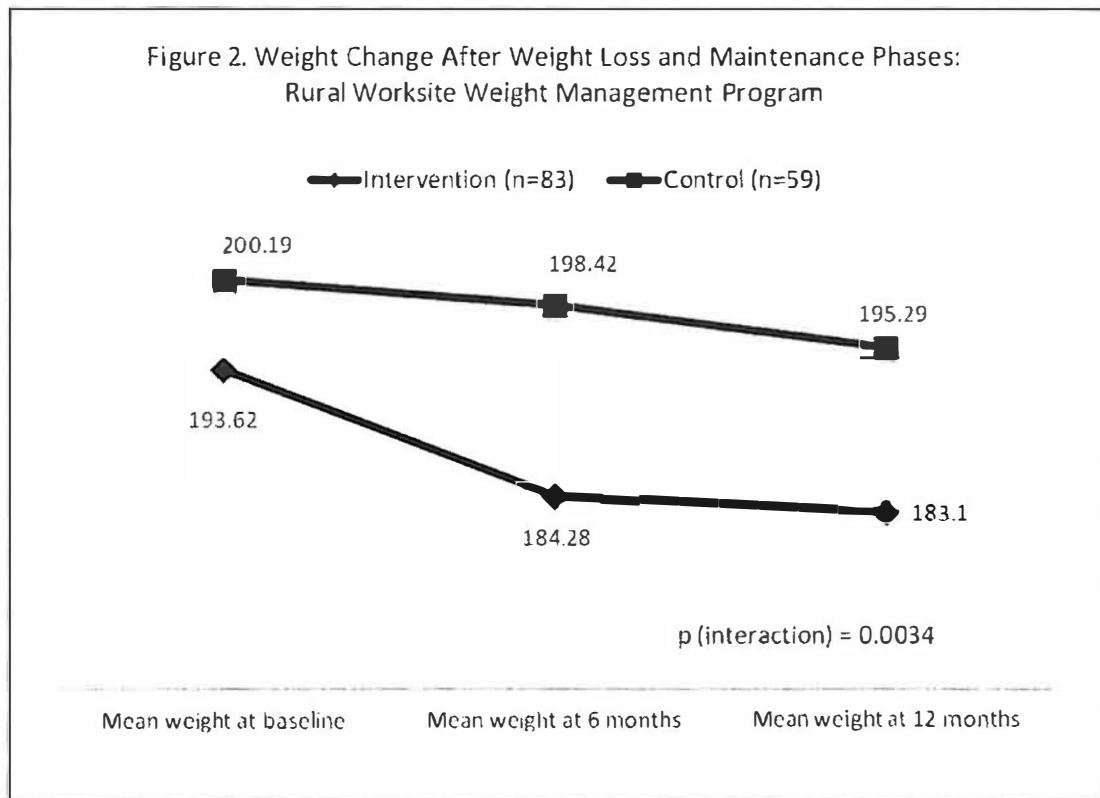


Figure 2 extended the analysis to include the weight maintenance as well as the weight loss phase of the study. This analysis was limited to employees with weight measured after both the weight loss and weight maintenance phases (83 intervention employees, 59 control employees). In these groups the weight loss at the intervention sites again exceeded the weight loss at the control sites, and the difference in weight change associated with the intervention persisted during the weight maintenance phase of the study ( $p=0.003$ ).

Figure 2: Weight Change After Weight Loss and Weight Maintenance Phases of the Rural Work Site Weight Management Program



## DISCUSSION

Preliminary analyses of the data from this intervention suggests that participation at an intervention worksite was associated with greater and more sustained weight reduction among subjects than among employees at control work sites who simply received nutrition and exercise pamphlets. All worksites involved had participated to a greater or lesser degree in a previous “Healthy Heart” worksite wellness program that had ended approximately two years before enrollment for this activity began. From this pool of rural worksites, pairs of employers were selected based upon similarity and then randomly assigned to either intervention or control. Efforts to match control and intervention worksites included segregation of intervention and control sites into educational vs. health care vs. manufacturing. These are typically the major employers in rural areas. Additionally these sites had all been scored using the Heartcheck instrument which scores the physical and food environments of the workplace, administrative, smoking and exercise policies, support or non-support of wellness efforts by insurers, etc. (9). Control / intervention employer pairs were selected from the large pool of potential participating worksites partly upon their scores for nutrition and physical exercise.

Despite the randomization efforts, Table 1 demonstrates some potentially meaningful baseline differences between the intervention and control groups. While both age and baseline weights are higher in the control group, these differences are quite small. More notable is the prevalence of weight-related health problems such as hypertension and diabetes, which are both higher in the control group.

As demonstrated in Figures 1 and 2, there was greater loss of weight in the intervention group and this persisted through the six month maintenance phase of the study (months 6-12). These figures also demonstrate the remarkable attrition experienced in both the intervention and control groups over this 12 month period. At six months, 96 (35%) of the intervention subjects and 87 (44%) of control subjects had dropped out of the study. Attrition was substantially greater at 12 months, with 191 (70%) of intervention subject no longer participating and 95 (62%) of control subjects lost.

