GIS to Direct Resource Allocation & Interventions for Childhood Obesity

Abstract

County of San Diego, Health and Human Services Agency, Public Health Services, Community Health Statistics

GIS to Direct Resource Allocation & Interventions for Childhood Obesity

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San Diego County

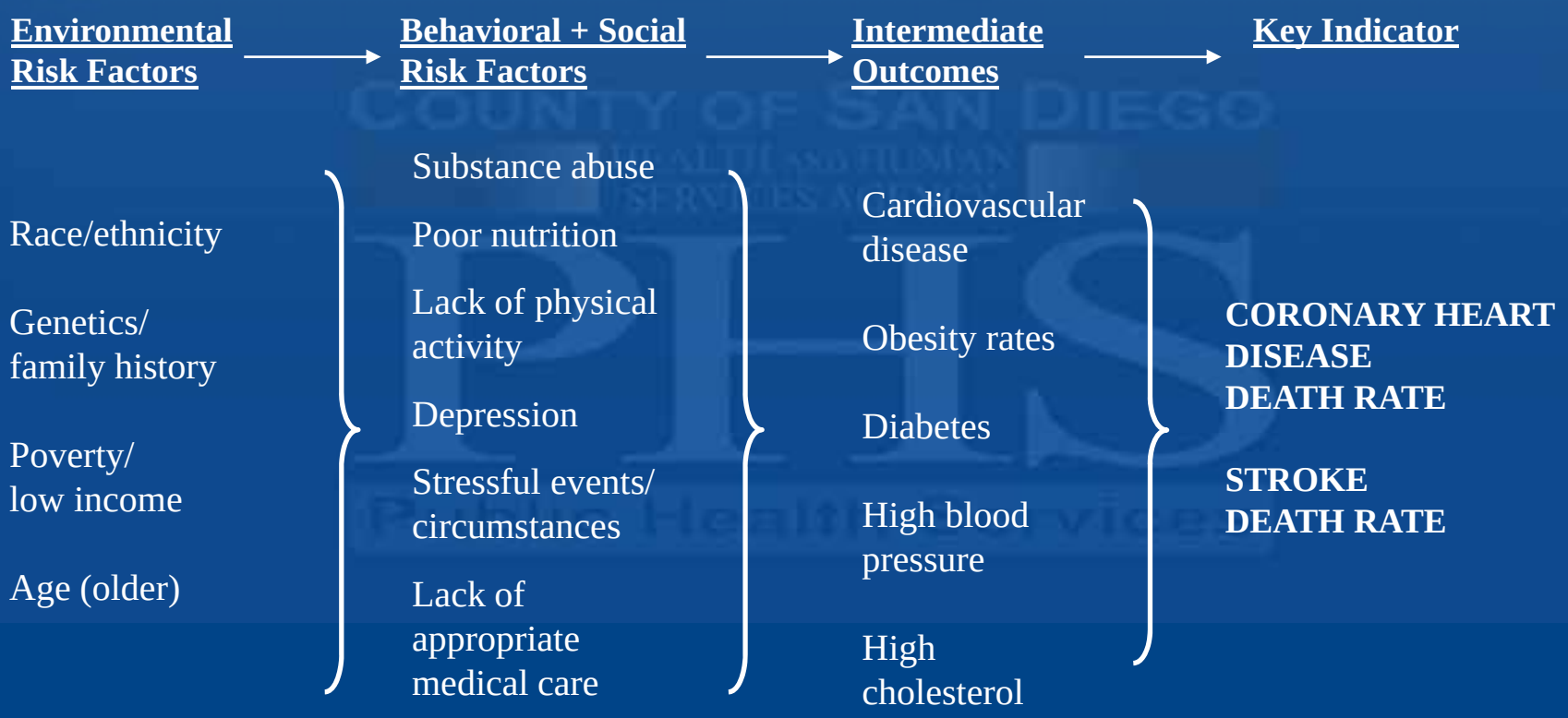
- **2.7 million acres**
  - **Ninth largest county in CA (land)**
  - **99/3066 Counties in US**
- **3.07 million residents**
  - **Sixth largest county in US (population)**
  - **29th most populous “state”**
- **We’re big in lots of ways…**

Our Kids are At Risk

- 14%-40% overweight (5^{th}, 7^{th}, 9^{th} grade SDCo)
- The rate of overweight in kids has doubled since 1970's
- 70% chance of being overweight/obese as adults
- 1 in 3 will be diabetic

1^{st} generation of kids in the US that aren't expected to live as long as their parents

Critical Pathways Involving Obesity, Nutrition, Exercise



Diabetes, Heart Disease, Stroke, Cancer, Depression, School Performance …what isn't affected by nutrition and physical activity.

ECONOMICS OF OBESITY

$117 billion – Nationwide direct and indirect health care costs attributed to obesity in 2000.

40 percent – The additional amount of health care resources used by people who are overweight.

49 percent – The additional number of inpatient hospital days that obese people experience, which results in 36 percent higher costs to their health plans.

$500 – The average additional amount people who gain 20 pounds or more will increase their medical bills per year.

$75 billion – Nationwide direct medical care costs of obesity in 2003. Medicare, the federal healthcare program for people 65 and older, and Medicaid, the federal/state program for the needy, accounted for more than 50 percent of those costs.

$21.7 billion – Amount spent by California in 2000 in direct and indirect medical care, workers' compensation, and lost productivity.

