Using GIS to Create Walkable Spaces Around Schools and Neighborhoods

Connecting Schools, Communities, Families For Health

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Abstract

Title: Using GIS to Create Walkable Spaces Around Schools and neighborhoods

Children’s environments circle around their neighborhoods, families and schools. In regards to health, Geographic Information Systems (GIS) was used to design a customizable walking-to-school routing app that will help engage children and their parents and the identification of routes, paths and physical activity resources that are in close proximity to their schools, neighborhoods and the importance of geography in understanding population health.
Objectives

OVERVIEW

• WALKING RESOURCE CENTERED AROUND SCHOOL COMMUNITIES AND NEIGHBORHOODS USING GIS MAPPING
• HOW DO WE CREATE HEALTH IN THE COMMUNITY?
• THE ROLE OF GIS AND HEALTH CENTERED ASSETS FOR YOUR COMMUNITY
• CONNECTING PEOPLE TO SERVICES
The “place” of children growing becomes clinically relevant.

Community health and wellness begins long before admission.

Geography becomes the new information “glue”.

Understanding the space and resources trumps everything else.
San Bernardino County

- POPULATION: OVER 2 MILLION
- PROJECTED TO REACH 3.6 MILLION BY 2050
- OVER 20,000 SQUARE MILES OF LAND
- EAST VALLEY, WEST VALLEY, MOUNTAIN, & DESERT REGIONS
Built Environments

» The conditions in which people live
» Lack of healthy Options
  ~ affordable food, Safety Concerns in Neighborhoods, Parks and Schools, high Unemployment rates, Poverty and Social Cohesion.

» elevating the health status of our communities
  ~ Improving the conditions and interrelationships in which people live, learn, work, and play
  ~ Integrating health policy efforts with those related to education, housing, business, transportation, agriculture, media, and other areas outside of the health sector

http://www.krusekronicle.com/
PARTNER WITH INDIVIDUALS, FAMILIES, AND COMMUNITY AGENCIES

Whole Community Care

Built & National Environment

Social Determinant

Schools

Health Systems

Whole Community Care
Children of San Bernardino County

- **MEDIAN** 31.7 years
- **POPULATION**
  - < 20 YEARS OF AGE 32%
  - 0-9 YEARS 15%
  - 10-19 YEARS 17%
- **HOUSEHOLDS POVERTY** 28%
Obese Preschool Children

STUDY: 3,600 children
3-6 years, Texas

FINDINGS:
Normal Lipid Panel
Elevated Markers for Heart Disease
C-Reactive Protein

Cardiovascular disease risk factors among obese preschool children,

Source: Sept 2012, Obesity Journal
WALKABLE SPACES AROUND SCHOOLS AND NEIGHBORHOODS

From there to here, and here to there, funny things are everywhere.

Dr. Seuss

LOMA LINDA UNIVERSITY HEALTH
WALKABLE SPACES AROUND SCHOOLS AND NEIGHBORHOODS

AAP Recommendations:
30-60 min activity for all children

Considerations:
School personal
All kids with their teachers

Distance: 2.99 miles
Calories: 330 Cal @180lbs
Time: 59min 48sec @3mph

Distance: 2.82 miles
Calories: 311 Cal @180lbs
Time: 56min 24sec @3mph

Distance: 3.43 miles
Calories: 379 @180lbs
Time: 68min 36sec @3mph

AAP Recommendations:
30-60 min activity for all children

Considerations:
School personal
All kids with their teachers

Healthier Worksite Initiative (CDC)

http://www.getmovinggethealthynj.rutgers.edu/miles.html
National Recommendations

National recommendations:

• School age children accumulate 60 min of daily physical activity (USDHS, American Journal of Pediatrics)
• CA Education code, sec 51210-51212, recommends 200 min every 10 days
• Presidential – Let’s Move! Active Schools Campaign

