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# Statewide Implementation of the 1% or Less Campaign

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The 1% or Less Campaign is an effective research-tested program for reducing saturated fat intake by encouraging individuals to switch to low-fat milk. All published studies have been conducted in small communities with mostly White populations. The 6-week intervention included a media campaign, public relations, and taste tests. Campaign effectiveness was measured using sales data and cross-sectional telephone surveys. Survey results showed a significant increase in low-fat milk consumption from 30.2% to 40.8% of milk drinkers ( $p < .001$ ) with a reduced yet sustained increase at 3 months. This translates to approximately 65,000 people switching to low-fat milk during the campaign with a sustained effect of approximately 32,000 people three months postcampaign. Sales data show an increase of low-fat milk sales from 32.7% to 39.9%. Results are similar to smaller community initiatives, indicating the program is effective in promoting population behavior change but may need booster sessions for sustained effects.

**Keywords:** *nutrition; mass media; behavior change*

The 2005 Dietary Guidelines for Americans recommend three servings of low-fat milk a day for all adults (U.S. Department of Agriculture [USDA], 2005). Although the guidelines recommend low-fat milk, more than 70% of milk consumption is high-fat (USDA, 2004). This makes milk the third leading source of saturated fat in the American diet behind cheese and beef (USDA, 2005). Diets rich in saturated fat are

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linked to high blood cholesterol, obesity, and heart disease and contribute to thousands of deaths each year (Centers for Disease Control and Prevention [CDC], 2004). Public health programs aimed at reducing saturated fat consumption have the potential to influence the incidence of heart disease in the United States. Switching from high-fat milk (2% or whole) to low-fat milk (1% or skim) is one simple effective way to reduce the consumption of saturated fat (Reger, Wootan, Booth-Butterfield, & Smith, 1998). If an individual drinking the recommended three cups of milk a day switched from whole milk to 1% milk, they would reduce their saturated fat intake by 3,311 grams and their calories by almost 47,000 a year.

The 1% or Less campaign is a research-tested program, which has shown significant increases in low-fat milk consumption in small communities (Reger et al., 1998; Reger, Wootan, & Booth-Butterfield, 1999). Based on the theory of reasoned action (TRA), the 1% or Less campaign uses mass media and community events to influence attitudes and intentions to drink low-fat milk (Booth-Butterfield & Reger, 2004). Earlier campaigns demonstrated significant changes in attitude and intention but not in subjective norms. Change in behavior was mediated by attitudes and intention (Booth-Butterfield & Reger, 2004). The campaign is targeted to current high-fat milk drinkers over the age of 2 encouraging them to switch to low-fat milk. Although the campaign has been successful in promoting low-fat milk consumption, it has been tested in small communities (population < 35,000) with mostly White populations.

The research question in this study was to assess if this program could be successfully implemented at a statewide level in a multiethnic community.

The population of the state of Hawaii is approximately 75% ethnic minority (U.S. Census Bureau, 2001). Five ethnic groups represent more than 80% of the state's population: Japanese, Native Hawaiians, Filipinos, Whites, and Chinese. Prior research studies have shown that individuals of Asian ancestry have a higher prevalence of lactose intolerance than White individuals (Miller, Jarvis, & McBean, 1997). To assess the feasibility of this study, a question was added to an ongoing surveillance system to assess frequency and type of milk consumption in the adult population. Results showed that two thirds of Hawaii adults consumed cow's milk in the last year, and two thirds of milk drinkers drank high-fat milk (Maddock, Marshall, Nigg & Barnett, 2003). Only individuals of Chinese descent were less likely to consume milk (50%). These results indicated a need for this campaign. Therefore, the original 1% or Less campaign was reviewed and modified for implementation at a statewide level in a multiethnic community.

## METHOD

### Intervention

A multicomponent campaign was created and included paid radio and TV advertising, a press conference, taste tests, promotional "shelf-talkers," a Web site, and posters displayed throughout the state. To advise the campaign and increase community buy-in, a 1% or Less commission was created with local physicians, health educators, nutritionists, and representatives from the Department of Health and the Department of Education. The campaign was 6 weeks long and ran from June 15, 2004 to July 27, 2004.

