Geomapping Patients

Using addresses to determine new clinical sites, transportation times, and available community resources

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Disclosures

None

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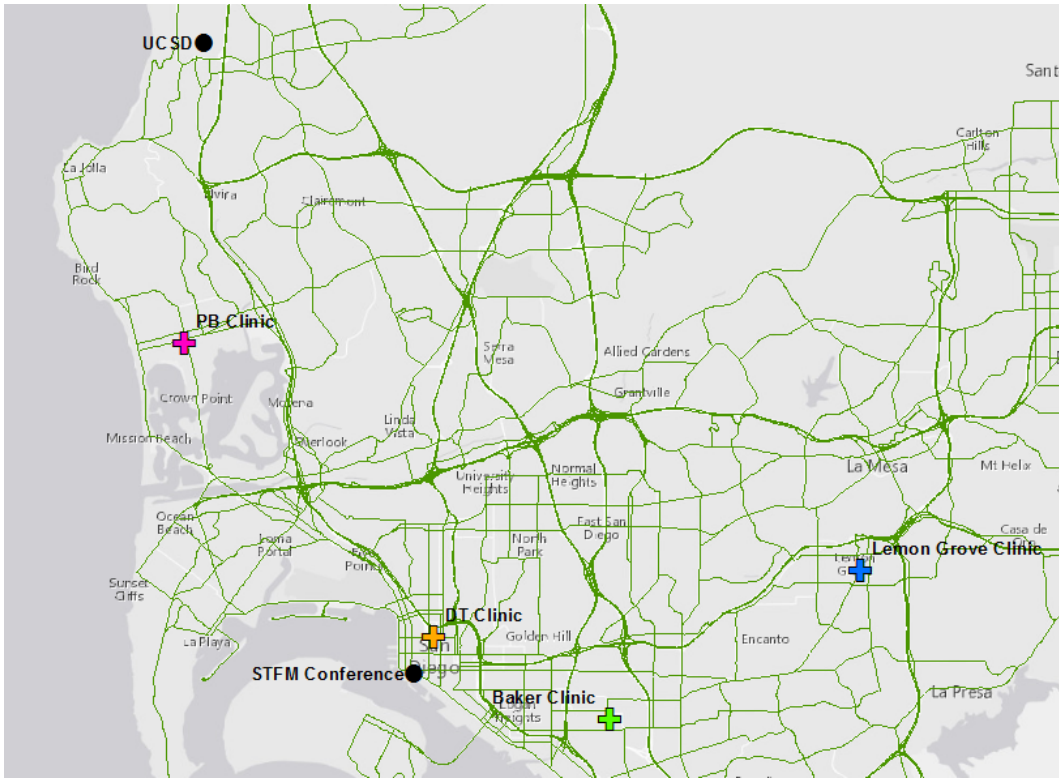
ISP Committee:
Dr. Sunny Smith
Dr. Kimberly Brouwer
Jessica Block

Objectives

- At the end of this presentation, participants should be able to
  - Define geomapping, and recognize its power in providing patterns and trends.
  - Recognize the potential risks to personal health information (PHI), and how to mitigate loss of PHI in geomapping projects.
  - Utilize geomapping to perform an internal quality assessment and quality improvement evaluation and visualize what resources exist in their community and utilize publicly available data to learn more about their patient populations.

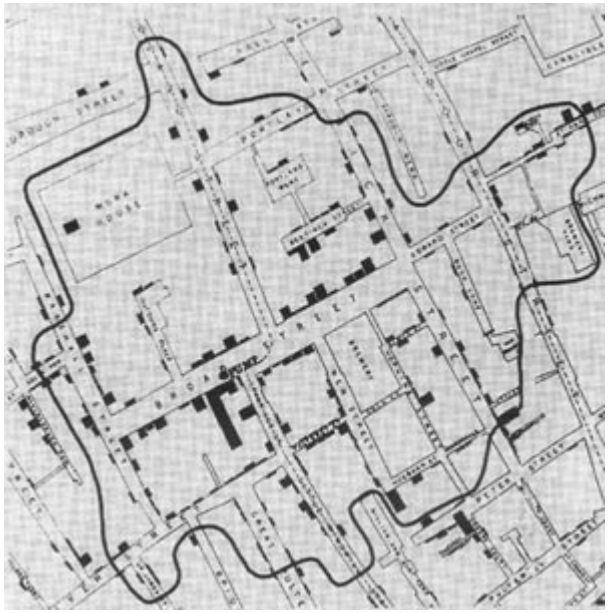
The UCSD Student-Run Free Clinic

- First clinic in PB in January, 1997
- Second clinic in Downtown October, 1997
- Third clinic at Baker Elementary October, 1998
- Fourth clinic at Lemon Grove Elementary in March 2011

