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Childhood Obesity
Research Across Borders:
Part 1: Social Determinants of Health
Part 2: The Physical Environment
Spotlight: Childhood Obesity Research Across Borders: The Physical Environment

- Promoting Cross-Border Behavioral Synergies using Cutting-Edge Methods & Participatory Action Approaches
- Built environment in programs to promote physical activity among Latino children and youth living in the United States and in Latin America
- Food environment solutions for childhood obesity in Latin American and for Latinos living in the US

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CHILDHOOD OBESITY PREVENTION ACROSS BORDERS: The Promise of US-Latin American Research Collaboration

BACKGROUND
Childhood obesity is increasing at alarming rates across the world, highlighting the need for evidence-based interventions. Research on innovative new strategies to tackle childhood obesity is taking place in the United States and in countries across Latin America. However, studies and programs are too often siloed, resulting in a fractured response to a highly interconnected region-wide issue.

Obesity Reviews published a special issue, Childhood Obesity Prevention Research Across Borders: The Promise of US-Latin American Research Collaboration, which shares research strategies and proven methods among researchers from Latin America and the United States.

PROJECT GOAL
The aim of the Childhood Obesity Prevention Across Borders: The Promise of US-Latin American Research Collaboration, led by the NIH Fogarty International Center, is to address the multifaceted nature of childhood obesity prevention in Latin America and among Latino populations in the United States. Sharing research strategies and proven methods among researchers from Latin America and the United States, especially those working with US Latino populations, can help identify common ground and lessons learned for the adaptation and implementation of evidence-informed childhood obesity prevention interventions.

In addition, scientific exchange can identify shared research questions and priorities moving forward that could be addressed collaboratively.

EXAMPLES. At both national and local levels, Latin America and the United States have been active in the implementation of innovative policy interventions to tackle obesity and non-communicable diseases. Mutual learning, though currently limited in scope, is already happening.

MEXICO
A tax on sugar-sweetened beverages and non-nutritive sugary foods was enabled by cooperation among academia, civil society, and the legislative and executive branches of government.

ARGENTINA
Evidence that almost all food in Argentina contains high levels of trans fatty acids (TFAs) led to the decision to significantly reduce TFAs from the food supply.

CHILE
Public health researchers and advocates were key to passing front-of-package labeling legislation.

ECUADOR
Motivated by data from a national nutrition survey, the Ministry of Health and Government of Ecuador demonstrated strong political will to enact a traffic light labeling regulation.

CITIES IN LATIN AMERICA AND THE UNITED STATES HAVE IMPLEMENTED Open Streets

460
INTERACTIVE POLL
SPOTLIGHT
Preventing Childhood Obesity Across Borders: Promoting Cross-Border Behavioral Synergies using Cutting-Edge Methods & Participatory Action Approaches

Abby C. King, PhD

The Healthy Aging Research & Technology Solutions Lab & Our Voice Global Citizen Science Research Initiative
Stanford University School of Medicine
Stanford, California USA

Presentation Objectives

• Briefly discuss several **goals** of the Fogarty workshop in addressing physical activity and nutrition research across borders

• Highlight some of the **cutting-edge methods** to advance this area, including participatory action methods

• Describe a particular form of “by the people” **citizen science** method that can promote both physical activity and healthy eating
One Major Problem: Silos that exist between PA & nutrition researchers, due in part to:

- Academic training programs may not sufficiently emphasize both health behaviors to prevent obesity and other health risks.
- Different regions tend to emphasize different aspects of the obesity prevention equation, for example:
  - in Latin America, a major focus on nutrition policy interventions, with less focus on physical activity interventions.
  - in the United States, difficulties often getting policy-level interventions activated.
A Solution: Cross-border researchers can learn much from one another through:

- explicitly exploring *behavioral synergies* between PA & dietary change

- when combined, can result in *more cost & time efficient interventions*

- can uncover *potential synergistic or interference effects* when combining these health behaviors
Example: **CALM Trial** testing how best to combine dietary & PA advice to optimize both behaviors (sequential vs. simultaneous delivery via phone)