### *Paid Advertisements*

Since the original commercials were developed in West Virginia, the 1% or Less Commission and the local media agency recommended creating culturally sensitive commercials using both surface and deep structure (Resnicow, Braithwaite, Ahluwalia, & Baranowski, 1999). Surface structure tailoring was achieved by using local actors, accents, and humor. Deep structure was achieved by changing the focus of the commercials. In the original spots, a woman uses individual responsibility to switch from high to low-fat milk in the supermarket. The Hawaii commercials were based on the traditional Native Hawaiian values of interdependence and *'ohana* (family) and used children to convey the message (McLaughlin & Braun, 1998). These commercials contained the same factual information on the amount of saturated fat in high-fat milk, that most people like the taste, and that the switch was easy to do using a light-hearted approach with the children as health "experts."

Two 30-second and two 60-second radio advertisements were created by a local advertising agency. The ads targeted children and families and encouraged current milk drinkers to switch from high-fat milk to low-fat milk to reduce their saturated fat consumption. A total of \$100,000 was spent on television advertisements and \$40,000 for radio. The television advertisements aired a total of 505 times on four statewide television stations, and the radio commercials aired a total of 1,936 times on 12 radio stations over a 6-week period.

Additional advertisements included 585 promotional "shelf talkers" that said "1% or Less Is Best" in supermarket dairy cases throughout the state of Hawaii. Posters that encouraged switching from high-fat milk to low-fat milk were placed on all Oahu buses for 30 days during the campaign. An additional 150 posters were distributed to local Department of Motor Vehicles, work sites, hospitals, and physicians' offices. A Web page was created on the state's health promotion site that contained background information on the campaign, campaign activities, tips to switching to low-fat milk, and links to successful milk campaigns conducted in other states.

### *Public Relations Activities*

The state of Hawaii governor's office hosted a press conference to kick off the 1% or Less Campaign. At this event, the governor and state health director encouraged Hawaii residents to switch from high-fat milk to low-fat milk. The children in the television advertisements also participated in a milk taste test at the press conference. This event generated news coverage in the state newspaper, on television news broadcasts, and in the governor's newsletter by distributing press kits with campaign activities, Web site, and milk facts to the local press who were invited to the event.

Additional free media exposure included two articles in the statewide newspapers, an article in a statewide magazine by the state's largest health insurer, and an article in the state Department of Health newsletter.

### *Taste Tests*

Trained volunteers on Oahu conducted blind milk taste tests in supermarkets and at community events. Participants wore dark glasses and tasted 1oz of four types of milk

(whole, 2%, 1%, and skim) in random order. Participants were then asked what type of milk they thought they were trying and if they liked it. Upon completion of the taste tests, health education volunteers discussed the health benefits of low-fat milk and encouraged high-fat milk drinkers to switch to low-fat milk. Participants also received a brochure containing facts about milk, a cow pen, and a \$0.75 coupon off one half gallon of low-fat milk.

### *School Milk Sales*

The Hawaii School Food Services manager was invited to join the 1% or Less Milk Commission. While participating on the commission, he felt strongly that the school environment should support the message of 1% or Less. Prior to the campaign, public schools in Hawaii offered whole milk, 2% milk, and 1% chocolate and skim milk. At the start of the campaign, a meeting was held between the two local dairies, the school food services manager, and the 1% or Less team. In September 2004, schools stopped offering 2% milk and replaced it with 1% white milk. This accounted for approximately 10% of school milk sales or 15,000 pints of milk per school day.

### **Evaluation**

The effects of the campaign were measured through three cross-sectional surveys, milk sales data, and data collection during the taste tests.

### *Cross-Sectional Surveys*

Three cross-sectional surveys were administered to Hawaii's noninstitutionalized adult population, using random digit dialing procedures (Waksberg, 1978). Surveys were conducted over a 2-week period at baseline, immediately following the campaign and 3 months postcampaign. The targeted sample size for each survey was 600 and had a confidence interval of  $\pm 4.0\%$  (assuming 50% prevalence) for the state population. The person in the household older than 18 with the most recent birthday was interviewed to provide randomization within each household. The survey took approximately 30 minutes to complete. Experienced interviewers were trained on the study prior to survey administration, instructed on interviewing techniques regarding probing and refusals, and supervised during live telephone calls. The computer-aided telephone interview (CATI) system, designed specifically for the survey, controlled for out-of-range responses, consistency of responses, and appropriate application of skip patterns. Phone numbers were attempted up to seven times to get a response. Participation rate was greater than 65% for all three waves.

