Use of Geographic Information Systems

Mapping to Mobilization

Presented by:
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• Documents the physical environment and empowers local action to change conditions to support individual behaviors

• A planning model that involves assessing communities in relation to a variety of obesity prevention benchmarks known as community indicators and assets

• Activate consumers and partners to improve food availability in low-income neighborhoods

• 3 = nutrition, physical activity and obesity prevention
CX³ - How does it work?

4 STEPS

1. Compile localized data (mapping and surveys)
2. Set priorities based on data
3. Implement strategic, community-focused action plan
4. Evaluate progress over time
CX³: On-line GIS Map Viewer
http://www.cnngis.org
Use of other data sources

• Environmental health data
• Google/Yahoo
• Google street view
• Walkscore
  – walkscore.com
  – transit score
• Healthy City
  – healthycity.org
  – All CA- does not include data about store for points on map
• City crime data
  – variable, but emerging
CX³ Mapping to Mobilization

Field surveys follow mapping
• 23 Network funded Local Health Departments
• All types: Urban dense, suburban, rural, remote
• More w/ other funding, including CA Regional Obesity Prevention Projects
• 3-7 low-income neighborhoods
• Each neighborhood comprised of
• 1-5 census tracts
• > 50% of population in census tract at or below 185% Federal Poverty Level (FPL)
• Other selection factors
  • Established partnerships
  • Race/Ethnic make-up
  • Rural and Urban (for some sites)
  • Obesity rates (used by one site)
CX³ Supermarket Access

- Total number of residents served by supermarkets or large grocery stores ( > 20 employees)
- Estimated percent of neighborhood residents served and not served within ½ mile buffer of supermarkets or large grocery stores
- *If no supermarket or large grocery store*, approximate distance required to travel to supermarkets for most residents (2/3 or more)
Access to supermarkets and large grocery stores

<table>
<thead>
<tr>
<th>Company Name</th>
<th>No. Employees</th>
<th>Range</th>
<th>County</th>
<th>2000 U.S. Census Tract</th>
<th>Retail Category</th>
<th>Retail Type</th>
<th>Address</th>
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Neighborhood = census tracts in blue, 2 supermarkets w/ in ½ mile buffer
- 1 ½ mile buffer from center of neighborhood
- 1.7 miles from farthest part of neighborhood using measure tool
Food Source ½ mile service area
Oak Park Neighborhood
Finding Access: 1 ½ miles to large grocery store

Neighborhood = 2 Census Tracts in blue, only small markets and convenience w/ in ½ mile
Proportion of supermarkets or large grocery stores with convenient public transit
- Store has a stop within 1 block
- Frequency: No less than 30 minutes each way including evenings and weekends
- Route access through residential areas

If no market in the neighborhood, expand search with buffer
- Urban or older/denser suburb—2 miles
- Newer suburb—5 miles
- Rural—15 miles
CX³ Supermarket access: Transit

Map NF1

Oak Park, Sacramento, CA

Markets

Food Maxx ½ Mile Buffer Service Area

Rte. 51

Rte. 83

Scale 1:27668
CX³ Supermarket Access Transit

Transit Score
Available with list of routes

Transit Score™

Transit Score™ measures how well a location is served by public transportation. A Transit Score™ of 90+ is considered a "Rider’s Paradise," meaning it is well served by public transportation. A Transit Score™ of 70+ is considered "Excellent Transit," meaning it is convenient for most trips. A Transit Score™ of 50+ is considered "Good Transit," meaning it has many nearby public transportation options. A Transit Score™ of 25+ is considered "Some Transit," meaning it has a few nearby public transportation options. A Transit Score™ of 0-24 is considered "Minimal Transit," meaning it is possible to get on a bus.