200 adults not meeting guidelines for either

![12-Month Fruits & Vegetables/Day](chart)

* * p ≤ .0004 vs. Control

King, Castro et al., *Ann Behav Med*, 2013
**CALM Trial: 12-Month % Calories from Saturated Fat**

* * p < .05 vs. Control

King, Castro et al., *Ann Behav Med*, 2013
**CALM:** 12-Month *Moderate-to-Vigorous PA Minutes/Week*

- **PA-1st:** Baseline-Adjusted Mean Minutes/Wk
- **Diet-1st:** Baseline-Adjusted Mean Minutes/Wk
- **Simult:** Baseline-Adjusted Mean Minutes/Wk
- **Control:** Baseline-Adjusted Mean Minutes/Wk

* $p < .02$ vs. Control

King, Castro et al., *Ann Behav Med*, 2013
One way to build synergies

- Have **physical activity AND dietary expertise** on your research team or through *cross-team collaborations*

*Both within and across countries & borders*
Turning to some of the cutting-edge methods highlighted in the 2021 *Obesity Reviews* Cross-Borders Supplement:

- Systems Science
- Implementation Science
- Participatory Action/Citizen Science
An example: The “OUR VOICE” Citizen Science Research Initiative
(http://ourvoice.stanford.edu)

Empowers residents to assess and advocate for healthier neighborhoods and communities (with local decision-makers)

Facilitators trained in this process can be community organizations, researchers, govt. groups, businesses, or local opinion leaders or residents themselves

Buman et al., Translat Behav Med, 2012; AJPM, 2013; Winter et al., Translat Behav Med, 2014; King et al., TJACSM, 2016; Goldman et al., J Urban Health, 2016; Sheats et al., J Urban Health, 2017; Hinckson et al., IJBNPA, 2017; King et al., IJERPH, 2020, 2021
Our Voice starts with an easy-to-use mobile app: Stanford Healthy Neighborhood Discovery tool

• Used by residents, *irrespective of “tech literacy” or language*, to assess community features that *promote or hinder* active and healthy living (currently in 13 languages and growing)

• Tool used to collect neighborhood info via **GPS Route tracking/ Geo-tagged Photos & Audio/text narratives**

• Users range in age from 9 to 95+
• App used to collect anonymized, de-identified data
The **Discovery Tool** generates spatially-tagged multi-component data & *integrated visualizations* for community & research use.
The Discovery tool is a gateway to the 4-step Our Voice Community Engagement Process:

- **Discover**: Discover aspects of your community that impact healthy living
- **Discuss**: Discuss your findings with other citizen scientists
- **Advocate**: Advocate for local improvements
- **Change**: Change your community for the better

Proven successes have been shown in diverse low-income communities supporting physical activity & healthy food access

- **Infrastructure repair/additions**
  - Supporting local walkability
- **Increased access to healthy foods**
- **Safer & activity-supportive parks & rec. spaces**

King et al., *IJERPH*, 2020, 2021
Have worked in 8 sectors/settings thus far:

- Citizen Science
- Neighborhoods/Community at large
- Parks
- Transit
- Worksites
- Schools
- Public Housing
- Clinics
- Food Outlets
For example: Intergenerational Our Voice neighborhood project in **N. Fair Oaks** (San Francisco Bay area)

Low-income Latino neighborhood; 20 adolescent and older adult citizen scientists

- Alerted waste management authorities about *illegal dumping* of trash & other items (e.g., mattresses) on sidewalks from other neighborhoods
- Helped form a *Community Advisory Board* to provide ongoing guidance on best practices to improve community health
- Developed a *bilingual Community Resource Guide* that included contact details for local safety & service providers
- Involved staff from the *nearby health center* to encourage program sustainability
Adding Our Voice to enhance the efficacy & participation rates for Safe Routes to School Programs

Town of Gilroy, CA; largely farmland & sub-urban areas; 58% Latino; 26% foreign-born

Elementary school receiving standard SRTS + Our Voice:

• Held **twice as many** school SRTS engagement events vs. SRTS Alone (**20 vs. 9**)

• This difference grew in subsequent school year (**43 vs. 7**)

• Got additional school bike racks added

• Had 1-year **walking/biking rates twice** that of SRTS Alone school (P < .001)

Rodriguez, Arce, Kawaguchi, King et al.; **BMC Public Health, 2019**
Going **GLOBAL**: the Our Voice Global Citizen Science Research Network

>20 countries, 6 continents

**Major Goal:** Dynamic exchange of data, measures, & learnings to advance global health equity

Hinckson, Schneider et al., *IJBNPA*, 2017; King et al., *IJERPH*, 2020, 2021
An example: Cuernavaca, Mexico – Social Mobilization through citizen science

Partnership between Instituto Nacional de Salud Pública & Stanford

- Four economically diverse neighborhoods; 41 adolescent and older adult citizen scientists
- Limited access to decision makers
- Local solution = social mobilization, leading to:
  - Formation of a Citizen Coalition to increase neighborhood cohesion
  - Development of a resident-driven campaign to curb, leash & clean up after stray & unleashed dogs (that make it difficult to walk safely)
  - Development of a better understanding about neighborhood graffiti through inter-generational discussions & decision-making

Goldman-Rosas et al., J Urban Health, 2016; King et al., TJACSM, 2016
In summary, this growing body of participatory research shows:

- Residents, from youth through older adults, can:
  - *Gather & analyze data* around local community features that influence healthy living & quality of life
  - *Successfully advocate* for healthier neighborhoods & communities
- This can *improve upstream factors* impacting key health behaviors *for everyone* (to advance health equity)
- Their role as positive “*change agents*” can also enhance personal and group efficacy, social cohesion & lead to *future advocacy efforts*
- Offers a good platform for *cross-cultural learnings & collaborations*

King et al., *IJERPH*, 2020, 2021; King et al., *Prev Med*, 2019
Thank you!

Our Voice Website:
http://ourvoice.stanford.edu

https://www.youtube.com/watch?v=sYcYXh51Bl0
Built environment in programs to promote physical activity among Latino children and youth living in the United States and in Latin America

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Bill Kohl, School of Public Health in Austin Department of Epidemiology, Human Genetics and Environmental Sciences Michael and Susan Dell Center for Advancement of Health Living, Austin, Texas, USA
Researching the interplay of physical activity and built environment for obesity prevention
Advancing the research agenda of BE and PA for obesity prevention

1) **Environmental indicators** to inform the design of location-based interventions and policy

2) **Interdisciplinary methodological approaches** and tools for the study of the complex association between built environment and physical activity

3) Types of physical activity-promoting **built environment programs**
Researching the interplay of physical activity and built environment for obesity prevention
Fig 1. Methodological Approaches to evaluate intervention targets of Built Environment Interventions promoting Physical Activity among youth

Physical Environ. intervention target (local) e.g.,
Safety, traffic, traffic safety, infrastructure, PA resources,
school facilities

Individual-level intervention target ,
e.g., physical activity intensity levels,
Motivation to engage in structured and unstructured PA,
Preferred playing materials, confidence, skills,
food choices and eating behaviors, electronic media use, citizen advocacy

Our Voice citizen science (to comprehensively evaluate the interventions and advocate for improvements)

Social Network Analysis
(to assess friend influence on PA and food choices, social norms)

Spatial analysis and observational methods (to assess urban form factors, traffic data, crime, transport access, walkability, bikeability)

Interpersonal level intervention target, e.g., Social norms shaping gender and age roles in play, PA, use of transport, public space, independent mobility;
Families and households parental rules and concerns, family cohesion, family support, intergenerational influences, transport choices, perceived neighborhood environment (parents and children);
Socio-cultural environment: social support, social capital, socio-cultural meanings of play and active travel; food environment

Adapted from King, Sartariano et al., MSSE, 2008 and King, IJBNPA, 2015
Spatial Analysis: Remote sensing imagery, or OpenStreetMap