### *Survey Measures*

The questionnaire and all procedures were approved by the University of Hawaii's Committee on Human Studies. Informed consent was obtained over the phone. Only adult participants who reported consuming cow's milk were included in the study.

Participants were asked about the household milk-purchasing and -drinking habits, and respondent's milk-drinking habits (Reger et al., 1998). Type of milk consumed was

recoded into high- and low-fat milk for several analyses. High-fat milk consisted of whole, 2%, and mixed types of high-fat milk (consumed both whole and 2%). Low-fat milk consisted of 1%, skim, and mixed types low-fat milk (consumed both skim and 1%). Participants who consumed both high- and low-fat types of milk (3.0% at baseline) were not included in these analyses.

Attitude, social norms, and intention from the TRA were also measured. Attitude was measured by four items assessing overall healthiness, health for children, vitamin and mineral content, and taste on a 5-point Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*) ( $\alpha = .64$ ). Social norms were measured with three items assessing the perceptions of friends and family, the community, and the participant's physician on a 5-point Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*) ( $\alpha = .54$ ). Intention was measured using a stage-for-change instrument. Participants classified themselves into one of five categories: precontemplation, "I do not primarily drink reduced fat milk and do not intend to in the next 6 months"; contemplation, "I do not primarily drink reduced fat milk, but I intend to start in the next 6 months"; preparation, "I do not primarily drink reduced fat milk but I intend to start in the next 30 days"; action, "I have been primarily drinking reduced fat milk for less than 6 months"; and maintenance, "I have been primarily drinking reduced fat milk for more than 6 months."

The surveys included additional questions that evaluated a respondent's exposure to, and impression of, the campaign activities including campaign advertising, taste tests, and overall opinions of the campaign.

Demographic variables included age, sex, marital status, ethnic identification, perceived health, income level, education attained, height, weight, and zip code.

### *Milk Sales*

Milk sales data were collected directly from the largest milk distributor in Hawaii for the months of March through October. The months of April and May were used as baseline, and September and October were assessed at follow-up. These months were used because schools were in session and make up a significant portion of milk sales. Only overall percentages of types of milk by county were available from the distributor because of concerns about releasing sales data to competitors.

### *Taste Tests*

At each of the taste tests, data were collected on the percentage of correct guesses for each type of milk and the percentage of people that liked each type of milk.

### *Analyses*

All data were analyzed using SPSS 13.0. Because the main outcomes were categorical, we assessed the difference in percentages using chi-square tests with odds ratios as the measure of effect size. Continuous variables were analyzed using *t* tests or one-way ANOVAs.

Table 1. Demographic Variables Across the Three Time Points (in percentages)

Variable	Pretest ( <i>n</i> = 600)	Posttest ( <i>n</i> = 603)	3-Month Follow-Up ( <i>n</i> = 602)	Significance Test
Ethnicity				$\chi^2(10) = 6.4, ns$
White	36.0	36.0	34.1	
Native Hawaiian	16.9	17.0	16.9	
Filipino	9.5	11.4	12.9	
Japanese	18.4	18.8	16.9	
Chinese	4.9	4.2	3.9	
Other	14.4	12.6	15.3	
Marital status				$\chi^2(10) = 12.45, ns$
% married	56.5	58.9	60.0	
Gender				$\chi^2(2) = 0.37, ns$
% female	49.3	50.2	48.5	
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	
Education (years)	13.1 (5.5)	14.2 (3.8)	14.7 (3.4)	$F(2, 1789) = 23.1, p < .01$
Income (10 categories)	5.7 (2.8)	5.8 (2.7)	6.0 (2.8)	$F(2, 1260) = 7.0, ns$
Age	45.6 (17.3)	47.0 (17.6)	46.7 (17.0)	$F(2, 1753) = 1.09, ns$
Body Mass Index	25.8 (6.7)	25.0 (6.0)	25.6 (4.8)	$F(2, 1698) = 2.97, ns$

## RESULTS

### Survey Results

#### *Demographics*

Demographic characteristics were assessed first. Approximately 64% of respondents at each wave were ethnic minorities. About half of the respondents were female, and more than half were married. No significant differences were seen across the surveys in gender, age, income, ethnic group, marital status, and body mass index. Education was the only variable that differed significantly with the two later surveys reporting slightly higher levels. The demographic characteristics of the samples are displayed in Table 1.

