



# Media, Health Communication, and the Cancer Risk Factors of Smoking and Obesity

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**MEDIA, HEALTH COMMUNICATION, AND  
THE CANCER RISK FACTORS OF SMOKING AND OBESITY**

**SHANIECE CRISS**

A Dissertation Submitted to the Faculty of  
The Harvard T.H. Chan School of Public Health  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Science  
in the Department of Social and Behavioral Sciences

Harvard University

Boston, Massachusetts.

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**Media, Health Communication, and the Cancer Risk Factors of Smoking and Obesity**

**ABSTRACT**

**Introduction:** Smoking is the leading cause of preventable death in the United States, and obesity is the second cause. Both are risk factors for various types of cancer. Specifically, smoking is linked to lung, esophageal, bladder, kidney, and stomach cancers; and obesity is linked to postmenopausal breast, colorectal, endometrial, pancreatic, and gallbladder cancers. Multiple factors affect health behavior, and this dissertation investigated the role of media and health communication as modifiable influences related to smoking and obesity.

**Methods:** Paper 1 examined the association between average hours of television viewing per day and smoking status among all Hispanic adults (n=675) and within the subgroups of Puerto Rican (n=182) and Dominican (n=396) adults using multivariable logistic regression models. Paper 2 explored how health information sources inform decision-making related to childhood obesity among Hispanic mothers during their children's first 1000 days of life (conception-age 24 months) using seven focus groups. Paper 3 documented the development and uptake of a media competition (with 595 student participants) implemented in the context of a multi-sector community intervention targeting childhood obesity prevention through process evaluation. Paper 3 also examined community, organizational and provider characteristics that explain variation in implementation effectiveness and described diffusion of the media competition across community sectors using 54 key informant interviews.

**Results:** In Paper 1, Hispanic adults who watched 5+ hours (5-15 hours) of TV per day were more likely to be a smoker than those who watched  $\leq 2$  hours, with the same association among Puerto Ricans. In Paper 2, trusted health information sources for Hispanic mothers included health care providers, female and male family members, BabyCenter.com and other

Internet sources, selected social media, and television. In Paper 3, salient themes that emerged as implementation facilitators were having a cascade of champions and adaptability through providing opportunity to participate in the media competition outside traditional class time.

**Discussion:** Papers 1 and 2 support the importance of understanding the nuances and differences in Hispanic adults in order to design appropriate media and health communication interventions. Paper 3 provides insight about how to replicate media competitions for children in other communities.

**TABLE OF CONTENTS**

Abstract..... ii

Table of Contents..... iv

List of Figures with Captions..... v

List of Tables with Captions..... vi

Acknowledgments..... vii

Paper 1: Higher levels of television viewing are associated with smoking in a highly immigrant population of Hispanic adults in northeastern Massachusetts with differences between Puerto Ricans and Dominicans..... 1

    Abstract..... 2

    Introduction..... 3

    Methods..... 6

    Results..... 10

    Discussion..... 16

    Funding Acknowledgements..... 20

    References..... 21

Paper 2: The role of health information sources in decision-making among Hispanic mothers during their children’s first 1000 days of life..... 24

    Abstract..... 25

    Introduction..... 26

    Methods..... 27

    Results..... 30

    Discussion..... 36

    Funding Acknowledgements..... 41

    References..... 42

Paper 3: Media Competition Implementation for the Massachusetts Childhood Obesity Research Demonstration Study (MA-CORD): Success through a Cascade of Champions.... 44

    Abstract..... 45

    Introduction for Study 1 and Study 2..... 46

    Study 1-Implementation Documentation..... 48

    Methods (Study 1)..... 48

    Results (Study 1)..... 55

    Study 2- Predictors of Implementation Effectiveness..... 58

    Methods (Study 2)..... 58

    Results (Study 2)..... 63

    Discussion for Study 1 and Study 2..... 76

    Funding Acknowledgements..... 81

    References..... 82

## LIST OF FIGURES

Figure 3.1. MA-CORD Media Competition Implementation Process.....	49
Figure 3.2. MA-CORD Media Competition Intervention Flowchart.....	51
Figure 3.3. Ecological framework for understanding effective implementation of the MA-CORD Media Competition.....	59

## LIST OF TABLES

Table 1.1. Sample characteristics of all Hispanic adult smokers and non-smokers from the Project IMPACT Survey (n=675) and by subgroups of Puerto Rican (n=182) and Dominican (n=396).....	11
Table 1.2. Smoking prevalence of Hispanic adults from the Project IMPACT Survey (n=675).....	13
Table 1.3. Unadjusted odds ratios and adjusted odds ratios for smoking by amount of television viewed per day among Hispanic adults from the Project IMPACT Survey (n=675) and by subgroups of Puerto Rican (n=182) and Dominican (n=396).....	15
Table 2.1. Focus group sample questions for health information sources and decision-making.....	29
Table 2.2. Hispanic mother and child characteristics according to focus group participation (n=49).....	31
Table 2.3. Health information sources, sender, and communication strategies for future interventions from 49 Hispanic women participating in focus group discussions.....	36
Table 3.1. Characteristics of the Community Setting for MA-CORD Media Competition....	50
Table 3.2. MA-CORD Media Competition Participation Levels by School and Afterschool Programs in each community.....	56
Table 3.3. Media Competition Interview Guide.....	61
Table 3.4 MA-CORD Media Competition Interview Participation Demographic Information.....	64
Table 3.5. Factors affecting the Implementation Process for MA-CORD Media Competition by School Participation Level: Major Themes and Illustrative Quotations.....	67

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I am truly thankful for my faith, and this verse has provided comfort to me throughout this endeavor, "Trust in the LORD with all your heart, and lean not on your own understanding; in all your ways acknowledge Him, and He shall direct your paths" (Proverbs 3:5-6).



**Paper 1**

**Higher levels of television viewing are associated with smoking  
in a highly immigrant population of Hispanic adults in northeastern Massachusetts  
with differences between Puerto Ricans and Dominicans**

Shaniece Criss, MPH, Kirsten Davison, PhD, Steven Gortmaker, PhD, K. Viswanath, PhD

## ABSTRACT

**Introduction:** Current smoking prevalence rates have decreased among Hispanics, yet lung cancer and heart disease are still leading causes of death for Hispanics. Despite smoking advertisement bans on television, smoking is common in programming. This study aimed to examine the association between average hours of television (TV) viewing per day and smoking status among all Hispanic adults and within the subgroups of Puerto Rican and Dominican adults.

**Methods:** We used the 2011 *Project IMPACT* cross-sectional survey data. We conducted multivariable logistic regression models predicting the odds of being a smoker by categorical TV hours in Hispanics (n=675). We also examined this relationship among the subgroups of Puerto Ricans and Dominicans. In all adjusted models, covariates measured were education, age, sex, marital status, birth country, and employment.

**Results:** In the adjusted model, Hispanic adults who watched 5+ hours (5-15 hours) of TV per day were 1.94 times more likely to be a smoker (CI: 1.17-3.22) than those who watched  $\leq 2$  hours. For the subgroup adjusted model analyses, Puerto Rican adults who watched 5+ hours of TV per day were 3.42 times more likely to be a smoker (CI: 1.41-8.29) than those who watched  $\leq 2$  hours; and Dominican adults did not show a statistically significant association.

**Discussion:** Television provides the opportunity for people to be exposed to smoking. The present study supports the importance of understanding the nuances and differences in Hispanic adults in order to design appropriate media interventions. Researchers can critically analyze programming to inform media literacy interventions and anti-tobacco campaigns so that adults can make conscious decisions about their TV viewing.

## INTRODUCTION

From 2005 to 2012, current smoker prevalence rates decreased from 20.9% to 18.1% among U.S. adults, and from 16.2% to 12.5% among Hispanics.<sup>1</sup> Despite declining smoking prevalence rates, smoking contributes to 480,000 premature deaths annually among Americans 35 years of age and older and affects millions more through related morbidities.<sup>2</sup> Cancer and heart disease are the top two leading causes of death among Hispanics<sup>3</sup> with lung cancer as the leading cause of cancer death among Hispanic men and second among Hispanic women.<sup>4</sup> Smoking rates vary among Hispanic subgroups. In 2008, 18.6% of Puerto Ricans smoked compared to 10.7% of Dominicans.<sup>5</sup> In addition, Hispanic immigrants have lower smoking rates than U.S. born Hispanics.<sup>6,7</sup> Examining differences within the Hispanic culture related to smoking can inform prevention opportunities.

Although the Public Health Cigarette Smoking Act of 1969 (passed in 1970 and enacted in 1971) banned cigarette advertising on television, smoking is still prevalent in programming with high potential for exposure. The Bureau of Labor Statistics reported that people in the U.S. ( $\geq 15$  years old) watch an average of 2.77 hours of TV per day with Hispanics viewing less (2.37 hours) than Whites (2.66 hours) and Blacks (3.66).<sup>8</sup> Neilson purported longer exposure with U.S. adults (18+) watching about 5 hours of traditional TV a day with Hispanics adults reporting the same hours of viewership.<sup>9</sup> Studies report that smoking is shown on scripted television series,<sup>10</sup> reality shows,<sup>11</sup> and music videos.<sup>12</sup>

The majority of research examining the links between television exposure and smoking status focus on youth. Greater exposure to television viewing has been associated with youth smoking intention via perceived prevalence of peer smoking.<sup>13</sup> Furthermore, youth who watched 5 or more hours of TV per day were almost 6 times more likely to initiate smoking compared to youth who watched less than 2 hours of TV per day.<sup>14</sup> Current smokers may be influenced by

television as well. A cross-sectional study among Belgium adolescents reported that smokers who watch more television smoke more cigarettes.<sup>15</sup> Pertaining to a specific genre, early exposure to popular music TV channels predicted increased smoking in U.S. youth.<sup>16</sup> Concerning race/ethnicity, private access to television during early adolescence predicted a greater likelihood of smoking initiation in white adolescents, but not among black adolescents.<sup>17</sup> Exposure to higher levels of television predicted smoking initiation for Hispanic adolescents, but not for white and black adolescents.<sup>18</sup> There is little information concerning television exposure and adult smoking outcomes. In adults in India, daily television and radio use is associated with higher likelihood of tobacco chewing.<sup>19</sup>

In addition, smoking is wide-spread in movies,<sup>20-22</sup> and most movies appear on various television channels after cinema airing. Therefore, its impact should be considered as well especially since the body of evidence between the association between smoking exposure in movies and adolescent smoking is quite substantial.<sup>17,18,21,23-30</sup> Concerning adults, cinema attendance was associated with increased smoking among men and women in India.<sup>19</sup> There is a paucity of literature related to the association between adult exposure to movies/television and smoking.

Immigration and acculturation may be contributing factors in the link between television exposure and smoking. Specifically, exposure to smoking imagery in movies is a stronger independent predictor to new experimentation with smoking in Mexican-American youth born in Mexico than Mexican-American youth born in the United States.<sup>31</sup> Television exposure is particularly salient because the acculturation process begins with “cultural learning” that starts with media use, then language, and lastly values and attitudes.<sup>32</sup> Banna and colleagues found that higher levels of language acculturation were associated with higher rates of everyday

smoking among Hispanic adult women.<sup>33</sup> More evidence is needed about association between television hours and smoking status among Hispanic adult populations with high immigration rates.

The transportation theory provides an explanation how narratives presented in television and movies may affect behaviors. The propositions about narratives include: “(a) narratives help overcome resistance to a message by reducing counterarguing, (b) narratives facilitate observational learning, and (c) identification with characters in a narrative influences perceptions of group and/or personal susceptibility as well as social norms” (pg. 785).<sup>34</sup> When utilizing the narrative approach, the person can be transported or immersed into the story, which is a primary mechanism of narrative persuasion.<sup>35,36</sup> The tobacco industry has understood this approach throughout the years. In 1972, a movie production executive to RJ Reynolds Tobacco explained that “film is better than any commercial that has been run on television or any magazine, because the audience is totally unaware of the sponsor involvement” (pg. 1519).<sup>37</sup> Dal Cin et al. found that greater identification with the smoking protagonist predicts stronger associations between self and smoking for both smokers and nonsmokers, as well as, increased intentions to smoke among smokers.<sup>29</sup> This theory offers a potential mechanism about how television content can influence smoking behavior, which could be particular salient among Hispanic adults, including immigrants.

This study aimed to examine the association between average TV viewing hours per day and smoking status among Hispanic adults and among the subgroups of Puerto Rican and Dominican adults. We hypothesized that Hispanic adults with greater exposure to television viewing would exhibit higher smoking rates. Our study is innovative because we assessed TV

exposure in an under-represented group of Hispanic adults with low socio-economic position (SEP) with disproportionate smoking rates compared to Hispanics from national data.

## **METHODS**

### **Dataset Description**

We used the public opinion survey from *Project IMPACT (Influencing Media & Public Agenda on Cancer & Tobacco Disparities)* to examine the association of television viewing and smoking status. The broader objective of the *Project IMPACT* study was to assess whether people in the community could change public agenda and political will to address the complex problem of health disparities. The goal was building community capacity to change the public agenda through local media coverage to ensure sustainability. The public opinion survey consisted of 55 items including demographics, nutrition, physical activity, tobacco use, media attention, attribution of behaviors/structural factors to health, reported discrimination, and opinions about government. Harvard T.H. Chan School of Public Health provided Institutional Review Board (IRB) approval.

### **Sample**

Participants in the Project IMPACT survey consisted of adult residents (ages 21-71) living in a northeastern city in Massachusetts, which has a high Hispanic population. For this cross-sectional study, 925 surveys were fully completed, and 66 surveys were partially done. More than half of the surveys were conducted in Spanish. The response rate was 19.6% and the cooperation rate was 46.2% based on completed and partially completed surveys. We restricted the analysis to people who identified themselves as Hispanic and had complete information available for the outcome, exposure, and covariates. The final sample consisted of 675 individuals.

## **Data Collection**

One objective of *Project IMPACT* was to engage students in the research process. Therefore, data collectors were high school and college students who participated in a comprehensive two-day training. The door-to-door survey was administered in Spanish or English by bilingual interview teams of 2-3 people. The teams were supervised by a community field supervisor, and observed and given feedback by study staff from *Dana-Farber Cancer Institute*. Data collection occurred during the morning shift (9 am – 1 pm) and afternoon shift (3 pm – 7 pm) between August 3 and December 11, 2011. Participants were selected by stratified random sampling of 11 neighborhoods in a northeastern city in MA, houses in each neighborhood were selected based on a random sampling scheme, and then the eligible resident with the closest birthday was selected to respond to the survey. If the resident was not available or refused, another member of the household was invited to participate. Survey participants received an incentive of a \$5 grocery store gift certificate.

