



Analysis of the Annual Influenza Vaccination Event Hosted by the Riley County Health Department

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Outline

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- II. Learning Objectives
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October 2017-April 2018

Field Experience Site:

- Riley County Health Department

Preceptor:

- Andrew Adams, MPH

Major Professor:

- Paige Adams, DVM, PhD

Graduate Committee:

- Robert Larson, DVM, PhD
- Ellyn Mulcahy, PhD, MPH



Riley County Health Department

“Healthy People in a Healthy Community”

- Location: 2030 Tecumseh Rd, Manhattan, KS 66502
- Services: Child Care Licensing, Immunizations, Maternal and Child Health, Reproductive Health Services, and Women Infants and Childhood (WIC) Nutrition





Okt-FLU-ber Fest

- Since 2012, RCHD has hosted “Okt-FLU-ber Fest”: an annual event in October where the public can receive an influenza vaccination
- 435 vaccinations were administered at Okt-FLU-ber Fest 2017
- Purpose: to provide a large quantity of flu vaccines to the community.
 - Comparatively, the most vaccinations administered at one of the health department’s standard mobile flu clinics in the 2017-2018 season was 129.
- Important target population: school-aged children (5-18 years old)



Learning Objectives

- I. Determine the economic impact of influenza and the benefit of flu vaccination programs.
- II. Gain an understanding of the responsibilities and operations of a county health department.
- III. Learn how a health organization analyzes its impact on the health of a community and determines how to improve in the future to increase overall health and public outreach.

Activities Performed

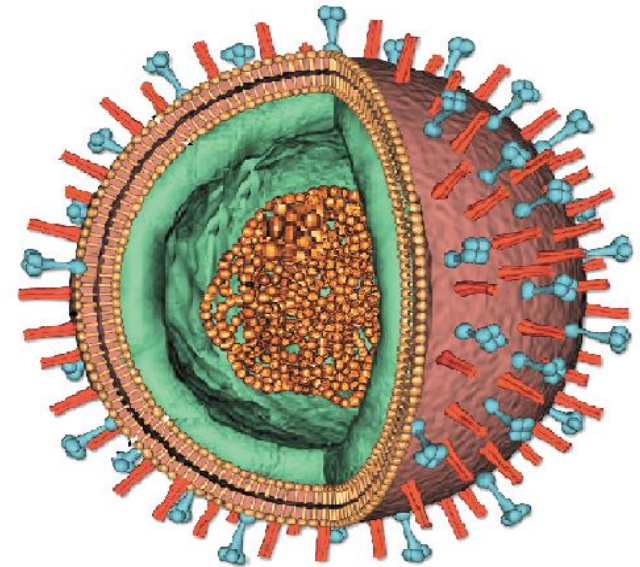
- I. Construct an analysis of Okt-FLU-ber Fest
- II. Experience and learn about the different programs of RCHD.
 - Attended “Epidemiology Team” meetings, all-staff meetings, emergency preparedness meetings, and accreditation meetings.
 - One-on-one meetings with personnel from different programs to learn about the purpose of the department and the responsibilities of their respective position.
 - Learned about different public health programs and databases, such as EpiTrax and GIS mapping.

Analysis Objectives

- The cost-benefit analysis was used to evaluate the potential economic benefit of Okt-FLU-ber Fest on an individual, county, and societal level.
- GIS mapping was used to analyze the overall outreach of RCHD and to be able to provide a visual representation of the coverage of flu vaccinations at the event.
- GIS mapping was used to analyze the median household income, poverty level, and vehicle access, to ensure areas of greater health inequities were provided vaccine coverage.
- Determine ages of the individuals vaccinated.

