

An Observational Study of an Employer Intervention for Children's Healthy Weight Behaviors

AUTHORS: Martín-J. Sepúlveda, MD, FACP,^a Chifung Lu, MS,^b Stewart Sill, MS,^a Joyce M. Young, MD,^a and Dee W. Edington, PhD^b

^aIBM Corporation, Somers, New York; and ^bUniversity of Michigan Health Management Research Center, Ann Arbor, Michigan

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Address correspondence to Martín-J. Sepúlveda, MD, FACP, IBM Corporation, Box 100, Route 100, Somers, NY 10589. E-mail: mjs851@us.ibm.com

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WHAT'S KNOWN ON THIS SUBJECT: Although evidence exists for childhood obesity-prevention interventions that target families, such efforts in employer settings have been limited. However, employers have demonstrated success in adult employee health improvement, and there is evidence that collaboration between pediatricians and employers can be powerful.



WHAT THIS STUDY ADDS: The findings from this unique program illustrate the potential of employers to activate parents and families around healthy weight behaviors, support a role for employers in community-based strategies for obesity prevention in children, and should trigger longer-term, experimental study.

abstract

OBJECTIVE: This observational study was undertaken to assess whether changes in healthy weight behaviors could be advanced in a short-term intervention involving parents and children at IBM.

METHODS: IBM's Children's Health Rebate offered a cash incentive for parents to complete a 12-week program of self-selected activities in family food planning and meals, family physical activity, and sedentary time related to electronic entertainment ("screen time"). A preprogram/postprogram comparison of self-reported activities was used to assess behavior change.

RESULTS: A total of 22 265 (52.3%) employees elected to participate, 11 631 (52.2%) of whom completed all program requirements and earned a \$150 cash rebate. Families completing the program reported significant changes in levels of physical activity, amount of entertainment screen time, and proportion of healthy meals. For example, family physical activity >3 times per week increased by 17.1 percentage points (from 23.2% to 40.3%), eating healthy dinners ≥ 5 days/week increased by 11.8 percentage points (from 74.9% to 86.7%), and entertainment screen time <1 hour/day increased by 8.3 percentage points for children (from 22.4% to 30.7%) and by 6.1 percentage points for adults (from 18.1% to 24.2%).

CONCLUSIONS: The results of this short-term observational study suggest that healthy weight behaviors in children, adolescents, and parents can be improved by using a Web-based intervention linked with a cash incentive. The results also show that employers can activate parents and support a role for employers in community-based strategies for obesity prevention in children. Experimental designs with biometric data would strengthen the suggestion of positive impact. *Pediatrics* 2010;126:e000

The pediatric community is vigorously challenging itself to take a leadership role in addressing socioecological determinants of excess weight in children and youth.^{1–5} For example, the American Academy of Pediatrics Committee on Nutrition has called on pediatricians to “enlist policymakers from local, state, and national organizations and schools to support a healthful lifestyle for all children,”⁴ and the Committee on Community Health Services recommends that pediatricians “interact and advocate to improve all settings and organizations in which children spend time.”⁵

For pediatricians to succeed in this expanded community-based role, it will be necessary to form partnerships with other groups and enterprises capable of effecting obesity-promoting social or environmental change. Groups most often mentioned as key collaborators include parents, schools, child care centers, and government agencies such as state and local public health departments.^{4,6} Generally, employers are not identified as potential partners for these initiatives. However, employers could be an integral partner, given their success with wellness programs, health benefits coverage to support clinical care needs, and incentives for improving employee health.^{7–9}

The purpose of this article is to present the results of a short-term observational study of a family-centered program aimed at healthy weight behaviors among children and parents in the IBM Corp. In this article the program is described, the data on behavior changes among program participants are presented, and the value of enlisting employers in community-based initiatives for the prevention of childhood overweight is discussed.

METHODS

Setting

IBM is a multinational information technology company, with ~400 000 employees worldwide. Employees in the United States work at >300 IBM worksites as well as from home offices and customer locations. More than 40 000 US employees have >80 000 children aged 2 to 18 years insured by IBM employee health plans. The Children’s Health Rebate program was first offered to employees in 2008, the year of this evaluation. Employees are invited to participate during annual health benefits enrollment.

Intervention

IBM’s Children’s Health Rebate program was designed by using an established IBM Web-based approach and incentive program^{10,11} and evidence from previously described family-centered interventions and expert panel recommendations.^{12–16} The program is delivered online to provide convenient anytime access to IBM’s dispersed workforce.