These very high rates of attrition imply the likelihood of substantial biases being reflected in our Figure 1 & 2 results. Considerable further analyses of this attrition phenomenon are underway and will be reported subsequently. Although "attrition" includes dropouts, it also includes pregnancy, left employment and others who were excluded from further data analyses. On early assessment, it appears that the numbers other than drop-outs are relatively small.

## CONCLUSIONS

At this point we conclude that: 1) it is possible to carry out AFHW-like weight management interventions in a variety of rural worksites – schools, nursing homes and small manufacturing plants; 2) our Aim for Healthy Weight – derived program was impacted by substantial attrition at six months and a similar increment that at 12 months; 3) those remaining in the intervention group experienced meaningful weight loss in the initial six months and were able to sustain this over the subsequent six months of time with less intensive participation in the program. Further data on both long term (18 mos) weight loss and on the phenomenon of attrition will be forthcoming.

## REFERENCES

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### III. Enrollment Table

## Inclusion Enrollment Report

This report format should NOT be used for data collection from study participants.

Study Title: The Rural Worksite Weight Management Project  
 Total Enrollment: 513 Protocol Number: \_\_\_\_\_  
 Grant Number: 5R21OH009507

<b>PART A. TOTAL ENROLLMENT REPORT: Number of Subjects Enrolled to Date (Cumulative) by Ethnicity and Race</b>				
Ethnic Category	Females	Males	Sex/Gender Unknown or Not Reported	Total
Hispanic or Latino	5	0	0	5 **
Not Hispanic or Latino	417	71	0	488
Unknown (individuals not reporting ethnicity)	17	3	0	20
<b>Ethnic Category: Total of All Subjects*</b>	439	74	0	513 *
<b>Racial Categories</b>				
American Indian/Alaska Native	0	1	0	1
Asian	3	0	0	3
Native Hawaiian or Other Pacific Islander	0	0	0	0
Black or African American	1	0	0	1
White	412	67	0	479
More Than One Race	5	2	0	7
Unknown or Not Reported	18	4	0	22
<b>Racial Categories: Total of All Subjects*</b>	439	74	0	513 *
<b>PART B. HISPANIC ENROLLMENT REPORT: Number of Hispanics or Latinos Enrolled to Date (Cumulative)</b>				
Racial Categories	Females	Males	Sex/Gender Unknown or Not Reported	Total
American Indian or Alaska Native	0	0	0	0
Asian	0	0	0	0
Native Hawaiian or Other Pacific Islander	0	0	0	0
Black or African American	0	0	0	0
White	2	0	0	2
More Than One Race	1	0	0	1
Unknown or Not Reported	2	0	0	2
<b>Racial Categories: Total of Hispanics or Latinos**</b>	5	0	0	5 **

\* These totals must agree.

\*\* These totals must agree.



**CDC Procurement & Grants Office - Branch V  
Equipment Inventory Listing**

Report Date:	12/19/2012	Grant Number:	5R21OH009507
Project Title:	Rural Worksite Weight Management Project	Project Period:	9/01/2009 - 8/31/2012
Grantee Name:	John May, MD	Project Officer:	Bernadine Kuchinski, PhD
Grants Management Officer:	Peter Grandillo	Grants Specialist:	Maryann P. Monroe

Description of Item: i.e. pH Meter	Mfr. <sup>1</sup> i.e. Fischer	Serial Number	Quantity	Condition <sup>2</sup>	Location <sup>3</sup>	Purchase Cost	Date Received [mm/dd/yyyy]
none							

<sup>1</sup>Mfr. (Manufacturer)

<sup>2</sup>Condition: (Excellent) (Good) (Fair) (Poor) (Inoperable)

<sup>3</sup>Location: complete physical address

For Government Use Only, not to be completed by the Grantee Property Administrator & PO Disposition Recommendation and Instructions:		
Description of Item	Disposition <sup>1</sup>	Address <sup>2</sup>
[Copy from above]	<input type="checkbox"/> Transfer Title <input type="checkbox"/> Retain and Compensate Awarding Agency <input type="checkbox"/> Return to Program Office <input type="checkbox"/> Other (explain)	Attn: [Project Officer] CDC / NIOSH 1600 Clifton Road, NE MS E-74 Atlanta, GA 30329-4018
[Copy from above]	<input type="checkbox"/> Transfer Title <input type="checkbox"/> Retain and Compensate Awarding Agency <input type="checkbox"/> Return to Program Office <input type="checkbox"/> Other (explain)	

<sup>1</sup>Check the appropriate disposition

<sup>2</sup>CDC Warehouse is the central receiving point for delivery of all non-hazardous and non-perishable supplies and equipment, CDC -AM-2004-03, update 2010