Influenza

- *Orthomyxoviridae* family
- Enveloped, -ssRNA virus [14]
- Types A, B, C
- Type A is the most common of the three virus types and typically causes the most severe symptoms and pandemics [12]
- Endemic or seasonal influenza is caused by types A and B [8]
- “Flu Season”: November-March

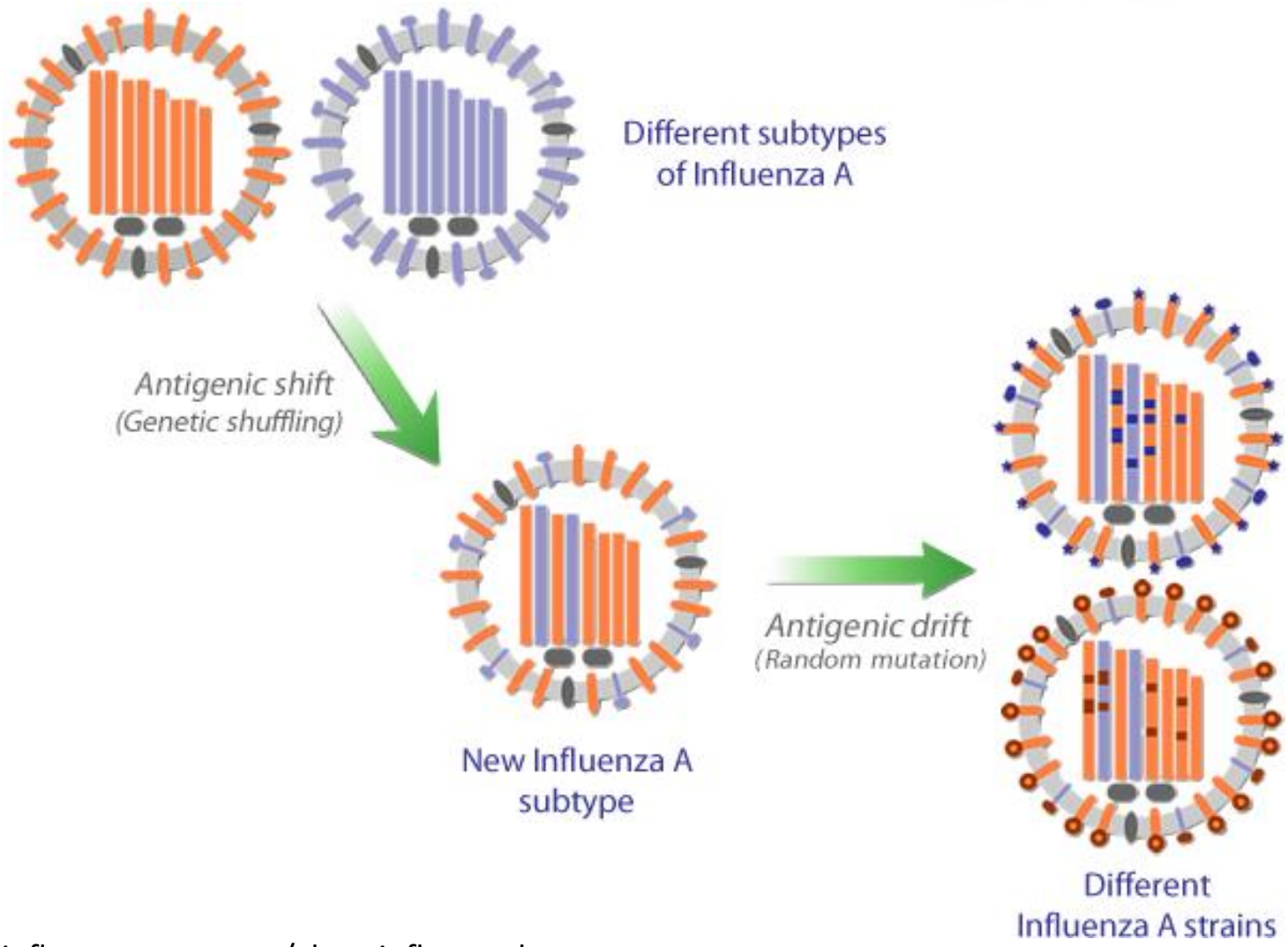


Influenza

- Influenza is easily spread through aerosol, droplet and fomite transmission [8]
- During an average endemic influenza season in the United States, approximately 200,000 hospitalizations and 36,000 deaths occur [12]
- Influenza is responsible for approximately 44 million days of work lost each year in the United States [2]
 - This immense loss of productivity can have negative effects on the economy.