The Children’s Health Rebate program was purposefully implemented as a nonrandomized, voluntary, and self-reported intervention without biometric data collection. This was done to afford all eligible IBM families with children the opportunity to participate and to reduce potential apprehension or privacy concerns related to requests for biometric parameters. The principal corporate

objective was to stimulate parental role-modeling and joint activities with children for change in the home environment. Data on individuals are unavailable to IBM except as required to pay rebates to eligible employees or as deidentified, aggregate group data for program analyses. This study of program results was approved by the University of Michigan’s institutional review board.

The action-oriented Children’s Health Rebate program incorporates expert recommendations into simple activities in which the whole family can participate. Four focus areas are targeted: healthy family meal engagement and consistent healthy eating; collaborative physical activity; appropriate screen time; and positive parental role-modeling. Participants address these target areas through a 3-phase process throughout 12 weeks: conducting an initial family inventory of healthy weight behaviors; setting and tracking family action goals; and identifying successes through a follow-up family inventory.

The initial family inventory is a 9-item assessment of behaviors that influence weight management in the 4 program areas: healthy eating (eg, consumption of unhealthy snacks); children’s physical activity; children’s entertainment screen time; and parental role-modeling (eg, parent entertainment screen time). The inventory items and the ideal target for each item are listed in Table 1.

TABLE 1 Family Inventory Items and Ideal Targets

Family Inventory Items	Target
Amount of fruits and vegetables in a typical day, cups	≥5
Amount of unhealthy snacks, unhealthy convenience foods, or sodas in a typical day, cups	0
How often children eat a healthy breakfast, d/wk	≥5
How often children eat a healthy dinner, d/wk	≥5
Frequency of physical activity for children in a typical week, times per wk	≥5
Amount of entertainment screen time children have in a typical day, h	<1
How often the family eats and/or prepares healthy dinners together, d/wk	≥5
How often the family is physically active together, times per wk	≥3
Amount of entertainment screen time adults have in a typical day, h	<1

After completion of the inventory, families are required to select between 3 and 10 action goals to strive for each week during the 12-week program. Action goal options are provided within each of the 4 program focus areas, but families can also create their own action goals. More than 50 goal options are available to choose from to account for the diverse needs, interests, and schedules of the families participating. Examples of family action goals include limiting fast food to once per week, walking children to school at least once per week, limiting video game time to 30 minutes/day, and involving children in meal preparation at least once each week. A printable tracking sheet is then generated, allowing participants to monitor fulfillment of their action goals on a weekly basis at home with their family throughout the 12 weeks. Participants are not able to change their action goals over the course of the program. Family resources are provided to support goal achievement, including an online resource center with convenient access to interactive meal planners, quick and healthy family recipes, physical activity trackers, parent tip sheets on reducing entertainment screen time and being healthy role models, and other tools. Participants also receive a copy of the *Family Power* book,¹⁶ a leading resource for developing a healthy-weight home. After 12 weeks, participants repeat the 9-item family inventory of healthy weight behaviors. Employees who complete all program steps earn a \$150 cash rebate, paid as taxable income in their paycheck.

Analysis

The association between baseline demographic characteristics (eg, employee's gender and age, children's age, and number of children in the family) and both program participa-

tion and program completion were examined by using χ^2 tests.

The average number of family action goals set per family and the percentage set of all goals available in each of the 4 program areas were calculated for both program completers and non-completers who completed the goal-setting step. The top 10 most frequently selected specific goals were identified among both program completers and noncompleters.

Changes in responses on the family inventory of healthy weight behaviors were assessed among participants who completed both the initial baseline inventory and a 12-week follow-up inventory. Participant responses for each item in the family inventory were categorized as either meeting or not meeting the ideal target (Table 1). A McNemar test was used to assess the change in the number of families who met the ideal target in each of the 9 inventory items between baseline and the 12-week follow-up.

Changes in inventory responses for each individual family were further categorized as improvement or maintenance (1) or lack of improvement or maintenance (0). An overall number of improved or maintained behaviors was calculated by adding the 9 categorized family inventory items.

Factors associated with the overall number of improved or maintained behaviors were assessed. For the "number of goals set" variable, optimal binning strategy was used because univariate analyses showed a nonlinear relationship between the number of family action goals set and the number of improved or maintained behaviors.¹⁷ From the optimal binning strategy, new variables were created on the basis of the number of goals set (ranging from 3 to 10) with binary cut points from 4 to 9. The final cut point of <6 goals was chosen because it yielded the highest association with the over-

all number of improved or maintained behaviors (Pearson's $r = 0.03$; $P = .001$).