Mile Equivalents

<table>
<thead>
<tr>
<th>Activity</th>
<th>Actual Miles/Minutes</th>
<th>Recorded Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking, stroll (2 mph)</td>
<td>30 minutes = 1 mile</td>
<td>1 mile</td>
</tr>
<tr>
<td>Walking, typical pace (3 mph)</td>
<td>30 minutes = 1.5 miles</td>
<td>1 mile</td>
</tr>
<tr>
<td>Walking, brisk (4 mph)</td>
<td>30 minutes = 2 miles</td>
<td>2 miles</td>
</tr>
<tr>
<td>Running (5.5 mph)</td>
<td>1 mile</td>
<td>1 mile</td>
</tr>
<tr>
<td>Cycling/Mountain Biking (13 mph)</td>
<td>7 miles = 1 mile</td>
<td>1 mile</td>
</tr>
<tr>
<td>Spinning</td>
<td>30 minutes = 2 miles</td>
<td>2 miles</td>
</tr>
<tr>
<td>Aerobics (moderate intensity)</td>
<td>30 minutes = 1 mile</td>
<td>1 mile</td>
</tr>
<tr>
<td>Stairmaster (moderate intensity)</td>
<td>15 minutes = 1 mile</td>
<td>1 mile</td>
</tr>
<tr>
<td>Roller Blading</td>
<td>3 miles = 1 mile</td>
<td>1 mile</td>
</tr>
<tr>
<td>Swimming (30 yards/min)</td>
<td>1 mile</td>
<td>1 mile</td>
</tr>
<tr>
<td>Garden, digging</td>
<td>30 minutes = 2.5 miles</td>
<td>1 mile</td>
</tr>
<tr>
<td>Garden, push mowing</td>
<td>30 minutes = 2.25 miles</td>
<td>1 mile</td>
</tr>
<tr>
<td>Garden, raking</td>
<td>30 minutes = 1 mile</td>
<td>1 mile</td>
</tr>
<tr>
<td>Garden, planting</td>
<td>30 minutes = 1.5 miles</td>
<td>1 mile</td>
</tr>
<tr>
<td>Dancing, moderate to rapid</td>
<td>20 minutes = 1 mile</td>
<td>1 mile</td>
</tr>
</tbody>
</table>

Example from Bay Haven School (Sarasota County)

http://www.getmovinggethealthynj.rutgers.edu/miles.html
Steps:
1. MAP OF SCHOOL SITE AREA
2. CHOOSE LIKELY PEDESTRIAN PATHWAYS
3. ACCESS AUDIT TOOL ON MOBILE DEVICE
4. LABEL STREET SEGMENTS (1,2,3)
5. USE AUDIT TOOL (9 QUESTIONS) TO ASSESS EACH SEGMENT INDIVIDUALLY
6. SCORE EACH SEGMENT
   - 0-39 POINTS IS HIGH RISK (UNATTRACTIVE)
   - 40-69 POINTS MEDIUM RISK (NON-DESCRIPT)
   - 70 AND ABOVE IS LOW RISK (PLEASANT)
7. SUM SCORES (A-H)

Observations
1. WHAT IS THE MOST DANGEROUS LOCATION ALONG THIS SEGMENT?
2. WHAT IS THE MOST UNPLEASANT ELEMENT OF THIS SEGMENT?
3. WHAT IMPROVEMENTS WOULD MAKE THIS SEGMENT MORE APPROPRIATE FOR PEDESTRIAN USE?
4. WOULD IT BE POSSIBLE TO DESIGN A MORE DIRECT ROUTE TO CONNECT THE ENDS OF THIS SEGMENT?
5. ARE THE CONDITIONS OF THIS SEGMENT APPROPRIATE AND ATTRACTIVE FOR EXERCISE OR RECREATIONAL USE?

http://www.getmovinggethealthynj.rutgers.edu/miles.html
Wonderful World of Technology
Education and Regular Exercise

CDC REPORT

“who engages in regular exercise?”

- 61% any college
- 50% high school diploma
- 37% no high school diploma
Partnering with 211: Linking patients to Community Resources

LLUH United Way 2-1-1

2-1-1
Get Connected. Get Answers.