$7.7 billion – Amount California spent in 2003 on direct health care costs attributed to obesity alone.

$22.3 billion – Costs attributed to physical inactivity, obesity, and overweight in California in 2000.

Sources: National Institutes of Health; UCLA Center for Health Policy Research; North American Association for the Study of Obesity; RTI International, Centers for Disease Control and Prevention

CALL TO ACTION

San Diego County

Childhood Obesity Action Plan

2006

Projects Collide = New Ideas

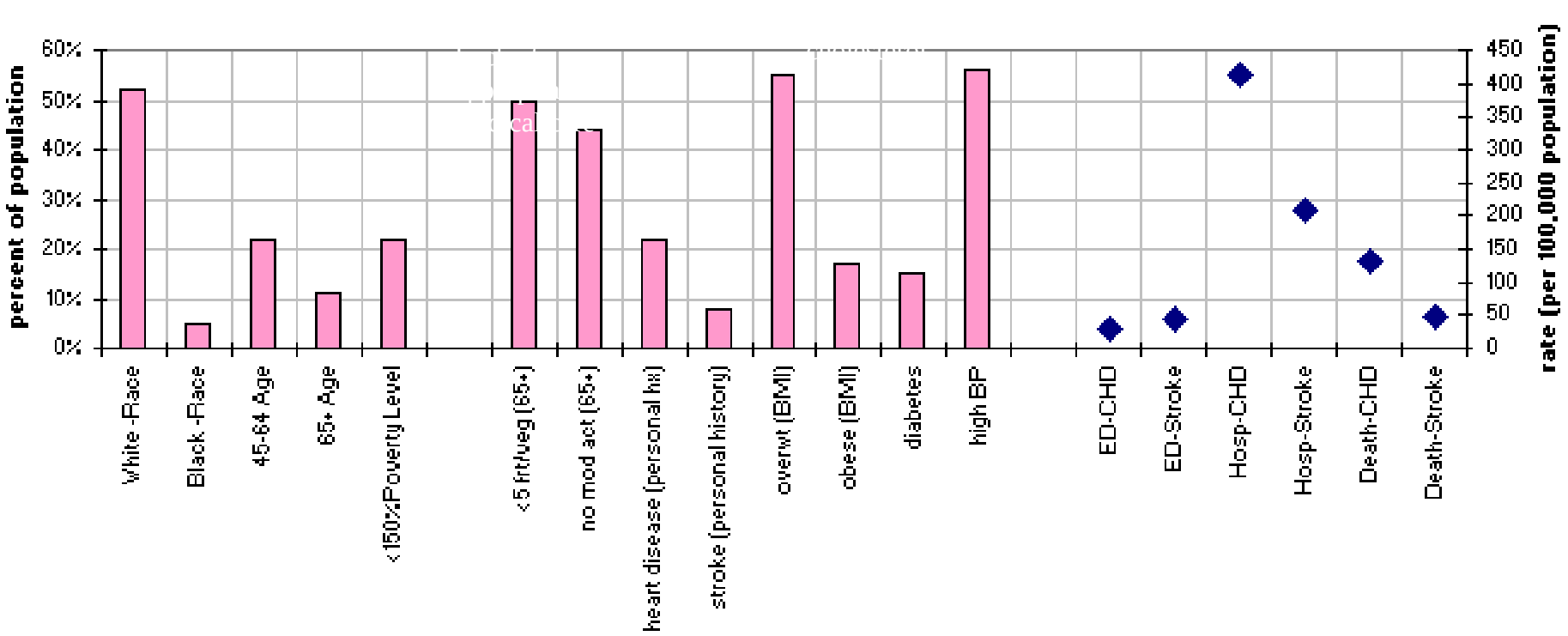
- Making people aware of data & resources
  - CHIS data (food & exercise behaviors)
- Regional focus on the built environment
- Mapping pediatric pedestrian injuries

Childhood Obesity & the Physical Environment

- Data Problems/Questions
  - How do we evaluate various types & sources of data at once?
  - How do we integrate data at various geographic units?
  - Where are fast food & other food outlets?
  - Where are kids?

Critical Pathways

Environmental Risk Factors	Behavioral + Social Risk Factors	Intermediate Outcomes	Key Indicator
Race/ethnicity	Substance abuse	Cardiovascular disease	**CORONARY HEART DISEASE DEATH RATE**
Genetics/ family history	Poor nutrition	Obesity rates	
Poverty/ low income	Lack of physical activity	Diabetes	**STROKE DEATH RATE**
Age (older)	Depression	High blood pressure	
	Stressful events/ circumstances		



How do we integrate various data?