Stepwise regression analysis that adjusted for other categorical variables was then performed to assess each variable's association with the overall number of improved or maintained behaviors. The dependent variable was the number of improved or maintained behaviors between baseline and the 12-week follow-up. The initial stepwise regression models included the number of family action goals set, employee's gender and age, average age of children in the family, and number of children in the family.

The reported value of program elements from a follow-up program evaluation was examined by using a 2-sample test of equality of proportions between any 2 given elements.

A significance level of .05 (2-tailed) was used for all statistical testing.

RESULTS

Participant Characteristics

A total of 22 265 employees elected to participate in the 2008 Children's Health Rebate program, representing 52.3% of employees with children covered by IBM's health plan. Employee participants were more likely to be female, be younger, have younger children, and have fewer children compared with nonparticipants (Table 2). Participants had a total of 44 172 children who spanned all dependent age categories, including 36.6% adolescents. Among the 22 265 program participants, 52.2% (11 631 employees, with 22 479 children) completed the program and earned the \$150 rebate. Compared with those who did not complete the program, the employee completers were more likely to be female, be younger, have younger children, and have fewer children.

TABLE 2 Characteristics of Employee Participants and Nonparticipants

	Nonparticipants (N = 20 317)	Participants (N = 22 265)	P ^a	Participants (N = 22 265)		P ^a
				Noncompleters (n = 10 634)	Completers (n = 11 631)	
Employee gender, %			<.001			<.001
Female	20.9	29.4		23.6	36.6	
Male	79.1	70.6		76.4	63.4	
Employee age			<.001			<.001
<35, %	6.9	11.0		9.3	12.9	
35–39, %	14.0	19.5		17.6	21.8	
40–44, %	20.8	23.1		22.8	23.5	
≥45, %	58.4	46.5		50.3	41.8	
Average, n	45.3	43.6		44.3	42.7	
Children's ages			<.001			<.001
<6, %	21.3	29.8		27.2	33.1	
6–11, %	28.8	33.6		32.8	34.5	
≥12, %	49.9	36.6		40.0	32.4	
Average, n	10.7	9.3		9.7	8.7	
No. of children			<.001			<.001
1, %	27.4	29.8		28.8	31.1	
2, %	49.6	48.2		47.6	48.8	
≥3, %	23.0	22.0		23.6	20.1	
Average, n	2.0	2.0		2.0	1.9	

^a χ^2 analysis-of-contingency table.

Goal-Setting

A total of 13 590 (61.0%) participants completed the goal-setting step and set an average of 7.8 family action goals for the program. Among the 4 program areas, participants set the most goals in the area of healthy eating (Table 3). The most frequently selected specific goals are presented in Table 4.

Improvement in Healthy Weight Behaviors

The 11 631 employees who completed the final program step of the 12-week follow-up family inventory demonstrated significant changes in all 9 as-

essment items (Fig 1). At baseline, these program completers reported relatively high frequencies of healthy dinners (74.9%) and healthy breakfasts (71.0%), but much lower levels of fruit and vegetable consumption (9.5%), family physical activity (23.2%), and appropriate screen time (22.4% for children and 18.1% for adults). Throughout the 12-week program, the largest improvements were seen in physical activity behavior (a 17.1-percentage point increase in family physical activity and 15.8-percentage point increase for children), whereas some of the smallest improvements were in the area of appropriate enter-

TABLE 3 Family Action Goal-Setting

	No. of Family Action Goals Available	Average No. of Goals Selected		
		All Participants Who Set Goals (N = 13 590), n (% of Goals Available)	Noncompleters Who Set Goals (N = 1959), n (% of Goals Available)	Completers (N = 11 631), n (% of Goals Available)
Healthy eating	22	3.6 (16.4)	3.8 (17.3)	3.6 (16.4)
Physical activity	7	1.4 (20.0)	1.5 (21.4)	1.4 (20.0)
Screen time	7	0.9 (12.9)	1.0 (14.3)	0.9 (12.9)
Parental role-modeling	17	1.8 (10.6)	1.8 (10.6)	1.8 (10.6)
Total	53	7.8 (14.7)	8.0 (15.1)	7.8 (14.7)

tainment screen time (8.3-percentage point increase for children and 6.1-percentage point increase for adults).