## **Smoking status**

We dichotomized the outcome of current smoker by grouping participants who reported smoking cigarettes “every day” or “some days” as current smokers and participants who reported smoking “not at all” as non-smokers. Self-reported data on smoking behaviors have been cited as valid and reliable in the scientific published literature.<sup>38</sup>

## **Average TV viewing per day**

Participants provided information for the exposure variable by responding to the following question: “Please think back over the past 7 days. On average, how many hours a day did you watch television?” with responses rounded to the nearest hour. We categorized television viewing into 0-2, 3-4, and 5+ (5-15) hours since 0-2 hours represented 0-25% of the

sample, 3-4 hours represented >25%-75% of the sample, and 5+ hours represented >75%-100% of the sample. We excluded two respondents who reported that they watched more than 16 hours of television per day since they were extreme outliers. We selected 0-2 hours as the reference group because viewing <2 hours of TV per day is associated with lowest mortality among adults.<sup>39</sup>

### **Sociodemographic Variables**

The dataset was restricted to participants who selected “yes” to the question “are you of Hispanic, Latino, or Spanish origin?” In addition, the respondents were requested to check all that applied for the following options: “Mexican, Mexican American, Chicano,” “Puerto Rican,” “Dominican,” “Cuban,” and “Other (e.g., Guatemalan, Colombian, Nicaraguan, Salvadorian)” with a blank box to fill-in. We included two respondents who selected that they were not Hispanic, but indicated that they were Dominican. For the subgroup analysis for Puerto Ricans and Dominicans, we only included participants who checked only one group.

Covariates measured include education, age, sex, marital status, birth country, and employment status. Education was categorized by < high school, completed high school, and  $\geq$ associate/college degree (reference group). The response variable “None” was coded as < high school and “Other” was coded as  $\geq$ associate/college degree. Age was used as a continuous variable. The following variables were dichotomized: sex (female or male), marital status (married/living with partner or not married/living with partner), and birth country (born outside the mainland U.S. or born in the mainland U.S.). Employment status was categorized by working (reference group), not working, and not working due to health. The category “working” included “working full time,” “working part-time,” “student,” and “keeping house or raising children full-time”; and the category “not working” included “unemployed or laid off,” “looking for work,” and “retired” from the survey response options.



## Analysis

We used a complete case analysis. Student  $t$  tests were used to compare mean results and  $X^2$  tests were used to compare differences in proportional results. We used multiple logistic regression to determine the association between television viewing and smoking status, controlling for education, age, sex, marital status, birth country, and employment status. This analysis was completed for all Hispanics, and then Puerto Ricans and Dominicans because these subgroups were most populous in the sample. Language was not included in the model because the majority of participants spoke both Spanish and English or mostly/only Spanish. The analysis is represented by the logistic regression equation below.

$\text{logit}(\widehat{SS}) =$

$$\widehat{\beta}_0 + \widehat{\beta}_1 TV_{3-4hrs} + \widehat{\beta}_2 TV_{>4hrs} + \widehat{\beta}_3 \text{LessThanHighSchool} + \widehat{\beta}_4 \text{GraduatedHighSchool} + \\ \widehat{\beta}_5 \text{Age} + \widehat{\beta}_6 \text{Female} + \widehat{\beta}_7 \text{Married} + \widehat{\beta}_8 \text{BornOutsideMainlandUS} + \\ \widehat{\beta}_9 \text{NotWorking} + \widehat{\beta}_{10} \text{NotWorkingDueToHealth}$$

## RESULTS

The majority of the sample (80%) reported a household income of less than \$30,000 per year. Table 1.1 shows the sample characteristics of all Hispanic adult smokers and non-smokers from the Project IMPACT survey and by subgroups of Puerto Rican and Dominican. The overall sample watched an average of 3.21 hours of TV per day (SD: 2.40). Compared to non-smokers, more smokers watched 5+ hours of TV (34%-Smoker vs. 20%-Non-smoker;  $p=0.001$ ); and less smokers were female (65% vs. 78%;  $p=0.002$ ), married or living with a partner (31% vs. 43%,  $p=0.010$ ), and born outside the mainland U.S. (66% vs. 88%,  $p< 0.0005$ ). The mean age for the sample was 43 years; and 38% had < high school education, 33% completed high school, and 29% had  $\geq$  associate/college degree with 57% of the sample currently working. Most of the sample spoke only/mostly Spanish or both Spanish and English (96%) with a statistically significant difference between the three groups ( $p< 0.0005$ ). In the subgroup analysis, Puerto Ricans compared to Dominicans had a higher percentage of participants not working due to health reasons (31% vs 15%), and a lower percentage of participants born outside the mainland U.S. (74% vs. 90%).

**Table 1.1. Sample characteristics of all Hispanic adult smokers and non-smokers from the Project IMPACT Survey (n=675) and by subgroups of Puerto Rican (n=182) and Dominican (n=396)**

Characteristic	-----All Hispanics-----			-----Subgroups----- *	
	Total (n=675)	Smoker (n=126)	Non-Smoker (n=549)	Puerto Ricans (n=182)	Dominicans (n=396)
<b>Average TV viewing per day</b>					
0-2 hours	46% (n=312)	45% (n=57)	46% (n=255)	46% (n=84)	45% (n=180)
3-4 hours	31% (n=211)	21% (n=26)	34% (n=185)	26% (n=48)	34% (n=133)
5+ hours (5-15 hours)	23% (n=152)	34% (n=43)	20% (n=109)	27% (n=50)	21% (n=83)
<b>Education</b>					
< High school	38% (n=257)	44% (n=55)	37% (n=202)	45% (n=81)	37% (n=147)
Completed high school	33% (n=224)	36% (n=45)	33% (n=179)	35% (n=63)	32% (n=128)
≥Associate/college degree	29% (n=194)	21% (n=26)	31% (n=168)	21% (n=38)	31% (n=121)
<b>Mean Age, years</b>	43 (SD=13)	42 (SD=12)	43 (SD=14)	43 (14)	43 (13)
<b>Female</b>	76% (n=510)	65% (n=82)	78% (n=428)	74% (n=136)	77% (n=305)
<b>Married/Living with Partner</b>	41% (n=278)	31% (n=39)	43% (n=239)	34% (61)	42% (n=167)
<b>Born outside mainland U.S.~</b>	84% (n=569) <sup>+</sup>	66% (n=83)	88% (n=486)	74% (n=134)	90% (n=357)
<b>Employment Status</b>					
Working <sup>a</sup>	57% (n=384)	49% (n=62)	59% (n=322)	44% (n=80)	59% (n=235)
Not working <sup>b</sup>	25% (n=167)	26% (n=33)	24% (n=134)	25% (n=46)	26% (n=102)
Not working due to health reasons	18% (n=124)	25% (n=31)	17% (n=93)	31% (n=56)	15% (n=59)
<b>Language</b>					
Only/mostly Spanish	53% (n=355)	40% (n=51)	55% (304)	36% (n=65)	62% (n=240)
Both Spanish and English about the same	43% (n=293)	50% (n=63)	42% (n=230)	59% (n=107)	37% (n=147)
Only/mostly English	4% (n=27)	10% (n=12)	3% (n=15)	5% (n=10)	2% (n=9)

~includes Puerto Rico | \*Other Hispanics" (n=97) excluded from subgroup analysis | <sup>a</sup>Working= working full time [65% (251)], working part-time [23% (90)], student [6% (22)], and keeping house or raising children full-time [6% (21)] | <sup>b</sup>Not working= unemployed or laid off [40% (68)], looking for work [31% (51)], and retired [29% (48)]

Table 1.2 shows the smoking prevalence of Hispanic adults from the Project IMPACT Survey. Nearly one-fifth of Hispanic adults were current smokers (19%) with rates varying by subgroups with 30% of Puerto Ricans, 13% of Dominicans, and 22% Other Hispanics identifying as current smokers. Over a quarter of respondents who watch 5+ hours of TV per day were current smokers (28%). Forty-one percent of respondents born in the mainland U.S. compared to 15% born outside the mainland U.S. were current smokers. Concerning employment status, 25% smoked who were not working due to health reasons, 20% smoked who were not working, and 16% smoked in the group who were working. Only/mostly English speakers had the highest prevalence of smoking (44%), followed by people who spoke both English and Spanish equally (21%), and then only/mostly Spanish speakers (14%).

**Table 1.2. Smoking prevalence of Hispanic adults from the Project IMPACT Survey (n=675)**

<b>Variable (n)</b>	<b>Smoker, % (n)</b>
<b>Total Sample (675)</b>	19% (126)
<b>Ethnicity</b>	
Puerto Rican (182)	30% (54)
Dominican (396)	13% (51)
Other Hispanic (97)	22% (21)
<b>Average TV viewing per day</b>	
0-2 hours (312)	18% (57)
3-4 hours (211)	12% (26)
5+ hours (152)	28% (43)
<b>Education</b>	
< High school (257)	21% (55)
Completed high school (224)	20% (45)
≥Associate/college degree (194)	13% (26)
<b>Gender</b>	
Female (510)	16% (82)
Male (165)	27% (44)
<b>Marital/Partner Status</b>	
Married/Living with Partner (278)	14% (39)
Not Married/Living with Partner (397)	22% (87)
<b>Place of Birth</b>	
Born outside mainland U.S.~ (569)	15% (83)
Born in mainland U.S. (106)	41% (43)
<b>Employment Status</b>	
Working (384)	16% (62)
Not working (167)	20% (33)
Not working due to health reasons (124)	25% (31)
<b>Language</b>	
Only/mostly Spanish (355)	14% (51)
Both Spanish and English about the same (293)	22% (63)
Only/mostly English (27)	44% (12)

~includes Puerto Rico

Table 1.3 examines the association between television viewing and smoking status. In the unadjusted model, Hispanic adults who watched 5+ hours of TV per day were 1.76 times more likely to be a smoker [95% confidence interval (CI): 1.12-2.78] than those who watched  $\leq 2$  hours per day. Controlling for baseline characteristics, Hispanic adults who watched 5+ hours of TV per day were 1.94 times more likely to be a smoker (CI: 1.17-3.22) than those who watched  $\leq 2$  hours.

In the unadjusted model, Puerto Ricans who watched 5+ hours of TV per day were 2.17 times more likely to be a smoker (CI: 1.03-4.59) than those who watched  $\leq 2$  hours; and in the adjusted model, Puerto Ricans who watched 5+ hours of TV per day were 3.42 times more likely to be a smoker (CI: 1.41-8.29) than those who watched  $\leq 2$  hours. In the unadjusted model, Dominicans who watched 5+ hours of TV per day were 2.13 times more likely to be a smoker (CI: 1.08-4.20) than those who watched  $\leq 2$  hours; and there was not a significant association in the adjusted model between TV hours and smoking status.

In all Hispanics and the subgroups of Puerto Rican and Dominican, being born outside the mainland U.S. was a protective factor from current smoking [All Hispanics OR: 0.22 (CI: 0.12-0.37); Puerto Ricans OR: 0.24 (CI: 0.10-0.60); Dominicans OR: 0.20 (CI: 0.07-0.54)].

**Table 1.3. Unadjusted odds ratios and adjusted odds ratios for smoking by amount of television viewed per day among Hispanic adults from the Project IMPACT Survey (n=675) and by subgroups of Puerto Rican (n=182) and Dominican (n=396)**

Variable	Subgroup Analysis			
	All Hispanics Unadjusted OR <sup>a</sup> n=675	Puerto Ricans Unadjusted OR n=182	Dominicans Unadjusted OR n=396	Adjusted OR n=396
<b>Average TV viewing per day</b>				
0-2 hours (ref.)	1.00 (-)	1.00 (-)	1.00 (-)	1.00 (-)
3-4 hours	0.63 (0.38-1.04)	1.31 (0.52-3.31)	0.58 (0.27-1.28)	0.63 (0.28-1.41)
5+ hours	<b>1.76 (1.12-2.78)*</b>	<b>3.42 (1.41-8.29)**</b>	<b>2.13 (1.08-4.20)*</b>	1.92 (0.92-3.99)
<b>Education</b>				
< High school	1.96 (1.09-3.54)*	2.75 (0.94-8.08)		1.54 (0.67-3.55)
Completed high school	1.77 (1.01-3.12)*	1.62 (0.57-4.64)		1.46 (0.63-3.36)
≥Associate/college degree (ref.)	1.00 (-)	1.00 (-)		1.00 (-)
<b>Mean age</b>	1.00 (0.98-1.02)			1.01 (0.99-1.04)
<b>Female</b>	0.50 (0.32-0.80)**	0.43 (0.19-0.95)*		0.58 (0.29-1.18)
<b>Married/Living with partner</b>	0.59 (0.38-0.92)*	0.43 (0.19-0.97)*		0.84 (0.43-1.63)
<b>Born outside mainland U.S.~</b>	0.22 (0.12-0.37)***	0.24 (0.10-0.60)**		0.20 (0.07-0.54)*
<b>Employment status</b>				
Working	1.00 (-)	1.00 (-)		1.00 (-)
Not working	1.35 (0.79-2.31)	1.20 (0.44-3.22)		1.42 (0.66-3.06)
Not working due to health reasons	1.92 (1.05-3.54)*	1.37 (0.50-3.75)		1.90 (0.76-4.78)

95% confidence intervals in parenthesis ( ) | \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  | ~includes Puerto Rico

<sup>a</sup> Completed the bivariate analysis for the exposure and covariates: the born outside mainland U.S. variable was associated with smoking and average TV viewing per day (0-2 & 2-4 hours); education (≥Associate/college degree) was associated with outcome smoking and average TV viewing per day (0-2 hours)

## DISCUSSION

Our sample had higher percentage of smokers (19%) compared to Hispanics in the U.S. (12.5%) and the general population (18.1%).<sup>1</sup> In the subgroup analyses, Puerto Ricans and Dominicans in our sample had greater smoking prevalence than a national sample, 30% vs. 18.6% for Puerto Ricans and 13% vs. 10.7% for Dominicans.<sup>5</sup> The present study found that all Hispanics and Puerto Ricans in the highest category of average TV viewing per day (5+ hours) had statistically significant results that showed they were more likely to smoke than participants in the lowest category of average TV viewing per day (0-2 hours).

