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Novel public–private partnerships to address the double burden of malnutrition

Adam Drewnowski, Benjamin Caballero, Jai K. Das, Jeff French, Andrew M. Prentice, Lisa R. Fries, Tessa M. van Koperen, Petra Klassen-Wigger, and Barbara J. Rolls

Public–private partnerships are an effective way to address the global double burden of malnutrition. While public–private partnerships operate in multiple forms, their leadership usually falls to governments, public health agencies, or nongovernmental organizations, with the private sector taking a subordinate role. The rapid ascent of social media and mass communications worldwide has provided a disruptive technology for new nutrition intervention programs. A new model, provisionally called private–public engagement, takes advantage of social media, mass media, and integrated social marketing to reach parents, families, and communities directly. These new private–public engagement initiatives need to be managed in ways suggested for public–private partnerships by the World Health Organization, especially if the private sector is in the lead. Once the rationale for engagement is defined, there is a need to mobilize resources, establish in-country partnerships and codes of conduct, and provide a plan for monitoring, evaluation, and accountability. Provided here is an example consistent with the private–public engagement approach, ie, the United for Healthier Kids program, which has been aimed at families with children aged less than 12 years. Materials to inspire behavioral change and promote healthier diets and lifestyle were disseminated in a number of countries through both digital and physical channels, often in partnership with local or regional governments. A description of this program, along with strategies to promote transparency and communication among stakeholders, serves to provide guidance for the development of future effective private–public engagements.

INTRODUCTION

The global double burden of childhood malnutrition manifests as both undernutrition and overweight.^{1–3}

Low- and middle-income countries are most vulnerable; in some communities, stunting, wasting, and obesity can coexist.^{4–6} Given increasingly limited public

Affiliation: A. Drewnowski is with the Center for Public Health Nutrition, University of Washington, Seattle, Washington, USA. B. Caballero is with the Center for Human Nutrition, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland, USA. J.K. Das is with the Division of Woman and Child Health, Aga Khan University, Karachi, Pakistan. J. French is with the Brighton Business School, Brighton University, Brighton, United Kingdom, and with Strategic Social Marketing Ltd, Concord, Hampshire, United Kingdom. A.M. Prentice is with the MRC Unit The Gambia at London School of Hygiene and Tropical Medicine, Keneba, Gambia, and with the MRC International Nutrition Group, London School of Hygiene and Tropical Medicine, London, United Kingdom. L.R. Fries is with the Corporate Nutrition, Health and Wellness Unit, Nestlé, Vevey, Switzerland, and with the Behavioral Science Group, Nestlé Research Center, Lausanne, Switzerland. T.M. van Koperen is with the Cuprifère Consult, Hilversum, the Netherlands. P. Klassen-Wigger is with the Corporate Nutrition, Health and Wellness Unit, Nestlé, Vevey, Switzerland, and with the Nutrition, Health and Wellness Unit, Nestlé Research Center, Lausanne, Switzerland. B.J. Rolls is with the Department of Nutritional Sciences, The Pennsylvania State University, University Park, Pennsylvania, USA.

Correspondence: A. Drewnowski, Center for Public Health Nutrition, University of Washington, 305 Raitt Hall, Seattle, WA 98195-3410, USA. Email: adamdrew@uw.edu.

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resources, childhood malnutrition appears resistant to local or single-sector solutions.⁷

Transformative approaches are needed to ensure deeper engagement by multisector stakeholders.^{7,8} The United Nations has encouraged governments, health jurisdictions, and civil society to engage with the private sector through public–private partnerships (PPPs) to address malnutrition.^{5,6,9} The more-successful and -sustained nutrition initiatives have been those that brought together government agencies, nongovernmental organizations, policymakers, schools, civil society, the food industry, and the media.^{3,9–13} International agencies have repeatedly called for increased engagement with the private sector to address the double burden of malnutrition in low- and middle-income countries.^{14–16}

The chief features of PPPs in public health nutrition have been described previously.¹⁷ Three types of functioning PPPs were identified. Philanthropic PPPs were characterized by charitable donations of money or food.¹⁷ Transactional PPPs required a higher level of interaction through shared principles and goals. Transformational PPPs, the highest level of engagement, involved multiple partners, large-scale programs, and social change.¹⁷ The common assumption underlying all PPPs has been that the public sector would take the lead, selecting and auditing potential industry partners in line with public health goals.^{17,18}

The rapid advent of social media and mass communications worldwide has provided a disruptive new technology that complements the traditional communication channels. A new intervention framework, provisionally called private–public engagement (PPE), takes advantage of social media, mass media, and integrated social marketing to reach parents, families, and communities directly. Novel PPE initiatives should not escape scrutiny and need to be managed in ways suggested for PPPs by the World Health Organization, especially if the private sector is to be in the lead. The rationale for engagement needs to be defined. Once the rationale is established, there is a need to mobilize resources, establish in-country partnerships and codes of conduct, and provide a plan for monitoring, evaluation, and accountability. Describing how these goals should be achieved is the topic of this review.

There is a clear global need for a new intervention framework. The majority of social marketing programs to prevent childhood obesity have been developed and delivered in the United States,^{19–25} Europe,^{26–29} or Australia.^{30,31} Only a few have addressed the rising rates of overweight in low- and middle-income countries, and these have tended to be community interventions in relatively isolated locations such as the Marshall Islands³² or Micronesia.³³ With the recent increase in the global reach of mass communication channels such as television, Internet, and mobile phones, there are

new opportunities to use social marketing approaches to create demand for healthy behavior among wider and more diverse global populations.