Factors Associated With Improvement in Healthy Weight Behaviors

The relationship between the number of family action goals set and the number of improved or maintained behaviors between baseline and the 12-week follow-up is presented in Fig 2. Stepwise regression analysis demonstrated that participants who set ≤5 family action goals reported a greater improvement in or maintenance of healthy weight behaviors compared with participants who set >5 goals (Table 5). In addition, female employee participants and employees with children of younger average age had a greater number of improved or maintained behaviors. Employee's age ($P = .19$) and number of children in the family ($P = .84$) were not significantly related to total numbers of improved or maintained behaviors and were excluded from the final model.

Usefulness of Program Features

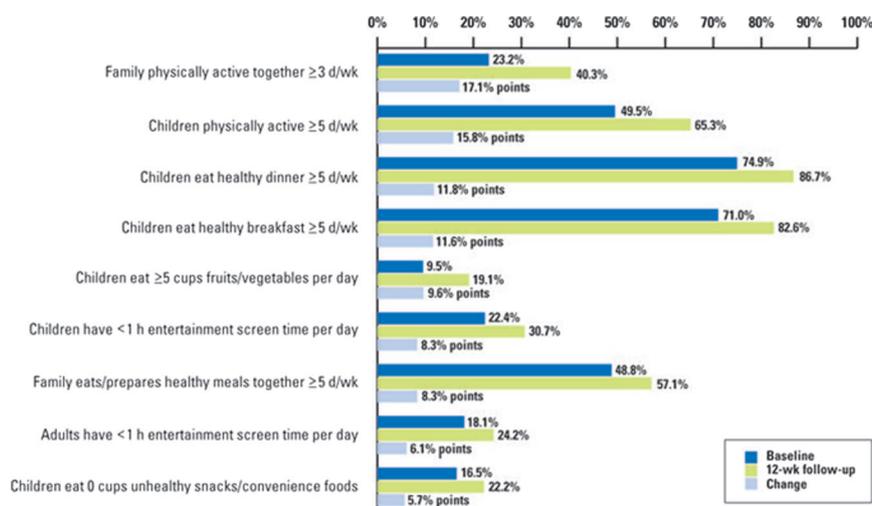
A random sample of 2500 program participants who completed the program was invited to complete an additional postprogram evaluation to collect feedback on usefulness of program features. The 689 responses (27.6%) are summarized in Table 6. Program features that prompted family-centered actions, such as setting family action goals, family collaboration, and family behavior assessments, were reported to be more valuable than access to weight-management resources.

DISCUSSION

Use of the family social context for positive health change has been recommended for childhood overweight interventions.¹⁸ The IBM Children's Health Rebate program adopted this

TABLE 4 Top 10 Family Action Goals Selected

Family Action Goal	Percentage of Participants Selecting the Goal			Focus Area
	All Participants Who Set Goals (<i>N</i> = 13 590), % (Rank Order)	Noncompleters Who Set Goals (<i>N</i> = 1959), % (Rank Order)	Completers (<i>N</i> = 11 631), % (Rank Order)	
Buy fresh fruits and vegetables each week	42.9 (1)	42.0 (2)	43.1 (1)	Healthy eating
Limit unhealthy snacks to 1 serving per child per day	40.7 (2)	42.9 (1)	40.3 (2)	Healthy eating
Make active indoor and outdoor chores the children's or whole family's responsibility (eg, vacuuming, mowing) each week	38.3 (3)	37.6 (3)	38.4 (3)	Physical activity
Eat at least 3 servings of fruits and/or vegetables per child per day	36.9 (4)	37.0 (4)	36.9 (4)	Healthy eating
Go on a family walk, bike ride, or other activity at least once per week	36.4 (5)	34.6 (5)	36.7 (5)	Parental role-modeling
Let each child choose a physical activity the whole family can participate in at least 1 time per week	32.7 (6)	32.2 (6)	32.8 (6)	Physical activity
Limit eating out to 1 time per week	30.3 (7)	31.8 (7)	30.0 (7)	Healthy eating
Adults maintain their own physical activity routine at least 30 min of moderate-intensity physical activity most days of the week	25.2 (8)	23.0 (10)	25.6 (8)	Parental role-modeling
Limit total entertainment screen time to 2 h per child per day	23.3 (9)	23.0 (9)	23.3 (9)	Screen time
Children eat a healthy breakfast every day	23.0 (10)	23.3 (8)	22.9 (10)	Healthy eating