With 84% of the Hispanic adults in our sample indicating that they were born outside the mainland U.S. and 96% speaking solely Spanish or both Spanish and English, the interplay of media and acculturation is paramount. Birth country and primary language spoken can serve as a proxy for acculturation- with English language<sup>40</sup> and acculturation dominant to the U.S. culture<sup>41</sup> typically associated with greater smoking among Hispanics. We had a similar association in our sample with smoking prevalence increasing with more English spoken (14% only/mostly Spanish, 22% both Spanish and English, and 44% only/mostly English). Acculturation affects smoking behavior among Hispanic subgroups as well. Borrelli et al. found Puerto Ricans were more acculturated and more nicotine dependent than Dominicans,<sup>42</sup> which provides support to our study findings.

Our results suggest that high levels of TV viewership could negatively impact smoking status. Potentially, Hispanics are “transported” into the content on TV, which would reduce counter-arguing and change social norm perceptions.<sup>34</sup> Hence, it is important to understand what group has time to watch 5+ hours of television and what TV viewers are watching. In our sample, 46% of Hispanic adults were not working or not working due to health, which would



suggest that these participants may have had more time to watch TV. In addition, unemployed people typically have a greater likelihood of smoking than employed people,<sup>43,44</sup> and the same pattern was shown in our sample. There were variations by subgroup with more Puerto Ricans not working due to health than Dominicans (31% vs. 15%) in our sample.

As for television content, English language news and sports was highly ranked among Hispanics born outside the U.S., along with Spanish-language channels of Univision and Telemundo over English-language broadcast stations like CBS, ABC, and NBC.<sup>45</sup> Among the 50 highest-rated shows in 2000-2005 from these Spanish-language channels, telenovela soap operas were most liked by the audience, and other popular shows included *Sábado Gigante* (variety show), *Yo Soy Betty La Fea* (telenovela), *Despierta América* (morning show), and *Al Rojo Vivo* (sensationalistic news magazine).<sup>46</sup> Little is known about the smoking prevalence in these shows.

As for scripted English language TV shows, the top 10 primetime programs for Hispanic adults (aged 18-49) had over 100 tobacco depictions (e.g., cues, mentions) in 71 episodes in a content analysis, which accounted for 15% of the media sample.<sup>47</sup> The TV narrative content may have contributed to the likelihood of being a smoker in our sample, especially since anti-tobacco advertisements alone are unlikely to negate pro-tobacco media exposure.<sup>48</sup> In addition, all Hispanics, regardless of primary language, watch mainstream English-language movies,<sup>45</sup> which have an abundance of pro-tobacco messaging.

### **Limitations**

Based on the abundance of TV content, a limitation of this study was that we did not have data on the specific type of programming viewed by each respondent. A future study should include specific programming as a measure of TV exposure. The present study cannot evaluate

the causality of TV exposure and smoking status since it was cross-sectional. Sampling bias could be a concern with a response rate of 19.6%, but after reviewing the logistic regression between the unadjusted and adjusted model for all Hispanics in our sample, we saw that there was no evidence for selection (Unadjusted OR: 1.76; Adjusted OR: 1.94), and we selected covariates to address confounding. Moreover, we did not include a scale to assess acculturation, but we did have birth country and language spoken as a proxy.<sup>40</sup> In addition, all information was self-reported. Even though studies support the efficacy of self-report concerning smoking behavior, other survey items may have misclassification. The respondents to this survey were all residents of the same city in MA so their responses may differ from people in other towns or regions.

## **Conclusion**

Our findings shed some light on how TV exposure is associated with current smoking in low SEP Hispanics in northeastern Massachusetts. These findings can offer more critical analyses in programming, media interventions, and anti-tobacco campaigns. For instance, many Hispanics (62.2%) are intermittent smokers (smoking in the past month, but not daily) compared to the general population of 38.1% intermitted smokers, but there are still health consequences associated with this level of smoking.<sup>2</sup> Some Hispanics may not consider themselves smokers, even though they do smoke intermittently. Therefore, the TV exposure is especially salient because shows may have the potential to cue a smoker to smoke more.<sup>15</sup>

We need more foundational research such as a content analysis on tobacco use in the most popular shows on Univision and Telemundo. We can categorize tobacco occurrence in a show by use, paraphernalia, other reference to tobacco, and brand appearance.<sup>49</sup> We should also conduct a study that allows participants to indicate shows that they watch. In addition, a

longitudinal study can help disentangle the difference in smoking status and smoking intensity among Hispanic adults. We should continue collecting data on Hispanic origin and include acculturation measures. Also, to continue with the technology trend, it would be important to assess on-demand viewing of TV shows/movies and smoking status.

This study shows a strong association of between high levels of TV viewing and smoking among Hispanic adults, but also demonstrates the importance of disentangling Hispanic subgroups. This study suggests that television has positive images or cues for smoking, which may promote tobacco use. Ackerson and Viswanath found attention to health media sources increases the likelihood of being an intermittent smoker instead of a daily smoker or former smoker;<sup>50</sup> therefore, we should work hard on promoting appropriate health messages so daily and intermittent smokers can become former smokers. The present study results should alert interventionists about the importance of critical analyses of programming to inform media literacy interventions and anti-tobacco campaigns so that adults can make conscious decisions about their TV viewing.

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## **Paper 2**

### **The role of health information sources in decision-making among Hispanic mothers during their children's first 1000 days of life**

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## **ABSTRACT**

**Objective:** This qualitative research aimed to explore how health information sources inform decision-making among Hispanic mothers during their children's first 1000 days of life (conception-age 24 months), and to generate appropriate health information sources and communication strategies for future interventions.

**Methods:** We conducted 7 focus groups with 49 Hispanic women who were pregnant or had children < 2 years old. Domains included interpersonal and media sources, source trustworthiness, dealing with contradictory information, and how information affects decision-making. We used immersion/crystallization process for analysis.

**Results:** Trusted health information sources included health care providers, female and male family members, BabyCenter.com and other Internet sources, selected social media, and television. Some immigrant women reported preferring the Internet citing less established local support networks. Women highlighted the importance of validating health information through checking multiple sources for consistency and resolving contradictory information. Mothers expressed interest in receiving reliable website links from healthcare professionals and outreach to extended family.

**Discussion:** Cultural factors, including immigration status, are important in understanding the use of health information sources and their role in decision-making about pregnancy and child health among Hispanic mothers. Healthcare providers and public health professionals should consider Hispanic mothers health information environment and provide culturally-relevant communication strategies and interventions during this high information-seeking time period.

## INTRODUCTION

Childhood obesity has origins in the earliest stages of life with 8.1% of infants and toddlers having high weight for recumbent length.<sup>1</sup> Hispanic children are disproportionately burdened with obesity and related risk factors by early childhood,<sup>1</sup> with non-exclusive breastfeeding, early introduction to solid foods, insufficient sleep, increased screen time, and higher intake of sugar-sweetened beverages contributing to racial/ethnic differences in childhood obesity prevalence.<sup>2-4</sup> The first 1000 days of life, conception through age 24 months, is a crucial window for mothers to receive accurate health information because it is a critical developmental period for the child.<sup>5</sup> Although health information seeking plays an important role in formation of health behaviors, little information exists regarding trusted sources of health information for Hispanic parents that contributes to the formation – and thus, prevention of childhood obesity risk factors during their child’s first 1000 days of life.

Clinicians are a principal trusted resource for health information and support.<sup>6</sup> Yet, individuals tend to use other sources like Internet, television, and family/friends to supplement their health information.<sup>7</sup> Health information seeking can be associated with positive outcomes such as knowledge of medical options, treatment adherence, and discussion of results with the physician.<sup>8</sup> In contrast, it is also associated with self-diagnosis,<sup>8</sup> with over one-third of U.S. adults using the Internet as a diagnostic tool.<sup>6</sup> The top 10 most trusted sources of information among all mothers in a 2008 study were pediatricians (58%), friends and family (55%), evening news (39%), Internet searches (38%), physician office (37%), web sites (33%), parenting books (32%), morning TV talk shows (31%), newspaper articles (28%), and magazines (25%).<sup>9</sup> These participants indicated that they ask their parents and the pediatrician about parenting advice, and seek the doctor first for health issues, nutrition, and diet information.<sup>9</sup> The top two trusted

sources (pediatricians and friends/family) have been consistent since the 1980s.<sup>10,11</sup> Concerning the Internet, pregnant women and mothers seek information about childhood illnesses, parenting, and development from clinical and parenting websites.<sup>12</sup>

Among Hispanic adults, common health information sources are doctors (71%), television (68%), family and friends (63%), newspapers and magazines (51%), and radio (40%).<sup>13</sup> In 2013, 73% of Hispanics used the Internet<sup>14</sup> with 66% searching for health information.<sup>6</sup> Many Hispanics (79%) reported that they acted on information from media sources; 41% reported that media influenced their decisions on how to treat medical conditions; and almost two-thirds reported that Internet, broadcast, and/or print media changed their views about diet or exercise.<sup>13</sup> Understanding how Hispanic mothers seek health information to inform decision-making about pregnancy and child health will inform future efforts to reduce disparities in childhood obesity.

The overall objective of this qualitative study was to explore how health information sources inform decision-making among Hispanic mothers for their children's first 1000 days of life. Using focus groups, we examined common health information sources, identified how health information sources impact decision-making in the context of pregnancy and child health, and generated appropriate health information sources and communication strategies for future interventions.

## **METHODS**

### **Study Setting and Participants**

We conducted seven focus groups with Hispanic women at three life stages: two pregnancy groups, three infancy groups (children aged birth-6.9 months), and two early childhood groups (children aged 7-24 months). Criterion-based sampling<sup>15</sup> was employed to

recruit participants. Eligibility criteria included participants who identified themselves as Hispanic, ability to speak Spanish or English, having a singleton pregnancy or having at least one child <2 with no major medical conditions, and at least 18 years of age.

We recruited participants in a community health center clinic waiting room and by telephone, selecting patients who had an outpatient visit for routine prenatal care or parents presenting for pediatric care. The eastern Massachusetts community health center is federally-qualified with a multispecialty provider group and serves a racial/ethnic and socioeconomic diverse population. We provided an incentive of \$40 for participation and \$20 to reimburse for childcare and travel.

### **Focus Group Guide Development**

This study was a component of the Family Experiences in Early Life (FEEL) Study, which focused on the role of socioeconomic status and race/ethnicity in disparities of early life risk factors for childhood obesity.<sup>16</sup> Therefore, mothers discussed health information sources within this context.

For our study, we used the Health Information Acquisition Model<sup>17</sup> to guide focus group question development and analysis. This model focuses on the health information seeking process, including cost/benefit analysis of searching and evaluation and adequacy of information.<sup>17</sup> Interview guides for each life stage were developed using an iterative process during several meetings with the research team. The topics pertaining to health information were: interpersonal and media sources, source trustworthiness, dealing with contradictory information, and how information affects decision-making. Selected questions are provided in Table 2.1.

**Table 2.1. Focus group sample questions for health information sources and decision-making**

<b>Pregnancy Focus Group Guide Questions:</b>
<p>1) Who do you get advice from about how to keep you and your baby healthy during pregnancy? <i>Probes:</i></p> <ul style="list-style-type: none"><li>○ Do you get advice from family members or friends?</li><li>○ What about your health care providers?</li><li>○ If you get different advice from different people, how do you decide what you are going to do?</li><li>○ <i>If they answer “I listen to the source I trust most”:</i><ul style="list-style-type: none"><li>▪ Probe: Who do you trust the most and why?</li></ul></li></ul> <p>2) Please share some examples of advice you received that you disagreed with, and how you dealt with that.</p> <p>3) Some people look for advice about pregnancy by looking through the media – for example TV, Internet, magazines, newspapers, Facebook, mobile apps and other types. What information do you get from the media about how to keep you and your baby healthy during pregnancy? (<i>be specific with details</i>)</p> <ul style="list-style-type: none"><li>a. What type of media do you trust for information about health during pregnancy? Why?</li><li>b. What specific TV shows, magazines, websites, or advertisements or other media that you trust? Why?</li></ul>
<b>Infancy &amp; Early Childhood Focus Group Guide Questions:</b>
Same as pregnancy section above with slight modifications referring to baby/child instead of pregnancy

### **Data Collection**

We conducted all 90-minute focus groups at the recruitment site between July 2013 and January 2014. Focus groups were conducted until saturation was reached for topic areas. At recruitment, each participant completed a brief survey asking demographic questions such as age, education, and number of children in household. For each focus group, a Hispanic bilingual moderator facilitated the discussion. Focus groups were primarily in Spanish with some English interpretation at times. Two study staff members took notes during the discussion, and team members debriefed after each focus group to summarize particularly salient themes. Discussions were audio-recorded and transcribed verbatim in Spanish, and then professionally translated to

English. The institutional review board at Massachusetts General Hospital for Children approved the study protocol. All participants provided informed, written consent prior to participation.

### **Analytic Approach**

The research team used the immersion/crystallization process involving immersion into the data through detailed examination, reflection on the analysis, and identification of themes.<sup>18</sup> We read the transcripts independently and then discussed the data as a group repeatedly to determine topical content and emerging themes. Team members took notes during meetings. We then developed and refined a codebook through iterative discussions. We used NVivo 10,<sup>19</sup> to import transcripts, code the data, and organize codes. Two research team members coded one transcript to guide discussion to ensure consensus on categorization of the data. One member of the team coded all remaining transcripts. We then analyzed code reports to complete content analysis and interpretation of themes<sup>20</sup> with the Health Information Acquisition Model<sup>17</sup> as a guide. We continued analysis until no new major themes emerged and resolved discrepancies at research team meetings.

## **RESULTS**

### **Participant Characteristics**

Table 2.2 shows characteristics of the 49 women in the focus groups. Mean maternal age was 26.4 [Standard Deviation (SD): 6.6] years. Mean gestational age in pregnancy groups was 5.1 (SD: 1.8) months. Mean child age was 2.8 (SD: 2.0) months in infancy groups and 14.3 (SD: 5.3) months in early childhood groups. More than half of women were born outside the United States, and most spoke both Spanish and English.

