National Childhood Obesity Efforts: Lessons Learned from the Healthy Communities Study
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Healthy Communities Study Aims

To assess/identify:

• Associations between characteristics of community programs/policies (CPPs) and BMI, diet, and physical activity for children

• Community, family, and child factors that modify or mediate such associations

• Associations between characteristics of CPPs and BMI, diet, and physical activity in communities with a high proportion of African American, Latino, and/or low-income residents

Observational study of children and communities: 2010-2016; 10-year retrospective

130 Communities: high school catchment area

3,229 Children: with BMIs

Design:

• **Cross-sectional** – BMI, diet, physical activity, community program/policy

• **Retrospective** – previous 10 years for data on
  -Children (medical record abstraction) AND
  -Communities (community programs/policies)
Big Study/Lots of Partners

- Battelle – Lead
- University of Kansas- Community measures
- University of California, Agriculture & Natural Resources – Nutrition
- University of South Carolina – Physical activity
- NIH – NHLBI, NIDDK, NICHD, NCI, OBSSR
- Scientific partners – CDC and RWJF
- Observational Study Monitoring Board

[Funded by NHLBI, NIDDK, NICHD, NCI, OBSSR]
HCS Household Data Collection

**Standard Protocol**
- BMI/anthropometry
- Nutrition questions
- Physical activity questions
- Medical history
- Demographics
- Behaviors/attitudes
- Exposure to community programs/policies
- Request consent to obtain child’s medical record/BMI
- Modified Windshield Survey of the home

**Enhanced Protocol**
Standard Protocol *plus*
- 24-hour dietary recall at first home visit and repeated at second home visit 1 week later
- Physical activity recall questions
- Accelerometers used over the 1-week period between the first and second home visits
Communities throughout U.S. engaged in creating environments to support healthy weight

- To varying degrees
- In different ways

Knowledge Gap--Little known about:

- “Dose”—scope and intensity—of such efforts
- Whether community programs/policies—of different amounts and types—are associated with children’s diet, physical activity, and healthy weight
Focus & protocol for community measurement

Focus—Number and type/intensity of community:
  • Programs (e.g., nutrition program)
  • Policies (e.g., new PA requirement in school)
  • Environmental changes (e.g. bike path)

Protocol:
  • Capture of Community Programs/Policies (CPPs)
  • Code instances of CPPs
  • Characterize CPPs for key attributes
  • Calculate intensity scores

Characterizing community programs/policies by key attributes

Attributes related to intensity:

- Duration (e.g., Higher—Ongoing; Lower—one time)
- Reach (e.g., Higher—21% or more of children in area; Lower—1-5%)
- Behavioral intervention strategy used (e.g., Higher—Modifying access or policy change; Lower—Providing information)

Other attributes, including:

- Primary goal
- Behavioral objective addressed
- Sector in which implemented
Calculating intensity scores for CPPs

Each CPP characterized (High, Med, Low) for each attribute

**Formula**: Individual CPP Intensity Score = (Duration + Reach + Strategy)/3
Calculating intensity scores for CPPs

Each CPP characterized (High, Med, Low) for each attribute

**Formula:** Individual CPP Intensity Score = (Duration + Reach + Strategy)/3

<table>
<thead>
<tr>
<th>Illustrative Community/ Program Policy (Goal Addressed)</th>
<th>Attributes used in Intensity Scoring</th>
<th>Duration</th>
<th>Reach</th>
<th>Behavioral Intervention Strategy Used</th>
<th>INTENSITY SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Created walking path/ greenway to connect neighborhoods and schools (Physical activity)</td>
<td></td>
<td>Ongoing (1.0)</td>
<td>High (1.0)</td>
<td>Modifying access, barriers, and opportunities (1.0)</td>
<td>1.0</td>
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<tr>
<td>Provided an educational seminar to parents attending elementary school Parent Teacher Association meeting about how to promote healthy eating among children. (Healthy eating)</td>
<td></td>
<td>One-time event (0.1)</td>
<td>Low (0.1)</td>
<td>Providing information and enhancing skills (0.1)</td>
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</table>
Distribution of community programs and policies (N=9,681) for the 130 communities over 10-year study period.

