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Disseminating a Sun Safety Program to Zoological Parks: The Effects of Tailoring

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Previous research found that a sun safety program for visitors at 1 zoo increased sun safety behaviors. This randomized study compared the effects of tailored dissemination materials plus 2 brief follow-up phone calls (tailored group) versus generic materials (basic group) on implementation by other zoos of the previously evaluated sun safety program. Education directors of 126 zoos completed surveys several months following initial dissemination and 1 year later. During Summer 1, 40% of tailored group zoos and 24% of basic group zoos offered visitors at least 1 sun safety activity (odds ratio = 2.2, 95% confidence interval = 1.0–4.8). During Summer 2, these rates were 34% and 44%, respectively (*ns*). The pattern of findings suggests that tailoring had no incremental long-term impact and that the generic materials produced a good level of dissemination.

Keywords: skin cancer prevention, dissemination, tailoring, recreational settings, children

Skin cancer rates are increasing throughout the United States. In 2003, more than 1 million people were diagnosed with nonmelanoma skin cancers and 54,000 with melanoma (American Cancer Society, 2003). Ultraviolet radiation (UVR) exposure is a key skin cancer risk factor (Elwood, 1993; Friedman, Rigel, Berson, & Rivers, 1991; Marks, 1995; Singletary & Balch, 1991), and outdoor recreational settings such as zoological parks, where numerous visitors typically are exposed to long bouts of solar UVR, are high-risk environments. In the United States, zoos alone are visited by more than 100 million people annually (American Zoo and Aquarium Association, 2003). In 1998, we surveyed U.S. zoos accredited by the American Zoo and Aquarium Association (AZA) to evaluate their current sun safety practices for visitors (Talosig et al., 2000). Results indicated that although only 5% of the zoos offered any sun safety-related advice or activities to visitors, the majority indicated they would be interested in providing sun safety activities in the future. The current study compared two strategies for disseminating sun safety activities to U.S. zoos.

Much of the current thinking about dissemination began with the work of Everett Rogers and his colleagues; this framework provided general guidance for developing our dissemination strategies. According to Rogers (1983, 1995; Rogers & Shoemaker, 1971), technological and behavioral innovations are often experimented with and adopted by certain individuals in a community who are seen by "late adopters" as trendsetters. The process of diffusion of innovations includes knowledge acquisition, persuasion, decision, and reinforcement (Rogers, 1983). Once success is achieved with a smaller group of early adopters, dissemination to other organizations, communities, and regions should prove much easier. The change agent should aim for a critical mass of individuals to adopt a single or limited number of changes in order to make a large-scale impact.

Initially, diffusion theory emphasized how workers adopted innovations (Rogers, 1983). Subsequently, researchers acknowledged that individuals often adopt innovations as members of organizations and that such individuals seldom adopt an innovation until it is first accepted by the organization (Steckler, Goodman, & Kegler, 2002). Diffusion within and dissemination between organizations is a complex process, requiring consideration of multiple factors, such as the organization's goals, authority structure, decision-making mechanisms, rules, regulations, and informal norms. Diffusion may depend on involving multiple entities, such as an organization's administrators, staff, and clientele (Parcel, Perry, & Taylor, 1990).

To date, only a few studies have been published describing controlled evaluations of dissemination strategies for health promotion programs (Oldenburg, Sallis, Ffrench, & Owen, 1999). Brink et al. (1995) used a quasi-experimental two-group design to

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evaluate the dissemination of a tobacco prevention program to Texas school districts. The dissemination strategies were based on Rogers's (1983) diffusion of innovation model and Bandura's (1986) social–cognitive theory. Opinion leaders were asked to introduce the program to their school district using videotapes and print materials. Intervention school districts and control districts (which received no information on the tobacco prevention program) did not differ on readiness to adopt a tobacco prevention program.