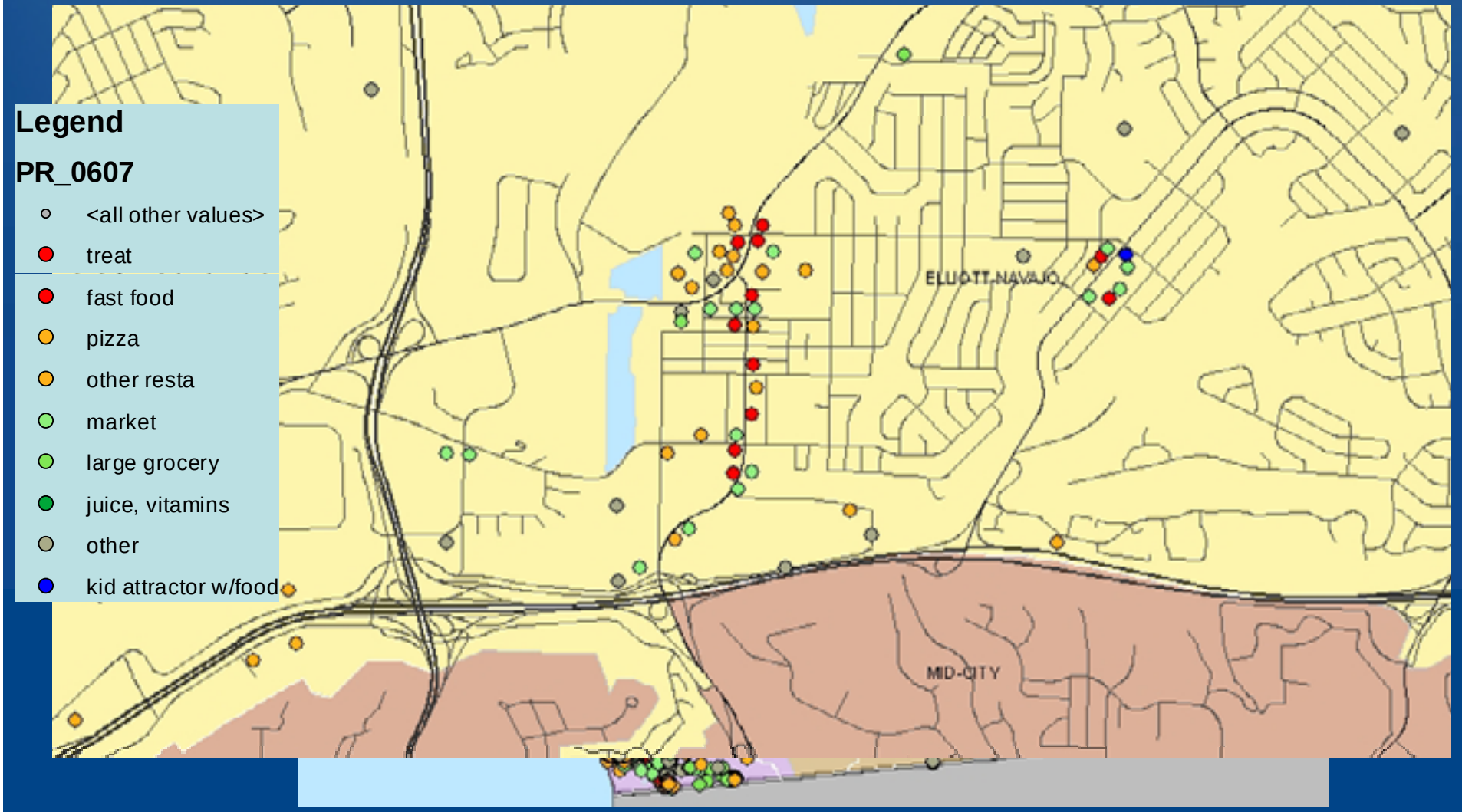
- MAPS
  - Various sources
  - Various types of data
  - Various geographic units
    - Zip Code
    - Point Location
    - Census tract, SRA
    - HHSA Region (county health planning areas)
  - Picture of a community
  - Context of the surroundings, resources, liabilities

Where do people eat?

- No fast food list among obesity prevention-ists
- Food sales are regulated/licensed
- Who holds permits?
- Our county partners…Environmental Health, Food & Housing Div.
  - Sites mapped for inspection routes