#### *Milk Consumption*

Next, the type of milk consumed was assessed. First, the overall percentage of high- and low-fat milk was assessed. Consumption of low-fat milk increased from 30.2% before the campaign to 40.8% immediately following the campaign,  $\chi^2(1) = 14.3, p < .001$ , odds ratio (OR) = 1.6. At the 3-month follow-up, a significant increase in the proportion drinking low-fat milk remained (35.9% vs. 30.2%),  $\chi^2(1) = 4.4, p < .05$ , OR = 1.3. When analyzing specific types of milk, the largest change came in a reduction of individuals consuming 2% milk from 45.2% prior to the campaign to 36.7% at the immediate posttest. Specific differences in type of milk are displayed in Table 2.

We then assessed changes in milk consumption by ethnic group. At baseline, Native Hawaiians (17.2%) and Filipinos (19.2%) reported lower consumption of low-fat milk

Table 2. Type of Milk Consumed by Time Point (in percentages)

Type of Milk	Baseline ( <i>n</i> = 600)	Posttest ( <i>n</i> = 601)	3-Month Follow-Up ( <i>n</i> = 600)
Whole	21.8	21.0	21.3
2%	45.2	36.7	40.7
1%	4.0	10.1	6.8
Skim	23.9	29.4	27.7
Mixed types high fat	0.7	0.5	1.0
Mixed types low fat	1.3	0.7	0.8
Mixed types high and low fat	3.0	1.7	1.7

$\chi^2(12) = 30.4, p < .01.$

Table 3. Ethnic Differences in Low-Fat Milk Consumption

Ethnic Group	% Low-Fat Milk Consumption				
	Baseline	Immediate Posttest	Baseline to Immediate Posttest $\chi^2(1) =$	3- Month Follow-Up	Baseline to 3-Month Follow-Up $\chi^2(1) =$
White	34.3	44.2	4.2, $p < .05$	43.0	3.2, $p = .07$
Native Hawaiian	17.2	38.0	10.8, $p < .001$	25.3	1.9, $p = .16$
Filipino	19.2	39.6	4.38, $p < .05$	19.4	.001, $p = .976$
Japanese	44.8	53.6	1.69, $p = .19$	49.0	.362, $p = .547$

than Whites (34.3%) or Japanese (44.8%),  $\chi^2(3) = 22.4, p < .01$ . Immediately after the campaign, no significant differences were seen in low-fat milk consumption between Native Hawaiians (38.0%), Filipinos (36.9%), Whites (44.2%), and Japanese (53.6%),  $\chi^2(3) = 6.9, p > .05$ . At the 3-month follow-up, Filipinos returned to the baseline rate (19.4%), whereas Native Hawaiians retained some of the change (25.3%). Prevalence of low-fat milk consumption in these four ethnic groups is presented in Table 3.

#### TRA Variables

Among the TRA variables, attitude significantly increased from baseline ( $M = 13.99, SD = 2.69$ ) to immediate posttest ( $M = 14.45, SD = 2.58, p < .01$ ). The positive increase in attitude was still present at the 3-month follow-up period ( $M = 14.42, SD = 2.55, p < .01$ ) compared to baseline. No differences were seen in social norms between baseline and either immediate posttest or the 3-month follow-up. A nonsignificant trend ( $p = .12$ ) was seen for stage of change across the three time points with the proportion of people in precontemplation decreasing from 46.0% at baseline to 41.6% at both follow-ups. Small decreases in proportions were seen for contemplation and preparation at both follow-ups with increases in action and maintenance.