PUBLIC–PRIVATE PARTNERSHIPS

The supporting role of the private sector in many PPPs has been to provide funding and other support for health programs initiated by governments and nongovernmental organizations.^{18,34} One well-known initiative with a global reach, Ensemble Prévenons l'Obésité des Enfants (EPODE),^{28,35} is a childhood obesity prevention program driven largely by public institutions and local governments. Local policymakers, such as mayors, have worked with schools and other public institutions to engage parents and children on issues related to childhood body weight. The role of the food industry (both multinational and smaller local enterprises) has been to provide financial support to the EPODE program and help fund local implementation of EPODE-affiliated programs.

Many of the existing programs (for examples, see Table 1^{19–24,26–28,30,36–38,39}) operate primarily through schools^{20,21,27,40} and have often been limited to one city or to a few school districts.^{19,20,22,30} However, some programs achieved a broader reach. Food Hero²³ began with a smaller-scale pilot program before expanding to a wider audience, in this case, one US state. The Fuel Up to Play 60 program²¹ promoted physical activity and nutrition in school-aged children in partnership with the National Football League. The national-level programs Change4Life²⁶ and UNICEF Kid Power²⁴ were designed by public agencies to achieve public health goals through multistakeholder engagement. While EPODE now functions globally, another program, Pro Children,²⁷ operates in 3 European countries.

While schools remain the primary channel of communication, some programs have reached the general community through messaging and interventions in other public spaces (eg, parks, shops) and through mass media.^{19,22,28,40,41} Digital communications are one tool for behavioral change. Although a few online programs have targeted parents directly,^{30,38} most interventions built around social media have targeted adolescents and young adults.^{42–44}

ROLE OF THE PRIVATE SECTOR

Private-sector engagement is increasingly viewed as indispensable to creating change in the food supply or the global food environment.^{9,15,45–47} While the role of the food industry in preventing childhood malnutrition continues to be a topic for spirited debate,^{48,49} government spending on public health has declined in recent years.^{17,50–52} In particular, governments of low- and

Table 1 Social marketing programs used to influence children's nutrition and lifestyle

Category	Program	Channels	Behaviors targeted	Audience	Behavioral outcome measures	Target and scale of program	Stakeholders	Initiator
Schools	Team Nutrition ^{20,36}	Schools (lessons, displays, tastings). Parent newsletter and events. Media coverage	Dietary choices (variety and quality)	Children and parents	Process measures (eg, no. of hours); qualitative interviews; questionnaires; teacher and food service observations; observations of children's food choices and behaviors	7 school districts in different US states	Government (US Department of Agriculture)	Public
	Pro Children ²⁷	Schools (classroom activities, F&V availability); parent activities; web tool (F&V advice); local media	F&V intake	Children and parents	24-h dietary recalls; FFQs	Schools in 3 European countries (Norway, the Netherlands, Spain)	Government (European Commission), academic institutions	Public
	Fuel Up to Play ^{60,21}	Schools (provision of educational activities, access to nutritious foods, and sports equipment)	Physical activity, nutritional choices	Children and parents	School decides how to track behaviors. Suggestions include the use of surveys; informal feedback from teachers or parents; and tracking the following: no. of children participating, meal purchases, and student behavior. Some studies have explored longitudinal effects on diet, physical activity, and fitness ^{21,39}	Nationwide in the USA	Private organizations (National Football League; National Dairy Council)	Private
Community	Bike, Walk, and Wheel ^{22,37}	Mass media, posters, promotions	Use of active transport	Community	Observations of pedestrians and cyclists	One US city (Columbia, MO)	Nonprofit organizations (PedNet Coalition; Robert Wood Johnson Foundation), local government	NGO

(continued)

Table 1 Continued

Category	Program	Channels	Behaviors targeted	Audience	Behavioral outcome measures	Target and scale of program	Stakeholders	Initiator
Community plus online component	EPODE ²⁸	Messaging disseminated through communities; environmental changes in schools and public spaces; events in schools and in the broader community (eg, stores, parks)	Nutritional choices, physical activity	Children	Anthropometry; process measures and output measures (no. of events, materials developed)	Mostly higher-SES countries	Government, NGOs, private partners	Public-private
	5-4-3-2-1 Go! ¹⁹	Mass media, events, student ambassadors, website	Nutritional choices, physical activity	Community	Home observations; interviews; assessment of reach and awareness	One US city (Chicago, IL)	Consortium of local organizations (CLOCC)	Public
	Change4Life ²⁶	Digital technology, school interventions, social media	Nutritional choices, physical activity	Children and parents	Parent interviews; assessment of claimed behavior adoption; basket analysis of shopping behavior; tracking of national obesity trends	Nationwide in the UK	National government (National Health Service)	Public
	INFANT Extend ³⁰	Group lessons for parents, Facebook group, newsletters delivered by email	F&V intake, decreased intake of SSBs and energy-dense foods, more physical activity, less screen time	Parents	Anthropometry; FFQs; accelerometers; questionnaires	One Australian metro area (Melbourne, Victoria)	NGO-funded organizations (World Cancer Research Fund), academic partners	Public
Online only	Food Hero ^{23,38}	Social media, website (recipe focused), community kit for nutrition educators	Nutritional choices	Parents	Assessment of no. of active users, clicks on posts, and virality of posts	One US state (Oregon)	Academic institution (Oregon State University)	Public?
Social movement	UNICEF Kid Power ²⁴	Activity monitor for children in the USA. School program exists, but children can participate independently, too	Physical activity	Children	Assessment of no. of children enrolled in school programs, no. of meals distributed to those in need	Nationwide in the USA	NGOs (UNICEF, Force for Change), industry partner (Target Corporation)	NGO