Similar to the present study, three other studies have compared less intensive with more intensive dissemination strategies. Cooke, Mattick, and Campbell (1999) disseminated a smoking cessation program to antenatal clinics. They compared a mailing only with a mailing plus personal contact from a program representative. Although the sample was too small for statistical analysis ($N = 23$), clinics in the intensive dissemination group had adopted or were planning to adopt more of the program components than those in the simple dissemination group. Lock and Kaner (2000) compared mailing, telemarketing, and personal marketing strategies to disseminate a brief alcohol intervention to general practitioners ($N = 614$). Personal marketing (in-person contacts) were the most effective, but telemarketing was the most cost effective. Schofield, Edwards, and Pearce (1997) compared two strategies for disseminating a sun-protection policy kit to primary and secondary schools ($N = 781$). They compared a mailed kit alone and a mailed kit plus staff development module strategy. Statistically significant between-groups differences were found among primary schools: 44% of schools that received the intensive dissemination strategy adopted the sun-protection policies as compared with 21% of schools in the mailing-only group. In sum, although the number of studies is small, the available evidence suggests that relatively more (vs. less) intensive dissemination strategies are more likely to increase adoption of a health promotion program by the recipient organization. In the current study, the more intensive strategy that was evaluated was based on tailoring.

Health promotion specialists increasingly have used interventions tailored specifically for individuals using information provided by the individual or from existing records. These tailored interventions typically consist of brochures, newsletters, and/or telephone counseling sessions. In a review of the literature regarding tailored interventions, C. S. Skinner, Campbell, Rimer, Curry, and Prochaska (1999) concluded that tailored materials and interventions were superior to nontailored materials and interventions in the majority of studies. The tailored materials were both more salient (read, remembered, and viewed as credible) and more effective in promoting behavior change. In recent years, tailored materials have been used in studies focusing on a variety of behaviors, such as mammography screening (Champion et al., 2002; Lipkus, Rimer, Halabi, & Strigo, 2000), physical activity (Bull, Kreuter, & Scharff, 1999; Clark et al., 2002), and smoking cessation (Lipkus, Lyna, & Rimer, 1999). In all of these studies the recipient was an individual person. The present study is novel with respect to tailoring materials to address the unique characteristics of individual organizations rather than individual persons.

Our research group developed the Sunwise Stampede project to reduce UVR exposure by zoo visitors and employees. In Phase 1, we developed an intervention package geared toward children and their parents that aimed to reduce zoo visitors' solar UVR risk during the zoo visit. We also developed an intervention component for zoo employees (although it was not systematically evaluated, owing to limited resources). In 1999 we evaluated the zoo visitor intervention package at the World-Famous San Diego Zoo and the San Diego Wild Animal Park in a winter study and then replicated it in the summer. The two sites served as intervention and control sites, respectively. Intervention components, which were based on operant learning principles (B. F. Skinner, 1953), social–cognitive theory (Bandura, 1986), and an ecological framework (Sallis & Owen, 2002), included sun safety tip sheets for parents, children's activities, a variety of prompts, and discounted hats and sunscreen in zoo gift shops. The majority of the content used animal adaptations to illustrate desirable sun safety behaviors, such as elephants dusting their skin with dirt to prevent sunburn. Results, reported in an earlier article (Mayer et al., 2001), indicated that the intervention site showed significantly larger increases in the sales of both hats (summer study only) and sunscreen (both studies) relative to the control site, and in the winter study, hat use by children (as they exited the zoo) was significantly higher at the intervention site.

This article describes Phase 2 of the project, whose goal was to encourage other zoos throughout the United States to implement at least one strategy from the Sunwise Stampede menu. We packaged the materials evaluated in Phase 1 (Mayer et al., 2001) and compared two dissemination strategies: basic versus tailored. Zoos in the basic group received a binder of generic materials, and zoos in the tailored group received a tailored binder and brief telephone calls from project staff. We hypothesized that zoos receiving the tailored package would be more likely to adopt the Sunwise Stampede program than those that received generic materials.