**FIGURE 1**

Percentage of program completers (*N* = 11 631) who met the ideal target for each item on the family inventory of healthy weight behaviors at baseline and the 12-week follow-up. All changes between baseline and the 12-week follow-up were significant at $P < .001$ (McNemar test).

recommendation and constructed the program around relationships in families between children and parents. Reciprocal reinforcement for healthy weight behaviors was sought from adult role-modeling and co-participation in activities such as food preparation and family physical activity. The findings from the program demonstrate that at least in the near

term this approach can promote positive behavior change when applied in an employer wellness program. Parents and children reported short-term improvements in healthy eating behaviors, level of physical activity, and decreased entertainment-related screen time. Participants also reported that program features that prompted family-centered actions and collabora-

tion were most valuable to them. These results are consistent with numerous studies outside the workplace that show that childhood obesity interventions are effective when directed at parents or families.^{19,20}

Examination of program attributes according to parent gender, child age, and goal-setting was instructive and may have implications for future program design. Participation and behavior achievement were greater among female employees and among employees with younger children, which may reflect the greater responsibilities that women often have in child-rearing and health-related decision-making²¹ and the greater control that parents can exercise over younger children compared with adolescents.²² Program goal-setting data showed that 83.6% of families established >5 action goals for the program. However, success in behavior improvement or maintenance throughout the 12 weeks was slightly greater when ≤5 action goals were set. These observations suggest that when program resources are limited, recruitment efforts that

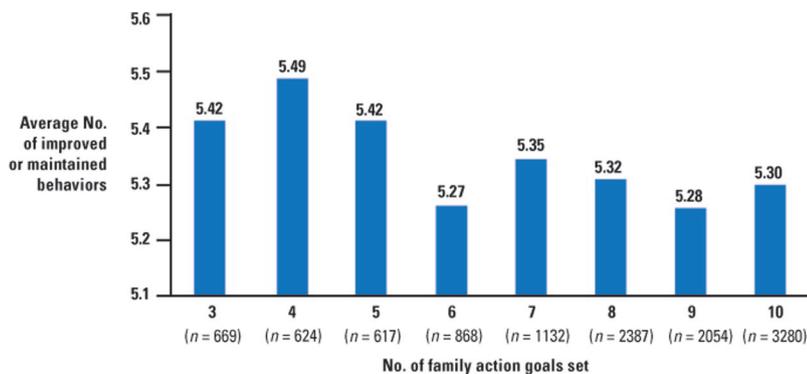


FIGURE 2

Relationship between the number of family action goals set and the average number of improved or maintained healthy weight behaviors between baseline and the 12-week follow-up ($N = 11\ 631$).

TABLE 5 Factors Associated With Number of Behaviors Improved or Maintained

Parameter	<i>n</i>	Least-Squares Means ^a	Parameter Estimate	SE	<i>t</i>	<i>P</i>
Intercept			5.23	0.05	100.36	<.001
No. of family action goals set						
<6	1910	5.49	0.11	0.05	2.34	.02
≥6	9721	5.38	0.00			
Employee gender						
Female	4257	5.61	0.35	0.04	9.17	<.001
Male	7374	5.26	0.00			
Average children's age						
<6 y	2442	5.53	0.19	0.04	4.31	<.001
6–11 y	3373	5.44	0.10	0.04	2.24	.03
≥12 y	5816	5.33	0.00			

^a Adjusted average number of behaviors improved.

TABLE 6 Participant-Reported Value of Program Elements

Program Elements	Percentage of Participants Who Reported Each as Valuable ($N = 689$), % (95% Confidence Interval)
Setting family action goals	72.3 (68.9–75.6)
Opportunity to involve family in process and activities	60.1 (56.4–63.8)
Family inventory of behaviors	58.6 (54.9–62.3)
Access to Web-based resources	39.5 (35.8–43.1)
Access to Family Power book	23.7 (20.5–26.8)

target women may be more productive than are widespread campaigns, and designing programs around a smaller number of action goals might be warranted.