**Table 2.2. Hispanic mother and child characteristics according to focus group participation (n=49)**

	<b>All Groups (N=49)</b>	<b>Pregnancy Groups (N=17)</b>	<b>Infancy Groups (N=15)</b>	<b>Early Childhood Groups (N=17)</b>
<b>Parent/Family Characteristics</b>				
Maternal age, years, mean (SD) <sup>a</sup>	26.4 (6.6)	25.6 (6.4)	25.6 (7.5)	27.9 (6.1)
Education, college graduate, n (%)	6 (12%)	2 (12%)	1 (7%)	3 (18%)
Education, high school graduate, n (%)	34 (69%)	13 (76%)	9 (60%)	12 (71%)
First Child, n (%)	30 (61%)	14 (82%)	10 (67%)	6 (35%)
Married/cohabiting, n (%)	30 (61%)	11 (65%)	9 (60%)	10 (59%)
US-born, n (%)	19 (39%)	6 (35%)	7 (47%)	6 (35%)
Language Comfort				
Spanish-only	16 (33%)	9 (53%)	4 (27%)	3 (18%)
English-only	1 (2%)	0	0	1 (6%)
Either	32 (65%)	8 (47%)	11 (73%)	13 (76%)
Gestational Age (months)	n/a	5.1 (1.8)	n/a	n/a
<b>Child characteristics</b>				
Age (months)	n/a	n/a	2.8 (2.0)	14.3 (5.3)

<sup>a</sup>SD= Standard Deviation

## **Sources of information and its relationship to decision-making**

We describe each health information source in the section below. The following themes were consistent among all groups, unless otherwise indicated.

Health Care Providers- Need an alternative for immediate information. Many participants cited their healthcare provider (e.g., doctor, nurse, WIC nutritionist) as their trusted information source. Participants mentioned that healthcare providers were helpful with nutrition information, such as safe and healthy foods in the pregnancy group, and breastfeeding and introducing solid foods in the other groups. However, in all groups, women mentioned the need to use other resources like the Internet and family members for immediate information: “I have to be there for a long time to talk with the [doctor], so I can talk with my aunt or my mom quickly, and she tells me quickly the things that the doctor will eventually tell me” (Pregnancy Group).

Interpersonal- Listen to advice from female and male family members with children. Most women in all groups reported that family members are a vital source for information about healthy pregnancy and children. Many women stated that they trust their mothers, along with other female family members including grandmothers, sisters, aunts, and mother-in-laws. Some women stated that they receive health information from male relatives, including their fathers, step-fathers, grandfathers, and brothers: “I [ask] my father because...he raised six kids, so he has good advice” (Early Childhood Group). A few pregnant women noted that they seek advice from their boyfriend: “My boyfriend, who has four girls, he is an expert.” Overall, there was a general sentiment that trusting family and friends who have experience as parents is important.

Self- Following intuition. Only participants in the infancy and early childhood groups indicated that they rely on their own intuition instead of following others’ advice when caring for their children: “I have so many different opinions; I’ll just go with my gut feeling” (Infancy



Group). Some women reported that it was called “mother’s instinct,” and came from the context of having some experience with their own child(ren), was essential in decision-making for child health, and trumped the advice of doctors and family members.

Internet- Trust websites with medical professionals and mothers’ advice. In all groups, women indicated their use of the Internet as a health source. Many cited Google as their main search engine and BabyCenter.com as a regularly utilized website. Women reported that they searched the Internet for information (mainly English language sites) about healthy fetus, baby, and child development, nutrition and feeding practices (e.g., breastfeeding, introduction of solid foods), and safety information (e.g., co-sleeping). Most women in the focus groups were born in another country, and one mother in the early childhood group noted that she preferred the Internet because, “I am new in this country, so I haven’t had the opportunity to meet many people.”

BabyCenter.com, a commercial information website, was popular among all groups. The participants stated that they visited the webpage, signed up for weekly e-mails, downloaded and used the application (app), and valued comments from parents with similarly-aged children. In pregnancy groups, women reported enjoying viewing weekly information about the development of their baby, and they learned about diet and exercise during pregnancy on the website. The participants reported trusting the site: “all the information from BabyCenter...it’s similar to what you see in the book, the doctor” (Pregnancy Group).

WebMD, another commercial website, was not mentioned in the pregnancy groups, but was consistently cited in the other groups for providing good child health advice. Other websites mentioned for health information were: WhatToExpect.com, BabyGaga.com, Parenting.com, Gerber.com, and Enfamil.com.

Participants talked about two forms of social media: YouTube and Facebook. On YouTube, women looked for videos about pregnancy nutrition, baby development, breastfeeding, swaddling, and gas relief for babies. One pregnant woman who experienced a previous miscarriage used YouTube to corroborate her abnormal pains before the miscarriage and as a form of social support afterwards with other women who had a similar experience. Many participants across groups reported that they use Facebook for social networking. When the moderator asked the participants if they would trust Facebook for pregnancy and child health information, all participants except two said “No.” Across groups, participants reported that people “post any information [they] want, whether it’s true or not,” (Pregnancy Group) and that “Facebook is too personal [and it is] not the space for [discussing personal health information]” (Early Childhood Group).

Television- Can increase awareness and initiate change. Participants in each life stage reported that they received pregnancy and/or child health advice from television shows. Several women indicated that they watched “A Baby Story” on The Learning Channel (TLC) and The Discovery Channel. In one pregnancy group and one infancy group, women highlighted the Spanish-speaking channels of Univision and Telemundo. One participant reported that she learned about the amount of sleep that babies should get on “Despierta América (Wake Up America)” on Univision. Another participant reported that she learned that a baby can “weigh too much” on the tabloid talk show, “Maury,” which featured a “really big” toddler on an episode.

Some participants in the infancy group made decisions based on the information that they received from television: “They say on television that if you give him breast milk they are more intelligent. I said I am going to give him a lot of breast milk because I want him to be very

intelligent” (Infancy Group). One mother described that she used to put an iPad in her child’s crib, but then saw a “pediatrician on the show” who discouraged the use of a baby seat with an iPad holder, which led the mother to stop putting an iPad in the crib.

Importance of Validation- Use multiple sources for consistency and resolving contradictory information. Women in all groups expressed a desire for accurate information about their pregnancy and child health. They reported reviewing various sources to confirm information and address discrepancies: “I listen to multiple sources and look for the common denominator... if there’s a majority that goes with the same reply, then, well, I follow more” (Infancy Group). One major aspect of validation for the mothers was including the doctor’s advice as an obligatory part of their compendium of health sources. In the infancy group, many women indicated that they ask their baby’s pediatrician for clarifying guidance when they hear conflicting health information from other sources, including family members. Some mothers compartmentalized which health source is appropriate concerning child health: “I pay more attention to the doctor when it’s about my son’s health...so television and activities are more for the grandmother and nutrition things for the doctor” (Early Childhood Group).

### **Health information sources and communication strategies for future interventions**

Participants in all groups suggested ways to reach them with the appropriate information. Table 2.3 shows health information sources, the perceived appropriate sender of the message, and communication strategies for future interventions highlighted by the mothers. The participants provided an array of health sources, and some women stated that they would want the fathers to be involved as well. The participants indicated that a health professional and/or experienced parent should deliver the messages.

**Table 2.3. Health information sources, sender, and communication strategies for future interventions from 49 Hispanic women participating in focus group discussions**

Health information source	Sender	Communication strategy
Email	Healthcare provider	Emails should include health tips and pertinent links to informative websites, along with space to hear other mothers' experiences online.
Mobile- Text messages and Smartphone apps	Healthcare provider / Public health professional	Text health messages <ul style="list-style-type: none"> <li>▪ “A text message is better than a call because sometimes you forget what you were supposed to do, and you go back and read it again.” (Infancy Group)</li> </ul>
Telephone Hotline/Support	Healthcare provider / Health advisor	Receive calls from a health care professional with the ability to call in with questions/concerns <ul style="list-style-type: none"> <li>▪ “Even though I’m not seeing them face to face, I know that there’s somebody I can trust.” (Early Childhood Group)</li> </ul>
Mail- brochures/pamphlets	Healthcare provider / Public health professional	Health education materials
Class	Healthcare provider / Public health professional / Other parents (mothers and fathers)	Provide in-person classes as a stand-alone program or in the waiting room, as well as, video classes; include mothers and fathers in the classes

## DISCUSSION

In this qualitative study of Hispanic mothers with children in the first 1000 days of life, we identified the relevance and nuances of each health information source along with how the sources influenced decision-making. Mothers trusted advice from doctors through in-person and online interactions and experienced male and female parents. We found that Hispanic mothers desired communication strategies and interventions that included their extended family and approved websites from their healthcare providers especially for immigrants with no or little family in the area.

The majority of our participants reported that they seek health information from a medical professional, which aligns with national survey findings that 77% of Hispanic women<sup>13</sup> and the majority of White and African American parents seek information from medical professionals.<sup>21</sup> One study found that some Hispanic women follow clinician advice without question,<sup>22</sup> whereas, our participants conferred with other sources but typically followed the doctor's advice. A segment of our participants revealed that they perceive barriers with attending health care visits, so they seek information from the Internet or family first. Disagreement with information provided by health professionals and lack of time to ask questions could explain some of the Internet use by participants in our study.<sup>23</sup>

Many women in our focus groups reported that they rely on their own "mother's instinct," particularly when confronted with various recommendations from different sources. Comparably, a similar study found that pregnant women from the southeastern U.S. elucidated a similar concept to "mother's instinct" that researchers labeled "it just came natural."<sup>11</sup> This concept seems to translate across race/ethnicity and could be used for empowerment concerning decision-making.

In our focus groups, interpersonal relationships were a common health information source, which is customary,<sup>13</sup> but it may be differentially utilized by immigration status. Immigrants are less likely to seek advice from family and friends than Hispanics born in the U.S., 59% versus 71% respectively, potentially based on having smaller networks in the U.S.<sup>13</sup> Most of our participants were immigrants (61%), and our findings suggest that recent immigration affects utilization of local interpersonal support.

Collectivist values often pervade Hispanic life leading to individuals seeking others to help guide decisions and opinions.<sup>24</sup> Therefore, the U.S. Centers for Disease Control

recommended using social networks for health promotion because they facilitate collective sharing of information and communication.<sup>24</sup> The top three social media sites for Hispanics are Facebook (73%), Instagram (34%), and Twitter (25%).<sup>25</sup> Even though most of our participants reported that they use Facebook, they claimed that it was not a trusted source for pregnancy and child health information because anyone could post information. Our participants did not mention Instagram and Twitter; therefore, it may not have been perceived as a source for health information, or they may not be active users of these modalities. If social media like Facebook was to be utilized for this audience, the health promotion source would have to adequately notify the women of its credentials, specifically presenting advice from a health professional or experienced parent. In addition, our findings elucidated that YouTube is a resource for demonstration and emotional support, including coping support during problematic pregnancies.<sup>26</sup> It seems that a participant's ability to search for the desired video topic (e.g., how to breastfeed) from someone outside her personal social network increased the usefulness of YouTube compared to Facebook.

Our participants cited Internet websites as regularly-used tools for health information seeking, which is common among all U.S. online health information seekers.<sup>6</sup> The Health on the Net Foundation Code of Conduct (HONcode) provides guidelines for certification of medical and health websites to bolster the reliability and credibility of information through the HONcode principles, including citing author qualifications and sources.<sup>27</sup> Specifically, our participants highly utilized BabyCenter.com. They emphasized that information from the Internet should be valid in order to use it in decision-making, which has been shown to increase behavioral intentions,<sup>28</sup> but this site is not HONcode certified, even though BabyCentre.co.uk has the certification.

Some of our participants noted that Spanish-language television played a role as a health information source. Among Hispanics who receive health information from television, 40% get that information from only Spanish-language television stations, 32% from a mix of Spanish and English-language stations, and 28% from only English-language stations.<sup>13</sup> Educational partnerships between Spanish language stations and health care professionals are important to disseminate accurate health information.

Several participants indicated that they watched birth and baby shows from Discovery Health and The Learning Channel. A content analysis of birth television shows found these programs are not aligned with evidence-based maternity practices.<sup>29</sup> In addition, there was underrepresentation of Hispanic women in general and an overrepresentation of Hispanic single women in the television shows compared to national demographics.<sup>29</sup> Practitioners should assess the television programs that Hispanic families view during pregnancy and early life to correct misinformation, and identify opportunities for intervention through PSAs, storylines, and representation in order to promote correct information about pregnancy and child health.

Our findings revealed the importance of maternal validation of pregnancy and child health information, mostly through Internet use. In one study, many Swedish pregnant women (84%) used the Internet to retrieve pregnancy-related topics and most considered it reliable if the information was consistent with other sources and included references, but rarely discussed the information with their clinician.<sup>30</sup> Pregnant women from various countries use the Internet to help validate information from other sources, share experiences within online forum communities, and assist in decision-making by providing details about available choices.<sup>31</sup> Internet is a convenient resource that mothers use to verify or resolve varied information.

Most existing qualitative research around health information for mothers focuses on pregnancy or a specific child development stage. Our study, in contrast, included mothers with children on the continuum of the first 1000 days of life. Some limitations should be noted. The discussion topic of obesity risk factors within this life stage was novel, yet perhaps mothers would have considered other health information sources if we discussed another topic. Similar to most qualitative studies, researchers should not generalize our findings to all Hispanic pregnant women or mothers of young children. Finally, some groups needed interpretation between English and Spanish within the discussion at times, and it is possible that some communication was hindered.

Our study highlights intricacies of health information source use and their role in decision-making of Hispanic mothers with children in the first 1000 days of life. Healthcare providers and public health professionals should consider the health information environment of their patients and provide culturally-relevant communication strategies and interventions. Practically, healthcare providers can ask patients about information they have found<sup>8</sup> and/or provide an easy-to-read, bulleted printed handout or email that also lists trustworthy Internet sites<sup>32,33</sup> that have been HONcode certified. The sites can also provide a platform to discuss health information with patients, especially among immigrants who may not have a strong support system established yet. Practitioners can provide classes for parents that include ways to validate health information and communication skills with family members. In addition, practitioners can distribute information through Internet discussion forums and mobile phones for parents and their family members (e.g., parents, in-laws, siblings) to increase accurate information about pregnancy and child health. Intervening during this high information period could help improve Hispanic children's health outcomes.



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**Paper 3**

**Media Competition Implementation for the Massachusetts Childhood Obesity Research  
Demonstration Study (MA-CORD): Success through a Cascade of Champions**

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K. Viswanath, PhD, Kirsten Davison, PhD

## **ABSTRACT**

**Objective:** Objectives of this study are to document the development and uptake of the media competition implemented in the context of a multi-sector community intervention targeting childhood obesity prevention (Study 1); and examine community, organizational and provider characteristics that explain variation in implementation effectiveness and describe diffusion of the media competition across community sectors (Study 2).