Influenza

- Influenza affects individuals of all ages; prevalence is highest in school-aged individuals. Disease severity tends to be greatest in infants, the elderly, and the immunocompromised [9]
- The most effective protection against influenza A and B is the inactivated flu vaccine [14]
- The purpose of the influenza vaccine is not to fully prevent influenza epidemics, but to prevent the serious consequences, such as severe disease, hospitalization, and death [9]
- The vaccine provides protection against serious outcomes among the elderly and children [9]
- A new vaccine must be produced each year because the virus undergoes antigenic drift [14]



<http://www.influenzacentre.org/aboutinfluenza.htm>

Influenza

2017-2018 vaccine strains ^[5]

- A/Michigan/45/2015 (H1N1)pdm09-like virus
- A/Hong Kong/4801/2014 (H3N2)-like virus
- B/Brisbane/60/2008-like (B/Victoria lineage) virus
- B/Phuket/3073/2013-like (B/Yamagata lineage) virus

Trivalent

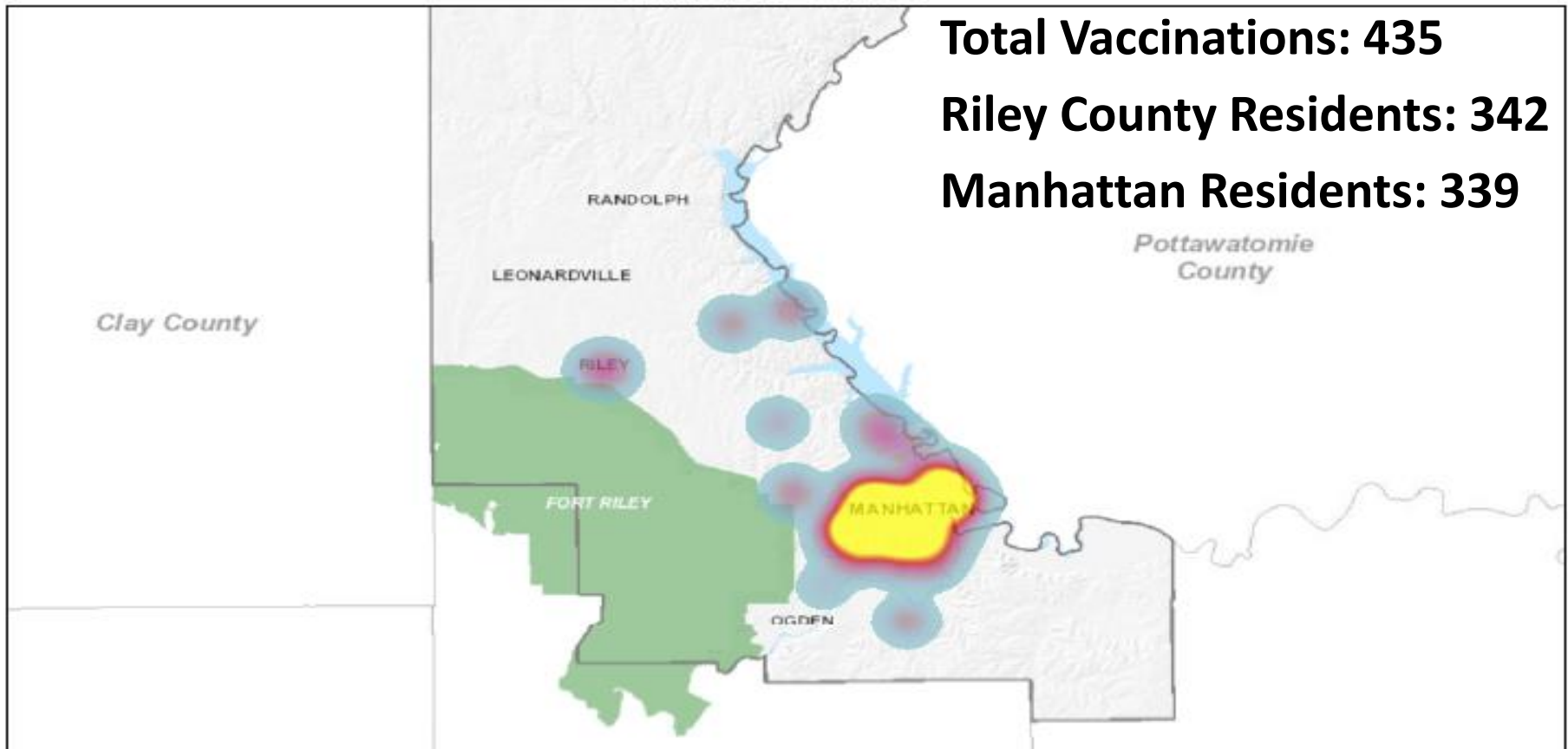
Quadrivalent

Okt-FLU-ber Fest 2017 Analysis

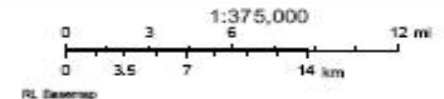
Location of Attendees: Event Outreach

OktFluber Fest 2017

Total Vaccinations: 435
Riley County Residents: 342
Manhattan Residents: 339

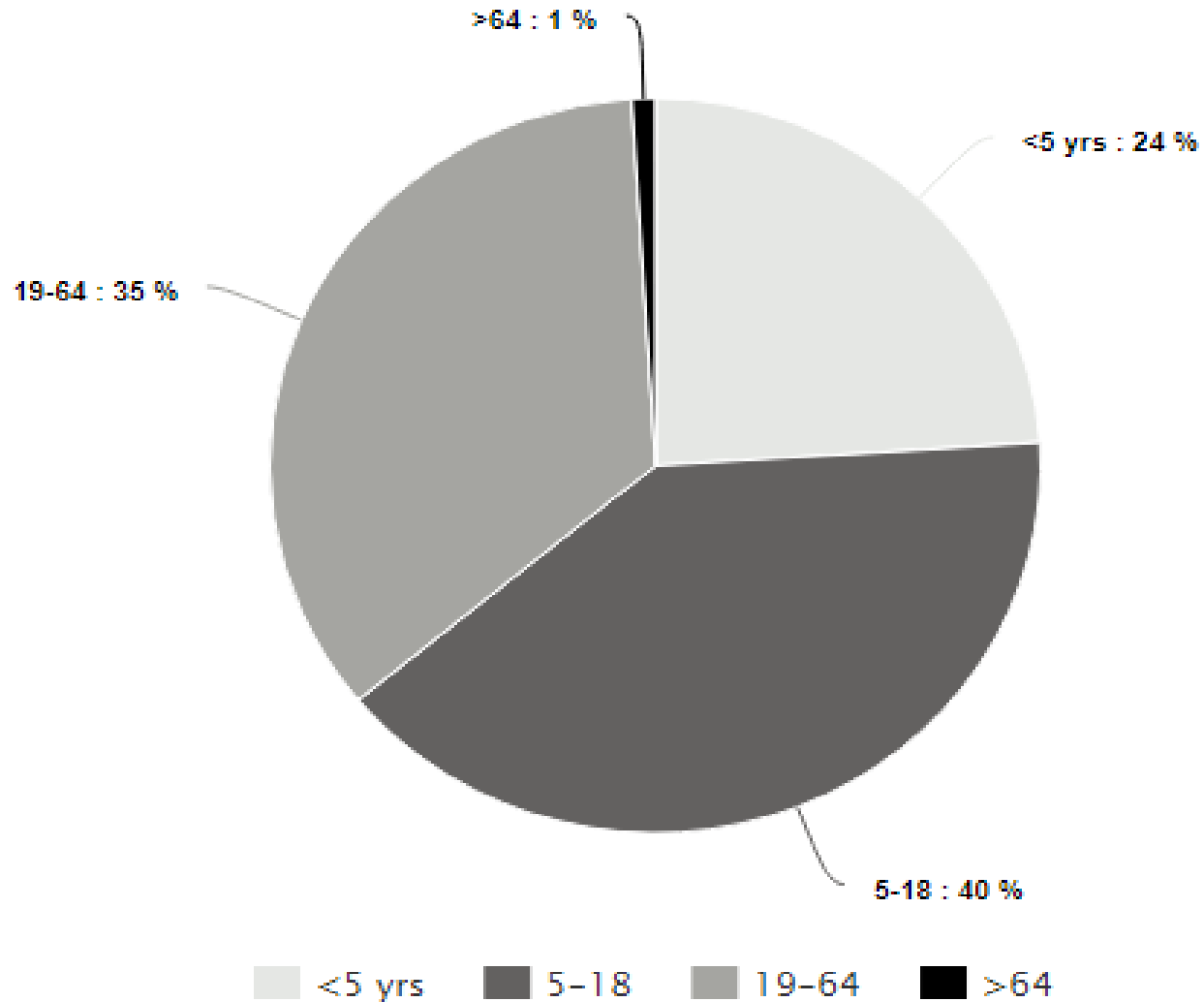


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RL BaseMap | BaseMap | April 16 |