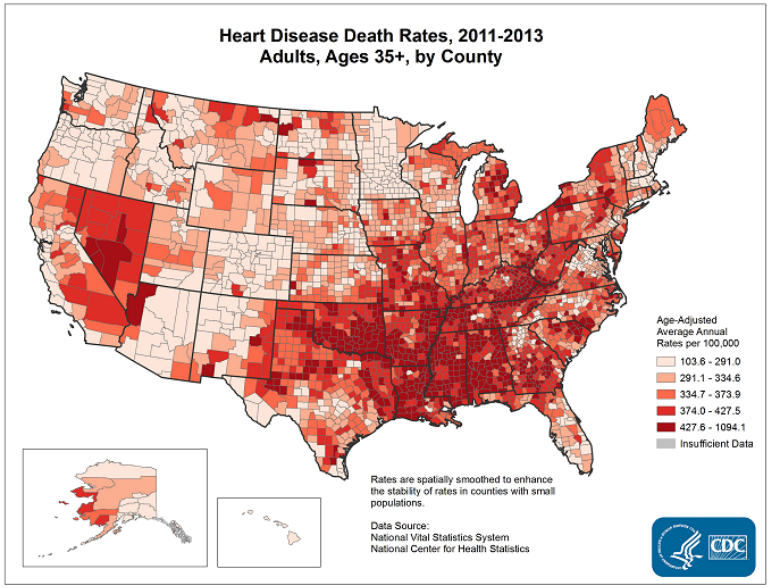


Geomapping

- To get a closer look, we used Geomapping



UCLA: Department of Epidemiology; Father of Modern Epidemiology



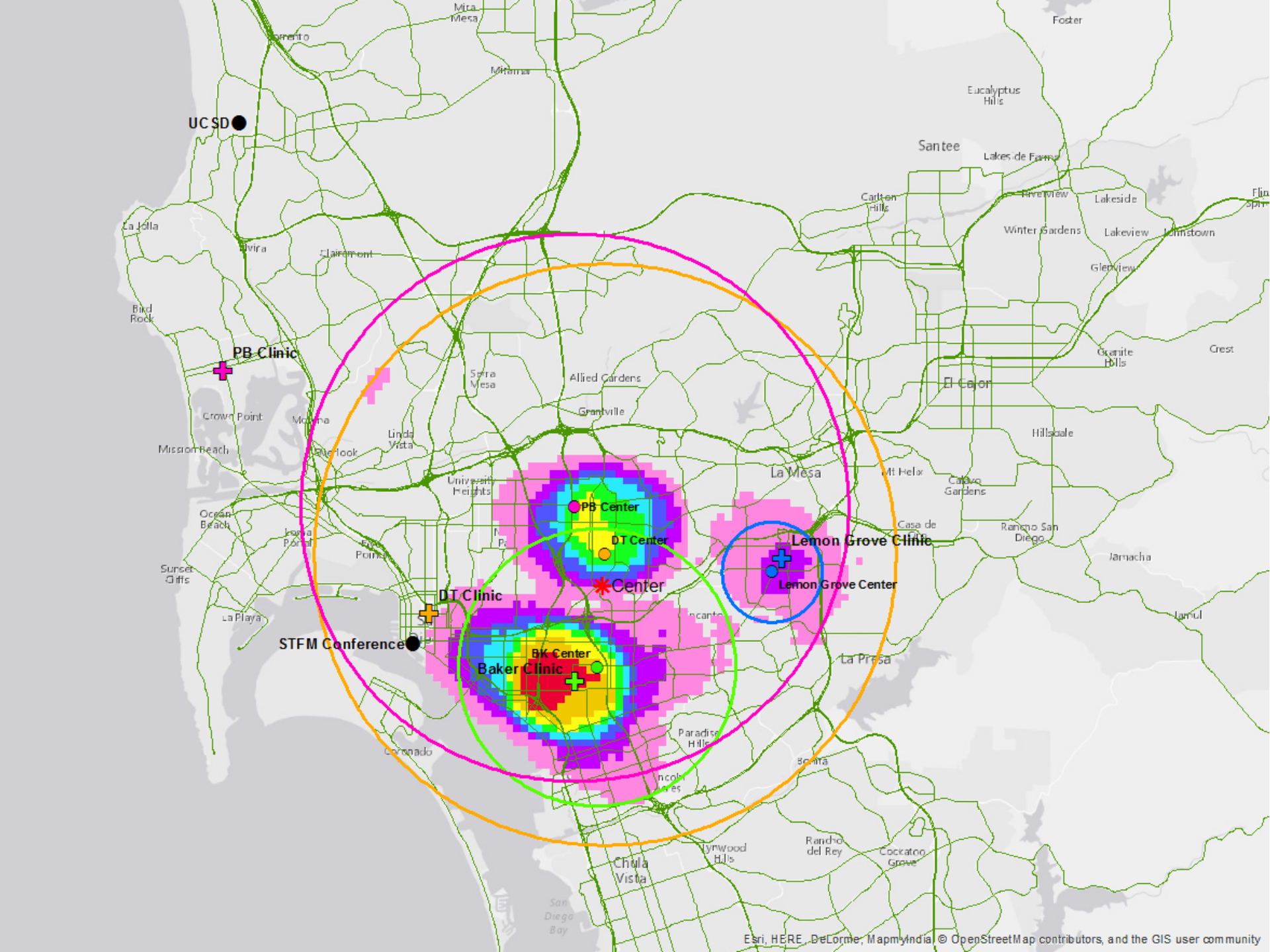
CDC: Division for Heart Disease and Stroke Prevention; Heart Disease Fact Sheet