**Methods:** In Study 1, the implementation process was documented, and reach and adoption of the media competition were calculated from data on process evaluation forms. In Study 2, 54 key informant interviews were conducted with 12 focusing solely on the media competition with school/afterschool teachers, and 42 interviews about all aspects of MA-CORD with other staff from school and afterschool programs, as well as, clinics, WIC, Parks and Recreation Department, and community coalitions. Interviews were recorded, transcribed, coded in NVivo software for data management and reliability comparison with Kappa coefficient, and analyzed.

**Results:** In Study 1, the media competition was implemented in 18 school and afterschool programs with 595 students submitting entries. Reach of the media competition ranged from 3-33% of the student population and adoption ranged from 22-100% in programs. In Study 2, salient themes that emerged as implementation facilitators were having a cascade of champions and adaptability through providing opportunity to participate in the media competition outside traditional class time. The media competition was diffused across the clinic and coalitions sectors, but it was not mentioned in WIC or the Parks and Recreation Department interviews.

**Discussion:** The documentation of the implementation should contribute to the replication of the media competition. In addition, our findings introduced the concept of cascade of champions, which can offer a new perspective on intervention design and a recommended direction for further study.

## **INTRODUCTION**

Obesity is an urgent public health concern in the United States, particularly among children. The data from the National Health and Nutrition Examination Survey (NHANES) reveals that 17% of all children and adolescents in the U.S. are obese, which has tripled over the past 30 years.<sup>1</sup> Excess weight in childhood is associated with increased risk of overweight and obesity during adolescence and adulthood and elevates the risk of chronic diseases and premature death as an adult.<sup>2</sup> Biologic, psychosocial, and behavioral factors across many interacting contexts contribute to childhood obesity;<sup>3</sup> therefore, multi-level interventions are recommended.

Although still in their infancy, multi-level community interventions to reduce childhood obesity have been effective in reducing BMI.<sup>4,5</sup> With the intricacies of these interventions, there can be difficulties with translation from research to practice.<sup>6</sup> Therefore, an iterative and cyclical process is required through replication and triangulation of data from various study designs to guide the translation of complex multi-level health interventions into real-world settings.<sup>7</sup> Dissemination of an intervention is not an end in itself, but the successful integration and implementation by the end user is a key indicator for success in practice-based settings.<sup>8</sup>

### **MA-CORD Overview**

The Massachusetts Childhood Obesity Research Demonstration Study (MA-CORD) is a multi-level, multi-sector community intervention to prevent and reduce childhood obesity among low-income children, aged 2-12 years in two communities in MA. Consistent with the Obesity Chronic Care Model,<sup>9</sup> MA-CORD incorporates evidence-based interventions in each sector including healthcare, early care and education, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), schools, after school programs, and the broader

community. The MA-CORD intervention design is outlined in detail by Taveras et al.,<sup>10</sup> and the specific evaluation plan and baseline results are presented in Davison et al.<sup>11</sup> MA-CORD was funded by the Centers for Disease Control and Prevention as part of a comprehensive approach in several cities across the U.S. to address childhood obesity.<sup>12</sup>

This study focuses on a media competition implemented with students in public elementary and middle school and afterschool programs in the MA-CORD communities (known as *Mass in Motion Kids* in intervention communities). Studies indicate that interventions with components of media arts competitions can improve student awareness and behavior change concerning obesity prevention topics.<sup>13,14</sup> Media competitions are important components of interventions, yet many studies do not focus on the detailed planning and implementation process for replication.

The goal of this media competition was to provide an overarching synergy for MA-CORD and promote awareness of the target behaviors which included: 1) Switch from sugary drinks (like soda, sports, and fruit drinks) to water.; 2) Watch no more than 2 hours of screen time per day (includes TV, smartphones, and hand-held video games).; 3) Get at least 1 hour of physical activity (including active play) per day.; 4) Replace sugary, salty, fried, and fast food with fruits and vegetables.; and 5) Sleep at least 10 hours (2-5 year olds) or 11 hours (6-12 year olds) hours per day. In particular, students were tasked with developing videos, song/rap lyrics, and artwork that reflected “How can you be a *Mass in Motion Kid*?” by addressing the goals.

The media competition adopted an empowerment approach on two levels. First, the competition as a whole was developed by school and community representatives in collaboration with researchers. Second, the competition promoted students’ active and meaningful engagement with the development and creation of their media competition entries to affect

change in their community.<sup>15</sup> Positive outcomes of this approach include increased self-efficacy and sense of responsibility through production of knowledge that impacts policy and action in their communities.<sup>16</sup> Incorporating the empowerment approach was particularly salient in this multi-sector intervention because community coalitions partnered with this study, which provided an opportunity for students' work to reach beyond the school.

### **Aims of Study 1 and Study 2**

This paper presents two interrelated studies that outline the development and implementation of the MA-CORD media competition in 18 school and afterschool programs in two communities in MA. Specifically, Study 1 (Implementation Documentation) documents the process used to develop and implement the media competition along with its reach and adoption. Study 2 (Predictors of Implementation Effectiveness) documents variation in implementation effectiveness across schools and after school programs in two communities; examines community, organizational and provider predictors of variation in implementation effectiveness; and describes diffusion of the media competition across community sectors.

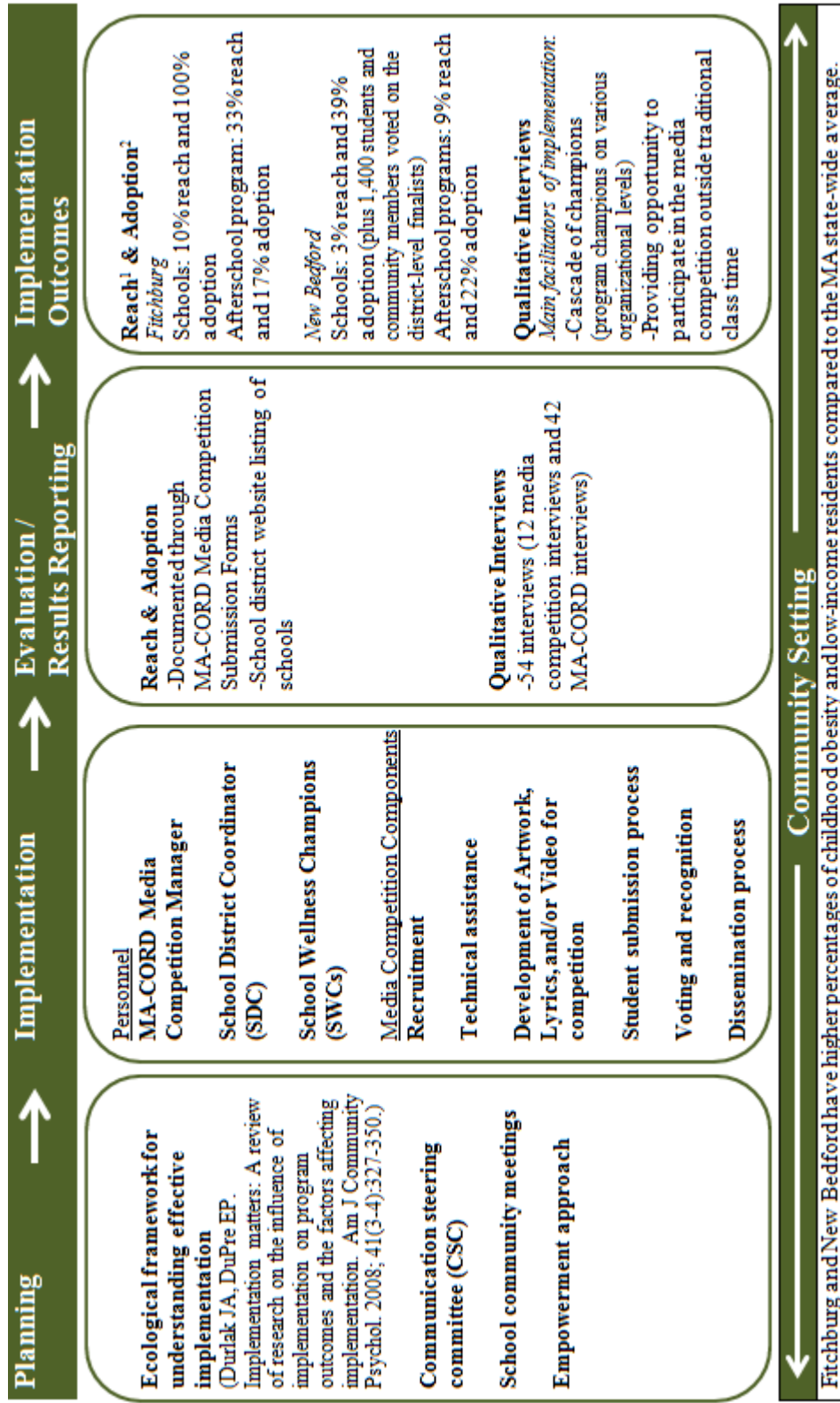
### **STUDY 1-Implementation Documentation**

#### **METHODS (Study 1)**

##### **Theoretical Framework**

Detailed documentation of the process to implement an intervention can facilitate its replication in other communities.<sup>17</sup> An adaptation of Neta and colleagues' 2015 framework on dissemination and implementation will serve as a guide to examine each aspect of the MA-CORD Media Competition.<sup>17</sup> Figure 3.1 shows the MA-CORD Media Competition Implementation Process, which includes planning, implementation, evaluation/results reporting, and implementation outcomes.





Adapted from: Neta et al. "A framework for enhancing the value of research for dissemination and implementation." *American journal of public health.* 2015; 105(1):49-57.

<sup>1</sup>Reach= student participation rates within schools who offered students the option to participate in the media competition

<sup>2</sup>Adoption= whether eligible schools or afterschool programs decided to implement the media competition.

**Figure 3.1. MA-CORD Media Competition Implementation Process**

## Community Setting

Understanding the community setting, which is shown at the base of the model, is essential for successful intervention adoption.<sup>18</sup> For MA-CORD, the community context was a cross-cutting factor that affected each aspect of implementation. The media competition was implemented in Fitchburg and New Bedford, Massachusetts. Table 3.1 lists the characteristics of the community setting for the MA-CORD Media Competition. Fitchburg has 40,514 residents with 6 public schools serving kindergarten through 8th grade, and New Bedford has 95,502 residents with 23 public schools. Across both communities, non-Hispanic white residents are the majority population (68% of residents) and Hispanics (18-22%) are the largest minority group. Both communities have a higher percentage of low-income residents and children classified as overweight or obese compared to the MA state-wide average.

**Table 3.1. Characteristics of the Community Setting for MA-CORD Media Competition**

<b>Socio-demographic Characteristics</b>	<b>Massachusetts</b>	<b>Fitchburg</b>	<b>New Bedford</b>
Total population <sup>1</sup>	6,436,940	40,514	94,502
% White (any race) <sup>1</sup>	76.1	68.2	67.9
% Black or African American (any race) <sup>1</sup>	6.0	1.1	5.2
% Hispanic or Latino (any race) <sup>1</sup>	9.6	21.6	16.7
% of children overweight or obese 2009-2010 <sup>2</sup>	33.4	46.2	37.2
Average per capita income <sup>3</sup>	\$35,485	\$22,949	\$21,343
% Families with children whose incomes are less 100% or more of the Federal Poverty Level <sup>3</sup>	12.0	23.5	27.1
# of public schools serving students kindergarten through 8th grade 2012-2013 <sup>4</sup>	1500	6	23

<sup>1</sup> 2010 Census

<sup>2</sup> Massachusetts Department of Public Health

<sup>3</sup> 2008-2012 American Community Survey 5-year estimates

<sup>4</sup> Massachusetts Department of Education

## Implementation

Figure 3.2 illustrates the MA-CORD Media Competition Intervention Flowchart. It focuses on the competition timeline highlighting competition development, technical assistance, development of the artwork, lyrics, and video entries, voting and recognition, and dissemination.

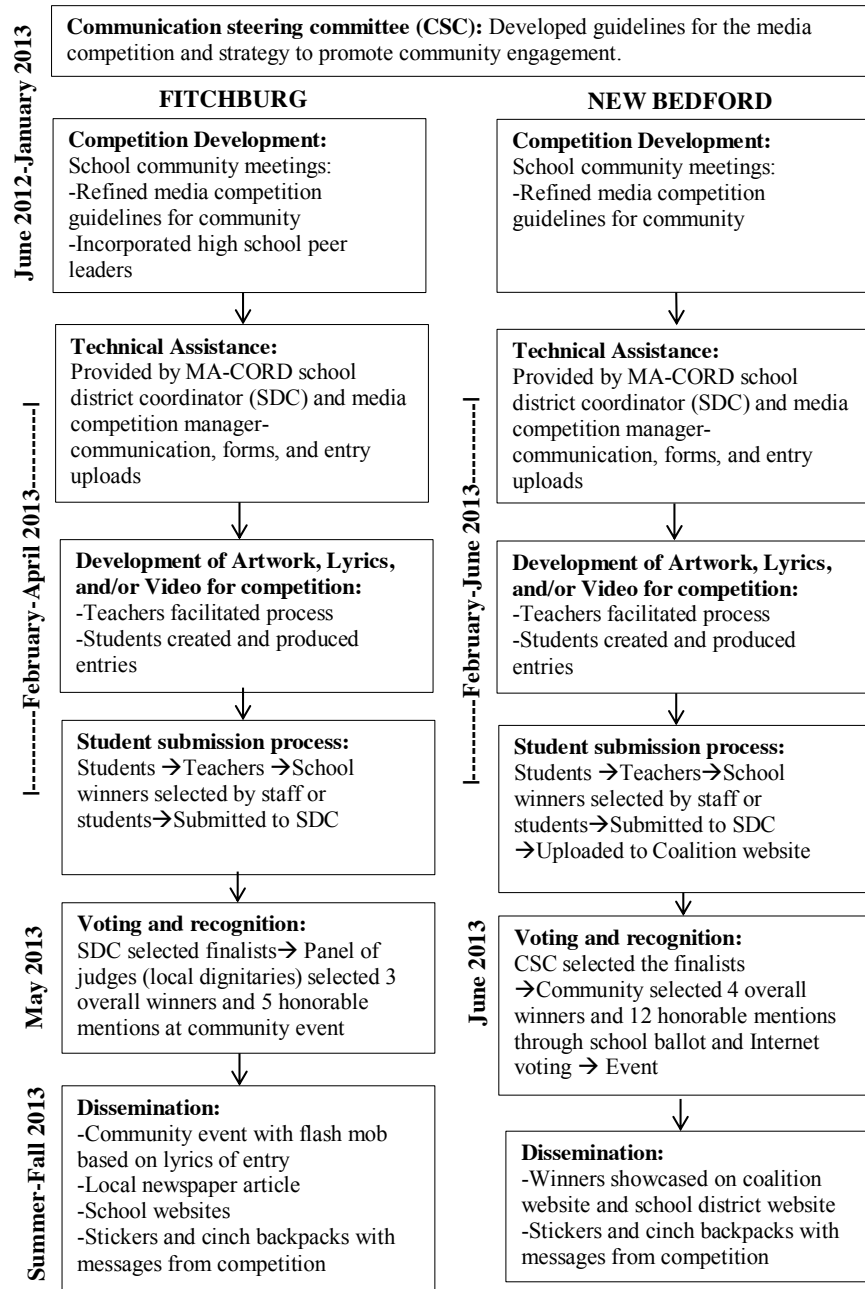


Figure 3.2. MA-CORD Media Competition Intervention Flowchart

Communication steering committee (CSC). The research team initiated a Communication Steering Committee (CSC) to guide the development of the media competition and further communication initiatives for the broader MA-CORD intervention. The committee consisted of teachers, nurses, and coalition members from each community, and representatives from the Massachusetts Department of Public Health and Harvard T.H. Chan School of Public Health. The CSC oversaw the media competition process and provided solutions concerning research and implementation issues. One main decision point was offering the students three types of submissions options (i.e., video, lyrics, and artwork) instead of one option (e.g., poster). The CSC met two times as a complete body, and a smaller subset met regularly at the weekly MA-CORD meetings during the duration of the development and implementation of the media competition.

