Identifying Dental Deserts in the Los Angeles County Safety Net using GIS Maps

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Oral Health Program
Background:

• Los Angeles County is the most populous and most diverse county in the US.

• How can issues related to access to dental care be addressed based on data and facts in such a complex system?
Q: How can someone plan for dental expansion in this vast and complex environment?
Facts About Los Angeles County:

- **LA County:**
  - Population: estimated to be more than 10 million
  - The most populous and most diverse county in the US
  - Size: 4,058 square miles
  - The county is larger than the combined areas of the states of Rhode Island and Delaware

- **Cities in Los Angeles County:**
  - There are 88 cities in LA County
  - LA City is the 2\textsuperscript{nd} most populous city in the United States (New York City is the most, but consists of 5 boroughs/counties)
Facts About Los Angeles County:

- Approximately 10% of county residents live outside of the 88 cities in unincorporated areas (137)

- The population of Los Angeles County is larger than 41 of the 50 states.

- More that 25% of California residents live in LAC

- Population density is very high: 2,420 people per square mile

- Los Angeles County has the highest number of millionaires and the largest number of homeless people of any county in the US
Q: How can someone plan for dental expansion in this vast and complex environment?
Answer: Using a Geographic Information System (GIS) Map with applicable Data sets.

The Power of Mapping:
GIS lets us visualize, question, analyze, and interpret data to understand relationships, patterns, and trends.
Objectives:

• Show how this complex system of dental care delivery can be analyzed by using GIS maps
• Define *Dental Deserts (DD)*
• Illustrated the steps used to identify the Dental Deserts
• Demonstrate how GIS helped with the identification of Dental Deserts
• Discuss next steps
Demographics:

Who utilizes LAC DHS Dental Clinics?

Who are our patients?
## Patient Demographics: GENDER

The table below shows the number of patients (FY 2012-13) by gender:

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>16,513</td>
<td>55.8</td>
</tr>
<tr>
<td>Male</td>
<td>13,060</td>
<td>44.2</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>29,575</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The pie chart on the right visualizes the gender distribution with Females constituting 56% and Males constituting 44%.
## Patient Demographics: AGE

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>122</td>
<td>0.4</td>
</tr>
<tr>
<td>5-14</td>
<td>753</td>
<td>2.6</td>
</tr>
<tr>
<td>15-17</td>
<td>609</td>
<td>2.1</td>
</tr>
<tr>
<td>18-24</td>
<td>2,310</td>
<td>7.8</td>
</tr>
<tr>
<td>25-34</td>
<td>4,589</td>
<td>15.5</td>
</tr>
<tr>
<td>35-44</td>
<td>5,189</td>
<td>17.6</td>
</tr>
<tr>
<td>45-54</td>
<td>7,094</td>
<td>24.0</td>
</tr>
<tr>
<td>55-64</td>
<td>6,919</td>
<td>23.4</td>
</tr>
<tr>
<td>65+</td>
<td>1,990</td>
<td>6.7</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>29,575</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

**Utilization by Age Group**

- 0-17: 7%
- 18-44: 41%
- 45-64: 47%
- 65+: 5%
### Patient Demographics: RACE/ETHNICITY

#### Number of Patients (FY 2012-13)

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic</td>
<td>18,956</td>
<td>64.1</td>
</tr>
<tr>
<td>Black</td>
<td>5,892</td>
<td>19.9</td>
</tr>
<tr>
<td>White</td>
<td>2,242</td>
<td>7.6</td>
</tr>
<tr>
<td>Asian/Pi</td>
<td>1,151</td>
<td>3.9</td>
</tr>
<tr>
<td>Native American</td>
<td>71</td>
<td>0.2</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>1,263</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>29,575</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

#### Utilization by Race/Ethnicity

- Hispanic: 64.1%
- Black: 19.9%
- White: 7.6%
- Asian/Pi: 3.9%
- Native American: 0.2%
- Other/Unknown: 4.3%

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(County of Los Angeles Public Health Logo)
Patient Demographics:
Patients by Service Planning Area (SPA)

Percentage of Total Patients (FY 2012-13)

- SPA 1: 13.4%
- SPA 2: 4.3%
- SPA 3: 18.8%
- SPA 4: 18.1%
- SPA 5: 15.9%
- SPA 6: 24.7%
- SPA 7: 1.8%
- SPA 8: 1.4%
- (blank): 1.6%
Types of Dental Clinics Included in Map:

1. My Health LA (MHLA) Clinics
2. Comprehensive Health Centers (CHC)
3. Graduate Medical/Dental Education Institutions
4. Federally Qualified Health Centers (FQHCS)
5. Community Clinics
6. Dental Schools
7. School Based Clinics
8. Clinics that treat only HIV patients
9. Clinics that treat only Children
Initial Data and First GIS Map

At first glance the map portrayal of Access to dental care was deceiving....
Looking for Need and Disparities....
Dental Services in Los Angeles County

- Community Clinics
- Comprehensive Health Centers
- Dental Schools
- DHS Medical/Dental Education
- FQHC
- School-Based
- Could Not Afford Dental Care
- Have Dental Insurance

Percent of Adults (18+ years old) Who Do Not Have Dental Insurance Coverage that Pays for Some or All of their Routine Dental Care
1 Dental Sites (All)