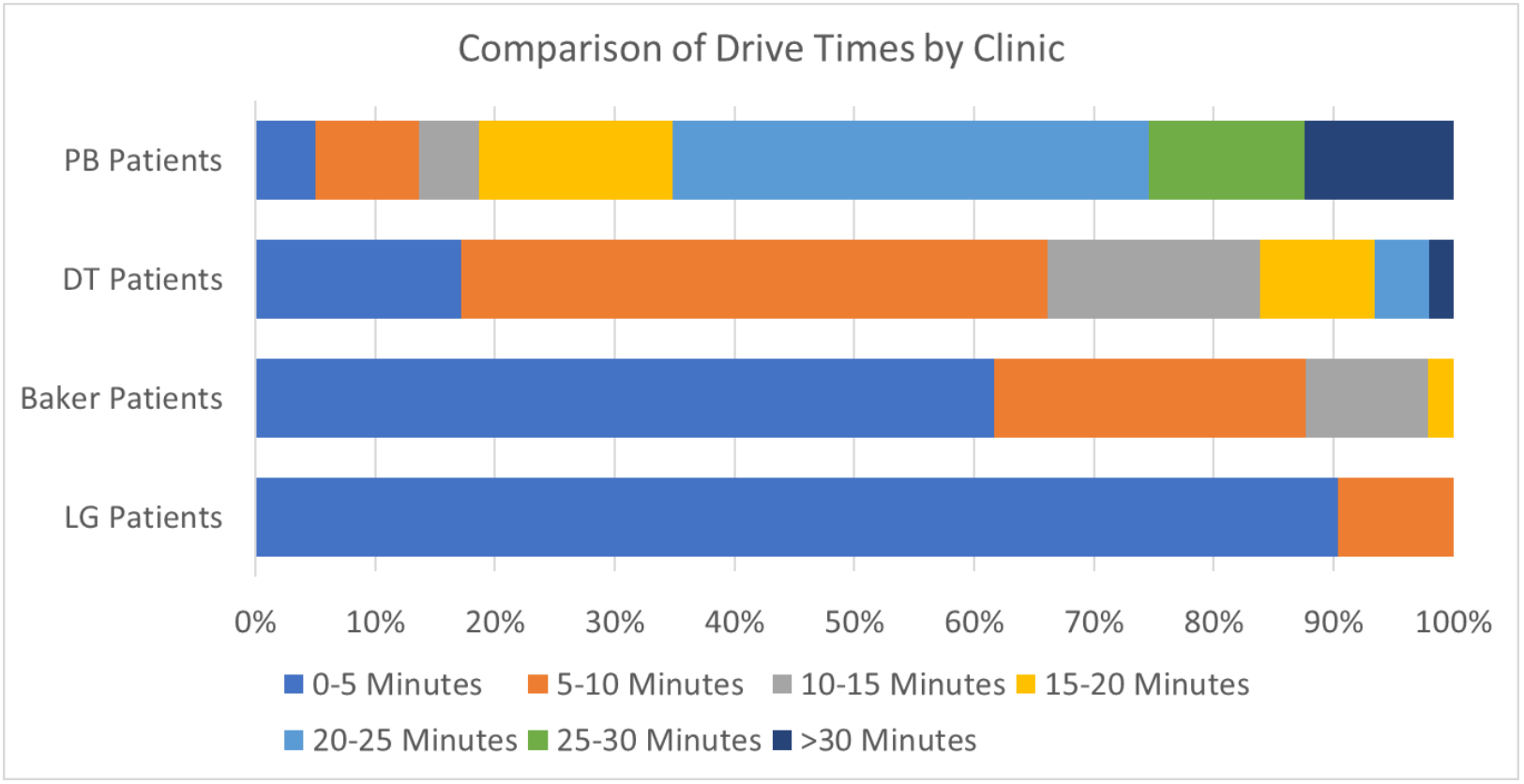
Geomapping

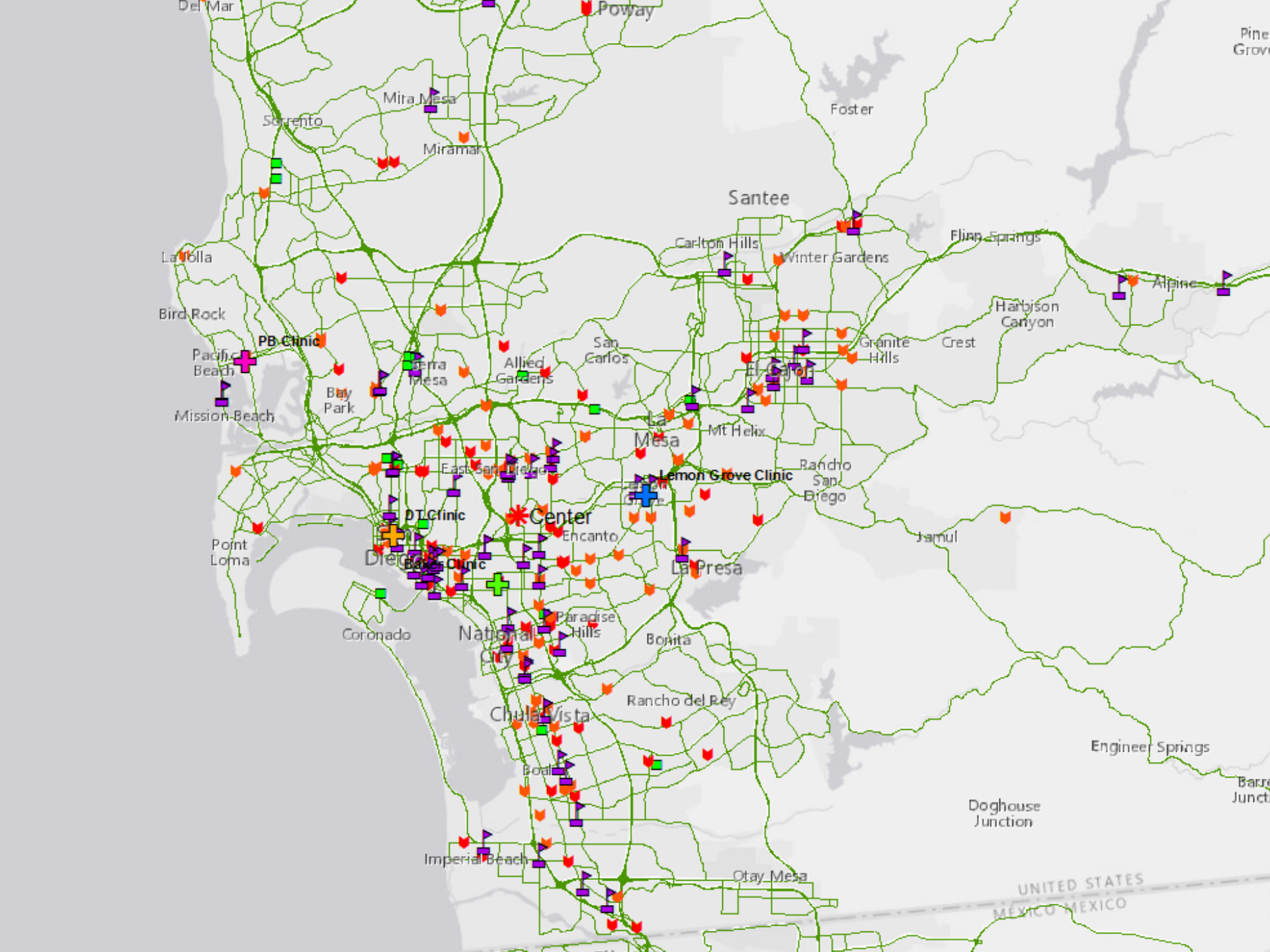
- To get a closer look, we used Geomapping
  - Displays clusters and patterns
  - Current software has a plethora of tools
  - Data and maps are readily available
    - Census data, state and city level data (SanGIS)