School community meetings. In addition, three meetings which included school and community representatives were held in each community to refine components of the media competition including the competition guidelines, promotion of the competition, the voting process, and the prizes. Specialty (e.g., health, art, physical education) and classroom teachers, cafeteria managers, school nurses, and coalition members (including a youth group in Fitchburg) participated in the school community meetings. Based on all these meetings, the Media Competition Manager (from the research team) adapted the media competition for each community to accommodate school district regulations and community preferences.

Technical Assistance. Key personnel included the competition manager, a school district coordinator from each community, and school wellness champions from each school. The MA-CORD Competition Manager coordinated the planning, delivery, and evaluation of the media competition. The school district coordinators, which were school nurses, coordinated all aspects

of the intervention related to schools and were the main liaison between the study team and school personnel. They were instrumental in providing technical assistance with the submission process by scanning parent permission forms and uploading entries on SchoolTube, a school-approved version of YouTube. Also, each school identified school wellness champions who were trained about the school-based aspects of the intervention, and they led and coordinated intervention efforts within their school. The school district coordinators worked with the school wellness champions to recruit teachers to offer the competition to their students through email, fliers, and on-site visits.

Guidelines. Each teacher received extensive guidelines about the media competition, including specific details about the stipulations for each submission type. School and afterschool programs had the latitude to conduct the competition to best fit their school schedule. The guidelines requested that schools submit their top three selections in each category- artwork, lyrics, and video. Students could work individually or in groups. Several schools had within-school competitions where students voted for their favorite entries. Parent/Guardian Media Release Forms were required for each student who submitted their entry to the district-level competition.

Recognition. For each winning entry, the school, teacher, and student received a prize. Fitchburg received gift certificates for educational materials, and New Bedford received gift cards from Amazon. In addition, the dissemination process consisted of showcasing the winning entries in the communities, including coverage on websites (e.g., coalition; school district), a story in the local newspaper, a community event with a flash mob based on lyrics of entry, and distribution of stickers and cinch backpacks with messages from the competition.

## **Participants**

All public elementary and middle schools and affiliated afterschool programs in the two MA-CORD intervention communities were eligible to participate in the media competition. In participating school and afterschool programs, students in kindergarten through 8th grade were eligible to submit a media competition entry.

## **Measures: Reach & Adoption**

In this study, reach was defined by student participation rates within schools who offered students the option to participate in the media competition, and adoption was defined by whether eligible schools or afterschool programs decided to implement the media competition.<sup>19</sup>

## **Data Collection and Analysis**

To document reach and adoption of the media competition across the two communities, we collected process data through MA-CORD Media Competition Submission Forms. In each participating school, a teacher sent in a Submission Form for each entry, which collected the teacher's school, position, contact information, entry title, description, number of students who participated in the competition with their name and role in the project (e.g., actor, writer), and total number of students in the school or afterschool program. In addition, we confirmed the number of schools in each community through their school district website. Data analysis consisted of calculating the percentages of the reach (number participants divided by number of all students in program) and adoption rates (number of schools/afterschool programs divided by total number of programs) in school and afterschool programs per school district.

## **RESULTS** (Study 1- Implementation Documentation)

Table 3.2 describes the MA-CORD Media Competition participation levels by school and afterschool programs in each community. A total of 595 students participated in the media competition from 18 school and afterschool programs. Participation level by school/afterschool program is defined by no participation (no entries), minimal participation (<1%-3% of student participation in school) and moderate participation (>3%-33%) with school exemplars identified as having moderate participation with more than 100 participants. For the moderate participation category, it was determined that the number of participating students from a school could connote at least the participation of one full class (e.g., at least 20 students in a school setting).

**Table 3.2. MA-CORD Media Competition Participation Levels by School and Afterschool Programs in each community**

School Type	Participation		Level~	Grade Level
	# of students	% student participation		
<b>Fitchburg</b>				
Elementary School*	40	6%	Moderate	2nd-4th
Elementary School*	192	30%	Moderate (>100 participants)	3rd-4th
Elementary School*	25	4%	Moderate	4th
Middle School*	25	4%	Moderate	5th-7th
Middle School*	50	8%	Moderate	5th-7th
Middle School (MI)	30	6%	Moderate	5th-6th, 8th
Middle Afterschool*	15	33%	Moderate	5th-7th
<i>Community Total:</i>	377			
<b>New Bedford</b>				
Elementary School*	38	5%	Moderate	4th-5th
Elementary School (NI)	23	4%	Moderate	3rd-5th
Elementary School*	120	13%	Moderate (>100 participants)	4th
Elementary School (NI)	3	<1%	Minimal	3rd
Elementary School*	11	<1%	Minimal	5th
Elementary School (NI)	2	<1%	Minimal	5th
Elementary School (MI)	10	3%	Minimal	5th
Elementary School (MI)	2	<1%	Minimal	5th
Middle School (NI)	1	<1%	Minimal	Not specified
Elementary Afterschool (MI)	3	1%	Minimal	2nd-3rd
Elementary Afterschool (NI)	5	16%	Moderate	5th
<i>Community Total:</i>	218			
<i>Intervention Total:</i>	595			

\* = Media Competition Interview | MI = MA-CORD Interview | NI= No interview

Note: Some programs included interviews from multiple teachers.

~ Participation Level =

Minimal = <1%-3% of student participation in school (School Range: 1-11 students; Afterschool Range: 3 students)

Moderate = More than 3% of student participation in school (>3%-33%) (School Range: 23-192 students;

Afterschool Range: 5-15 students)

Moderate (>100 participants) = School Exemplar (still within the moderate category)

Note: In Community 2, six participants (3 from elementary schools, 1 from a middle school, and 1 from elementary/middle afterschool) participated in a MA-CORD interview, but their program did not submit any entries to the competition.



Reach. Average reach in Fitchburg (i.e., student participation rates within schools who offered students the option to participate in the media competition) was 10% for schools and 33% for the one afterschool program with a total of 377 student participants. Average reach in New Bedford was 3% for schools and 9% for afterschool programs with a total of 218 student participants. In addition, 1,400 people voted on the district-level finalists through school ballot (850 students) and Internet on the coalition website (550 community members).

Adoption. In Fitchburg, six schools (3 elementary schools, 3 middle schools) and one middle afterschool program had 10 teachers submit 38 student entries (10 videos, 11 songs/raps, 17 posters). The adoption in Fitchburg (i.e., whether eligible schools or afterschool programs decided to implement the media competition) was 100% for schools (6 out of 6 eligible schools) and 17% for afterschool programs (1 out of 6 eligible afterschool programs, measured by staff member participating in a MA-CORD learning community). In New Bedford, nine schools (8 elementary schools, 1 middle school) and two elementary afterschool programs had 20 teachers submit 58 entries (10 videos, 10 songs/raps, 38 posters). The adoption in New Bedford was 39% for schools (9 out of 23 eligible schools) and 22% for afterschool programs (2 out of 9 eligible afterschool programs).

## **STUDY 2- Predictors of Implementation Effectiveness**

### **METHODS (Study 2)**

Building upon the process of developing and implementing the MA-CORD Media Competition in Study 1, Study 2 extends into understanding the variation of implementation effectiveness across schools and afterschool programs, along with the diffusion of the media competition across community sectors. Effective implementation refers to transferring and maintaining efficacious interventions into real-world settings.<sup>19</sup> Challenges for effective implementation include lack of knowledge, motivation, or implementation problems in communities so that the diffusion of interventions typically yields diminishing returns.<sup>19</sup> Study 2 identifies factors that explain variability in effective implementation, which can provide insight to address these challenges. Variability was assessed through participation levels in the media competition, which includes: no participation, minimal participation, moderate participation, or exemplar participation (summarized in Table 3.2). Study 2 provides a nuanced examination of implementation factors that can inform replication of media competitions in other communities.

### **Theoretical Framework**

MA-CORD was implemented in real-world settings by non-researchers, which is crucial for providing insight in translating research into similar practice settings. For this reason, Durlak & DuPre's ecological framework for understanding effective implementation<sup>19</sup> guided the analysis of the media competition implementation. This framework asserts that effective implementation is influenced by variables in five categories: the prevention delivery system (features related to organizational capacity), the prevention support system (training and technical assistance), innovation characteristics (e.g., characteristics of the media competition), provider characteristics (e.g., teacher characteristics), and community factors. Figure 3.3 shows

the ecological framework for understanding effective implementation of the MA-CORD Media Competition. All the factors can interact with each other, which creates a constellation of factor combinations that can lead to effective implementation. This framework provides clear guidance on focus areas to evaluate implementation.



Adapted from: Durlak JA, DuPre EP. Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American journal of community psychology*. 2008; 41(3-4):327-350

### **Figure 3.3. Ecological framework for understanding effective implementation of the MA-CORD Media Competition**

#### **Participants**

For Study 2, qualitative key informant interviews were conducted to describe the context in which the media competition was implemented and to gauge program diffusion. A total of 54 key informant interviews were conducted with 12 participants for the media competition interviews and 42 participants for the MA-CORD interviews. The eligibility criterion for the media competition interview was being a teacher or staff member who worked with students who submitted an entry, and the eligibility criterion for the MA-CORD interview was being a stakeholder in any sector that was actively participating in at least one aspect of MA-CORD.

MA-CORD interviews included teachers and staff from schools, afterschool programs, clinics, WIC, the Park and Recreation Department, and coalitions, with varying participation and/or awareness of the media competition to provide information on diffusion of the competition. Criterion-based sampling<sup>20</sup> was employed to ensure that we selected participants who had varying levels of participation. The Harvard T.H. Chan School of Public Health's IRB Board approved the protocol and interview guide for this study.

### **Instrument**

The interview guide was developed using the ecological framework for understanding effective implementation.<sup>19</sup> Table 3.3 lists the questions for the Media Competition Interview Guide and the corresponding questions within the MA-CORD Interview Guide, which related to the broader MA-CORD intervention with questions specific to the media competition integrated into the guide. At the end of each interview, demographic information was captured including participant age range, race, ethnicity, and occupation. The interview guide was designed to take approximately 30 minutes.

**Table 3.3. Media Competition Interview Guide**

<b>Media Competition Interview Guide for Participating School/Afterschool Teachers</b>
<p><b>Construct #1: Community Level Factors</b></p> <ol style="list-style-type: none"> <li>1) Tell me about how <i>Mass in Motion Kids (MiM Kids)</i>* School Media Competition is perceived in your community.</li> <li>2) Describe the support that you received in your school regarding the media competition. [Probe: Did you have enough time?]</li> <li>3) What about funding? Please explain.</li> </ol> <p><b>Construct #2: Teacher Characteristics</b></p> <ol style="list-style-type: none"> <li>1) How was the Media Competition relevant to addressing childhood obesity in your [school/afterschool program]?</li> <li>2) What type of benefits do you think the Media Competition will achieve within the [school/afterschool] level?</li> <li>3) How well equipped did you feel to help students participate in the competition?</li> </ol> <p><b>Construct #3: Characteristics of the Media Competition</b></p> <ol style="list-style-type: none"> <li>1) How well did the media competition fit your school's [school's/afterschool's] mission and current priorities? Please explain.</li> <li>2) How could the Media Competition have been adapted to fit into your [school/afterschool] norms?</li> </ol> <p><b>Construct #4: Organizational Capacity</b></p> <ol style="list-style-type: none"> <li>1) What factors at your [school/afterschool program] contributed to implementing the Media Competition? [Probes: Organizational factors: work climate, organizational norms regarding change, integration of new programming, staff buy-in]</li> <li>2) Who decided how the Media Competition would be implemented in your [school/afterschool program]? Were other people in the [school/afterschool program] supportive of the decision-making? Please explain.</li> <li>3) What type of support did you receive from the administration?</li> </ol> <p><b>Construct #5: Technical Assistance</b></p> <ol style="list-style-type: none"> <li>1) Once the competition was underway, what technical support did you receive from <i>MiM Kids</i> at your school? Was this sufficient to meet your needs? What resources would have been helpful?</li> </ol>
<b>Media competition questions included in the MA-CORD Interview for staff in every sector</b>
<ol style="list-style-type: none"> <li>1) Tell me about how <i>MiM Kids</i> School Media Competition was viewed in your community.</li> <li>2) What type of benefits do you think the Media Competition had for the schools and afterschool programs? What about benefits for the students?</li> <li>3) How well equipped did you feel to help schools participate in the competition? Explain.</li> <li>4) What are your thoughts about the implementation process for the media competition?</li> <li>5) How could have the implementation been improved?</li> </ol>

\*Massachusetts Childhood Obesity Research Demonstration (MA-CORD) was known as *Mass In Motions Kids (MiM Kids)* in the community.

