The impact of human development on rates of reported animal bites, Lake County, FL 2013-2017.

Florida Department of Health Lake County
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Objectives

• Background/Rational
• Goals/Objectives
• Study Design/Methodology
• Expected Outcomes
• Where are we now?
• References
• Questions
Background and Rational

• Animal bites are a public health concern
  – They are considered a notifiable disease condition in most states
  – They increase risk of transmission of zoonotic illnesses
  – Children ages 0-4 are disproportionately affected

• Animal bites continue to increase in the US
  – Dogs account for 80% of reported bites
  – Since 2001, risk of being bitten by a dog has increased 50%
  – Dog ownership has increased by 42% since 2001
Background and Rational

TOTAL BITES REPORTED BY YEAR
LAKE COUNTY, FLORIDA, 2014-2017

- Reported Bites
- Linear (Reported Bites)
Background and Rational

ANIMAL TYPE PERCENT BY YEAR
LAKE COUNTY, FLORIDA, 2014-2017

Dog  Cat  Other

2014: 69  27  4
2015: 70  27  3
2016: 68  29  3
2017: 76  21  3
Background and Rational

PERCENT OF GENDER BY YEAR
LAKE COUNTY, FLORIDA, 2014-2017

- **2014**: 58 Female, 41 Male, 1 Unknown
- **2015**: 52 Female, 18 Male, 30 Unknown
- **2016**: 59 Female, 41 Male, 0 Unknown
- **2017**: 57 Female, 42 Male, 2 Unknown

Legend: Female, Male, Unknown
### Background and Rational

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number of Bites</th>
<th>Total Population</th>
<th>Population Percent per Age Group</th>
<th>Proportion Bite Victims</th>
<th>Age-Specific Bite Rates per 1,000 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-4</td>
<td>124</td>
<td>48486</td>
<td>4.8</td>
<td>0.00256</td>
<td>2.56</td>
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<tr>
<td>5-17</td>
<td>386</td>
<td>159596</td>
<td>15.8</td>
<td>0.00242</td>
<td>2.42</td>
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<tr>
<td>18-24</td>
<td>186</td>
<td>99870</td>
<td>9.9</td>
<td>0.00186</td>
<td>1.86</td>
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<tr>
<td>25-49</td>
<td>643</td>
<td>261362</td>
<td>26.0</td>
<td>0.00246</td>
<td>2.46</td>
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<tr>
<td>50-64</td>
<td>419</td>
<td>189540</td>
<td>18.8</td>
<td>0.00221</td>
<td>2.21</td>
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<tr>
<td>65+</td>
<td>392</td>
<td>248315</td>
<td>24.7</td>
<td>0.00158</td>
<td>1.58</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2150</strong></td>
<td><strong>1007169</strong></td>
<td><strong>100.0</strong></td>
<td><strong>0.00213</strong></td>
<td><strong>2.13</strong></td>
</tr>
</tbody>
</table>

**TABLE 1.** Age-Specific Bite Rates for All Bite Reports: Lake County, FL (2014-2016)
Background and Rational

• Domestic animals play an important role in maintaining the wildlife-livestock-human interface.
  – As human encroachment increases into previously undeveloped areas, these interactions also increase
Source: Adapted by Hassell et al, 2017, Figure 1. Conceptual Framework for Disease Emergence in Urban Landscapes.
Background and Rational

• The effects of the wildlife-livestock-human interactions have been well documented in developing countries.
  – Negative impacts on agricultural practices
  – Negative impact on wildlife diversity
  – Maintenance of zoonotic disease cycle in competent hosts

• Less known are these effects in developed areas
Background and Rational

• Lake County, FL poses a unique community for study
  – Rapid urban development
  – Large Agriculture communities
  – Rural/forest communities
## Background and Rational

### PERCENT OF VACCINATED ANIMALS, LAKE COUNTY, FLORIDA, 2014-2017

<table>
<thead>
<tr>
<th>Year</th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>48</td>
<td>20</td>
<td>32</td>
</tr>
<tr>
<td>2015</td>
<td>52</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>2016</td>
<td>53</td>
<td>18</td>
<td>29</td>
</tr>
<tr>
<td>2017</td>
<td>50</td>
<td>18</td>
<td>32</td>
</tr>
</tbody>
</table>

- **Yes**: Percentage of vaccinated animals
- **No**: Percentage of unvaccinated animals
- **Unknown**: Percentage of animals for which vaccination status is unknown
Background and Rational

PERCENT OF ATTACK TYPE BY YEAR
Lake County, Florida, 2014-2017

- SICK/HURT: 53, 53, 53
- PROVOKED: 24, 35, 35, 32
- UNPROVOKED: 41
- PLAYFUL: 30, 8, 11, 7
- OTHER: 13, 16, 7
- UNKNOWN: 11, 7

Yearly Breakdown:
- 2014: Blue
- 2015: Turquoise
- 2016: Green
- 2017: Teal
Background and Rational

• Do the effects documented in rapidly developing countries also apply to smaller unique communities in developed countries?

• Do the effects of rapid urban development increase the rate of animal bites/rabies exposures?
Goals and Objectives

• Primary Goal: Identify if a causal relationship exists between urban development and reported animal bites

• Secondary Goals:
  – Identify populations at increased risk for bites or injury
  – Develop predictive models
  – Improve knowledge and understanding
  – Development of policies and programs
  – Influence funding for education and prevention
Study Design and Methodology

• Retrospective case review of patient self-reported data

• Inclusion Criteria
  – Lake County Resident
  – Zip code data must be available
  – Rabies possible exposure

• Population estimates will be from US. Census Bureau Annual Estimates of Resident Populations from April 1, 2010 to July 1, 2017
Study Design and Methodology

- Urbanization rates will be defined as the percentage of population increase from the previous year.
- To control for differences in population rates per 10,000 will be used.
- ArcGIS to develop Choropleth maps.
- Chi square testing will be done to determine if data is normally distributed.
- Descriptive statistics.
Expected Outcomes

• Alternative Hypothesis
  – There is a significant increase in the number of reported bites in zip codes with higher percentage of estimated population growth as compared to zip codes with lower percentages of estimated population growth

• Null Hypothesis
  – There is no difference in the rate of reported bite for zip codes with higher or lower estimated percentage population growth

• Expected Outcome
  – We will accept the alternative hypothesis
Where are we now?

• Currently in the process of going through IRB approval

• Data analysis will begin May 1\textsuperscript{st}

• Analysis should conclude July 1\textsuperscript{st}

• Write up should be complete by December 1\textsuperscript{st}
Questions?
References