Urban Landscape form

NDVI (Normalized Difference Vegetation Index)
Source: SALURBAL project

Street Design
Our Voice Citizen Science

1. Community walks
2. Community meetings
3. Community engagement
4. Follow up
Social Network Analysis: Friendship networks before and after the intervention

MARA + SMS
Network Classroom 1

MARA + SMS
Network Classroom 2

Guerra et al 2020
Play Streets
Active Travel to School
Lessons Learned

• The programs targeting the BE to promote PA and prevent or control obesity, in addition to transforming the BE, must **impact the social structures** where the Latino and Latin American youth are embedded.

• The programs can create supportive environments and **transform parents' and youth's perceptions toward BE features** that facilitate active behaviors.

• Interdisciplinary participatory methodological approaches will contribute to **engage multiple stakeholders** as citizen scientists in building supportive environments for PA promotion (i.e., youth, parents, etc).

• Any program aiming to promote PA as a means to address childhood obesity necessarily requires to be implemented along with similar strategies trying to **provide healthy food environments**.
Funding

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Fogarty

Food Environment solutions for childhood obesity in Latin American and for Latinos living in the US

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\textsuperscript{2} Gillings School of Global Public Health, The University of North Carolina at Chapel Hill
Background

Children living in Latin America & children of Latino heritage living in the US are experiencing a growing intake of ultra-processed foods and beverages.

Dietary contribution (%) of ultra-processed foods in the US Population aged 2-19 (NHANES 2009-2014)

- All children and adolescents (2-19y): **64.6%**
- 2-5 y: 58.2%
- 6-11y: 66.2%
- 12-19y: 66.4%

Neri et al., 2019
Ultra-processed food consumption

Dietary contribution (%) of ultra-processed food (UPF) consumption is slightly lower among Mexican-Americans (55%) and other Hispanics (52%), when compared with Non-Hispanic Whites (60%), and Non-Hispanic Blacks (61%) (Baraldi et al., 2018)

But… acculturation is associated with greater consumption of UPF among Mexican Americans and other Hispanics (Steele et al., 2020).
Ultra-processed foods consumption and childhood obesity

Adolescents (16y at baseline)
Brazil, ELANA, 2010-2021

Children, (7–13yo at baseline),
ASPALC, UK, 1998–2018

Cunha et al., Nutrition and Diabetes, 2018

Chang et al. Jama Pediatrics, 2021
A systemic food environment problem

Affordability of unhealthy vs. healthy foods

Confusing food labeling

Junk food marketing targeting kids

Institutions promoting unhealthy foods
Background

1) Compare food environments
2) Describe solutions
3) Identify research priorities

International Network for Food and Obesity/Non-communicable diseases Research, Monitoring, and Action Support (INFORMAS) conceptual framework. Swinburn et al 2013, Obesity Reviews
Policy as a solution:

Food environment policies affect millions of people at once
An Example: Food Marketing
Marketing: it’s everywhere!

- **Celebrity endorsements**
- **TV & movies: product placement**
- **“Adver-games”**
- **Schools: fundraisers, materials, sports events**
- **Social media: viral marketing**
- **Persuasive packaging**
In the US, marketing is targeted

All kids see ads for junk food, but preschoolers (2–5y), children (6–11y), and teens (12–17y) of color see more ads per week on average than their white peers (Rudd Center, 2012)

Two-thirds of the food ads seen by children on Spanish-language TV promote fast food, candy, sugary drinks and snacks

Proportion of TV food ads viewed by Hispanic children on Spanish-language TV.

- Fast-food & other restaurants: 38%
- Candy, sugary drinks & snacks: 30%
- Yogurt, other dairy, 100% juice, plain water, fruits & vegetables: 19%
- Cereal: 10%
- All other: 3%
In 2016, Tostitos launched a telenovela web series called “Botanas del Cielo.” The series promoted three Latin-inspired products: Cantina Chipotle Thins, Dip-Etizers Spicy Queso, and Habanero Salsa.
McDonald’s “Siganme los Buenos!” campaign featured character El Chapulín Colorado, recognized across Latin America and by U.S. Hispanics, to promote its $1 $2 $3 Dollar Menu. The multi-media campaign featured videos and influencer livestreams on social media, a media tour, radio and TV spots, giveaways, and limited edition games in 2018.
We examined social media activity for 12 fast-food restaurants that targeted advertising to Hispanic or Black youth and/or had relatively high levels of digital advertising.