Distribution of total intensity scores for the 130 communities over 10-year study period

(Collie-Akers, Schultz, Fawcett, et al., in press, *Pediatric Obesity*).
Take away messages for community efforts to promote healthier weight

- Some communities invest more—others relatively little—in promoting healthier weight among children.

- Communities showed a wide range in number and intensity of CPPs, with increasing trend over time.

- Potential explanations of increasing trend:
  - Recommendations and calls to action by agenda-setting organizations, including reports from the National Academies of Science and the U.S. Centers for Disease Control and Prevention.
  - Subsequent increases in initiatives and investments by national and local grant-makers.
Distribution of CPPs by behavioral objective—nutrition, all communities

(Collie-Akers, Schultz, Fawcett, et al., in press, *Pediatric Obesity*).
Take away messages for nutrition efforts to promote healthier weight

- Longer (multiple years) of exposure is better than shorter (1 year)

- Several features of community efforts are important; there is no “single” or “simple” solution

- More effort needed to change some behaviors: eating from a fast food restaurant, eating dinner with family, and eating while watching TV

- Physical activity efforts may also be associated with improved nutrition

- Considerable room remains for changing environments to improve child diets

[Source: Ritchie et al, in press, Pediatric Obesity; Webb et al., in press, Pediatric Obesity]
Distribution of CPPs by behavioral objective—physical activity, all communities

(Collie-Akers, Schultz, Fawcett, et al., in press, *Pediatric Obesity*).
Take away messages for physical activity efforts to promote healthier weight

- Longer (6 year history of) exposure to behavior change strategies used in community programs/policies was positively associated with children’s moderate-to-vigorous physical activity.

- Community initiatives to promote physical activity in children may be more successful if they are sustained for several years and employ multiple behavior change strategies.

[Source: Russ Pate and HCS Physical Activity Team]
Scatter plots of mean BMI vs. CPP nutrition target behavior score & CPP physical activity target behavior score

Take away messages for community efforts to promote healthier weight

- Communities showed variation in the number and types of behavior change objectives addressed.
- Community investment to implement more comprehensive CPPs—those targeting a greater number of distinct behaviors—was associated with lower child BMI.
- Target multiple behaviors to achieve intended results.
Distribution of CPPs across the socioecological system
Most communities implemented CPPs through schools, and an average of 7 different settings; but with variation.

This combination—higher intensity community programs implemented across multiple sectors—is associated with lower BMI in communities.

Engage multiple sectors, across levels of the socioecological model.
Results—CPP Intensity Scores over time
(Collie-Akers, Schultz, Fawcett, et al., in press, *Pediatric Obesity*).
Results—BMI/CPP relationship (Strauss, et al., 2018, *Pediatric Obesity*).
Take away messages for community efforts to promote healthier weight

- Intensity of community programs/policies is significantly associated with lower BMI in children
- For a community that goes from the minimum observed score to the maximum, its children would see a reduction of -1.4 BMI units
- Community investment matters in assuring conditions for healthier weight among children
Investigating child/family level effect modifiers for BMI/CPP relationship

Strauss et al., 2018, *Pediatric Obesity*

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Level</th>
<th>Sample Size</th>
<th>Estimate</th>
<th>SE</th>
<th>P Value</th>
<th>Type III P-Value</th>
<th>Interaction</th>
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## Investigating child/family level effect modifiers for BMI/CPP relationship

<table>
<thead>
<tr>
<th>Covariate</th>
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<th>Estimate</th>
<th>SE</th>
<th>P Value</th>
<th>Interaction</th>
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<td>Max Parent Education</td>
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<td>Some College</td>
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<td>Retired or Disabled</td>
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<td>Home Student Other</td>
<td>244</td>
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</table>
Take away messages for community efforts to promote healthier weight

• Child and family level factors modify the influence of community programs/policies on lower BMI in children

• Those children benefitting more:
  • Whites, Non-Hispanic
  • In particular grades
  • Higher family income
  • More parent education

• Assuring conditions for healthier weight among all children may require more intensive and targeted community investment
## Investigating community level effect modifiers for BMI/CPP relationship