Abbreviations: CLOCC, Consortium to Lower Obesity in Chicago Children; EPODE, Ensemble Prévenons l'Obésité des Enfants; F&V, fruits and vegetables; FFQ, food frequency questionnaire; NGO, nongovernmental organizations; SSB, sugar-sweetened beverage; UNICEF, United Nations Children's Fund.

middle-income countries are forced to devote their scarce resources to the prevention and treatment of the continuum of malnutrition, from wasting and stunting to overweight.⁵³

Transnational food companies can leverage their research, expertise, consumer insight, and marketing power to address global nutrition challenges. Because they operate globally, large food companies are uniquely positioned to implement large-scale initiatives around the world. Their global reach stands in contrast to PPPs that may be driven and financed by committed local stakeholders such as local governments or nongovernmental organizations^{19,22,30} but may lack the necessary resources to network and develop programs on a larger scale.

The importance of balancing the benefits and risks of PPPs to address global malnutrition has been well described in influential works.^{17,54} Kraak et al¹⁷ noted that large food companies have contributed to PPPs to alleviate hunger, promote food security, and help develop microenterprises or small businesses. They highlighted the importance of so-called transformational PPPs that addressed complex global nutrition challenges such as food fortification and the creation of programs to promote a healthy diet and to prevent obesity. Among the leaders in this space were the Global Alliance for Improved Nutrition, described as an “alliance of governments, international organizations, the private sector and civil society” and the Healthy Weight Commitment Foundation.¹⁷

Private–public engagement differs from PPP in one important respect. In PPE, the private sector takes the leading role in bringing together multiple entities—families, schools, communities, policymakers, the media, and nongovernmental organizations, among others—to address health-related issues.

The principles for managing the benefits and risks remain the same. Transformational PPE programs need to be aligned with local and regional policies on nutrition and health. Their rules of engagement with stakeholders, both public and private, also need to follow standard principles. These include having a clearly defined set of achievable goals to benefit the public, a clear statement of work, and a statement of roles and responsibilities of partners. Accountability is essential to ensure that the objectives of PPEs meet both public and private needs. Also needed are guidelines for the use of industry brands, logos, icons, and color schemes and policies on where and how the names and logos of the partnering organizations should be used. All communications must follow country-specific policies related to marketing to children, which may forbid the use of specific products or brand names.

AN EXAMPLE OF PPE: THE UNITED FOR HEALTHIER KIDS PROGRAM

The United for Healthier Kids (U4HK) program, now launched in 11 countries by Nestlé, uses social media, mass media, and integrated social marketing to reach parents and caregivers directly. The main principles of the U4HK program are presented in **Box 1**. These rules of engagement highlight the importance of building evidence-based health interventions with committed partners that are adapted and fully responsive to local needs. Such principles could also guide future PPE initiatives by other companies that are equally committed to creating shared value for society.^{55,56}

The U4HK transformational PPE model is shown in **Figure 1**. The PPP approach to reaching families through multiple communication channels is shown on the left, while the complementary PPE approach, which makes greater use of direct access by social media, is shown on the right.

Six science-based behavioral goals

At the time it was launched, the U4HK program had public health nutrition goals that were clearly defined. The content, built around 6 goals for dietary or behavioral change (**Figure 2**), was science driven and evidence based. The 6 family-centered goals for dietary or behavioral change selected for inclusion in the U4HK program were based on an exhaustive review of the literature by internal and external experts. A global advisory board, convened by Nestlé, provided advice on the overall framework⁵⁸ and scientific content of the program. This framework was used in each country as guidance for creating content. The board also established a framework for assessment to guide countries in measuring the reach of the program, change in knowledge and attitudes, and intended and effective change in behavior.

The focus on parents of children under 12 years of age was guided by a socioecological model^{57–59} that emphasizes the role of personal, social, and environmental factors and the role of the environment in health decision-making. Studies have shown that the time window of early to middle childhood represents a critical opportunity for promoting lifelong behavioral change.⁶⁰

The 6 behavioral goals outlined in the following sections were developed to be understood by laypeople. In each country or region, program materials were translated into the local language, and wording was aligned with existing local health messaging, where appropriate.

Box 1 Six suggested principles for private–public engagement programs

1. Ensure a clear rationale for local engagement: Public health nutrition content should be culture specific, sensitive to local needs, and aligned with existing local programs and national guidelines.
2. Build programs on solid partnerships: A tripartite model is encouraged, one that brings together private industry, government agencies, NGOs, and consumers. Multiple stakeholders bring complementary resources to the table and must have clear roles and responsibilities.
3. Base programs on long-term commitment: Each country or region should commit to running the program for several years and creating a local coordination team.
4. Use a science-driven approach: Health messaging should be science driven and evidence based, guided by nutrition, behavioral, and social sciences.
5. Monitor and evaluate programs for impact: Outcome and process evaluations are needed to assess project performance. New metrics on the effectiveness of social media may need to be developed.
6. Ensure programs are transparent and accountable: Reports and other information about the program and its partners should be available to all stakeholders and partners, including the public.