### *Campaign Awareness*

Awareness of the campaign was also assessed. At the posttest, 37.8% of the respondents had heard of the campaign. At the 3-month follow-up, 27.6% remembered seeing or hearing the campaign. Among those people who were aware of the campaign, the majority saw the campaign on television (82.2%). Other channels where the campaign was remembered included radio (4.1%), newspaper (5.0%), and magazines (4.6%). The primary message of the campaign was correctly recalled unaided by 33.8% of the respondents. Overall, the campaign was very well liked, with 72.9% of those who recalled the campaign rating it as favorable and only 3.7% rating it as unfavorable. Of those exposed to the campaign, 20.5% reported changing the way they think about milk because of the campaign. Among those people drinking high-fat milk at the start of the campaign, 25.3% reported being motivated to switch to low-fat milk. No significant differences were seen in campaign awareness by ethnic group, age, gender, income, or education ( $p < .05$ ).

### *Estimating the Impact*

With a change in low-fat milk consumption, an estimate of the population impact can be made. In Hawaii, there were 915,770 adults in 2000 (U.S. Census Bureau, 2001). Of these, approximately 67% or 613,566 are milk drinkers (Maddock et al., 2003). Given a change of 10.6%, this would equal 65,038 individuals (confidence interval [CI]: 15,427-114,149) switching to low-fat milk over the course of the campaign. This was reduced to 32,519 at the 3-month follow-up.

### **Sales Data**

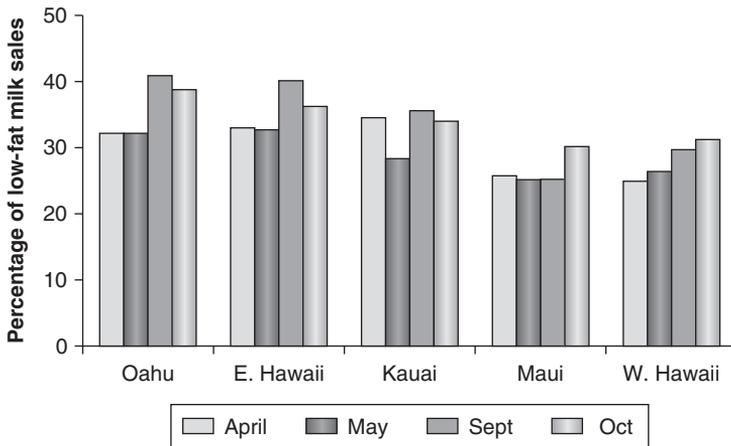
Low-fat milk sales on Oahu, the state's largest county (80% of the population) increased from 32.1% in April and May 2004 to 41.0% in September 2004 and 38.8% in October 2004. Neighbor islands saw positive but smaller changes in low-fat milk sales. Maui increased from 25.6% to 27.8%. Kauai increased from 31.5% to 34.9%. In East Hawaii, sales increased from 32.9% to 38.2% and in West Hawaii from 25.8% to 30.5%. Overall, the average increased from 32.7% in April and May to 39.9% in September and October. Figure 1 displays the results for all counties.

### **Taste Tests**

Taste tests were completed by 323 people across the island of Oahu. Most of the participants (65.2%) reported normally drinking high-fat milk. Overall, 61.5% of the milk types were guessed incorrectly. Seventy-two percent of the participants reported liking the taste of skim milk, and 92% said they like the taste of either 1% milk or skim milk. Among current high-fat milk drinkers, 87.1% pledged to switch to low-fat milk following the taste test.

## **DISCUSSION**

Based on the design of the study, results suggest but do not prove that the 1% or Less campaign was effective in increasing the percentage of people who drink low-fat milk



**Figure 1.** Low-fat milk sales: April 2004–October 2004.

in Hawaii. The results of this study are important for several reasons. First, the campaign appeared to work in a multiethnic population, with the largest immediate effects in Native Hawaiian and Filipino groups, which had behavioral disparities at baseline. Second, the campaign was implemented at a statewide level, possibly changing the consumption habits of 65,000 people. Although the switch from high- to low-fat milk is a relatively minor change, it can have a substantial impact on population health because of the magnitude of the number of people changing their behavior. One limitation of the effectiveness of the intervention is on the population consuming whole milk. The data appear to indicate most of the reduction in high-fat milk consumption came from the 2% group. These results are similar to the original campaign, which found 2% milk drinkers much more likely to switch to low-fat milk (Reger et al., 1998). This group may need more intense interventions such as the in-store tests to influence their behavior. Future research is needed to better understand this group to influence their behavior. Another limitation of the intervention is its long-term effects. Although a 10% change was assessed immediately postcampaign, this was reduced to just below 6%, 3 months later. For sustained effects, booster sessions may be needed to firmly establish the behavior. Little is currently known about the effects of booster sessions' effectiveness for this campaign.