Lesson:
Using available resources in new ways

Retail Food Permit Layer



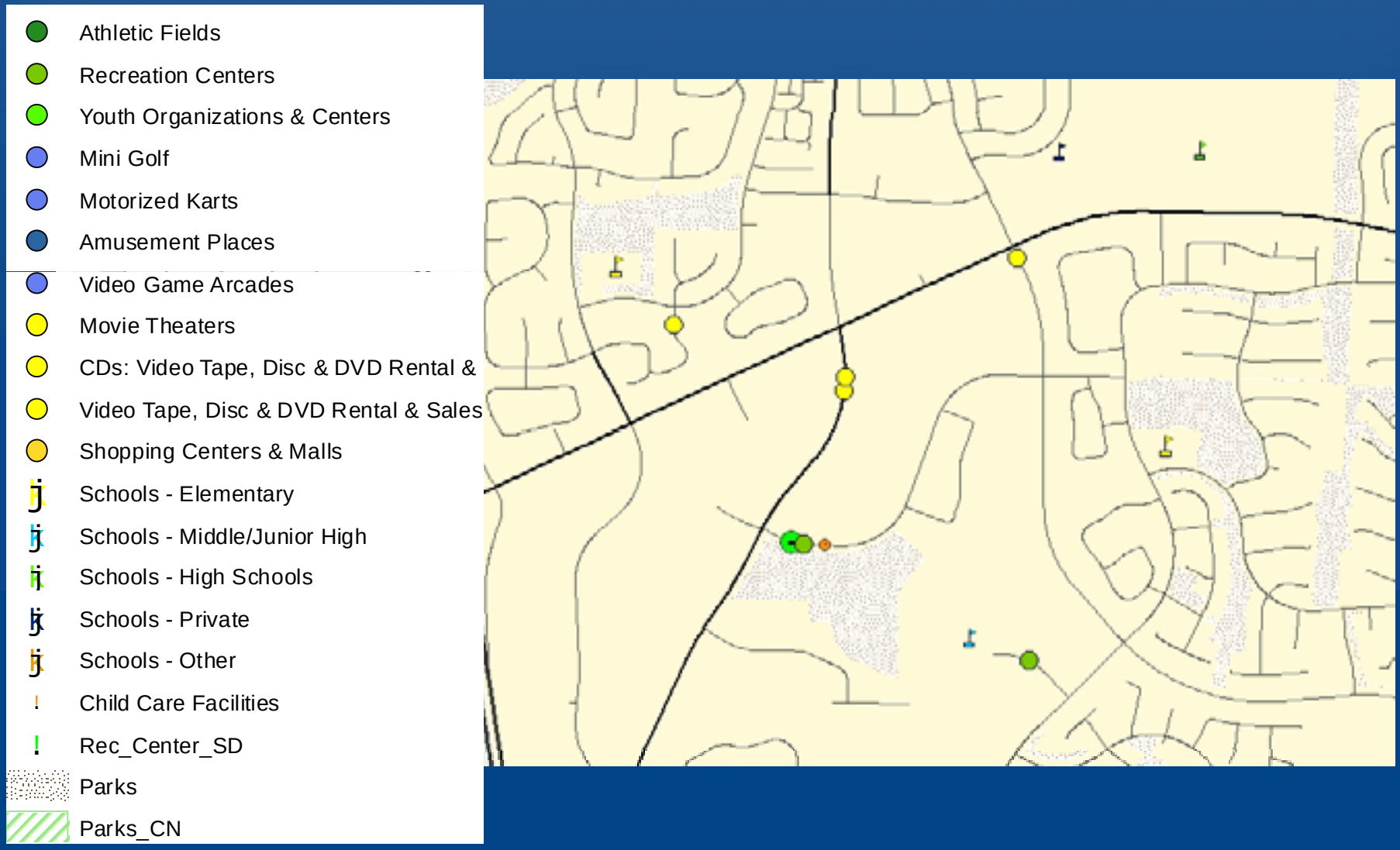
Where do we find kids?

- Schools (have this layer)
- Parks, rec centers (have this layer)
- Entertainment, amusement (Movies, Music, mini golf)
- Loitering sites: malls, shops, convenience markets
- Youth organizations

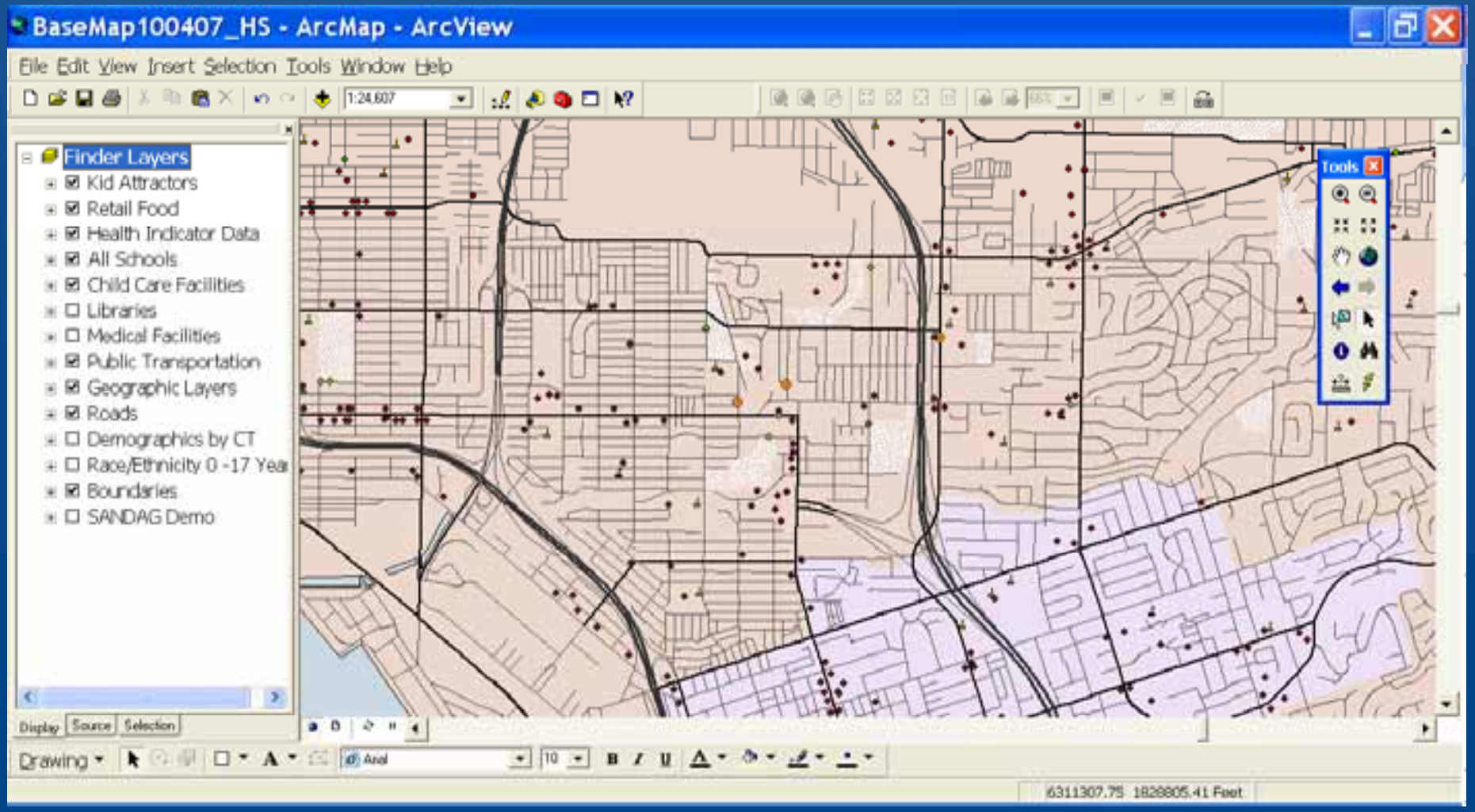
… how do we find these places usually?