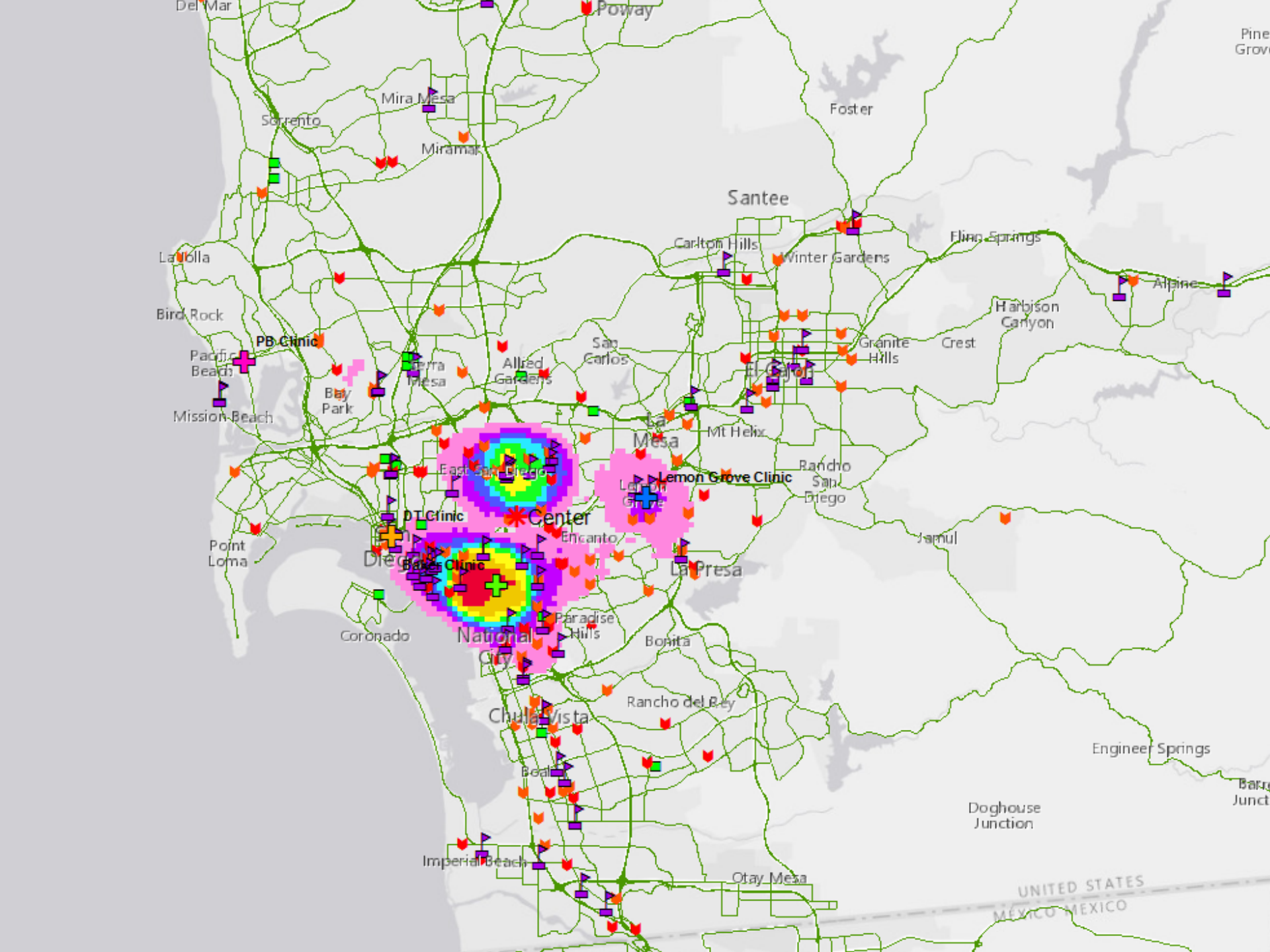
Geomapping: How We Used It

- Addresses were geocoded in ArcGIS
  - Take an address and get X,Y or Lat, Long coordinates
  - Could use geocoding service, business associate contract (HIPAA Compliant)
- Addresses were plotted to visualize where our patients lived (Must consider HIPAA)
  - Depending on ultimate purpose, that information can be “masked”


UCSD
PB Clinic
PB Center
DT Center
Center
DT Clinic
STFM Conference
BK Center
Baker Clinic
Lemon Grove Clinic
Lemon Grove Center
Esri, HERE, DeLorme, MapmyIndia © OpenStreetMap contributors, and the GIS user community


Comparison of Drive Times by Clinic
PB Patients
DT Patients
Baker Patients
LG Patients
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
0-5 Minutes
5-10 Minutes
10-15 Minutes
15-20 Minutes
20-25 Minutes
25-30 Minutes
>30 Minutes


Del Mar
Poway
Mira Mesa
Sorrento
Miramar
Foster
Santee