Manage portions. Portion sizes can influence the amount of food consumed at each eating occasion, with larger portions leading to higher energy intakes.^{61–65} Larger portions of energy-dense foods, which contain concentrated energy per unit of weight, can lead to overeating.^{66,67} Selecting ample portions of nutrient-rich vegetables and limiting portions of energy-dense foods are important parts of healthy eating habits.^{68–70} Serving larger portions of fruits and vegetables at dinner promotes intake of both of these types of foods among young children.⁶⁸ Parents were taught specific strategies to use portion size positively to increase the intake of more nutritious foods.^{66,71} The goal was to convey the notion that foods need to be balanced within a meal and portion sizes matched to the child's age. Practical guidance on how parents can become positive role models was provided through both the social media platform and on-the-ground implementation.^{72,73}

Choose nutritious and varied options. Introducing a broader variety of foods from within and across food groups into children's diets has nutritional benefits, as does reducing sugars and fats that are eaten in excess. Variety in foods can be a driver of sensory enjoyment and can be shaped to increase consumption of healthier, nutrient-rich foods.⁷⁴ Among the strategies found to be effective in increasing the consumption of healthy foods at home are the use of a variety of vegetables and fruits as snacks and side dishes and the incorporation of

vegetables and fruits into main dishes.^{71,75,76} Providing children with balanced food choices while avoiding overt food restrictions was identified as a successful technique.^{77,78} The U4HK program provided practical ideas and tips for improving dietary variety, building on strategies such as repeated exposure, modeling eating healthy foods, and involving children in preparing nutritious meals.^{81–84}

Choose to drink water. Another goal was to make water the preferred choice over sugar-sweetened beverages.^{85–88} To achieve this, the water supply needs to be accessible, safe, reliable, and affordable. The U4HK program provided information about the role of water in hydration and why water should be the preferred beverage for hydration. Practical guidance included strategies to make drinking water fun and attractive.⁸⁷

Enjoy meals together. The behavioral structure of meals is a component of a healthy lifestyle.^{88–91} Where, how, and with whom children eat, as well as for how long they eat, can affect diet quality and body weight.^{92–96} In some studies, frequent family meals were linked to lower risk of childhood overweight.^{89,97} Family meals also provide time for interactions that can help children's social and emotional development.^{98,99} The U4HK program gave practical guidance on how to provide structure and create a positive environment during mealtime while avoiding distractions at the table in order to increase children's consumption of a variety of nutrient-rich foods.⁹⁹ Toys, books, smartphones, and television may not be compatible with mindful eating.

Feed your baby like a baby. Adequate nutrition during the first 1000 days of life, from conception, through pregnancy, and up to 2 years of age, is vital for infant growth and development.^{100–104} Dietary intake studies often show that infants consume foods and beverages that are not appropriate for their age^{105,106} and that nutrient requirements are not met. The U4HK program provided practical guidance to promote exclusive breastfeeding for 6 months and continued breastfeeding for up to 24 months and to encourage responsive feeding (ie, looking for cues of hunger and satiety) to benefit infants' nutritional status. Dietary patterns are established by age 2 years. Early exposure to a greater variety of nutritious foods may lead to preferences for a diversity of foods throughout childhood and beyond.^{105,107}

Move more, sit less. Regular physical activity is an integral part of a healthy lifestyle for children.¹⁰⁸ It helps develop motor skills and promotes decision-making, attention, and teamwork.^{108,109} Materials to encourage physical activity provided guidance for parents to

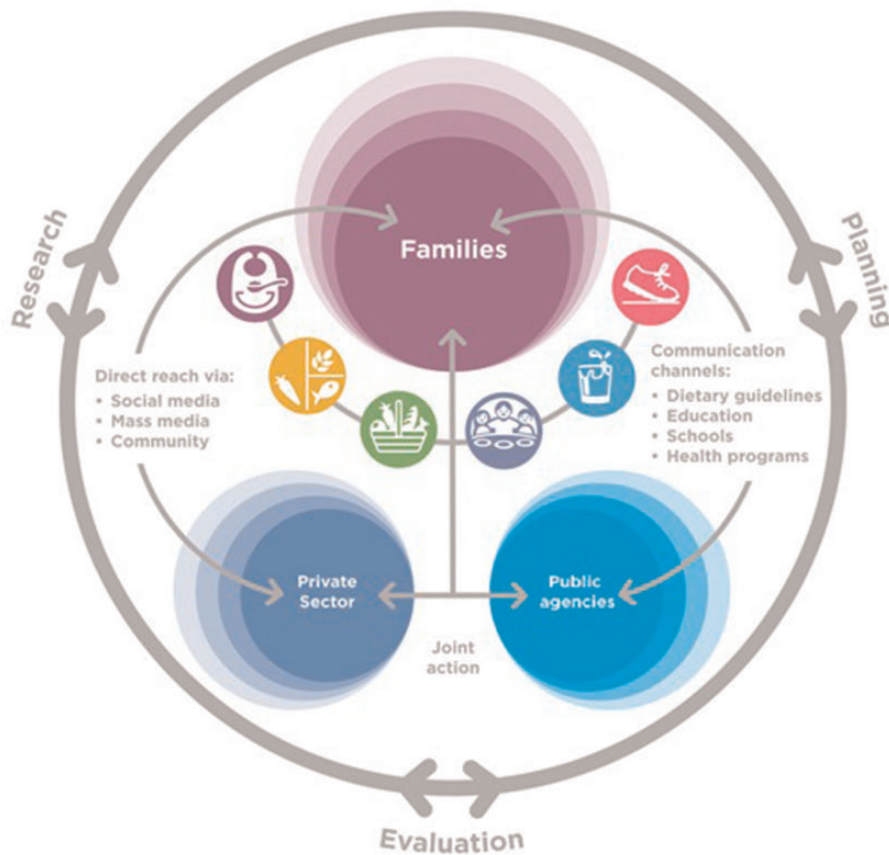


Figure 1 The United for Healthier Kids (U4HK) transformational model of private–public engagement (PPE). The public–private partnership (PPP) approach to reaching families through multiple communication channels is shown on the left, while the complementary PPE approach, which makes greater use of direct access by social media, is shown on the right.

motivate their children to spend more time being physically active and less time being sedentary (eg, using digital devices). That guidance took into consideration certain limitations such as dangerous living environments or financial constraints.