Ages of Attendees



Cost to be Vaccinated

Vaccine Type	# Administered	Price per Dose	Total Cost
Private PF 6-35 m	30	\$38	\$1,140
Private PF >36 m	274	\$38	\$10,412
Public PF 6-35 m	22	\$18	\$369
Public PF >36 m	86	\$18	\$1,548
317 PF >36 m	18	\$0	\$0
High Dose	5	\$63	\$315
Total	435		\$13,784 

Cost to Provide Vaccines

Vaccine Type	# Administered	Price per Dose	Total Cost
Private PF 6-35 m	30	\$16.53	\$495.90
Private PF >36 m	274	\$16.53	\$4,529.22
Public PF 6-35 m	22	\$0	\$0
Public PF >36 m	86	\$0	\$0
317 PF >36 m	18	\$0	\$0
High Dose	5	\$42.44	\$212.00
Total	435		\$5,237.12 

Additional Costs to RCHD

Supplies	Cost
Pumpkins	\$437
Popcorn	\$34
Advertisement	\$50
Snacks	\$30
Face Painting	\$40
Band-Aids	\$28.90
Alcohol Wipes	\$19.47
Nitrile Gloves	\$87.55
Syringe + Needle	\$44.15
Total	\$771.07

Cost of Labor	
Staff	35
Hours	5
Hourly Wage	\$25.31
Cost of Labor	\$4,429.25



Revenue

Total Cost to Consumer	Total Cost to RCHD	Revenue
\$13,784	\$10,438.44	\$3,345.56



Direct Costs of Influenza

Medical Service	Avg. Cost (w/ insurance)	Avg. Cost (no insurance)
Medical Care (Outpatient)	\$29 ^[10]	\$96 ^[10]
Influenza Virus Test	\$12 ^[10]	\$41 ^[10]
Tamiflu® Prescription	\$32.36	\$107.89
Total Outpatient Cost	\$73.36	\$244.89



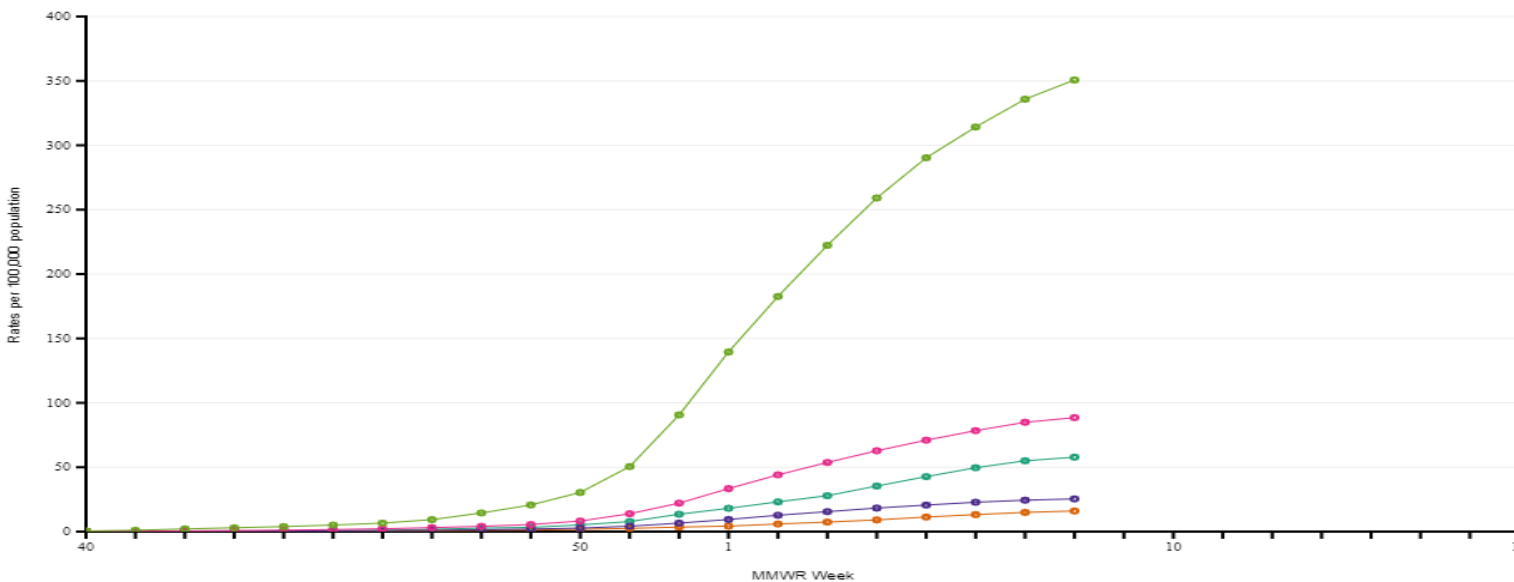
Laboratory-Confirmed Influenza Hospitalizations