## **Data Collection and Analysis**

The media competition interviews were conducted in June 2013, immediately following the announcement of the media competition results. The MA-CORD interviews were conducted between November 2013 and April 2014. It was important to capture other school and afterschool staff not interviewed in the media competition interviews in order to document diffusion of the media competition, or the outcomes of the competition, across sectors. Interviewees were compensated \$40 for their participation. One member of the research team directly contacted the prospective interviewees and conducted all the interviews for the media competition interviews. Two research team members conducted the MA-CORD interviews. Interviews were conducted until saturation was reached. All interviews were conducted over the telephone and audiotaped.

The 54 transcribed interviews were entered into NVivo 10,<sup>21</sup> a qualitative analytic software program. The lead author developed the codebook using the ecological framework for understanding effective implementation, and added additional codes after reading the 12 media competition interviews. Two researchers coded one media competition transcript together, then clarified operational definitions of codes and modified the codebook. Subsequently, the researchers coded 10 media competition interviews (five from each community) independently. The initial inter-rater reliability was measured by a Kappa coefficient<sup>22</sup> in NVivo. The major coding categories scores for the 10 interviews were: funding (0.77), perceived need for media competition (0.94), perceived benefits of the competition (0.88), self-efficacy (0.93), compatibility (0.93), adaptability (0.60), staff buy-in (0.49), shared decision-making (0.64), communication (0.75), leadership/administrative support (0.80), and technical support (0.73). The researchers discussed discrepancies and re-coded the transcripts. The final inter-rater

reliability among these transcripts ranged from a Kappa coefficient of 0.82 to 0.99 in all the major coding categories. A Kappa coefficient of  $>0.80$  is considered excellent.<sup>23,24</sup> This benchmark facilitates a process for researchers to clarify their understanding of the data and build consensus.

To address the implementation factors of the media competition in school and afterschool programs by participation level, we limited the analysis to school and afterschool personnel (n=38) from the media competition and MA-CORD interviews. The remaining 16 transcripts from the MA-CORD interviews were analyzed to describe diffusion across community sectors beyond schools using the same codebook. The lead author randomly selected five MA-CORD interview transcripts for independent coding using a random number generator. The two researchers coded five MA-CORD interviews, which resulted with a Kappa coefficient of  $>0.80$  in all major categories. The same codebook was utilized with fewer codes to highlight the specific media competition questions that were in the MA-CORD interviews.

In total, over a quarter of the transcripts (28%, n=15) were coded independently by two researchers (10 from the media competition and five from the MA-CORD interviews). After researchers discussed discrepancies for all these transcripts, the lead author coded the remaining interviews and further discussed the analysis with the other researchers on the team.

## **RESULTS** (Study 2- Predictors of Implementation Effectiveness)

Demographic information for all Study 2 participants (n=54) is reported in Table 3.4. Most participants were white females with bachelor or master's degrees who worked in the school sector as teachers or school nurses. The interviews were evenly dispersed between the two communities. Interviewees were categorized by student participation level in the media competition to assess variation of implementation effectiveness by having no entries (n=6),

minimal participation (n=6), moderate participation (n= 23), or not applicable (n=19; interviewees not working at a specific school and afterschool program).

**Table 3.4 MA-CORD Media Competition Interview Participation Demographic Information**

<b>Variables [% (n)]</b>	<b>Total</b>		<b>Media Competition Interviews</b>		<b>MA-CORD Interviews</b>	
	n=54		n=12		n=42	
<b>Sex</b>						
Female	93%	(50)	100%	12	90%	38
Male	7%	(4)	-	0	10%	4
<b>Age Category</b>						
18-29	7%	(4)	17%	2	5%	2
30-39	20%	(11)	33%	4	17%	7
40-49	24%	(13)	33%	4	21%	9
50-59	35%	(19)	17%	2	40%	17
60 or older	11%	(6)	-	0	14%	6
Not specified	2%	(1)	-	0	2%	1
<b>Race</b>						
White	87%	(47)	92%	11	86%	36
Black/African American	6%	(3)	8%	1	5%	2
Asian	2%	(1)	-	0	2%	1
Other- Hispanic	4%	(2)	-	0	5%	2
Not specified	2%	(1)	-	0	2%	1
<b>Highest degree earned</b>						
High School	2%	(1)	-	0	2%	1
Associate's Degree	6%	(3)	8%	1	5%	2
Bachelor	30%	(16)	17%	2	33%	14
Master	56%	(30)	75%	9	50%	21
Doctoral, MD	6%	(3)	-	0	7%	3
Not specified	2%	(1)	-	0	2%	1
<b>Sector</b>						
School	59%	(32)	92%	11	50%	21
Afterschool	11%	(6)	8%	1	12%	5
Clinic	15%	(8)	-	0	19%	8
WIC	6%	(3)	-	0	7%	3
Parks & Recreation	4%	(2)	-	0	5%	2
Coalition	6%	(3)	-	0	7%	3



**Table 4.4 (Continued)**

Variables [% (n)]	Total		Media Competition Interviews		MA-CORD Interviews	
	n=54		n=12		n=42	
<b>Position</b>						
School teacher	30%	(16)	100%	12	10%	4
School nurse	20%	(11)	-	0	26%	11
School administrators (e.g., Principal, superintendent)	9%	(5)	-	0	12%	5
Clinic staff (Physician, Community Health Workers, Coordinators)	15%	(8)	-	0	19%	8
Afterschool staff (Director, Coordinator, Teacher)	11%	(6)	-	0	14%	6
Parks & Recreation Staff	4%	(2)	-	0	5%	2
Coalition Members & School District Coordinators	6%	(3)	-	0	7%	3
WIC staff	6%	(3)	-	0	7%	3
<b>Community</b>						
Fitchburg	46%	(25)	50%	6	45%	19
New Bedford	54%	(29)	50%	6	55%	23
<b>Media Competition Participation Level~</b>						
No entries	11%	(6)	-	0	14%	6
Minimal	13%	(7)	8%	1	14%	6
Moderate*	41%	(22)	92%	11	26%	11
Not applicable	35%	(19)	-	0	45%	19
~ Participation Level =						
<b>Minimal</b> = <1%-3% of student participation in school (School Range: 1-11 students; Afterschool Range: 3 students)						
<b>Moderate</b> = More than 3% of student participation in school (>3%-33%) (School Range: 23-192 students; Afterschool Range: 5-15 students)						
<b>*Includes Moderate (&gt;100 participants)</b> = School Exemplar (2 schools, 5 interviewees)						
Note: Percentages may not add to 100% based on rounding.						

Concerning the 12 media competition interviews (6 in each community), Fitchburg (FB) participants included teachers from three elementary schools, two middle schools, and one middle afterschool program. New Bedford (NB) participants included teachers from three elementary schools with four participants from one school. In the MA-CORD interviews, there were an additional four teachers, 11 school nurses, five school administrators, and six afterschool staff whose interviews were pertinent to investigating the implementation of the media competition. A total of 38 interviews were utilized for this section.

### **Factors that explain variation in implementation effectiveness**

Table 3.5 presents major themes and illustrative quotations by the factors affecting the implementation process and school participation level for the media competition. The following section outlines relevant factors of the framework's five categories: organizational capacity, technical assistance, characteristics of the media competition, teacher characteristics, and community level factors.

**Table 3.5. Factors affecting the Implementation Process<sup>+</sup> for MA-CORD Media Competition by School Participation Level: Major Themes and Illustrative Quotations**

Factors with Definitions	School Participation Level~	Themes and Quotes
<p><b>Organizational Capacity</b>  <i>Program champion:</i> An individual who is trusted and respected by staff and administrators, and who can rally and maintain support for the innovation, and negotiate solutions to problems that develop.</p>	Moderate	<p><i>Cascade of champions</i>                      [After the school district coordinator provided guidance], the entire staff [including administration] definitely helped us out [4<sup>th</sup> grade teacher team]. They all came to the forum to watch the videos, to vote, and to cheer us on. (Elementary School Teacher, 4<sup>th</sup> grade, Moderate-Exemplar Participation, NB*)</p>
	Minimal	<p><i>Lack of teacher champion</i>                      I just know that some of the teachers were not interested, and they didn't do anything with it. (Elementary School Teacher, No entries, NB)</p>
<p><b>Characteristics of the Media Competition</b>                      (i.e., Characteristics of the Innovation)  <i>Compatibility:</i> Extent to which the intervention fits with an organization's mission, priorities, and values.  <i>Adaptability:</i> The extent to which the proposed program can be modified to fit provider preferences, organizational practices, and community needs, values, and cultural norms</p>	Moderate	<p><i>Providing opportunity to participate in the media competition outside traditional class time</i>                      It really just came down to access. Part of this was done after school. Part of it was done during the school day. I think there was a component, actually, where children were coming in on the weekends. That was—pulling all of that together, the kids had access to it. (Middle School Principal, 5<sup>th</sup>-6<sup>th</sup> &amp; 8<sup>th</sup> grade, Moderate Participation, FB*)</p> <p><i>Compatible cafeteria initiatives</i>                      There are many changes going on with the district with healthier food offered in the cafeteria, as well as, summer programs that offer free meals. They're healthy meals. There's a big push to remove junk food at local vending with snack trucks and snacks shacks. (Elementary School Teacher, 2<sup>nd</sup>—4<sup>th</sup> grade, Moderate Participation, FB)</p>
	Minimal	<p><i>Not currently compatible</i>                      We do have our school improvement plan, the whole connection piece, but we don't really have in our plan around being a well-child. (Elementary School Teacher, 5<sup>th</sup> grade, Minimal participation, NB)</p> <p><i>Competing priorities</i>                      I would have liked to do it, but it's just—it's just a logistics problem. ... The teachers are doing more than they can take right now trying to get the scores up, and the focus is testing, testing, testing and the academics. ... Right now, the focus is we have to survive. (Elementary School Nurse, No entries, NB)</p>

<p><b>Teacher/Staff Characteristics</b> (i.e., Provider Characteristics) <i>Perceived Need for Media Competition (i.e., Perceived Need for Innovation):</i> Extent to which the proposed innovation is relevant to local needs <i>Perceived Benefits of the Media Competition (i.e., Perceived Benefits of the Innovation):</i> Extent to which the innovation will achieve benefits desired at the local level <i>Self-efficacy:</i> Extent to which providers feel they are will be able to do what is expected</p>	<p>Moderate</p>	<p><i>Perceived need for media competition</i> It made the kids realize that they need to get more active. ... They did not realize that they were in the house more than they were outside. ... They just see what their parents do. So they just kind of follow along. (Elementary School Teacher, 4<sup>th</sup> grade, Moderate-Exemplar Participation, NB)</p> <p><i>Media competition improved intention and behaviors</i> It [media competition] really helped and they started bringing water bottles and showing me. Then in the cafeteria, they are picking up their veggies and their fruits, and they would pass by me and show them to me. They were aware and they were actually doing the stuff. (Middle School Teacher, 5<sup>th</sup>-7<sup>th</sup> grade, Moderate Participation, FB)</p> <p>They definitely used the 60 minutes a day to make sure that they got their recess every day. They were funny about that. They would say you really need to give us more than 20 minutes of recess because we need to get 60 minutes of exercise a day. (Elementary School Teacher, 4<sup>th</sup> grade, Moderate-Exemplar Participation, NB)</p> <p><i>Excitement from recognition</i> I actually displayed them on a long hallway. We had over 200 entries so the excitement was building as we came and went each week as we added more and more entries. (Elementary School Teacher, 3<sup>rd</sup>-4<sup>th</sup> grade, Moderate-Exemplar Participation, FB)</p> <p>It was like mania broke out in my classroom. ... They shared with other students, it's online! A couple of students saw schools that some of the people they know attend, and they were just excited. ... I know my kids were coming back in school and saying that "my grandmother watched it in Portugal, and my uncle that lives here, he saw it and told me that I did a good job." They were really excited about that part. (Elementary School Teacher, 4<sup>th</sup>-5<sup>th</sup> grade, Moderate Participation, NB)</p>
	<p>Minimal</p>	<p><i>Health education materials vs. targeted participation in media competition</i> I had quite a bit of the Portuguese population in my classroom last year. Portuguese people are big on soda with every meal. ... Every parent got a booklet that Mass in Motion had sent to our school so every parent got a booklet. I tried talking about it in my newsletters and that kind of thing. I know some of the kids didn't touch soda after that. Even if I got one not to drink soda again, I think it worked. (Elementary School Teacher, 5<sup>th</sup> grade, Minimal participation, NB)</p>

<b>Community Level Factors</b> <i>Funding</i> (e.g., a necessary but insufficient condition for effective implementation) <i>Politics</i> (e.g., perceptions in community; school staff required by the superintendent's office to offer new programs)	Moderate	<i>Awareness of district and school resources</i> I had what I needed in terms of the artwork and that type of thing, but I knew that I could go to [MA-CORD School District Coordinator] if there was something I didn't have so we were all set in that area. (Elementary School Teacher, 3 <sup>rd</sup> -4 <sup>th</sup> grade, Moderate-Exemplar Participation, FB)  <i>Parental support</i> I know the parents were excited. . . . They said that they knew their kids were working on it, and they were excited because the kids were excited about it. I found that the parents were willing participants because the kids were excited and went home and told them all about it. (Elementary School Teacher, 4 <sup>th</sup> -5 <sup>th</sup> grade, Moderate Participation, NB)
	Minimal	<i>Lack of awareness of resources</i> We wish we had more money for that [prizes] because that's really something they work for. There's not much money. (Elementary Afterschool Teacher, 2 <sup>nd</sup> -3 <sup>rd</sup> grade, Minimal, NB)

Source: Durlak JA, DuPre EP. Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American journal of community psychology*. 2008;41(3-4):327-350

\*Factors were included that were relevant to this proposed study.

\*FB= Fitchburg | \*NB= New Bedford

**~ Participation Level =**

**Minimal** = <1%-3% Student Participation at school (School Range: 1-11 students; Afterschool Range: 3 students)

**Moderate** = More than 3% (>3%-33%) School Participation (School Range: 23-192 students; Afterschool Range: 5-15 students)

**Moderate-Exemplar**= Within moderate category and has >100 participants

*Note: Technical Assistance:* This refers to the combination of resources offered to providers once implementation begins, and may include retraining in certain skills, training of new staff, emotional support, and mechanisms to promote local problem solving efforts.