The rebate program was intentionally designed not to request biometric data from families in its initial years. This decision was made to avoid creating privacy-related barriers to participation because, unlike adult IBM wellness programs which routinely gather such data, this has not previously been

requested for children. The large absolute number of participating families (nearly 12 000 program completers) supports the approach in launching the program. Use of Web-based programming was an additional design feature in the Children's Health Rebate program. This delivery vehicle responds to the preferences of a highly dispersed and mobile IBM workforce, both for access and for flexibility. Electronic program delivery and the modest cash payment of \$150 have been a

successful combination in IBM's adult-targeted prevention initiatives for many years.^{10,11}

The primary objective of the IBM Children's Health Rebate initiative is to promote active engagement in healthy weight activities by parents together with their children. Strengthening employee good will for IBM and providing a private sector model for employer activation were additional motivations. It is possible that IBM health care expenses could be reduced if behaviors exhibited during the program were adopted permanently, but the program was not launched expressly for this purpose. Nonetheless, obese children do have direct financial impact to employers. For example, IBM health care costs in 2008 indicate that children under age 18 with a diagnosis of obesity incurred nearly twice the average cost of nonobese children (\$2907 vs \$1640). In addition, children with a diagnosis of type 2 diabetes incurred an average cost of \$10 789 in that same year. This was 3 times the average cost of obese children without type 2 diabetes, and 6.5 times the average cost of nonobese, nondiabetic children.²³

How prevalent are employer wellness programs for healthy weight in children and families? It seems that employer wellness initiatives that target families as the unit for intervention are limited overall and for childhood overweight specifically.²⁴ For example, more than half of all firms (58%) and nearly a third of large firms (30%) that provide health benefits and offer at least 1 wellness program do not offer these to families.²⁵ However, this approach has shown benefit. It was found in the Treatwell 5-A-Day study,²⁶ for example, that worksite interventions that involved families were more than twice as effective in increasing the consumption of fruits and vegetables as those that did not. Baptist Health

South Florida's "Families Step Up" program offers intensive nutrition and activity counseling along with biometric testing for weight management in families. Preliminary data from this program covering 28 families indicates that when both parents are actively engaged, completion rates are higher for the 6-week program.²⁷

Employers are an important source of influence that should be included in community efforts for prevention of childhood overweight. Employers have demonstrated previously that employee health improvement can be achieved with worksite policies and practices (eg, smoke-free buildings and flexible work hours), wellness programs, financial incentives, and lower cost-sharing for certain health services.^{7,28} Pediatricians and the American Academy of Pediatrics have shown that positive outcomes on important health issues are possible when working with employers on programs and policy initiatives. For example, in the Talking Parents, Healthy Teens initiative, pediatricians, researchers, and employers collaborated in worksite programs to improve parental communication skills for sexual health discussions with their adolescent children.²⁹ Joint work between employers, pediatricians, and other primary care physician groups has been effective in advancing legislative support for medical home demonstration projects since 2008. Working together, pediatricians, family physicians, internists, osteopaths, and IBM in 2007 launched the

Patient-Centered Primary Care Collaborative, an effective collaboration for primary care and medical home advocacy that now includes >600 member organizations.³⁰ The American Academy of Pediatrics has also teamed with the National Business Group on Health to create toolkits for employers to use in designing insurance coverage for appropriate prenatal, child, and adolescent preventive services.³¹ Regarding childhood overweight, the academy and employers such as Pepsi, Owens Corning, and the Houston Independent School District have joined with the Clinton Foundation and the American Dietetic Association to promote adequate employer insurance coverage for obesity-related clinical services.³²

This study has several limitations. This is an observational study without a separate comparison group and therefore suffers many limitations from its nonexperimental design. It lacks randomization and information on weight or other biometric measures. Behaviors examined are self-reported, but IBM data in other programs have shown strong correlations between self-reported behaviors and actual levels of health care costs. For example, self-reported data on physical activity among >28 000 employees showed a significant dose response relationship between increased minutes of physical activity per week and decreased per capita health care costs during the same period.³³ Selection bias is also possible in the current study because

of the voluntary nature of participation and the noncompletion rate of 47.8%. However, this level of attrition is typical for Internet-based interventions, which are reported to often have 40% to 50% attrition rates.^{34,35} Secular change in the pre versus postprogram comparison is not considered a threat to the validity of the observations given the short 12-week measurement period. The higher socioeconomic status of the IBM workforce and the health promoting culture of the IBM work environment are additional considerations in interpretation.

CONCLUSIONS

The IBM Children's Health Rebate program illustrates the potential of employers to facilitate short-term eating, physical activity, and screen time behaviors in children and parents participating in a Web-based program. This finding is consistent with previous studies of childhood overweight targeting parents and families in nonoccupational venues and supports a role for employers in community-based strategies for obesity prevention in children. Longer-term and experimental study designs are needed to define the magnitude and durability of employer interventions on the reported observations.

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