Carlton Hills
Winter Gardens
Flinn Springs
La Jolla
Alpine
Bird Rock
Harbison Canyon
PB Clinic
Pacific Beach
Granite Hills
Crest
San Carlos
Allied Gardens
Tierra Mesa
Bay Park
Mission Beach
La Mesa
Mt Helix
Lemon Grove Clinic
Rancho San Diego
East San Diego
DT Clinic
Center
Encanto
Point Loma
La Presa
Jamul
Paradise Hills
Coronado
National City
Bonita
Rancho del Rey
Chula Vista
Engineer Springs
Doghouse Junction
Imperial Beach
Otay Mesa
UNITED STATES
MEXICO
MEXICO


Del Mar
Poway
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Sorrento
Miramar
Foster
Santee
Carlton Hills
Winter Gardens
Flinn Springs
La Jolla
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Bird Rock
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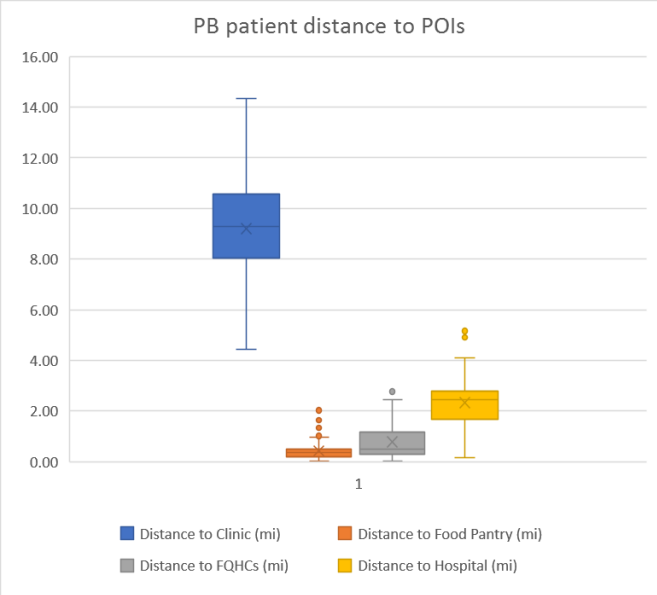
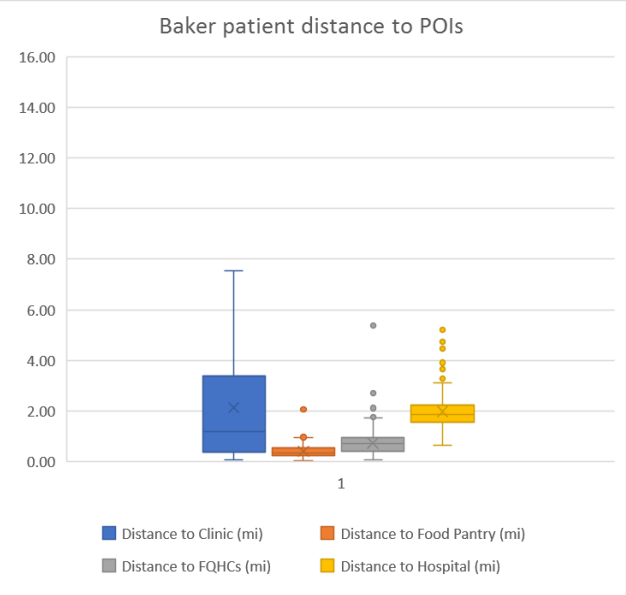
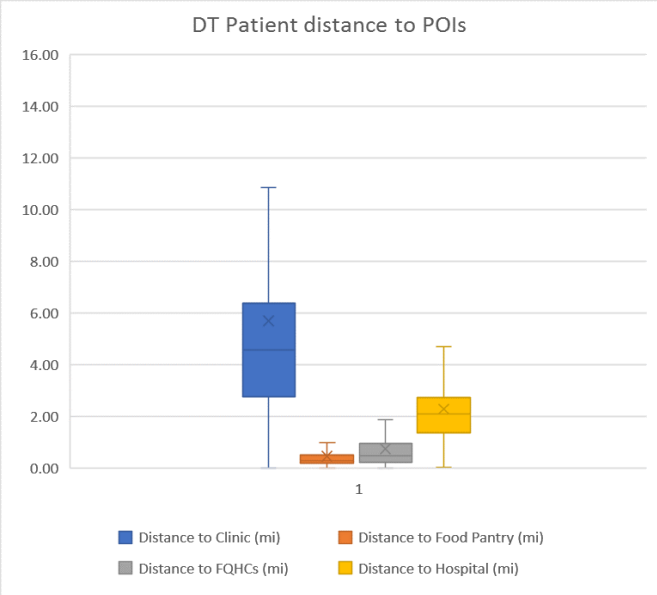
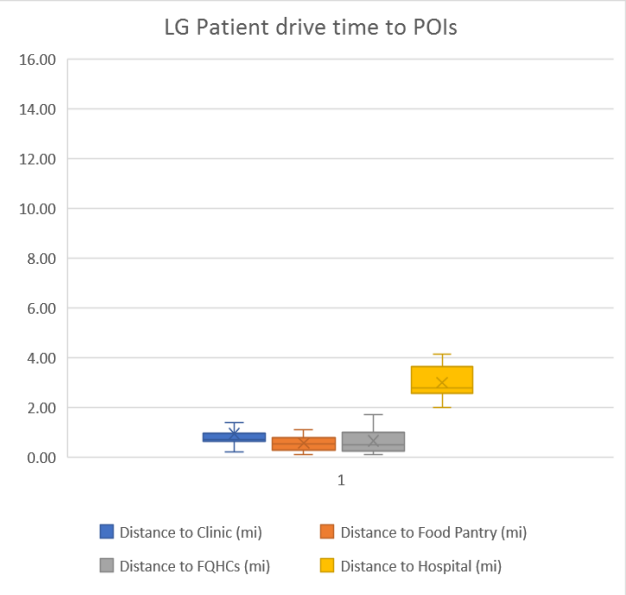