Table 2. Targeted fast-food restaurants

<table>
<thead>
<tr>
<th>Restaurant</th>
<th>Total ad spending ($ mil)</th>
<th>Spanish-language TV ad spending(^a)</th>
<th>Black-targeted TV ad spending(^b)</th>
<th>Digital ad spending(^c)</th>
<th>Advertised digital offerings (mobile apps or website)(^d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>McDonald's</td>
<td>$776.8</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Domino's</td>
<td>$441.6</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Taco Bell</td>
<td>$377.5</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burger King</td>
<td>$348.8</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subway</td>
<td>$250.0</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wendy's</td>
<td>$247.0</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KFC</td>
<td>$200.0</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pizza Hut</td>
<td>$194.8</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dunkin'</td>
<td>$186.6</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chick-fil-A</td>
<td>$119.4</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chipotle</td>
<td>$89.1</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starbucks</td>
<td>$88.8</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) Ranked in the top-ten in ad spending on Spanish-language TV
\(^b\) Ranked in the top-ten in ad spending on Black-targeted TV
\(^c\) Ranked in the top-ten in ad spending on digital media
\(^d\) TV advertising featured digital offerings (mobile apps and website)

### MCDONALD’S

In 2019, MCDONALD’S ranked first in total advertising spending ($776.8 mill), Spanish-language TV ad spending ($66.0 mill), and digital ad spending ($39.3 mill). The restaurant advertised its mobile ordering app and spent $11.6 million to advertise on Black-targeted TV (#2 among the 27 top fast-food advertisers).

#### Social media accounts

<table>
<thead>
<tr>
<th>Restaurant</th>
<th>Facebook Followers (000)</th>
<th>Twitter Followers (000)</th>
<th>Instagram Followers (000)</th>
<th>YouTube Videos</th>
<th>Subscribers (000)</th>
<th>TikTok Followers (000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>McDonald’s</td>
<td>80,819</td>
<td>3,700</td>
<td>3,800</td>
<td>180</td>
<td>462</td>
<td>767</td>
</tr>
</tbody>
</table>

McDonald’s ranked number-one on Facebook (followers) and YouTube (subscribers). It also ranked in the top-five for followers on Instagram (#2), Twitter (#3), and TikTok (#5).

Fleming-Melici et al., 2021
Food marketing and physical activity-related built environment

Mtn Dew social media marketing promotes extreme sports, rock concerts, and other youth-oriented appeals.

Fleming-Melici et al., 2021
GATORADE (PEPSICO)

Gatorade spent $134 million to advertise in 2019 (#2 among sugary drink brands). The brand also ranked #2 in sugary drink ads viewed by teens, with a disproportionately high ratio of ads viewed by teens compared to adults. Gatorade was also highly targeted to Hispanic and Black youth. Gatorade ranked #8 in ads viewed on Spanish-language TV, and Black teens saw 2.8 times as many ads for the brand compared to White teens.

Gatorade also had a significant presence on social media with Facebook, Twitter, YouTube, and Instagram accounts. The brand ranked #8 with 6.8 million followers on Facebook, but #4 on Instagram, with 1.2 million followers on that platform.
Unhealthy sponsorships represented 8.9 % of all identified sponsorship arrangements. A quarter of all clubs accepted unhealthy food sponsors (25.9 %), and one-fifth of all clubs accepted high-risk food (unhealthy brands with large market share) (18.1 %)
A marca AJI-NO-MOTO promove hoje (17) uma degustação de pratos da culinária brasileira preparados com o produto. A ação acontece no Parque Villa-Lobos (SP), das 12h às 18h, e será aberta ao público.