-There was no difference by participation level in our study so it was not included in the table.

In the following section, when “participant” is preceded by exemplar, moderate, or no entry; it connotes that interviewee is from a school/afterschool program with that specific student participation level.

### ***Organizational Capacity.***

Cascade of champions. A cascade of champions refers to having program champions on various organizational levels. It seemed to be the most salient facilitator in successfully implementing the media competition by student participation level. Exemplar and moderate participants reported the layers of support from committed staff from the MA-CORD school district coordinator (SDC), school principals, and teachers. Most participants from both communities reported that the SDC was “awesome,” visited each school to introduce the media competition, helped staff submit entries, and communicated with them throughout the entire process (sometimes sending 2-3 emails a day).

The school administration was involved on varying levels. Several participants mentioned they had to get approval from the school principal, especially since some students would appear on the Internet with SchoolTube. A teacher reported, “And of course she was concerned about making sure that parents were aware we were doing videos, and that this video was something outside of the school. She wanted to make sure the parents were okay with that. She was a great help” (Elementary School Teacher, 4<sup>th</sup>-5<sup>th</sup> grade, Moderate, NB). Several moderate participants indicated that their principal was supportive. One participant stated, “My principal is very good at programs like this so he was aware of it and he was ready to supply everything that I needed” (Middle School Teacher, 5<sup>th</sup>-7<sup>th</sup> grade, Moderate, FB). A few moderate participants indicated that they would have preferred more support from their principal.

The teachers who were committed to the media competition (teacher champions) were critical for activating student engagement. Regardless of staff buy-in, they were dedicated to assisting their children with the media competition. One participant said, “I made time in my own class for kids to work on it, but I don’t feel as a whole staff that many teachers really valued it or supported to the level (Middle School Teacher, 5<sup>th</sup>-7<sup>th</sup> grade, Moderate Participation, FB). In contrast, several moderate participants indicated that they received support from the specialists at their school, such as the art, music, gym, or health teacher, school nurse, or wellness champion. One participant shared, “I had the support of the other specialists. The health teacher and I collaborated quite a bit. The physical education teacher was very interested in it and mentored a few kids in their participation in it” (Elementary School Teacher, 2<sup>nd</sup>-4<sup>th</sup> grade, Moderate Participation, FB). The teacher champions provided alternative forums for students to contribute to media competition (e.g., created an afterschool program). In addition, one exemplar school had the entire 4<sup>th</sup> grade team commit to conducting the media competition. Those teachers supported each other and garnered support from the school administration and other teachers in the voting process.

Lack of teacher champion. Participants from schools with no to minimal implementation reported that staff members did not take the lead on facilitating the media competition due to a lack of interest in the competition or needing more outside organizational support. One participant reported, “I think it would've been great if we could've had someone come in on a weekly basis from *Mass in Motion* just to keep it going with our kids and not just leave it up to the classroom teacher only because we're just so strapped for time” (Elementary School Teacher, Minimal Participation, NB).

### ***Technical Assistance.***

About half of the participants reported that they did not need any technical assistance. The other half needed assistance with SchoolTube and shared that the School District Coordinator, Media Competition Manager, and SchoolTube support staff were helpful with the process. A few participants reported that they would have liked more support in engaging student participation during the onset of the competition. Participants in Fitchburg shared how the guidelines changed from the community meeting stage to implementation, and they would have preferred a clearer explanation of the changes and listing of the prizes (the prizes were not listed based upon school district policy). Across participants, there was no pattern of variation by implementation effectiveness.

### ***Characteristics of the Media Competition.***

Compatibility. Participants from schools with moderate and exemplar student participation had mixed views on the fit of the media competition within their school's priorities. Moderate participants indicated that the competition was a priority for the health and gym teachers, as well as, the cafeteria staff who focused on healthier food options for students. Some participants from schools with moderate student participation mentioned that the district "had a big push for health" so that their school was following instructions. Some minimal participants indicated that the competition was not compatible (e.g., child wellness not addressed in school improvement plan).

Competing priorities. All school and afterschool participants indicated that the competition timeline was a barrier. Fitchburg had a 3-month implementation timeline, and New Bedford requested an extension for a 4-month implementation timeline. Participants reported that they would prefer to be given a longer time period so it would not conflict with statewide



testing. Some no-entry and minimal participants reported that they had other required curriculum (e.g., bullying) so they could not commit time to another program, along with the statewide testing requirements. Several participants expressed the tension addressing health in an academic setting. One participant conveyed how she covered both aspects, “I had a packet of our story that goes with our curriculum that covers reading comprehension. At the end, they had to keep a diary for a whole week of what they ate so parents would see the connection” (Elementary School Teacher, 4<sup>th</sup>-5<sup>th</sup> grade, Moderate Participation, NB).

Providing opportunity to participate in the media competition outside traditional class time. This factor was very salient in engaging students to participate in the media competition. Several exemplar and moderate participants reported that they allotted some class time for the students to work on their entries. Several moderate and exemplar participants were able to dedicate unconventional time to the competition, and that the flexibility in the implementation of the media competition opened various ways to allow students to participate. One exemplar teaching team created an afterschool program for two weeks so that their students could participate in the competition.

### ***Teacher Characteristics.***

Perceived need for media competition. The teachers in school and afterschool programs have varied views about the need and benefits of the media competition. Only one no-entry participant and one minimal participant mentioned that the competition seemed relevant for their students; whereas, most moderate and exemplar participants indicated that the media competition was extremely relevant to addressing childhood obesity, and that it was an issue among their students and parents.

Media competition improved intention and behaviors. Most participants reported positive benefits of the media competition for their students, such as understanding the five behaviors, critically thinking about their choices (e.g., hours of sleep, food selection), behavior change, and excitement of the competition from the online presence and teaching their peers. Moderate teachers who implemented the competition reported changed intentions and behaviors for their students concerning the five goals. One teacher reported that the competition made her students realize, “there are things that they can do to counteract [obesity] or prevent it, as opposed to just being a statistic that is placed on them” (Elementary School Teacher, 2<sup>nd</sup>-4<sup>th</sup> grade, Moderate Participation, FB). Participants recounted conversations with their students telling them that they were drinking more water, decreasing soda consumption, eating more fruits and vegetables, and negotiating for more recess time. Health education materials vs. targeted participation in media competition. Also, minimal participants reported benefits from health education materials vs. targeted participation in the media competition.

Excitement from recognition. Several participants from moderate and exemplar school participation mentioned that students were excited, and felt a sense of school pride to see their work displayed at school, on the local community television station, and on the Internet, which allowed them to share their work with family and friends. One middle school principal stated that the competition allowed the students “access to being motivated and passionate about a cause [by competing with other schools in district]” (Middle School Principal, 5<sup>th</sup>-6<sup>th</sup> & 8<sup>th</sup> grade, Moderate Participation, FB).

Self-efficacy. Most participants indicated that they felt equipped to facilitate the competition for their students because of previous engagement with the topic and training. One participant said, “I think the wellness champion trainings were very helpful. ... Once you have

the information and the platform, the rest is easy. The kids' level of engagement really determines the success of the event so I felt well prepared" (Elementary School Teacher, 2<sup>nd</sup>-4<sup>th</sup> grade, Moderate Participation, FB). Across participation levels, some participants reported that they did not have access to updated computers and recording equipment and had difficulty with uploading materials on SchoolTube, which reduced their self-efficacy. A participant suggested, "It would be nice to provide some video assistance and technology to families that don't have that, because those kids have wonderful ideas too, but they don't have access to the technology at their house to create an infomercial" (Elementary School Principal, Moderate Participation, FB).

### ***Community Level Factors.***

Awareness of district and school resources. Most participants indicated that they were aware that the media competition was an initiative stemming from the school district office in partnership with *Mass in Motion* program from the Massachusetts Department of Public Health and Harvard University. Participants reported mixed views on funding. Some minimal participants indicated that funding was lacking; whereas, moderate and exemplar participants indicated that they were aware of school district resources and/or had access to personal equipment/materials (e.g., iPhone). Parental Support. The moderate participants reported that several students and parents were excited to participate in the media competition with the parental support critical in collecting media release forms and assisting their children with the competition at home.

### **Diffusion of the media competition across community sectors**

Eleven out of 42 participants from the MA-CORD interviews had not heard of the media competition [no participants from the WIC and Parks and Recreation Department sector; two from the clinic sector; and three from the school sector (one was new to his/her position at a

school with no entries). The remainder of this section will focus on participants from non-school/afterschool sectors (n=16). Some participants from other sectors, specifically the clinic and coalitions, had a very positive perception of the media competition. The coalitions in each community utilized the media competition awareness within their activities. One participant said, “I think the media competition was a success [especially since we integrated] it into the website [to create] community-wide voting. I thought that was really successful because we’ve had over 500 people vote through our website, which I thought was fantastic” (Coalition, NB). Several participants reported that they thought the media competition could be helpful to address childhood obesity. A participant reported:

I mean that's the biggest driver is that these kids are now being made aware that it's okay if they need a stretch break, they can get up and stretch, and when they come back, they're expected to come back and be ready to then learn. I think it's definitely catching on. I think the teachers are using it in a positive way. I think it's only going to get better (Clinic Staff, N/A Participation, FB).

Some participants indicated that they knew about the competition from their own children attending a school or afterschool program that was participating.

## **DISCUSSION for Study 1 and Study 2**

Study 1 outlines the planning, implementation, and evaluation/results of the MA-CORD Media Competition to provide much needed “how-to” documentation for end users. Since schools are a common setting for interventions to address childhood obesity, and afterschool programs are emerging as a setting as well,<sup>25-28</sup> we provided detailed documentation about our media competition because process evaluation illuminates effective elements in school-based interventions with multiple components.<sup>29-31</sup> To bolster message reach and adoption beyond the

595 student participants, steering committees could invite members from every sector to provide insight about how their sector could diffuse information to their stakeholders in a relevant way.

Study 2 builds upon Study 1 by utilizing Durlak & DuPre's ecological framework for understanding effective implementation to explore how implementation outcomes varied across participation levels. The framework components worked well in differentiating levels of implementation within school and afterschool programs and ascertaining the key factors for effective implementation. Salient themes that emerged as facilitators of effective implementation were having a cascade of champions and providing opportunity to participate in the media competition outside traditional class time.

The implementation of a student media competition with video, lyrics, and artwork puts high demands on teachers who are grappling with competing academic demands and priorities. Therefore, the need for a champion was paramount. At the onset of the study, MA-CORD established Wellness Champions at each school to teach the evidence-based lessons and implement school wellness policies, yet not all Wellness Champions translated into Media Competition Champions. When teachers feel that their work is meaningful and beneficial to their students, then they feel motivated to implement the intervention.<sup>32</sup> Therefore, it is important to identify champions who are passionate about the specific innovation because their passion in turn encourages adoption of an innovation by others.<sup>33</sup> For this particular competition, it would have been helpful to target more human resources toward recruiting teachers who expressed a specific interest in the creative process and subject matter.

Program champions have been shown to ease the implementation of health promotion programs including programs focusing on childhood obesity prevention in school settings<sup>34,35</sup> along with community marketing.<sup>36</sup> While champions are typically middle-level staff,<sup>37</sup> our

study highlights the importance of having a cascade of champions, or champions across organizational levels. Schools with moderate participation consistently spoke about the school district coordinator's enthusiasm and active engagement, their school administration's backing and involvement, and their own fortitude to encourage their students to develop projects and even provide their personal resources to contribute to the students' success. Since program champions can influence the use of evidence-based prevention programs in schools,<sup>38-41</sup> this structure of cascade of champions could offer a new conceptualization of how to frame implementation in a multi-level intervention. Program planners could specifically set-up a cascade of champions in the intervention design so that there is a multi-level team approach to provide support bi-directionally throughout various ecological levels of the organization (e.g., teacher, administration) and its partner organizations (e.g., school district office).

The media competition was designed such that schools and afterschool programs had the autonomy to implement the competition to fit within their program schedule. We observed that teachers who provided students with opportunities to participate in the media competition outside traditional class time, had higher levels of participation. Also, teachers could choose to have students submit in all categories (i.e., video, lyrics, artwork) or just one. The community context also affected implementation of the media competition. For instance, Fitchburg had a small school district so the school district coordinator was able to actively communicate with all schools, but the school district policy concerning finances restricted the number of student winners. New Bedford had a larger school district and was in a state of fluctuation during the competition due to a transition of superintendents and concern overall about job stability. The school district coordinator requested that the timeline be shifted so that more teachers could be rallied to participate. Adaptability gave the teachers the flexibility to modify the media

competition to fit their preference,<sup>19</sup> but adaptability is missing from many frameworks and checklists that assess intervention applicability and transferability.<sup>42</sup>

### **Limitations**

We did not test the effectiveness of the media competition independent of the other intervention activities of MA-CORD, yet we were able to collect implementation data to inform future iterations of the media competition. The media competition interviews consisted mostly of teachers with moderate student participation levels so they could have been more positive about the program implementation compared to the participants representing no entries or minimal participation who were not represented. It was helpful that some of the under-represented participants were able to contribute in the MA-CORD interviews. Since the media competition only had three afterschool programs submit to the competition with one person participating in the detailed media competition interview, the afterschool perspective did not reach saturation. Yet, the school sector did reach saturation.<sup>43</sup> The interviewers were all part of the MA-CORD study team so there was a potential for social desirability bias in that the respondents may have provided information that they perceived the interviewers wanted to hear. To counter this bias, the interviewers shared that the respondent's comments would be used for program improvement and that identifying information would be removed. Also, the study findings apply directly to the two communities where the intervention was conducted. The results may not be generalizable in other type of communities with different populations.

### **Conclusion**

The adapted Neta et al. framework provided an efficient guide to document the entire implementation process to support replication of the media competition. In addition, utilizing Durlak and DuPre's ecological framework for understanding effective implementation allows

this study to contribute to the field of implementation science by identifying key factors to support intervention participation. Specifically, our findings introduced the concept of cascade of champions, which can offer a new perspective on intervention design and a recommended direction for further study. Since MA-CORD Media Competition is part of a multi-level, multi-sector intervention, these results will add to the ability to triangulate data concerning the effectiveness of MA-CORD, as well as, evidence to facilitate program implementation in other multi-level community interventions.



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