PB patient distance to POIs
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1
Distance to Clinic (mi)
Distance to Food Pantry (mi)
Distance to FQHCs (mi)
Distance to Hospital (mi)

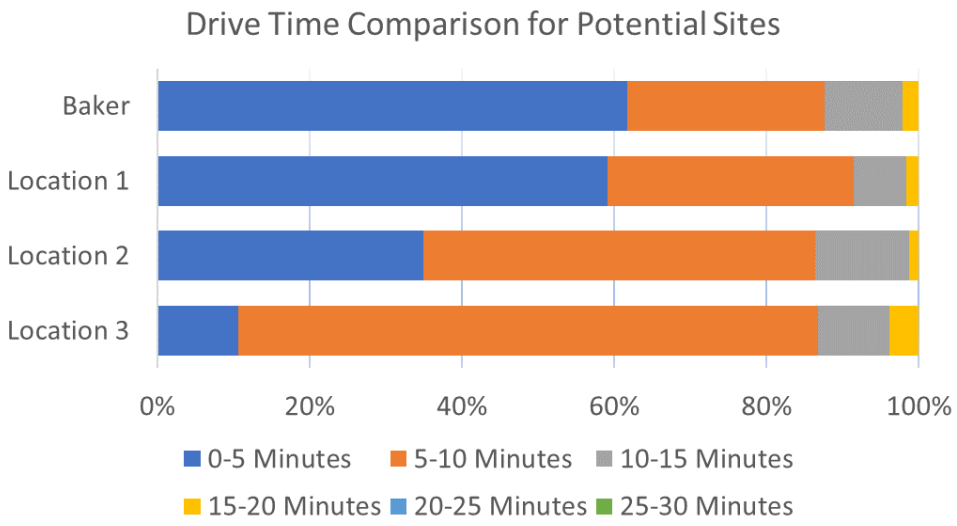

Baker patient distance to POIs
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1
Distance to Clinic (mi)
Distance to Food Pantry (mi)
Distance to FQHCs (mi)
Distance to Hospital (mi)

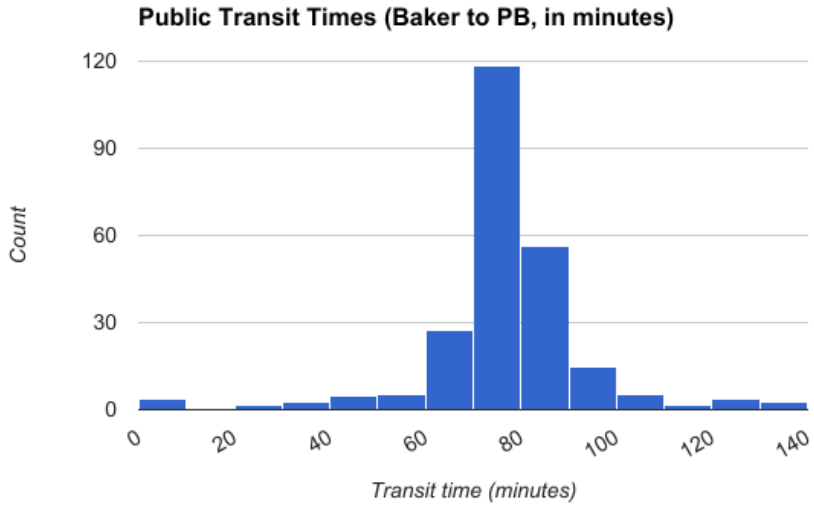

DT Patient distance to POIs
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1
Distance to Clinic (mi)
Distance to Food Pantry (mi)
Distance to FQHCs (mi)
Distance to Hospital (mi)