Preliminary cumulative rates as of Feb 24, 2018

FluSurv-NET :: Entire Network :: 2017-18 Season :: Cumulative Rate

Age Selection

- All Age Groups
- 0-4 yr
- 5-17 yr
- 18-49 yr
- 50-64 yr
- 65+ yr



The Influenza Hospitalization Surveillance Network (FluSurv-NET) conducts population-based surveillance for laboratory-confirmed influenza-associated hospitalizations in children (persons younger than 18 years) and adults. The current network covers over 70 counties in the 10 Emerging Infections Program (EIP) states (CA, CO, CT, GA, MD, MN, NM, NY, OR, and TN) and three additional states (MI, OH, and UT). The network represents approximately 9% of US population (~27 million people). Cases are identified by reviewing hospital, laboratory, and admission databases and infection control logs for patients hospitalized during the influenza season with a documented positive influenza test (i.e., viral culture, direct/indirect fluorescent antibody assay (DFA/IFA), rapid influenza diagnostic test (RIDT), or molecular assays including reverse transcription-polymerase chain reaction (RT-PCR)). Data gathered are used to estimate age-specific hospitalization rates on a weekly basis, and describe characteristics of persons hospitalized with associated influenza illness. Laboratory-confirmation is dependent on clinician-ordered influenza testing. Therefore, the unadjusted rates provided are likely to be underestimated as influenza-associated hospitalizations can be missed if influenza is not suspected and tested for. FluSurv-NET hospitalization data are preliminary and subject to change as more data become available. All incidence rates are unadjusted. Please use the following citation when referencing these data: "FluView: Influenza Hospitalization Surveillance Network, Centers for Disease Control and Prevention. WEBSITE. Accessed on DATE".

Indirect Cost of Influenza

Avg. Hourly Salary in Riley County	Avg. Hours of Work Missed per Person	Avg. Lost Income
\$11.50	32	\$368



Avg. Cost to Attend Okt-FLU-ber Fest

Avg. Cost of Vaccination at Event	Avg. Hours of Work Missed to Attend Event	Avg. Hourly Salary	Avg. Cost of Attendance + Vaccination
\$31.68	1	\$11.50	\$43.18



Averted Costs

- Cost of Outpatient Care + Lost Income

\$441.36

- Cost of Attendance + Vaccination

\$43.18

- Adjusted Averted Costs (per person)

\$398.18

Averted Costs

- Cost of Outpatient Care + Lost Income

\$612.89

\$43.18

- Cost of Attendance + Vaccination

- Adjusted Averted Costs (per person)

\$569.71

Averted Societal Costs

- 5%-20% of population affected by flu
- 36% vaccine efficacy

$$435 \times 0.05 = 21$$

$$435 \times 0.2 = 87$$

$$21 \times 0.36 = 7$$

$$87 \times 0.36 = 31$$

$$7 \times \$398.18 = \$2,787.26$$

$$31 \times \$569.71 = \$17,661.01$$

Averted Costs to Riley County

Averted Costs per Person	Vaccines Administered to Riley County Residents	Cost to RCHD to Host Event	Adjusted Averted Costs to Riley County
\$398.18 - \$569.71	342	\$10,438.44	\$2,263.30- \$13,276.97