The overarching goal was to deliver consistent and positively framed messages and interventions rooted in nutritional and behavioral sciences.^{110,111} Each country or region selected which of these behavioral goals to implement, depending on local needs and the local context. The use of social media allowed the program content to be adapted to the specific nutritional needs, health priorities, and available resources in each country.

ROLE OF SOCIAL MEDIA AND MASS MEDIA

Capable of reaching large parts of populations in most countries, modern technologies such as social media are fast becoming an essential component of nutrition intervention programs at the population level. The new technologies are engaging and can promote networking and community building among parents and

	Manage Portions
	Choose Nutritious and Varied Options
	Choose to Drink Water
	Enjoy Meals Together
	Feed Your Baby Like a Baby
	Move More, Sit Less

Figure 2 Six family-centered strategies for dietary or behavioral change used in the United for Healthier Kids (U4HK) program.

caregivers.¹¹² Television, newspapers, and radio can raise awareness, influence attitudes and beliefs, and affect public opinion.^{111,113,114} In multiple studies, greater

exposure to Internet-based intervention content has been consistently associated with greater effectiveness.^{111,115} Electronic health (e-health) and mobile health (m-health) methods, especially when paired with goal setting and self-monitoring, can have a larger impact on public health than the traditional face-to-face approaches to health education.¹¹⁶ Moreover, with the rapid growth of the Internet and the use of mobile devices in developing countries, such methods are increasingly being used among low- and middle-income populations to improve physical activity and eating behavior.¹¹⁶ However, not all populations use, or have equal access to, social media or mass media. In the U4HK program, therefore, it was important to choose the right mix of outreach approaches and channels to parents. For example, in the Philippines, short and memorable messages relevant to the local behaviors were aired through a radio station rather than on TV. Additional on-ground community activities became part of the program in order to permit access by parents across all socioeconomic classes.

SOCIAL MARKETING: BALANCING RISKS AND BENEFITS

Another strategy that uses mass communication channels to promote health behavior change is social marketing. Social marketing has been defined as the systematic application of marketing, alongside other concepts and techniques, to achieve specific behavioral goals for a social good.¹¹⁷ Social marketing programs focus on the application of 6 core concepts to increase the efficiency and impact of social programs: (1) explicit social goals; (2) citizen-focused planning and delivery; (3) citizen-perceived value as assessed via the social marketing mix; (4) data- and insight-informed audience segmentation, analysis of competition, barriers, assets, and action plan; and (5) development of systemic, strategic, and reflexive programs.

Interventions using a social marketing approach can encourage healthier lifestyles.^{40,118–120} Both the Change4Life²⁶ and the EPODE²⁸ programs have applied social marketing strategies to change lifestyles and environmental factors and to reduce the risk of childhood obesity. However, the application of social marketing differed between the 2 programs. While EPODE was inspired by social marketing theory, it was not designed solely on the basis of social marketing benchmarks.¹²¹ By contrast, Change4Life used social marketing principles together with the help of private marketing agencies to create a social movement within the United Kingdom. Social marketing can be used as part of a strategy to develop a social movement by engaging target audiences in the selection, design, implementation, and evaluation of social programs. Used in this way,

social marketing is a powerful tool for engaging citizens and creating ownership and responsibility rather than a more top-down, expert-driven approach to social change.

Although the effects of EPODE's predecessor, the Fleurbaix Laventie Ville Santé Study, were published in 2009¹²² and the effects of EPODE in France appeared promising in 2010,¹²³ other studies of the effects of EPODE have not yet been published. Thus, the overall impact of EPODE is unclear. The EPODE for the Promotion of Health Equity studies conclude that effects of EPODE's integrated community-based approach can be seen in differences in children's lifestyle behaviors and parental practices; however, a 1-year follow-up assessment suggests that the long-term effects of the program may be limited.^{124,125}

Although it can be challenging to specifically evaluate the role of social marketing in a comprehensive program like EPODE, several of the affiliated programs that used the EPODE approach have shown promising outcomes. For example, both the Belgian program VIASANO and the Dutch program Young People at a Healthy Weight showed decreases in weight status and improvements in behavior after using social marketing.^{87,126} For some of the EPODE and related programs, the publications lack details about the activities implemented and the social marketing strategies used, thereby limiting the ability to replicate successful methods elsewhere.

In contrast, the Change4Life program was based on social marketing principles using specialists from both public and private sectors to inform the program and was developed and described thoroughly.^{127,128} Emphasis was placed on evaluation to create and optimize a program that focused on targeted segments of families with young children. Multiple process and impact evaluations have been conducted of specific interventions or elements of the program.^{26,41,127,129,130} There appears to be substantial evidence that engagement in Change4Life positively influences change toward more-healthy eating.¹²⁷ These results provide encouraging evidence that Change4Life made progress toward its aim to create a social movement to sustain the program over the long term.

MONITORING A SOCIAL MOVEMENT

Social movements critically depend on working collaborations to understand the local needs, social environment, and culture as well as the likely barriers and challenges. A social movement develops when multiple elements of society, such as families, nonprofit organizations, government, and private industry, take action to promote change for a specific societal benefit. Key to a successful social movement is insight into how

messages are shared, how interaction is sustained over time, what motivates participants, and what barriers participants face.¹³¹ Interactions on social networks drive more people with the ambition of making a long-lasting, positive impact on society to become engaged, and a dynamic can be built that is cumulative and sustained in its effect. Like the Change4Life initiative in the United Kingdom, the U4HK program aims to inspire and mobilize people into collective action that results in the formation of a self-sustaining social movement to improve children's health behaviors. Change4Life used social marketing principles to create a social movement by building partnerships with many sectors, using tactics such as community outreach to engage citizens in the program development, and establishing forums to allow private-sector partners to offer input on how to increase the impact of the program.