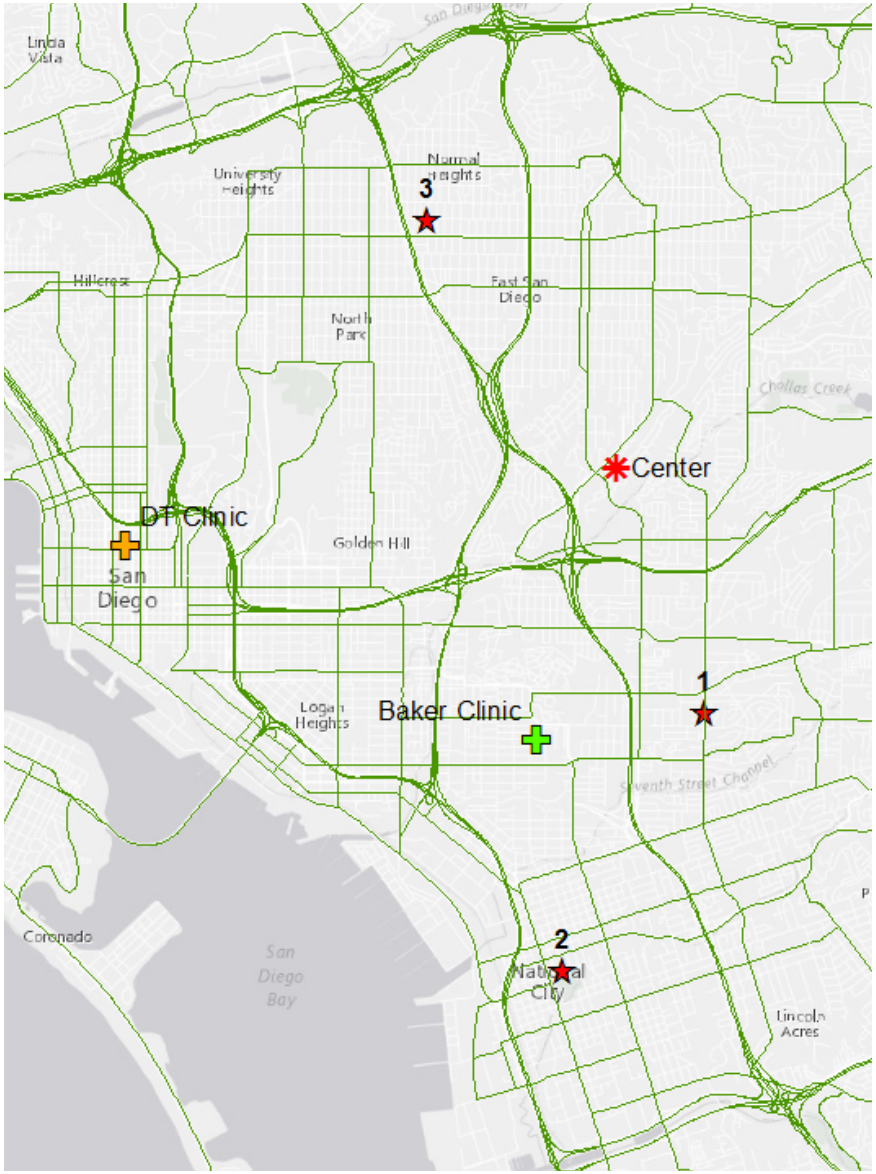

LG Patient drive time to POIs
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1
Distance to Clinic (mi)
Distance to Food Pantry (mi)
Distance to FQHCs (mi)
Distance to Hospital (mi)