“Esta ação está alinhada à nossa estratégia de atrair jovens consumidores e também pessoas com pouca experiência na cozinha, já que não é necessário ter grande habilidade para usar o produto. Com AJI-NO-MOTO, é muito simples e fácil deixar as receitas mais gostosas”, explica a gerente da marca, Carla Junqueira.
Policy as a solution

Countries with **statutory regulations** or **voluntary industry self-regulations** on food marketing to children

Not shown: IFBA’s Global Policy provides minimum criteria for marketing directed to children <12y that is paid for by IFBA companies in every country where they market their products.

Companies include:

- Ferrero
- General Mills
- Grupo Bimbo
- Kellogg Company
- McDonald’s
- Mondelēz International
- Mars, Incorporated
- Nestlé SA
- PepsiCo, Inc.
- Unilever

Last updated July 5, 2018
© Copyright 2018 Global Food Research Program UNC
The Chilean Law of Labeling & Advertising
Chile’s example: law of food labeling and marketing

Ultra-processed foods & drinks high in added sugar, sodium, and sat fat

1) Labeling

2) Marketing

3) School

6 a.m. to 10 p.m. ban
Decreases in Child-Directed Marketing

2015

43% of “high-in” cereals used child-directed marketing

Mediano, et al., 2019 *IJERPH*

2017

15 % of “high-in” cereals used child-directed marketing
Television advertising for high-in food decreased

- High-in food ads dropped from 41.9% to 14.8%
- High-in ads with child-directed content dropped from 44.0% to 12.0%
- Kids’ exposure to high-in food ads dropped by 44% to 58%

Correa, et al., 2020 *AJPHE*
Dillman Carpentier, 2019; *Public Health Nutr*
Chile's New Food Labeling Laws Have Created Creepy, Faceless Chocolate Santas

Mr. Claus is the latest fictional character banned from appearing on sweets in the country as the government attempts to curb obesity.
San Jorge, 2013: ham, sausages, etc.
San Jorge, 2021: ham, sausages, etc.
Coke, 2018
An example: Food marketing research priorities

What is the impact of personalized marketing, particularly in digital media, and integrated marketing strategies?

What is the broader impact of child-directed food marketing on children's rights (e.g., privacy and healthy development)?

How well are existing statutory marketing policies being enforced and monitored?

What are the cross-border implications of marketing policies implemented in one country on other countries without regulations?

How has industry responded to policies? What strategies does industry use to avoid or push back against new policies?

Duran et al., Obes Rev 2021
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El Compendio de actividades físicas para niños, niñas y adolescentes

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136+
ARTICLES INCLUDE THE MEASURE IN THE REGISTRY

LANGUAGES
25+
LANGUAGES

25+
MEASURES IN SPANISH

MEASURES
70+
MEASURES FOR CHILDREN 0-5

15+
MEASURES FOR CHILDREN B-24MONTHS

49+
MEASURES TESTED IN HIGH-RISK POPULATIONS

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They’re free, easy to use, and save time by providing easy access in one centralized location!

How can these tools help me in my classes or on my projects?

These resources can assist you in selecting the most appropriate measures or datasets. These are handy for thesis or capstone projects where you can:
- Conduct systematic reviews and meta analyses
- Develop a childhood obesity intervention
- Evaluate a health promotion program

What types of undergraduate and graduate programs can use these tools?

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Other questions about NCCOR or upcoming activities?

Email the NCCOR Coordinating Center

nccor@fhi360.org
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NCCOR NEWS

NCCOR publishes chapter: Behavioral Design as an Emerging Theory for Dietary Behavior Change

NCCOR is highlighting multidisciplinary partnerships to celebrate National Childhood Obesity Awareness Month 2018!

Utility of the Youth Compendium of Physical Activities

NCCOR to present at the Society for Prevention Research and the American College of Sports Medicine 2018 Annual Meetings

NCCOR updates the Catalogue of Surveillance Systems and seeks recommendations for new systems

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Upcoming Webinars
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THANK YOU!