2 Community Clinics

3 Comprehensive Health Centers

4 Dental Schools

5 DHS Medical/Dental Education

6 FQHC

7 School-Based

8 Could Not Afford Dental Care

Percent of Adults (18+ years old) Unable to Obtain Dental Care (Including Check-Ups) (in the past year) Because They Could Not Afford it
Mapping “Dental Deserts”
Mapping Dental Deserts

Definition: Areas in LA County that meet all 3 criteria:

1. Areas with high population density; AND

2. Areas of low-income AND

3. Areas that have no or insufficient dental services.
Methods/Sources of Data:

- Maps were created with GIS showing where each facility is located in the LAC area.
- Data provided by the 211 LAC Hot Line,
- My Health LA Database,
- HRSA data on FQHC, and
- City population data was gleaned from the U.S. Census. (Source: 2015 ESRI, Arc GIS)
Mapping Dental Deserts

Definition: Areas in LA County that meet all 3 criteria:

1. Areas with high population density; AND

2. Areas of low-income AND

3. Areas that have no or insufficient dental services.
High Density Population:

- Clear definition of population density, but not of “high” density. Population density is the total number of people within a defined area.

- Since the 10 most densely populated cities in the US have an average population density of > 10,000 people per square mile, we used that number as the definition of “high” density.

Mapping Dental Deserts

**Definition:** Areas in LA County that meet all 3 criteria:

1. Areas with high population density; **AND**

2. Areas of low-income **AND**

3. Areas that have no or insufficient dental services.
Deciding Low-Income Population:

- If you make less than **138% of the Federal Poverty Level**, you qualify for Medi-Cal.

<table>
<thead>
<tr>
<th>Household Size</th>
<th>100%</th>
<th>133%</th>
<th>138%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$11,880</td>
<td>$15,800</td>
<td>$16,394</td>
</tr>
<tr>
<td>2</td>
<td>16,020</td>
<td>21,307</td>
<td>22,108</td>
</tr>
<tr>
<td>3</td>
<td>20,160</td>
<td>26,813</td>
<td>27,820</td>
</tr>
<tr>
<td>4</td>
<td>24,300</td>
<td>32,319</td>
<td>33,534</td>
</tr>
</tbody>
</table>
Mapping Dental Deserts

**Definition:** Areas in LA County that meet all 3 criteria:

1. Areas with high population density; **AND**
2. Areas of low-income **AND**
3. Areas that have no or insufficient dental services.
IS THE NUMBER OF CLINICS AND DENTISTS SUFFICIENT FOR THE DEMANDS OF THEIR CATCHMENT AREAS?
What’s the acceptable ratio of dentists to patients?

- Centers for Medicare and Medicaid Services recommended ratio of 1 provider for every 1,500 patients.
- California Office of Statewide Health Planning and Development defines a geographic area:
  - Overutilized if the ratio of 1 provider for more than 3,000 patients
  - with unusually high needs: ratio of 1 provider for more than 4,000 patients
• Each dental clinic has an average 2.5 providers

• We will use the Fed’s definition of an unusually high needs: ratio of 1 provider for more than 4,000 patients.

• So each clinic’s catchment area can serve 10,000 patients.
Findings:

We found areas which clearly fall within our definition of Dental Deserts based on high-density, low income, and inadequacy of dental services.
Compounding the current problem of Dental Deserts...
### Ratio per 1,000 residents– Trend in Los Angeles County

<table>
<thead>
<tr>
<th>Year</th>
<th>Ratio per 1,000 residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>0.873</td>
</tr>
<tr>
<td>2010</td>
<td>0.726</td>
</tr>
<tr>
<td>2011</td>
<td>0.743</td>
</tr>
<tr>
<td>2012</td>
<td>0.759</td>
</tr>
<tr>
<td>2013</td>
<td>0.777</td>
</tr>
<tr>
<td>2014</td>
<td>0.739</td>
</tr>
</tbody>
</table>

The number of dentists per capita have decreasing over time.

Additionally...

Data Source: [AHRF (HRSA/BHP)](http://www.healthindicators.gov/Indicators/Dentist-rate-per-100000-population_130/Profile/Data)
• Dentists Moving out of State: 4% in 2008 up to 14% in the current survey.

• Dentists Nearing Retirement: Many dentists in the state are nearing retirement.

• Specialization: More and more dentists are leaving general dentistry behind to become a specialist. In 2008, 6% of newly licensed dentists were specialists, up to 13% on 2012.
Next Steps:

• Contact the CA Department of Health Care Services (DHCS) to obtain information regarding fee-for-services providers that are actually billing for dental services.

• Engage medical FQHC that could be our potential partners for areas that are truly underserved.

• Expand the loan repayment program (HPSA) to the Dental Deserts to attract additional dentists.
Los Angeles County
Dental Clinics - Medical Potential Partners
Dental Deserts

- Dental Clinics
- Medical Potential Partner
- Dental Deserts

Source: EDRI 2015
Conclusion/Learned Lessons:

- GIS maps are ideal tools to illustrate the distribution of dental services and should be a standard tool when planning delivery of dental services and analyzing access to care.

- Must be careful to analyze every data set and scrutinize the results in a careful and unbiased manner.
Acknowledgements:

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Questions
Thank you!!

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