Use the LLUH United Way 2-1-1 service lookup to access information about community, social, health and government services in San Bernardino or Riverside County.

Speak to a live, bilingual call specialist 24 hours a day - dial 2-1-1 or 800-435-7565.

To find resources you can enter any of these search terms and then hit search:

- agency names
- service terms
- programs
- city
- zip code

Once the results have been returned, click on “Get more information” to see additional details for each resource.

Get started by using one of these categories or enter your own search terms in the search box below:

Clothing | Dental Care | Food | Clinic | Housing | Behavioral Health | Transportation | Support Groups

Enter search term:  
Search for Resources:

- Search Agency Names
- Search All Fields

Look for resources in or near a location, add filters, then click Search for Resources to apply filters:

- City: Winchester
- Zip Code:
- Location Filter: Serving city residents

- Sort Alphabetically
- Sort by Proximity to chosen zip code
Utilization of GIS technologies can be used to benefit the decision making process, and policy development throughout the County, which will result in the improvement of the health, safety, and quality of life of its citizens.
Agency for Healthcare and Quality: AHRQ Study 2013

FACT:
1 IN 3 CHILDREN ARE OVERWEIGHT OR OBESE

34,500 articles reviewed, 131 fit criteria
• High income country
• Randomized trials
• Children 2-18 years of age
• Outcome followed 6-12 months
Agency for Healthcare and Quality: AHRQ Study: 2013 Conclusions

• Combining a home or community component with a school-based program also works.

• Limitations: The magnitude of effects appears to be modest, although the heterogeneity in study interventions, outcomes, and duration make it difficult to estimate a precise effect size.

• School-based programs involving dietary or physical activity interventions are effective in preventing childhood obesity.

“Back to School” Note for Parents

Researchers found that:

- Programs at schools to help children eat healthy and be physically active can keep children from becoming overweight or obese.
- Along with school programs, additional steps at home and in the community can also help.
- More research is needed to know which particular programs or steps work the best.
Health Happens Where Children Live

- Health arena for a child is their family, school and community.
- Hospitals are the safety net for . . . . . when health fails.
- Physicians and health systems need to help bridge the gap to connect with communities as this is the beginning.
Response:
Change requires the impact of all hands
“WHOLE CHILD”

- Schools and Health have long been partners for families and communities.
- Creating new forms of collaborations for health in our schools and communities.
- Familiarize schools and families with resources that encompass:
  - NUTRITION AND FOOD
  - PHYSICAL ACTIVITY AND HEALTHY LIVING
  - HEALTH ACCESS
  - CREATE A SCHOOL STORY MAP
Objectives

CREATE A RESOURCE CONNECTION FOR SCHOOLS AND HEALTH CARE CENTERED AROUND SCHOOL COMMUNITIES USING GIS MAPPING

~ What is it that schools want to know to assist families
~ What are the existing strengths and assets
~ What are the missing pieces needed for health
~ How do we create health in the community

~ Interactive walking App for each school
Maps: School Resources

Tutoring
Mentoring
Preschools
School dashboards

https://lluh.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=d51506f06c894d35b8ca066dfc36341
Maps: Healthy Foods / Physical Activity

Health food shopping  farmer markets  green spaces
WIC offices  food banks  free foods
Fast food activity  bike paths  walking zones

https://lluh.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=22ef5d8642644617ac44ab1cfbb26609
Maps: Health Care Access

Pharmacies
Clinics
Dental offices
Health care provider offices
Hospitals

https://lluh.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=060f07b2f58b4775813402183995030c
Interactive Story maps

Maps that tell stories about the community and resources

http://134.173.236.104/KingMiddle/
Creating a Healthier, Educated Generation

... From Cradle
Creating a Healthier, Educated Generation. . . . To Careers
PARTNER WITH INDIVIDUALS, FAMILIES, AND COMMUNITY AGENCIES