A social movement is not a controllable approach to change. Its success depends on whether the messages used are aligned with the needs, desires, values, and goals of the target population and whether leadership is present to define the goals of the movement, to establish the tactics to be used, and to mobilize and coordinate collective action.^{132,133} A social movement has the potential to influence public policy to promote change through the simultaneous actions of family, government, public and private organizations, and civil society. However, appeals to improve health and reduce body weight have not proved motivating enough for the general public.¹³⁴ Stealth interventions have been considered a potentially important additive to the creation of a social movement,¹³⁴ and a combination of approaches would likely be the most impactful.

IMPLEMENTATION AND MONITORING

Approaches to implementation of social marketing techniques need to be tailored to the local environment in order to address the primary needs of the target population and to address barriers to behavioral change in a way that is culturally appropriate. As an example of how the U4HK program was implemented in two countries that differ greatly in terms of both the culture and nutritional challenges, 2 pilot markets, Mexico and the Philippines, are described. Mexico currently has the higher prevalence of childhood obesity,¹³⁵ while the major concerns in the Philippines are nutritional deficiencies and a high prevalence of stunting (30%).¹³⁵

Mexico

The Mexican U4HK pilot program had 4 primary partners: the Ministry of Health, the Ministry of Public Education, the Kimberly-Clark Corporation, and

Televisa. The Ministry of Health endorsed the program, which was launched on the Ministry's premises. The behavioral content selected by in-country Mexican partners was chosen to align with an ongoing governmental campaign.¹³⁶ The following goals were selected: manage portions; choose nutritious and varied options; choose to drink water; feed your baby like a baby; and move more, sit less. Focus groups were conducted with Mexican parents and other caregivers (eg, grandparents) to explore both motivating factors and barriers to achieving these goals.

Multiple communication channels created awareness and reached large segments of the population. The largest national TV network, Televisa, helped to create a new format of TV shows by combining elements of a reality show and a talk show and featuring interventions based on behaviors described in the U4HK program. The show was broadcast weekly for 26 weeks. Specialists with different fields of expertise (pediatrics, psychology, and nutrition) monitored and guided families through the interventions over the course of the 26 weeks. The 5 families that participated in the TV show underwent a detailed nutritional and health assessment before and after the show. There were promising changes in the dietary habits of the families, with the estimated consumption of fruits and vegetables increasing by 120% among adults and by 104% among children. In 2014, the TV show reached an estimated 5 million parents and caregivers weekly. Consumer research showed that viewers of the TV show were more familiar with the behavioral goals and placed a higher importance on children's physical activity.

The television program was successful in building awareness but was resource intensive to produce. Once consumers were aware of the program, communications shifted toward digital resources, and new content was created specifically for dissemination through Facebook, YouTube, and Twitter. Overall, digital media generated a total of 13.5 million exposures to the audience in 2014 alone: 10.3 million views on Facebook, 2 million views on YouTube, and 1.2 million visits to websites. As the messaging became amplified by external press, the program snowballed to include more than the original partners. An additional 34 million exposures of the U4HK messages were generated in the form of published articles, mass media releases, and blogs. There is also some evidence that related groups, such as United for my Healthy Community, were created and linked on Facebook.

Historically, campaigns of this nature have focused almost exclusively on the number of people reached and how those people interact online with the content,¹³⁷ with little emphasis on the effects of the program on behavioral change. To address this gap, a study

was conducted to assess the impact of a Facebook campaign on consumers' shopping habits.¹³⁸ The research participants were families with school-aged children who were members of a Kantar consumer panel, a group that scans their grocery purchases into a database. The study tracked the families' exposure to Facebook messages using embedded cookies and examined associations with the nutritional quality of the family food purchases. Results showed that families who were exposed to at least 4 messages bought significantly healthier groceries, with increases in fruit and vegetable purchases and decreases in pastry and fast food purchases. There was a trend for an association between increased exposure to the Facebook content and better nutritional quality. This promising demonstration of the potential impact of social media on health behaviors merits further exploration.

Two offline interventions featuring physical tools were developed. The first was a portioned plate designed to help families balance the intake of different food groups. The Mexican Ministry of Health distributed 40 000 of these plates and conducted 4 workshops for parents to provide information about portion size. Another intervention was developed through an industry partnership with the Kimberly-Clark Corporation, which printed fun characters, so-called grease monsters, on napkins and paper towels to encourage consumers to remove excessive grease from fried foods. In August of 2016 alone, over 20 million napkins were sold (corresponding to over 225 000 packages). This demonstrates how nudges for behavioral changes can be incorporated into existing commercial products at little cost to the industrial partner in order to benefit the local population.

The Philippines

In an intervention conducted in the Philippines, 4 behavioral goals were selected on the basis of local public health needs: manage portions; choose nutritious and varied options; choose to drink water; and enjoy meals together. The program initially targeted employees of Nestlé Philippines who had children aged 4 to 12 years. Partners from the public and private sectors included the Food and Nutrition Research Institute, the Department of Tourism, the Central Bank of the Philippines, and Facebook and other private companies. Multiple workshops and brainstorming sessions with partners were held. Once on board, employees of partner organizations were reached through the same employee engagement program.