Method

Design

As noted, our primary objective in the dissemination phase was to encourage zoos to adopt at least one sun safety strategy for zoo visitors and at least one for zoo employees. Inclusion criteria for this study were that a zoo (a) was accredited by the AZA and (b) had completed our baseline survey in 1998. Because the AZA was collaborating with us in recruiting zoos and disseminating our program and would have credibility with zoos, the first criterion was viewed as important. The second criterion was used to ensure that we would be able to obtain outcome data for the zoos; four zoos (3%) had not responded in the 1998 baseline survey after repeated attempts.

The 126 zoos meeting the inclusion criteria were stratified on two factors and randomly assigned to one of two dissemination groups: basic and tailored, with 63 zoos in each. The stratification factors were the estimated number of visitors per year, dichotomized (500,000 or less vs. over 500,000) and region of country (i.e., Northeast, Southeast, Plains, Midwest, Central Pacific, Southwest, and Northwest).

Intervention

In the spring of 2000, each of the 126 zoos was mailed an introductory letter and a binder consisting of project-related materials. The package typically was addressed to the zoo's education director. The basic group materials (a) explained the Sunwise Stampede goals and strategies, (b) described the features and benefits of participating, (c) summarized data from San Diego Zoo's experience with the program, (d) provided information about each element or strategy of the program, and (e) provided our contact information (should the recipient have questions or comments). We also provided samples and masters related to the intervention strategies, including, for example, camera-ready copies of sunscreen application reminders for restrooms, camera-ready point-of-purchase signs for gift shops, and a script for an employee sun safety in-service presentation.

Zoos in the tailored group received content similar to that described above, with the following modifications: (a) UVR and skin cancer data were provided for the state; (b) existing sun protective features of the zoo were highlighted (e.g., shade trees or other shade structures); (c) descriptions for each element of the program were tailored according to an individual zoo's resources (e.g., animal adaptations for only the animals in that zoo were provided); (d) irrelevant information was deleted (e.g., if a zoo did not have a gift shop, the gift shop incentive element was not described); and (e) photographs of various locations in the zoo were included to demonstrate implementation opportunities by digitally superimposing an animal adaptation fact over one of the animal exhibits. Prior to creating the materials, project staff had visited each of the zoos in the tailored group to evaluate relevant aspects of their environments and obtain digital photographs. The information obtained during the site visits enabled us to tailor the materials appropriately. Additionally, the Sunwise Stampede representative who had site visited a particular zoo phoned the education director twice—once approximately 10 working days after the binder was mailed and again around the middle of the first summer. Each call lasted 5 min or less. The objectives of the calls were to inquire whether the education directors had reviewed the materials, offer advice or recommendations (as needed) regarding which activities may be the most feasible for their zoo, and praise any plans they had made to offer activities.

Zoos in both groups were informed via the binder and an e-mail message about two Sunwise Stampede Web sites. The zoo staff site contained content similar to the basic group's binder content and had downloadable materials (http://www.foundation.sdsu.edu/sunwisestaff). The zoo visitor site targeted zoo visitors irrespective of their geographic location and presented tips for a sunwise visit and sunwise activities, animal facts, and a Web game (http://www.foundation.sdsu.edu/sunwisestampede).

Following the short-term survey, which was conducted several months after the distribution of the initial materials described above but prior to the long-term survey, additional materials were mailed. New materials included additional children's activities, Spanish language translations of previous visitor-oriented materials, and a hippopotamus–person sun safety adaptation poster. These supplemental materials did not differ by group; no special tailoring for individual zoos occurred.