Phone book.
Tried a few electronic directories (library listing)

Sample - Kid Attractors Layer



Sample - Everything Map



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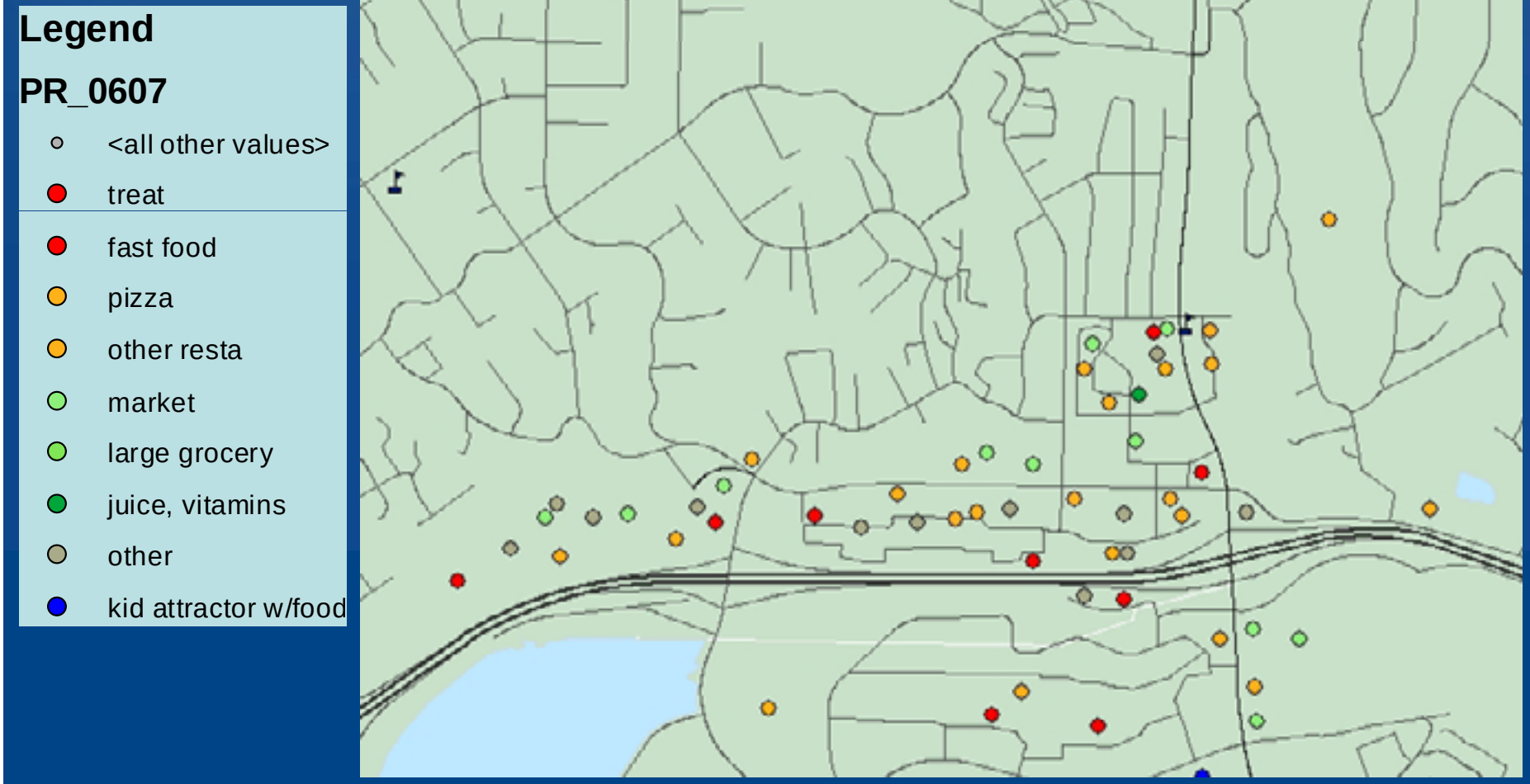
High Density Restaurants Near Schools