Transit Score: 38
Some Transit
8 nearby routes: 7 bus, 1 rail, 0 other

Compare Your Walk Score

Sacramento top 10%: 91
Your score: 65
Sacramento average: 55
34% of Sacramento residents have a higher Walk Score.
CX³ Farmers’ Markets

- Number of farmers markets in the neighborhood and if accept EBT, WIC, Senior Vouchers
- If **no** farmers markets in neighborhood, number within 5 miles
  - If they accept EBT, WIC, Senior Vouchers
  - If have convenient public transit
Within 5 miles, 5 markets, none accept EBT
Farmers' market Just over 1 mile from center of neighborhood

Neighborhood = 2 Census Tracts in blue

Just over 1 mile from center of neighborhood
Can use measure tool to map walking distance
CX³ Markets Around Schools

- Number of small markets and convenience stores within ½ mile of schools
- Proportion of schools with small markets and convenience stores within ½ mile
  - Out of all schools in neighborhood, how many have small markets and convenience stores
- Highest number for a school within ½ mile (ie. worst case scenario)
Small markets and C-stores around schools

Neighborhood = Census tracts in blue, 9 small markets and 1 C-store w/in 1/2 mile
Two locations, same address
Also across street from Elementary School
Comparison of 3 schools

1. Bobby G Duke School, Somewhat Walkable (Walk Score 55 out of 100)
   - Restaurants: Domino's Pizza (0.33mi)
   - Coffee: Starbucks (2.92mi)

2. Sunnyside High School, Car-Dependent (Walk Score 31 out of 100)
   - Restaurants: Casa Bonita (0.59mi)
   - Coffee: Diner in a Train Car (0.79mi)

3. Burnett Elementary School, Very Walkable (Walk Score 72 out of 100)
   - Restaurants: Fabulous Burgers (0.08mi)
   - Coffee: Starbucks (0.57mi)
   - Groceries: Art's Market (0.08mi)
   - Shopping: L & E Fashion Warehouse (0.4mi)
   - Schools: Sunnyside High School (0.15mi)
   - Parks: Sunnyside Park (0.19mi)
   - Books: Sunnyside High School (0.08mi)
   - Bars: Snuffy's Bar & Grill (0.74mi)
   - Entertainment: Harkins Tucson Twin (2.63mi)
   - Post Offices: Emery Park Post Office (0.98mi)

Public Transportation
Why isn't public transit showing? About transit data

Compare Your Walk Score
CX³ Fast Food Outlets

- Ratios of fast food to population
  - Fast Food Chain, Non-Chain, Pizza, Sandwich/Deli
- Number of outlets within 1000 ft and ½ mile to schools and parks in neighborhood
- Proportion of schools/parks with fast food outlets within 1000 ft and ½ mile
- Highest number of outlets for a school/park with fast food within 1000 ft and ½ mile (i.e. worst case scenario)
Fast food outlets around school: 

1/2 mile buffer

Neighborhood = Census tracts in blue, 8 fast food w/ in 1/2 mile
22 Fast food in buffer and neighborhood
Worksheets and Data Entry

CX3-Tier 1—NF1: Supermarket Access Worksheet

Please complete a worksheet for each neighborhood mapped. Include only markets that are listed as having more than 20 employees from the general grocery layer on the GIS. Any large market is located in the neighborhood, but is not found on the GIS, include only large markets with 40 or more registers. Make a note of any supermarkets entered that are not found on the GIS. Enter for each neighborhood or the supermarket name, number of employees, and the approximate number of neighborhood residents within a mile buffer of each supermarket. Estimate from census population data an approximate amount served in the buffered area. Expand the buffer as needed to estimate the approximate distance required to travel to a supermarket by most of the residents (at least 200 residents) in the neighborhood. Print clearly and keep in mind that documentation of store selection and inclusion is an important practice.

1. Neighborhood Name:

2. Census Tract (circle how qualified):

3. Supermarket Name:
   - Number of employees (range: include-only > 20):
   - Approximate number of residents served:

4. Total number of supermarkets in neighborhood:

5. Estimated percent served (use mile buffer, account for overlap):

6. Estimated percent not served (use mile buffer, account for overlap):

7. Approximate distance required to travel to supermarkets for most residents

8. Total # residents served:

9. Total # residents served (account for overlap):

10. Total # residents not served:

11. Total # residents served (account for overlap):

CX3-Tier 1—Markets around Schools Worksheet

Please complete a worksheet for each neighborhood mapped. Use this table to show calculations of access to small markets and convenience stores around schools.