Measures

A survey was conducted between Fall 2000 and Winter 2001 to assess the short-term impact of disseminating the materials, and a follow-up (long-term) survey was conducted approximately 1 year later. For each survey, initially questionnaires were mailed to the education director at each zoo, followed by a second mailing and subsequently a phone interview for initial nonresponders. Phone surveys were conducted by trained data collectors who had had no previous contact with respondents. The short- and long-term survey instruments were similar and included items that assessed whether specific strategies had been implemented. On both surveys, respondents were asked about whether the activities had been offered the previous summer and specified the year (i.e., 2000 for short-term survey and 2001 for long-term survey). The main outcomes, computed from respondents' answers to whether each activity on the menu had been offered, were (a) whether a zoo offered at least one activity to zoo visitors, (b) whether a zoo offered an activity to zoo staff, and (c) the number of activities offered to visitors. The total number of visitor activities was 17. The number of activities offered to staff was not used as an outcome, because only one activity targeting staff was promoted by the project (i.e., offering the sun safety in-service presentation).

Process data included (a) description of the specific activities that zoos were most likely to implement (based on survey responses), (b) self-reported exposure to and perceptions of the materials, and (c) description of the unsolicited contacts Sunwise Stampede received from nonstudy zoos or other organizations and individuals (based on notes written at the time of each contact).

Analysis

Assessment of randomization was examined for number of zoo visitors using a Wilcoxon rank-sum test and for geographic location using a chi-square test for contingency tables. Statistical analyses were performed at each of the time periods, short term and long term, and treated short and long term as repeated measures using generalized estimating equations (GEE). At each time period, odds ratios and 95% confidence intervals were calculated for dichotomous outcomes and rate ratios for number of activities. Repeated measures analyses were carried out using GEE to correctly estimate the standard errors for calculating p values when testing the Group $\times$ Time interaction and the group main effect.

Results

Response Rates and Randomization

The response rate of the zoo education directors for the short-term survey was 100%; 41% responded to the mailed version, and the others were surveyed by phone. One hundred fourteen of the 126 zoos responded to the long-term follow-up survey (90.4%). Of these, 47% responded to the mailed questionnaire, and the others were phoned. On the first survey, the majority (70%) of respondents were women and between the ages of 30 and 49 (71%). These proportions were comparable on the second survey (72% and 73%, respectively).

The differences between the two groups with respect to annual number of zoo visitors and distribution of geographic location were assessed. The median number of zoo visitors in the tailored group was 380,000 and in the basic group was 355,000; results of a Wilcoxon rank-sum test showed no significant group difference ($Z = -0.08$, $p = .94$). As shown in Table 1, groups did not differ on distribution of geographic location, suggesting that randomization also balanced out this characteristic.

Outcome Data

Table 2 displays the descriptive statistics by group and time and the GEE analysis. None of the comparisons between the groups was significant at the .05 level. However, results approaching significance can be seen for offered activities to visitors (odds ratio $= 2.2$, 95% confidence interval $= 1.0–4.8$, $p < .01$) in the short term. For this variable, a higher percentage of tailored group zoos

Table 1
Assessment of Randomization

	Basic		Tailored		
Geographic location	n	%	n	%	$\chi^2(6, N = 126)$
Northeast	15	23.8	14	22.2	1.01
Southeast	9	14.3	11	17.5	
Plains	10	15.9	7	11.1	
Midwest	10	15.9	11	17.5	
Central Pacific	7	11.1	7	11.1	
Southwest	10	15.9	10	15.9	
Northwest	2	3.2	3	4.8	

Table 2
Descriptive Statistics by Group and Time and Repeated Measures Analysis Using GEE

Outcome and group	Short term			Long term			GEE results[a] Group × Time		GEE results[a] Group	
	n/N	%	OR (95% CI)	*n/N*	%	OR (95% CI)	$\chi^2(1)$	*p*	$\chi^2(1)$	*p*
Offered activities to visitors										
Tailored	25/62	40.3	2.2 (1.0–4.8)	17/50	34.0	0.64 (0.3–1.4)	7.73	.005		
Basic	14/59	23.7		24/54	44.4					
Offered activities to staff										
Tailored	5/60	8.3	1.7 (0.4–7.3)	7/49	14.3	0.76 (0.3–2.2)	1.12	.29	0.001	.99
Basic	3/58	5.2		9/50	18.0					
	M	*SD*	RR (95% CI)	*M*	*SD*	RR (95% CI)				
Number of activities offered to visitors										
Tailored	0.98	1.48	1.2 (0.7–2.1)	1.20	1.94	0.93 (0.5–1.6)	0.22	.64	0.04	.85
Basic	0.85	1.83		1.30	1.88					