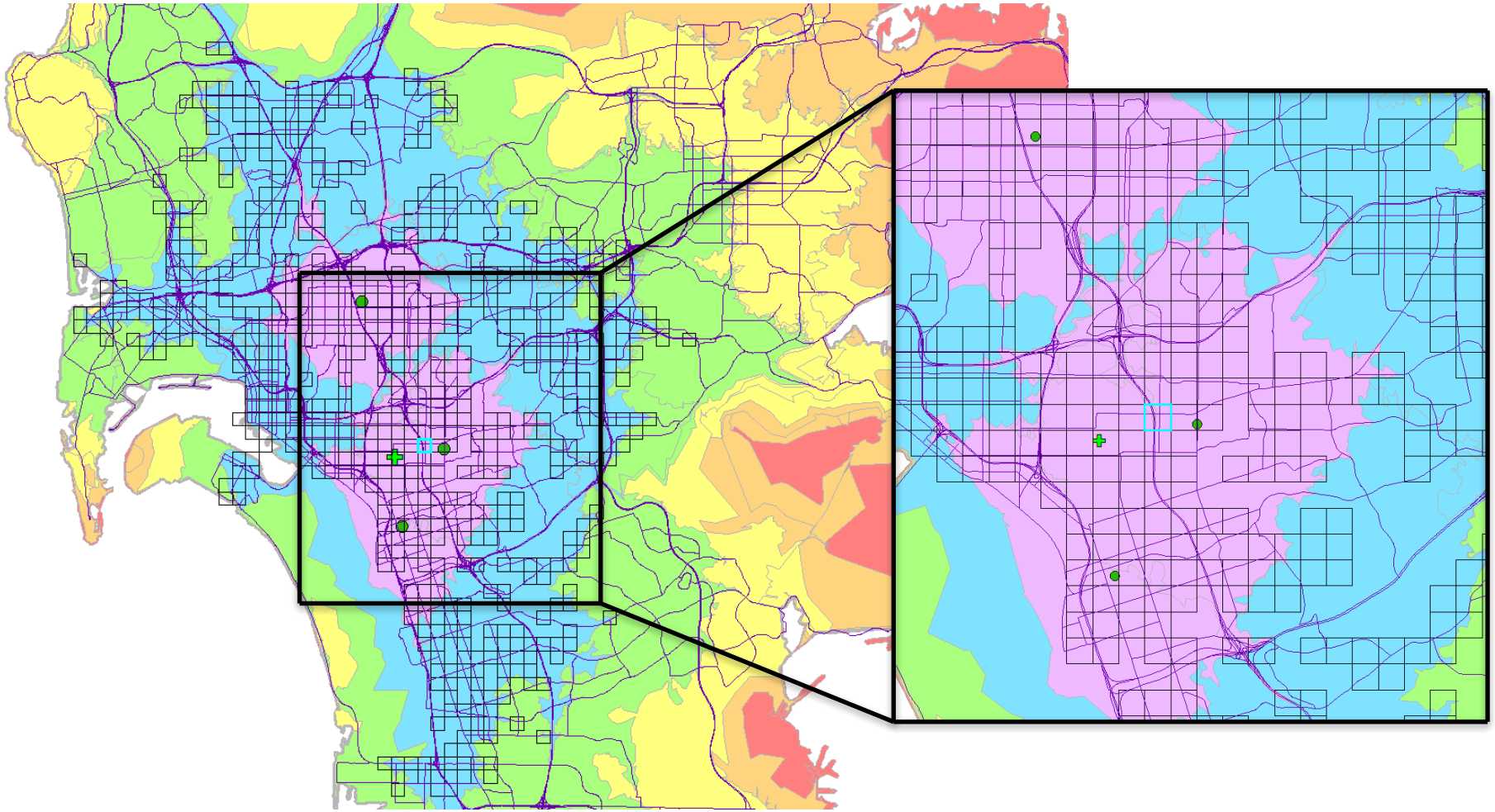
Geomapping: How We Used It

- Distances and driving times evaluated three potential clinic sites
- A fourth area was determined by selecting key features on the map to locate an ideal location


Drive Time Comparison for Potential Sites
Baker
Location 1
Location 2
Location 3
0%
20%
40%
60%
80%
100%
0-5 Minutes
5-10 Minutes
10-15 Minutes
15-20 Minutes
20-25 Minutes
25-30 Minutes


Public Transit Times (Baker to PB, in minutes)
Count
120
90
60
30
0
0
20
40
60
80
100
120
140
Transit time (minutes)


Center
DT Clinic
San Diego
Baker Clinic
Golden Hill
Logan Heights
Coronado
San Diego Bay
Lincoln Acres
1
2
3



Limitations and Considerations

- Are patient addresses correct?
- Where do patients actually come from?
  - Home? Work? Somewhere else?

- Certain factors are more important than geography
  - Space, safety, strength of partnership, etc…
- Opening a new clinic requires more than identifying a new site

Going forward

- We opened a new clinic site (for 1 year now) at location 1
  - We are considering opening another with more capacity, and more hours
- Consider increasing the hours/staff at existing sites
- We NEED patient input
  - Ask the patients where they want a new clinic
  - Ask student managers for their thoughts
- Develop criteria for allowing patients to switch clinics

Please feel free to contact me with any questions or comments that you might have

icoblent@ucsd.edu

Thank You!

Selected Resources

- ArcGIS (Esri)
- GRASS GIS
- Google Maps (“Your Places” function)

- O'Keefe, Christine M., and Donald B. Rubin. "Individual privacy versus public good: protecting confidentiality in health research." *Statistics in medicine* 34.23 (2015): 3081-3103.
  - http://onlinelibrary.wiley.com/doi/10.1002/sim.6543/full
- Paul A. Zandbergen, “Ensuring Confidentiality of Geocoded Health Data: Assessing Geographic Masking Strategies for Individual-Level Data,” Advances in Medicine, vol. 2014, Article ID 567049, 14 pages, 2014.
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- Richards TB, Croner CM, Rushton G, Brown CK, Fowler L. Information Technology: Geographic Information Systems and Public Health: Mapping the Future. *Public Health Reports*. 1999;114(4):359-373.
  - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1308497/
- Davidson, Peter J. et al. A GIS-based methodology for improving needle exchange service delivery. *International Journal of Drug Policy. 2011;22(2):140-144*
  - http://www.ijdp.org/article/S0955-3959(10)00140-4/fulltext

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