The national TV broadcasting company helped both in organizing the formal nationwide launch of the program at prime time and in disseminating the content. A new concept called "food economics" addressed

the main drivers of food choice, notably taste, affordability, availability, and cultural acceptance. Recipes were developed for school cafeterias and for parents to prepare nutrient-rich meals at home. The next steps were to provide practical tips for parents on how to prepare tasty meals with high nutritional value at an affordable cost. The U4HK program has partnered with a network of nongovernmental organizations to engage parents by providing nutritional education and practical culinary instruction that is being field tested by National Food and Nutrition Research Institute.

This content was communicated to parents via digital channels, reaching over 18 million mothers in the Philippines. The Facebook group now has more than 200 000 fans, and the U4HK website generated 30 000 unique visits and 150 000 page views within 2 weeks. When exposures from all communication channels such as digital media, broadcast TV, and the press are combined, more than 150 million exposures to the audience can be estimated. Responses to the U4HK program and the nutrition-related content overall were positive.

A Nestlé-sponsored initiative was launched in 2016 to raise public awareness of hunger and malnutrition and to encourage people to volunteer at and donate to local nongovernmental organizations. Several digital platforms, including a website, YouTube (messages from celebrity ambassadors), and Twitter (#HangryAboutHunger), were used to disseminate content. A launch event featured presentations by government partners and officials, including the vice president of the Philippines. Using a social listening model, which has been previously used by researchers to monitor the rate of mentions of medical conditions,^{139,140} mentions of malnutrition on social media in the Philippines were compared with mentions of other issues. In the first 4 months after the launch, mentions of malnutrition on social media doubled, making malnutrition the third most discussed issue on social media in the Philippines, after human rights and climate change. The likely impact of increased awareness on volunteering and donating to food-related nongovernmental organizations is being measured.

Table 2 provides a more complete overview of U4HK's reach across several countries.

A PLAN FOR EVALUATION

The U4HK program is a complex multisector intervention with a population-wide reach. It has now been launched in 11 countries, and there are plans for subsequent expansion to other countries and regions. Each of the 11 countries performed a local assessment of the nutritional situation, developed a plan for local

Table 2 United for Healthier Kids (U4HK) results through March 2017

Country/region	Launch date	Mass media and digital						On-ground participation				
		Reach of program			Engagement			Parents/children participating in U4HK activations ^a	Parents/children attending U4HK nutrition consultations ^a	Parents/children at U4HK-sponsored events ^a		
		Unique visits to website	Unique consumers reached (FB, Instagram)	Views (YouTube) or impressions (Twitter)	Impressions (press, TV, radio, print, others) ^a	Active app downloads ^a	Interactions with U4HK FB content ^b					
Brazil	May 2015	35 000	419 849	NA	4100	NA	95 000	6900	NA	NA		
Central America ^c	September 2015	159 152	26 197 351	NA	550 000	NA	ND	320	7982	1500		
Ecuador	November 2016	NA	1 7494 09	132 124	8 359 300	NA	ND	NA	NA	NA		
Egypt	April 2016	30 000	15 000 000	238 604	3 451 740	NA	37 000	NA	NA	NA		
Mexico	August 2014	1 275 427	67 314 119	11 022 199	274 000 000	17 078	2 242 418	140 000	NA	NA		
Middle East ^d	October 2015	261 565	29 201 146	13 302 739	3 000 000	92 000	45 011	ND	NA	NA		
Pakistan	August 2016	115 249	10 100 000	3 420 000	14 400 000	NA	ND	ND	NA	NA		
The Philippines	September 2014	133 544	8 492 483	NA	38 000 000	NA	ND	ND	NA	NA		
Switzerland	November 2016	1538	NA	1 200 000	1 200 000	NA	ND	150	NA	NA		
Thailand	June 2016	NA	14 811 702	NA	27 418 872	NA	ND	1261	NA	NA		

Abbreviations: FB, Facebook; NA, not applicable; ND, no data.

^aFigure extracted from December 2016 report.

^bFacebook clicks, likes, views.

^cPanama and Guatemala.

^dUnited Arab Emirates, Lebanon, Kuwait, Jordan, Kingdom of Saudi Arabia.

Table 3 Overview of the use of social media, digital assets, and offline activities in the multicountry program United for Healthier Kids (U4HK)

Country/ region	Stunting/overweight (year of survey) ^a	Behaviors targeted ^b	U4HK digital assets				No. of partners	Government partners	Other partners	Nondigital activities
			Website	Facebook	Twitter/ Instagram	YouTube				
Brazil	7.1%/7.3% (2007)	2, 4, 6	✓	✓	✓	✓	22	Municipal secretaries of education	NGOs, industry, media	Gamified activities at school and home TV series
Ecuador	25.2%/7.5% (2012–2013)	1, 2, 4, 5, 6	✓	✓			4	Ministry of Education, Municipality of Quito	Media, chefs association	TV series
Egypt	22.3%/15.7% (2014)	1, 2, 4, 5, 6	✓	✓	✓		6	Ministry of Social Solidarity	Academia, industry, media	Distribution of breastfeeding covers; pilot in- tervention in village
Guatemala	46.5%/4.7% (2014–2015)	1, 2	✓	✓			4	Secretary of Food Security and Nutrition	NGOs, university, media	TV and radio spots, mobile nutri- tional consultations
Mexico	9.0%/13.6% (2011–2012)	1, 2, 4, 5, 6	✓	✓	✓ ^c	✓	20	Ministry of Health, Ministry of Education	Academia, industry, media	TV program; por- tion plates/ guides; grease monster napkins
Middle East	15.4%/10.7% (2016)	1, 2, 4, 6	✓	✓	✓	✓	11	Dubai Health Authority	Academia, industry, media	Book; supermarket campaign
Pakistan	45.0%/4.8% (2012–2013)	2, 4, 6	✓	✓	✓	✓	5	Ministry of Planning and Development	Industry, media	Activities in local stores and schools
Panama	19.1%/NA (2008)	1, 2, 4, 6	✓	✓			5	Ministry of Health, Ministry of Education	Nutritionist associa- tion, media	TV clips; sponsored sports events; school activities
Philippines	30.3%/5.0% (2013–2014)	1, 2, 4	✓	✓	✓	✓	14	Consultation via app	Academia, NGOs, media	Pilot nutritional in- tervention; volunteerism platform
Switzerland	NA/11% (2017) ^d	1, 2, 3, 4	✓		✓		2		Chefs association	Cooking classes
Thailand	16.3%/10.8% (2012)	2, 4, 6	✓	✓			5	Ministry of Education	Academia, media	School program with portion plates