Note. GEE = generalized estimating equations; OR = odds ratio; CI = confidence interval; RR = rate ratio.
[a] Chi-square test with 1 degree of freedom for the Group × Time interaction and the group main effect when the interaction is not significant ($p > .05$).

offered at least one visitor activity as compared with the basic group short term. However, this difference disappeared long term. This differential change over time was demonstrated by a significant Group × Time interaction ($p < .01$). More specifically, for offered activities to visitors, the interaction effect reflects the differential pattern of differences in percentages between tailored and basic groups seen short term versus long term. This is evident in Table 2. It appears that the tailored group had an initial higher percentage of zoos offering visitor activities, which stayed relatively constant over time (with a slight, nonstatistically significant decay), whereas the basic group had a near doubling of percentages over time. As can be seen in Table 2, the group main effects for the other outcomes are not significant.

Exploratory Analysis

To examine potential associations between long-term implementation of at least one visitor activity and select zoo characteristics, chi-square tests were performed (with conditions combined). Zoo characteristics, obtained during the 1998 baseline survey (Talosig et al., 2000), included location (urban, rural, etc.), U.S. geographic area (Northeast, etc.), number of annual visitors, number of employees, and number of animal species featured by Sunwise Stampede having sun-protective adaptations; data for the last three variables were dichotomized using a median split. Sample sizes ranged from 86 to 104, owing to missing data for one or both variables. None of the associations was statistically significant.

Process Data

Activities offered by zoos. Survey respondents reported whether their zoo had offered each of the 17 Sunwise Stampede visitor activities the previous summer. Table 2 presents the mean number of activities for all zoos in each group. For zoos that had implemented at least one activity (groups combined), the mean number of activities in 2001 was 2.85 (SD = 1.72) and in 2002 was 3.17 (SD = 1.74). Activities that were most likely to be offered during the first summer continued to be the ones most offered the second summer. These activities consisted of (a) adding Sunwise Stampede messages to guided tours (18 zoos in 2001 and 17 zoos in 2002), (b) offering paper-and-pencil activities to children (n = 15 and 17, respectively), (c) offering art activities to children (n = 14 and 15, respectively), (d) distributing the tip sheet (n = 15 and 15, respectively), and (e) posting the point-of-purchase signs (promoting sunscreen or hats) in the gift shop (n = 13 and 13, respectively). The numbers of zoos selling sunscreen in 2001 and 2002 were 40 and 43, respectively, and the number selling hats was 60 in both summers. However, selling sunscreen and selling hats were not used as activities when computing our outcome variables, because they could not be directly linked to our intervention.

Exposure to the materials. As noted, all 126 zoos initially were mailed binders with descriptions of the program and activities, along with ready-to-use materials. The proportions of respondents in the tailored and basic groups reporting they had read at least some of the binder were approximately 93% and 90%, respectively. The proportions in these groups reporting they had read more than half of the binder were 59% and 42%, respectively. Of those who reported having read at least some of the binder, the distribution of usefulness ratings in the tailored group was *not useful* = 5%, *somewhat useful* = 49%, and *very useful* = 45%. The distribution of ratings for this variable for the basic group was 11%, 48%, and 41%, respectively. Results of chi-square tests indicated that there were no statistically significant associations between group assignment and (a) amount of binder read or (b) perception of usefulness. The mailed version of the survey sent to tailored group zoos at the short-term follow-up assessed perceptions about the tailoring. Of 27 tailored group respondents, 25 (93%) noticed that the materials in the binder had been tailored specifically for their zoo. When asked how important it was to them that the materials were tailored, 13% responded *not important,* 29% responded *somewhat important,* and 58% responded *very important*. Only 9 (7.7%) of the respondents (groups collapsed) reported visiting the zoo staff Web site on the short-term survey.