Neighborhood Name: ____________________________

Schools with small markets and convenience stores within 1/2 mile:

<table>
<thead>
<tr>
<th>Name of school (enter all in neighborhood)</th>
<th>School type (elementary, middle, high, continuation)</th>
<th># Small markets with &gt; 20 employees</th>
<th># Convenience stores (chain/non-chain) for each school</th>
<th>Total # stores around school (small stores and convenience) (for each school)</th>
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<tbody>
<tr>
<td>American Legion High</td>
<td>Continuation</td>
<td>1</td>
<td>0</td>
<td>2</td>
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<tr>
<td>Sacramento Charter High</td>
<td>High</td>
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<td>2</td>
<td>0</td>
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<tr>
<td>Capitol Heights Academy</td>
<td>Elementary/Middle (K-8)</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Father Keith E. Kenny Elementary Charter</td>
<td>Elementary</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
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</table>

Account for overlap—record number of duplicates and subtract for totals.

Total # schools: 4
Total # small markets: 4
Total # convenience stores: 0
Total # stores around school: 6
• 18 Local Health Departments

• 73 Neighborhoods
  – Supermarket Access & Transit
  – Farmers Markets
  – Fast Food

• 52 Neighborhoods
  – Small Markets and Convenience Stores around 133 Schools

• Most neighborhoods defined by 1-2 census tracts, maximum of 5
CX³ Findings- Supermarket Access

- 31% neighborhoods had no supermarket within census tract boundaries
- 42% reported most residents had access to supermarket within ½ mile
- 74% access within 1 mile
- Mean distance for most residents to get to supermarket .88 miles (removing 17 mile rural outlier)
- 63% lacked convenient public transit
Convenience and Small Markets within 1/2 Mile of Schools

<table>
<thead>
<tr>
<th>Number of Stores</th>
<th>Percent of Neighborhoods</th>
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</thead>
<tbody>
<tr>
<td>None</td>
<td>9.6%</td>
</tr>
<tr>
<td>1 - 5</td>
<td>46.1%</td>
</tr>
<tr>
<td>6 - 10</td>
<td>36.6%</td>
</tr>
<tr>
<td>11 +</td>
<td>7.6%</td>
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</table>

n = 52 neighborhoods
CX³ Findings - Farmers’ Markets

- 76% no farmers’ market (FM) in the neighborhood
- In the 18 neighborhoods with a FM,
  - 78% accept EBT (Electronic Benefits Transfer - aka. Food Stamps or Supplemental Nutrition Assistance Program), WIC or Senior Vouchers
- For those with no FM in neighborhood,
  - 36% had 1-2 w/in 5 miles
  - 50% had 3 or more w/in 5 miles
  - 66% had convenient public transit to market w/in 5 miles
- 13% had no farmers’ market within 5 miles
Neighborhood

- Only 4 had no fast food
- 12% 15 or more
- One neighborhood with 30 in 2 census tracts
- Mean ratio of outlets to population 1:1,608
  - Worst of 1:202

n = 73 neighborhoods
CX³ Findings - Fast Food

Around Schools

• 1000 ft (approx. 2 blocks)
  – 49% neighborhoods had no fast food
  – 30% neighborhoods had 1-2 fast food

• ½ Mile
  – only 11% had none
  – 22% 10+
  – Mean of 6 fast food
CX³ Use of GIS Maps

- Maps rated as very useful by local health departments
- Locals describe power of maps combined with local level data and photos
- Provide visual description of relationships between food sources, community residents and other neighborhood infrastructure
- Give initial view to make decisions for dedicating resources, education and action in neighborhoods
Issues - Gaps & Opportunities

- Drawing boundaries to fit natural neighborhoods
- Crime/safety data
  - (not city, neighborhood level)
- Public transportation routes
- Accuracy of GIS retail databases
- Resolution of maps
- Snapshot in time- conditions change quickly
Next Steps for CX³

- **School Neighborhood Scoring**
  Examines environment within ½ mile boundary of school and includes
  - Retail food stores
  - Fast food
  - Outdoor marketing (1000 ft)
  - Mobile vending (500 ft)
  - Walkability and safety

- **Food Retail Mix Exposure Scale**
  Includes all opportunities for eating
  - Adding to current elements: donut shops, coffee shops, ice cream, specialty, etc.
  - Plan to examine relationships with body composition of youth (FITNESSGRAM), income and school level
Things to come....
Thank you!

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