Similar to early studies, this campaign appears to be effective through changes in attitudes toward low-fat milk consumption. Significant changes were seen in attitudes from baseline to immediate posttest. These changes were sustained through the 3-month follow-up. No changes were seen in social norms. Although we cannot conduct mediation analyses because of the cross-sectional design of the study, research on other 1% or Less campaigns showed similar results, with attitude mediating the change in behavior (Booth-Butterfield & Reger, 2004).

Health promotion programs need to assess not only the effectiveness of their program but also the reach to determine population impact (Dzewaltowski, Etsabrooks, Klesges, Bull, & Glasgow, 2004). Most health promotion campaigns have not found media to be an effective stand-alone intervention (Mittelmark, Hunt, Heath, & Schmid,

1993; Task Force on Community Preventative Services, 2005, pp. 88-89). The 1% or Less campaign has been an important exception to this. It has been postulated that this is due to a focus on a simple, single behavior change unlike most dietary messages (Reger et al., 1999). Overall, the results support wide-scale implementation of the 1% or Less campaign to reduce saturated fat consumption in large populations.

There were several limitations in this study. The most prominent is the lack of a control and comparison group. The importance of this is limited for several reasons. First, the research question was on dissemination. This program has several effectiveness studies, which show the program work. Second, there is no suitable control group for the state of Hawaii given its multiethnic composition. Finally, the use of multiple measures including both self-report and sales data indicate the same trend in results. This gives us confidence that there were real changes in milk consumption during and following the campaign. Factors external to the campaign could have also influenced the results. Although this is possible, it is not likely. Nationwide, during the past 10 years, the percentage of high- to low-fat milk has remained very constant (75.6% of milk sold in 1994 was high-fat milk compared with 72.2% in 2004) compared to our study (67.9% of milk sold was high-fat milk in April 2004 compared with 59.0% in September 2004 on Oahu; USDA, 2004). Finally, the estimate of effect is limited in several ways; the self-selection bias of the sample as well as other factors can affect this estimate. It should be taken as an approximation of the size of the effect.

Dissemination of effective dietary interventions is essential to improve adherence to the Dietary Guidelines for Americans. Although the Dietary Guidelines for Americans focus on numerous areas of healthy eating, few programs are available for public health practitioners. A review of the National Cancer Institute's Cancer Control Plan in May 2005 revealed on four non-school-based dietary interventions. All of these focused on increasing fruit and vegetable consumption. Two were specifically developed for African Americans, and the other two showed no evidence for cultural appropriateness (National Cancer Institute, 2005). A review of published studies on behavioral interventions also revealed a lack of reporting external validity (Dzewaltowski et al., 2004). Although this study addresses some of these limitations, further research is needed to build an evidence base of high-reach and high-efficacy dietary interventions in multiethnic populations.

## IMPLICATIONS FOR PRACTICE

The results from this study and previous work indicate that the 1% or Less campaign can be effective in decreasing low-fat milk consumption in both small and large communities (Reger et al., 1998). Although this campaign appears effective in diverse communities, future implementers of this campaign assess the social and cultural aspects of their community and tailor the campaign accordingly. Partnerships were a key to the success of this program. Including the local university, the department of health, local dairies, and supermarkets was essential to the success of the program. In this case, the local dairy provided free milk for the taste tests, coordination of messaging, and sales data. Strong collaborations with the state health department led to the involvement of the governor who acted as a spokesperson for the campaign. In Hawaii, there is only one major media market and a population of 1.2 million people. Although this campaign was conducted at the statewide level, it is probably similar to a medium to large

metropolitan area in many parts of the country. Overall, the campaign appeared to be effective in this population; however, booster sessions of the intervention may be necessary to sustain effects over time.

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