Dissemination beyond the study sites. Since implementing the zoo visitor Web site, 35 persons not involved with study zoos or the study itself have contacted the project (unsolicited by us). The types of organizations most often represented were medical centers, hospitals, or cancer centers ($n = 8$); state or local health departments ($n = 6$); schools or colleges ($n = 4$); and businesses related to sun safety clothing or equipment ($n = 4$). The purpose of the contact typically was to request materials ($n = 16$), obtain information about partnering with a local zoo ($n = 5$), get permission to use or reproduce project materials ($n = 3$), or link to our Web site or include our Web game on their Web site ($n = 3$).

Discussion

The results regarding the impact of tailored materials plus follow-up calls on a zoo's likelihood of implementing sun safety activities were mixed. Specifically, the more intensive intervention appeared to increase the likelihood that a zoo would offer activities for visitors the summer that immediately followed initial program dissemination, but this increase was not found for the zoo employee activity. The next summer, zoos in the basic group had levels of activities for both visitors and staff that were comparable to the tailored group's levels. In general, between Summers 1 and 2 the levels decreased slightly in the tailored group and increased in the basic group. The intervention strategies that were used for each group differed only during the period prior to the short-term survey; in Year 2 of the program, both groups received the same (nontailored) materials, and neither group received phone calls. Thus, given our design, it is not possible to determine whether (a) providing tailored materials plus phone calls over a longer interval would have maintained higher levels of zoo visitor activities (relative to providing generic materials); (b) providing tailored materials plus calls simply may have prompted those zoos to offer visitor activities earlier; or (c) the increase between the two summers in the level of activities at basic group zoos was due to a delayed reaction to the initial intervention or due to the receipt of additional materials and contacts during Year 2 of the intervention.

Another key finding was that 31% (39/126) of participating zoos had implemented at least one visitor activity by the first summer, and this proportion was 33% (41/126) the following summer. Although our design did not include a no-treatment control group, the activities that we assessed were specific to the Sunwise Stampede program. Consequently, we believe it is unlikely that zoos would have implemented these activities in the absence of our program. Additionally, the base rates of any sun safety activities for zoo visitors had been negligible in our earlier national survey (Talosig et al., 2000). The data from the current study suggest that our menu of activities, which had been developed at one zoo, was attractive to a respectable number of other zoos. The development of the initial Sunwise Stampede activities tested in San Diego (Mayer et al., 2001), as well as the dissemination strategies and materials, was informed by the results of extensive formative evaluation with zoo and AZA personnel.

Although no formal cost analyses were performed, the site visits to the tailored group zoos required more resources than typically would be available. To reduce costs, information about zoo characteristics could be obtained via phone interviews of relevant zoo personnel, and digital photographs (of key exhibits, etc.) could be provided by zoo staff or volunteers. The majority of respondents in both groups reported having read at least some of the binder and finding it useful. In contrast, very few accessed the zoo staff Web site. However, this likely occurred because (a) many zoos did not have computer resources at that time, and (b) the Web site content mirrored the content of the binder, and the binder was introduced first.

We also were encouraged by the contacts we received about Sunwise Stampede from those who were not study participants; most of these contacts were stimulated by people accessing the zoo visitor Web site. The number of contacts we received likely underestimates the degree of dissemination that occurred naturally.