### Fully Adjusted Model

<table>
<thead>
<tr>
<th>Covariate</th>
<th>Level</th>
<th>Sample Size</th>
<th>Estimate</th>
<th>SE</th>
<th>P Value</th>
<th>Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Region**</td>
<td>Midwest (n&lt;sub&gt;c&lt;/sub&gt;=26)</td>
<td>628</td>
<td>-0.939</td>
<td>0.932</td>
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<td>Northeast (n&lt;sub&gt;c&lt;/sub&gt;=20)</td>
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<tr>
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<td>South (n&lt;sub&gt;c&lt;/sub&gt;=55)</td>
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<td>West (n&lt;sub&gt;c&lt;/sub&gt;=29)</td>
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<td>Community Race/Ethnicity**</td>
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<td>0.869</td>
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<td>Other (n&lt;sub&gt;c&lt;/sub&gt;=54)</td>
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<tr>
<td>Community Income**</td>
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<td>-0.451</td>
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</tr>
</tbody>
</table>

** Community level variables are based on a weighted combination of census tract information (as communities may include >1 tract and/or parts of multiple tracts). African American communities were defined as communities in which >30% of residents were African American. Similarly, Hispanic communities were defined as communities in which >30% of residents were Hispanic. Further detail on the specification of these variables are available in supplementary tables available at the following website: [http://dx.doi.org/10.1016/j.amepre.2015.06.021](http://dx.doi.org/10.1016/j.amepre.2015.06.021). The number of communities in the HCS of each type is also indicated (n<sub>C</sub>).
Comparing BMI/CPP relationship by race/ethnicity of community
Community factors modify the influence of community programs/policies on lower BMI in children

Those communities benefiting more:
- Predominately White, Non-Hispanic
- Place (and race/ethnicity) matters in assuring conditions for healthier weight among all children
Overall take away messages

• Planning, implementation, and evaluation of obesity prevention efforts would benefit from systematic measures of the intended (actual) “dose” of interventions

• What matters in achieving a sufficient “dose” to improve BMI outcomes:
  » Total intensity (amount/kind) of CPPs
  » Targeting of multiple behavioral objectives
  » Penetration through multiple sectors
  » Time—multiple years of exposure

• Equity and Justice require assuring more intense and targeted dose with populations and places experiencing health inequities
Understanding community-level interventions to enhance equity and address risk for chronic disease
• 31.6% of the Hispanic/Latino population lives below the poverty level; compared to just 11.8% of the White population.

• Only 46% of Latinos 25 years or older earned a high school diploma or higher compared to 88% of the White population age 25 or older (US Census Bureau, 2014).

• Based on a large-scale, randomly selected, door-to-door survey conducted in 2009 (n=659), found that:
  • 38.7% of Latinos in Kansas City, Kansas reported being in fair or poor health compared to 12.3% of all Kansans.
  • About 44% reported meeting recommendations for either moderate or vigorous activity
  • Fewer than 20% reported consuming five or more servings of fruits and vegetables
  • 13.7% reported been told by a doctor that they have diabetes
  • 23.6% reported been told by a doctor, nurse, or other health professional that they have high blood pressure

• Hispanics are almost twice as likely as non-Hispanic whites to be diagnosed with diabetes by a physician.

• They have higher rates of end-stage renal disease, caused by diabetes, and they are 40% more likely to die from diabetes as non-Hispanic whites.
Socioecological system
Implementation of Healthy Spaces, Healthy Places

Increase access to healthy foods through:
- Healthy Corner stores
- Healthy Restaurants
- Healthy Vending

Increase access to physical activity through:
- Enhanced park design

Increase access to health services through:
- Increasing opportunities to link to coverage
- Enhancing the cultural competence
Healthy Spaces, Healthy Places: Initial Results

• Intermediate outcomes
  • Increased access to enhanced parks
  • Increased access to opportunities to purchase healthy foods

• Behavioral outcomes
  • Significant increases in total number of users and vigorous activity at parks with enhancements compared to those without enhancements
  • Purchase of healthy options at food retail sites participating in Healthy Retail Initiative significantly increased compared to sites not participating
Other local examples

- Douglas County Safe Routes to School Implementation and Outcomes Measurement
- Douglas County Healthy food and Physical Activity Community Health Improvement Plan
- Healthy Schools, Healthy Communities Initiative funded by the Missouri Foundation for Health
For more information

• Please contact: Stephen Fawcett sfawcett@ku.edu
• Vicki Collie-Akers vcollie@ku.edu
• Communityhealth.ku.edu