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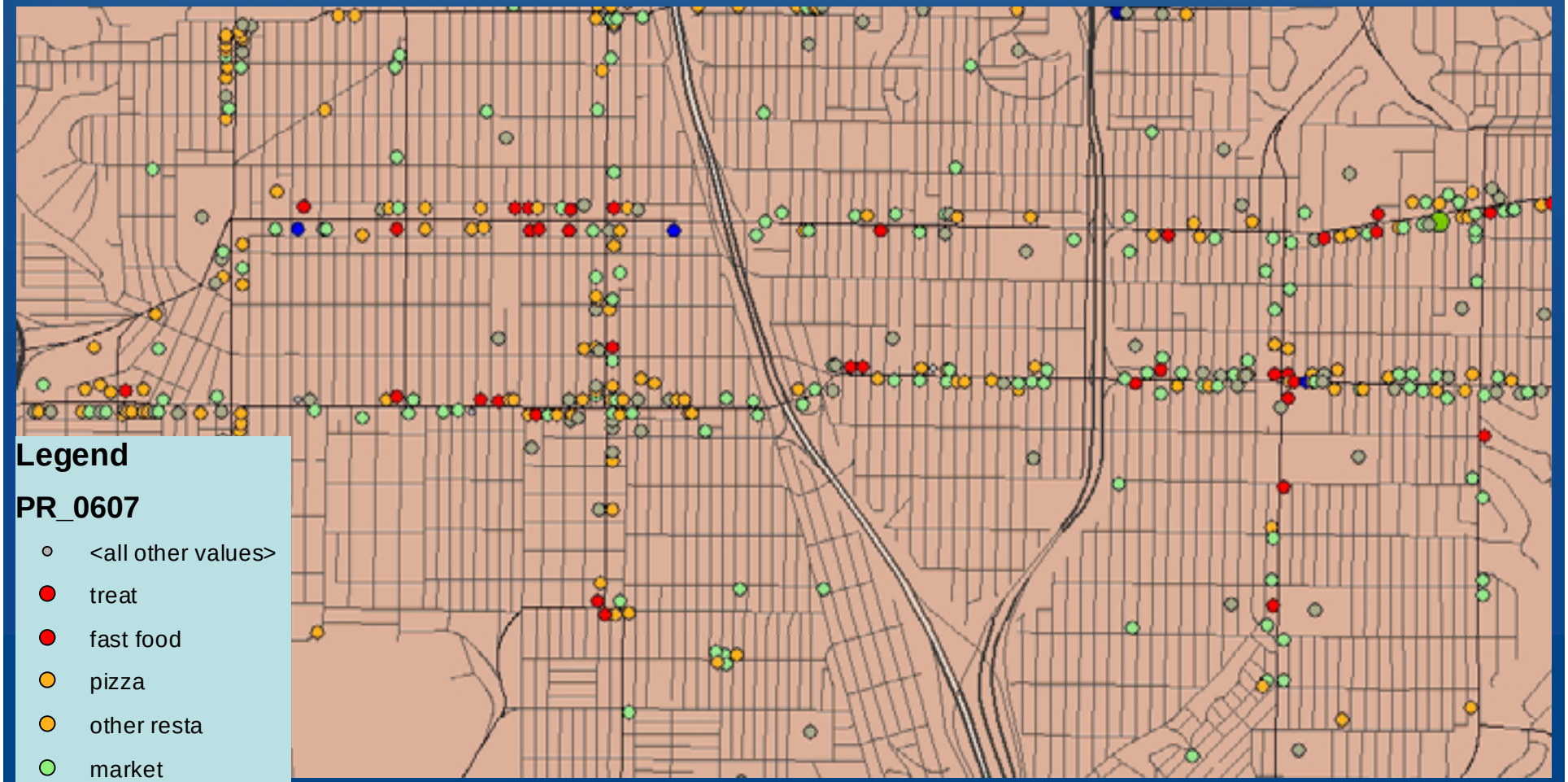
Fresh Food Deserts