Methodological strengths include (a) inclusion of nearly all AZA-accredited zoos in the sample, (b) high response rates in both surveys, and (c) random assignment to groups using number of visitors and geographical region as stratification factors. A key methodological weakness is that all outcomes were based on verbal report. We did not attempt to validate the data by directly observing whether the activities were being offered or by interviewing multiple staff at each zoo. Thus, it is possible that because of social demand or other biases, respondents overestimated the number of activities their zoo adopted; this bias may have been stronger in the tailored group. Second, as noted earlier, a study design in which the tailored group received tailoring in Year 2 of the intervention (as well as in Year 1) would have allowed clearer interpretations of the long-term group comparisons. Furthermore, the tailored group received two phone calls, whereas the basic group received no calls. Thus, direct comparisons cannot be made between tailored versus generic materials per se. Finally, we did not measure the impact of the Sunwise Stampede activities (at zoos that implemented them) on visitor and employee behaviors; this type of evaluation was beyond the project's scope and budget.

Our decision to compare two dissemination strategies of different intensities rather than compare one strategy to no strategy (i.e., a true control group) was influenced by our goal to expose as many AZA zoos as possible to the Sunwise Stampede program. Only two conditions were compared because of our sample size constraints. Our decision to evaluate the additive impact of tailoring was based, in part, on (a) the diffusion criteria of "adoptability," presuming that a tailored intervention would enhance adoptability by making it easier to both "sell" and implement within the organization; (b) the success of interventions tailored to individuals in improving health outcomes (C. S. Skinner et al., 1999); and (c) the plethora of studies within the "two paths to persuasion" literature (Chaiken, 1987; Petty & Cacioppo, 1986a, 1986b) showing that increased personal relevance of communication (via tailoring) heightens persuasion. We had reasoned that tailored materials would be more persuasive, resulting in a higher likelihood of a decision by key zoo personnel to adopt Sunwise Stampede activities. This was confirmed by the Year 1 finding that zoos in the tailored condition were significantly more likely to adopt the intervention. The finding that tailoring encouraged greater rates of adoption, but not maintenance of the intervention in Year 2, may mean that zoo program implementers did not realize significant additional benefits from implementing the tailored intervention. Given the importance of maintenance in the diffusion process, the numerous factors that could account for this phenomenon should be explored in future process and impact evaluation studies.

Initially in brainstorming our interventions, we considered (a) maximizing the cross-talk among zoos directly and via AZA communications and (b) soliciting national, mass-media publicity about the program. These strategies likely would have enhanced the adoption process in both groups through increasing shared knowledge, mutual persuasion, or reinforcing adopters for already implementing part or all of the intervention (Rogers, 1983, 1995). However, we ruled them out because they may have caused contamination between the study groups. Thus, we potentially weakened our intervention in an attempt to strengthen a study design typically used in efficacy and effectiveness research. Ironically, the "contamination" and "cross-talk" one seeks to reduce in controlled efficacy and effectiveness trials are the very goals of the dissemination process. This catch-22 indicates that different paradigms (as well as different criteria for funding and publication) will be needed for dissemination intervention research if we wish to develop the most effective strategies.

In summary, the combination of tailoring printed dissemination materials and providing two brief phone contacts had a marginally significant short-term impact (relative to generic print materials) on a zoo's likelihood of offering a sun safety activity to visitors; this effect was not found for the zoo employee activity. However, during the subsequent summer, the proportion of basic group zoos offering visitor activities had increased substantially, and there were no between-group differences. By the second summer, one third of all participant zoos were offering at least one Sunwise Stampede visitor activity. We conclude that the mailed, print materials that targeted the "typical" zoo environment were sufficient for a diffusion of this innovation to occur, namely, to encourage a moderately high number of zoos to offer sun safety activities to their visitors.

Additional research is needed to address systematically whether a larger "dose" or longer duration of tailoring would be more effective (and cost effective) for promoting long-term implementation. Moreover, the impact on visitor and employee behavior due to implementing Sunwise Stampede activities should be evaluated across multiple zoos to replicate our initial effectiveness study (Mayer et al., 2001). The number of activities that is sufficient to modify sun safety behavior, and which activities are the most powerful, also should be addressed. Finally, as noted earlier, we warn investigators to avoid the design-hygiene trap we succumbed to. Rather, we would endorse innovative designs for evaluating dissemination strategies that build on the cross-talk and diffusion that occur naturally within and across zoos.

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