Abbreviations: app, application; NGO, nongovernmental organization; SMS, short message service (ie, text message).

^aData extracted from UNICEF/World Health Organization/World Bank Group—Joint Child Malnutrition Estimates, 2017. ¹³⁵

^b1, Manage portions; 2, choose nutritious and varied options; 3, enjoy meals together; 4, choose to drink water; 5, feed your baby like a baby; 6, move more, sit less.

^cThese assets were launched but are no longer active.

^dData extracted from Stamm et al (2017). ¹⁴¹

engagement with public and private partners, and selected relevant behavioral goals. Table 3^{135,141} summarizes the U4HK program in place in these 11 countries.

From its inception to the end of 2016, the U4HK program reached over 3.8 million parents through websites, social media pages, and on-ground activities, with many more messages communicated through social media (YouTube, Twitter) and traditional media (eg, TV, radio, print). Attesting to its multisector engagement, U4HK is currently collaborating with some 50 diverse partners and stakeholder groups.

Metrics to assess the success of complex approaches, community engagement, and social movements are themselves complex. The design, sampling, and data collection methods used with PPE initiatives, the influence of the physical, social, or economic environment, the secular trends, and the duration or intensity of interventions do not lend themselves to easy statistical analysis.^{142–147} Interventions driven by social media cannot be tested using classic randomized controlled trials.^{116,148}

Despite these challenges, it is essential to monitor the various PPE programs and evaluate their outcomes in order to enable large-scale reach and behavior change. Evaluating the impact of such programs is challenging: it is difficult to attribute specific effects to particular components of an intervention, since social marketing campaigns can work through both direct and indirect pathways.¹¹¹ Factors external to PPE interventions may also add or subtract from their impact.

To evaluate a complex program, evaluators will need to go beyond the traditional notions of evaluation research and experimental design.^{145,148–150} To increase the impact and sustainability of the program, it will be helpful to involve target groups and stakeholders in the design, implementation, and evaluation.^{151,152} However, this more participatory evaluation approach often means that the intervention will change during the implementation process, and this cannot be foreseen in the planning stage.¹⁵³ Interventions will also evolve depending on available resources (eg, budget, human resources), the needs of stakeholders, and the environment.^{145,154} Of note, previous studies using social media as a means of behavior change have often reported very high attrition rates,¹⁵⁵ likely reflecting the nature of how people use these tools in real life. Studies that can capture how many people drop out of a study in the absence of laboratory or field visits and incentives will give better estimates of the potential impact of the intervention on the general population.

The first goal of evaluation is to demonstrate the progress achieved against the set of public health nutrition goals and objectives. To be successful, interventions driven by PPE need to be subject to rigorous,

locally sensitive, continuous evaluation. Annual targets are set by each country on the basis of local priorities and activation plans. The evaluation of the program is comprised of process measures, measures of reach (eg, number of parents and children reached), and measures of the level of engagement achieved, as well as measures of behavior change intent, claimed behavior change, and objectively measured behavior change. Independent researchers and research agencies are part of this process at both the global and the local levels.

The second goal of evaluation is to promote transparency and communication: progress reports relative to a defined goal need to be shared with governmental as well as nongovernmental partners, including the scientific community and the general public. The third goal of evaluation is to optimize accountability by strengthening and amplifying those aspects of the program that work and by refining or removing those aspects that were not successful.

ACCOUNTABILITY AND GLOBAL REACH

The ability of for-profit organizations to act as leaders or facilitators of initiatives in public health nutrition needs to be constantly evaluated and open to public scrutiny. The proposed evaluations of U4HK will track the impact of interventions on health outcomes, the relative efficiency of the U4HK program, and the return on investment. Additional process measures should assess the effect of PPE on future broad-reaching, sustained collaborations between the private sector, public agencies, and civil society. Outcome and process evaluations are needed to assess whether PPE strategies can make a measurable impact on global public health. Those efforts are spelled out in the World Health Organization position on protecting public health goals and programs from industry-related conflicts of interest. Consistent with these rules of conduct, the U4HK program has been and will be continuously monitored and evaluated to ensure the projected milestones and success criteria are met. Given the need for health interventions that extend beyond local political cycles, the global goals were set for a time horizon of 10 years and beyond.

CONCLUSION

Public–private partnerships have proven to be effective in addressing the double burden of malnutrition. Reaching parents directly through social marketing strategies built around social and mass media is a relatively new approach, identified here as PPE. It is imperative that PPE programs follow the principles and rules of engagement previously formulated for PPPs. The

U4HK program is an example of how such programs can be introduced and implemented in multiple countries.

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