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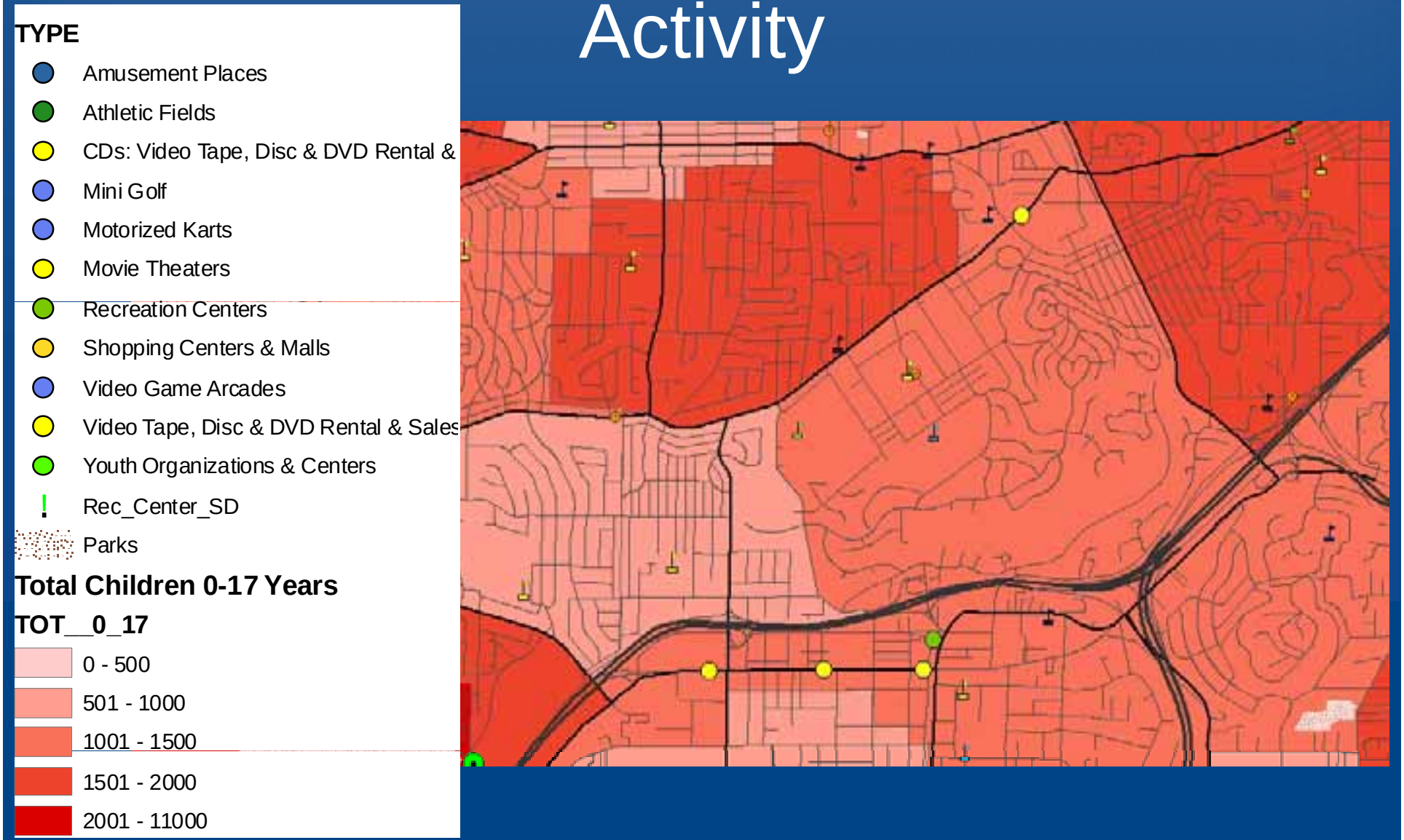
Limited Opportunities for Physical Activity



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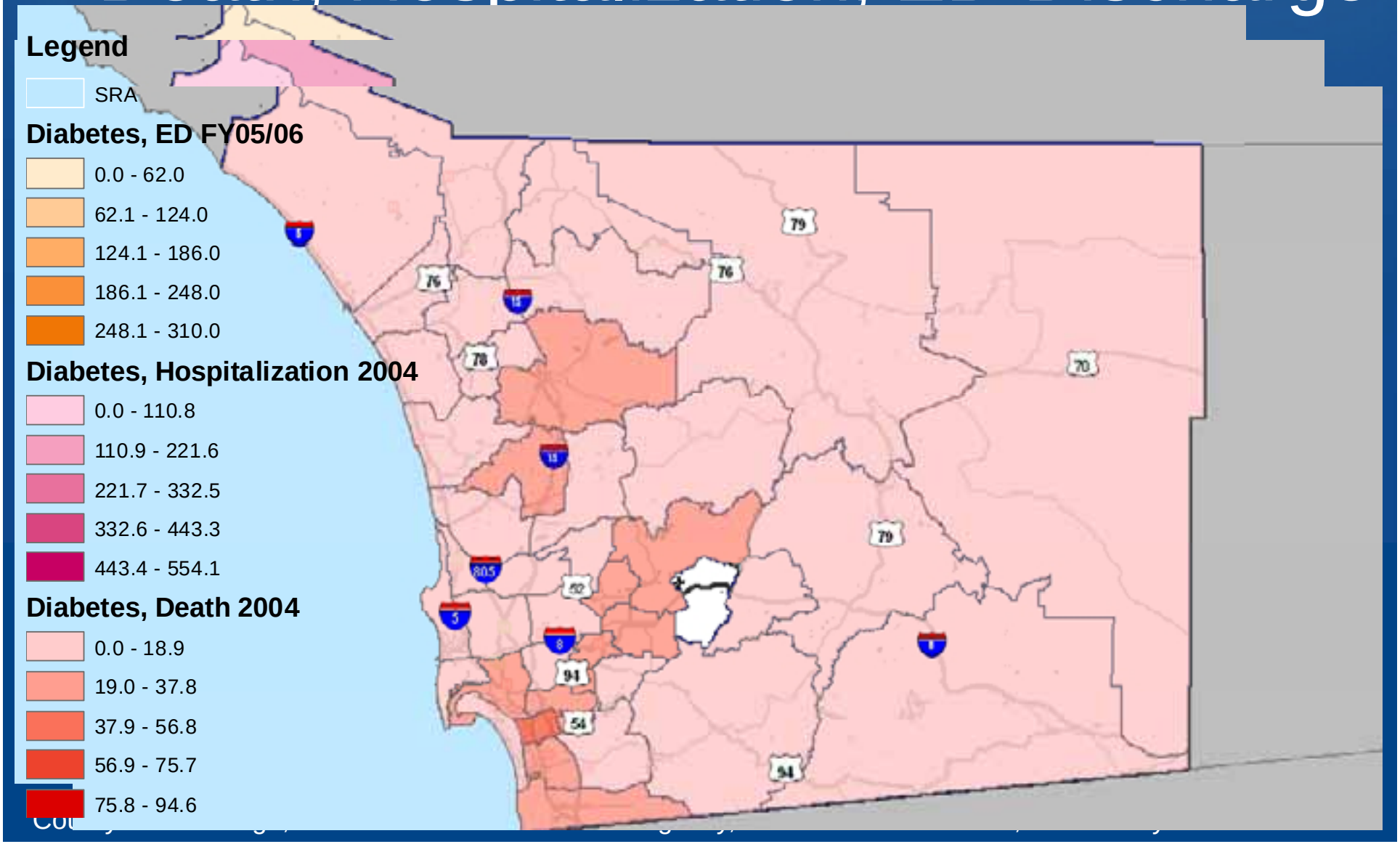
Diabetes Rates - Death, Hospitalization, ED Discharge



GIS Tool to Allow for ID of:

Assets

- Healthy eating
  - Areas available to gather for farmers market
  - Community gardens
  - Grocery vs restaurants
- Healthy activity & exercise
- Outreach resources/opportunities

Liabilities

- High density restaurant areas near schools
- Limited physical activity sites
- Higher rates of adult obesity-related disease

Future

- Sharing information
  - Clickable PDF format, (upgrade to ArcView 9.2)
  - GIS/Data Interactive Community Forums
- Mapping more data
  - Walkability: Safe Routes to School, Safe Routes to Parks
    - Sidewalks, Bike Paths
    - Neighborhood Crime
    - Pedestrian Injury
  - Billboard/Advertising Sites
  - BMI Data
    - FitnessGram (5th, 7th, 9th graders)
    - School Entry Pilot (entry into 1st grade)

Acknowledgements

- County of San Diego, Department of Environmental Health
  - Vickie Church, Food & Housing Division
  - Pam Gilb, GIS
- Childhood Obesity Action Plan
  - Tracey Delaney, County of San Diego
- San Diego Association of Governments (SANDAG), SanGIS
- Public Health Data Providers

Contact

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www.sdhealthstatistics.com
Data Requests (619) 285-6479

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San Diego County - Public Health Data

Diabetes

Death Certificate

Healthy People 2010 Target: n/a for diabetes deaths (underlying cause)
USA: 25.3 deaths per 100,000 population, age-adjusted (2003)* ‡
California: 22.6 deaths per 100,000 population, age-adjusted (2003)* ‡

Diabetes† Deaths Among San Diego County Residents by Location of Residence

	North Coastal		North Central		Central		South		East		North Inland		Unknown§		County		County age-adjusted rate*
Year	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	
2000	60	13.0	73	13.1	110	22.9	60	15.6	95	21.5	61	16.5	<5	---	481	17.1	19.2
2001	48	10.3	69	12.3	113	23.1	66	17.1	99	22.1	93	18.6	<5	---	491	17.1	19.3
2002	80	16.6	58	10.1	94	19.3	71	17.2	94	20.8	76	14.9	<5	---	475	16.3	18.3
2003	72	14.7	62	10.5	96	19.7	87	20.4	88	19.4	89	17.0	5	---	499	16.8	18.6
2004	63	12.7	80	13.5	101	20.5	94	21.6	104	22.8	87	16.1	<5	---	531	17.6	19.4
2005																	

* Rates per 100,000 population. Age-adjusted rates per 100,000 2000 US standard population.
† Diabetes death refers to ICD-10 codes E10-E14. Data here represent only underlying cause of death and do not include those where Diabetes was a contributing cause of death.

Hospital

Diabetes† Hospitalizations Among San Diego County Resident by Location of Residence

	North Coastal		North Central		Central		South		East		North Inland		Unknown§		County		County age-adjusted rate*
Year	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	
2000	319	69.4	379	68.2	787	163.9	553	143.5	504	114.1	401	81.7	6	---	2,949	104.8	113.0
2001	356	76.2	348	61.8	689	141.0	539	135.6	480	107.2	416	83.3	55	---	2,883	100.7	108.0
2002	317	65.6	359	62.3	739	151.9	596	144.6	591	131.0	400	78.3	39	---	3,041	104.1	111.7
2003	350	71.6	379	64.1	756	154.9	617	144.9	537	118.6	480	91.4	47	---	3,166	106.5	113.0
2004	358	72.1	361	60.9	717	145.5	701	160.9	579	127.1	486	90.2	43	---	3,245	107.7	113.8
2005																	

* Rates per 100,000 population. Age-adjusted rates per 100,000 2000 US standard population.

Emergency Department

Diabetes† Emergency Department Discharges in San Diego County by Location of Residence

	North Coastal		North Central		Central		South		East		North Inland		Unknown§		County		County age-adjusted rate*
Year**	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	
2005/06	444	89.0	472	78.9	1,015	203.3	822	179.3	660	145.6	510	92.2	250	---	4,173	136.1	141.1
														---			

* Rates per 100,000 population. Age-adjusted rates per 100,000 2000 US standard population.
† Diabetes emergency department visit refers to ICD-9 codes 250
** New database; FY 2005/2006 is first full year regional data is available
§ Rates not calculated for fewer than 5 events. Rates not calculated in cases where zip code is unknown or outside San Diego County
Source: HASD&IC, CHIP, County of San Diego, Health & Human Services Agency, Emergency Medical Services, Emergency Department Database; SANDAG, Current Population Estimates, 9/27/06
Prepared by County of San Diego (CoSD), Health & Human Services Agency (HHSA), Community Health Statistics, 12/12/2006