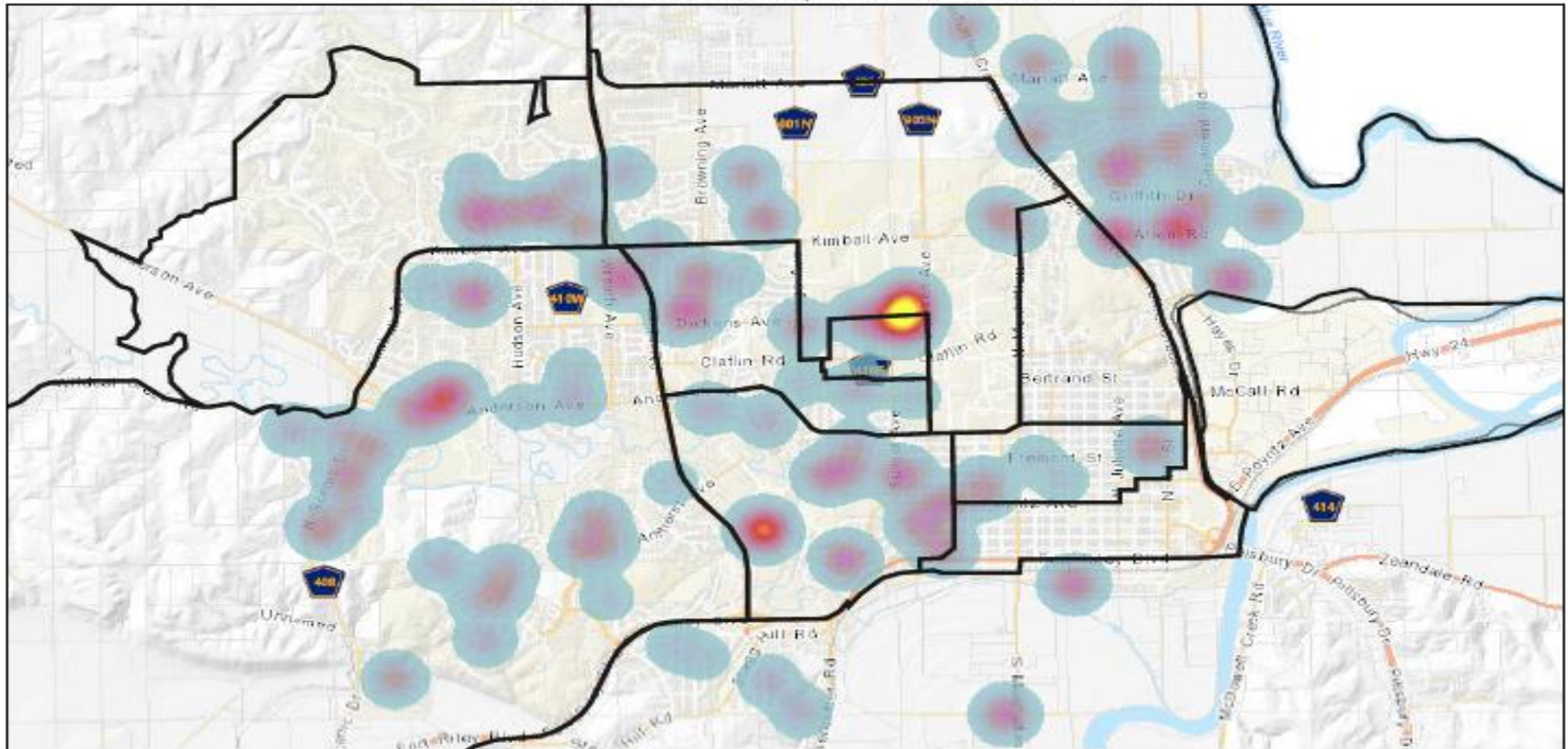


Okt-FLU-ber Fest 2016


	2016
Length	3 hours
# Vaccinations Administered	357
RCHD Revenue	\$2,644.02
~\$1,390 more in potential averted societal costs in 2017 than 2016	

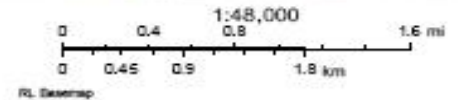
Manhattan Residents

OktFLUber Fest Shot Recipients, Manhattan 2017



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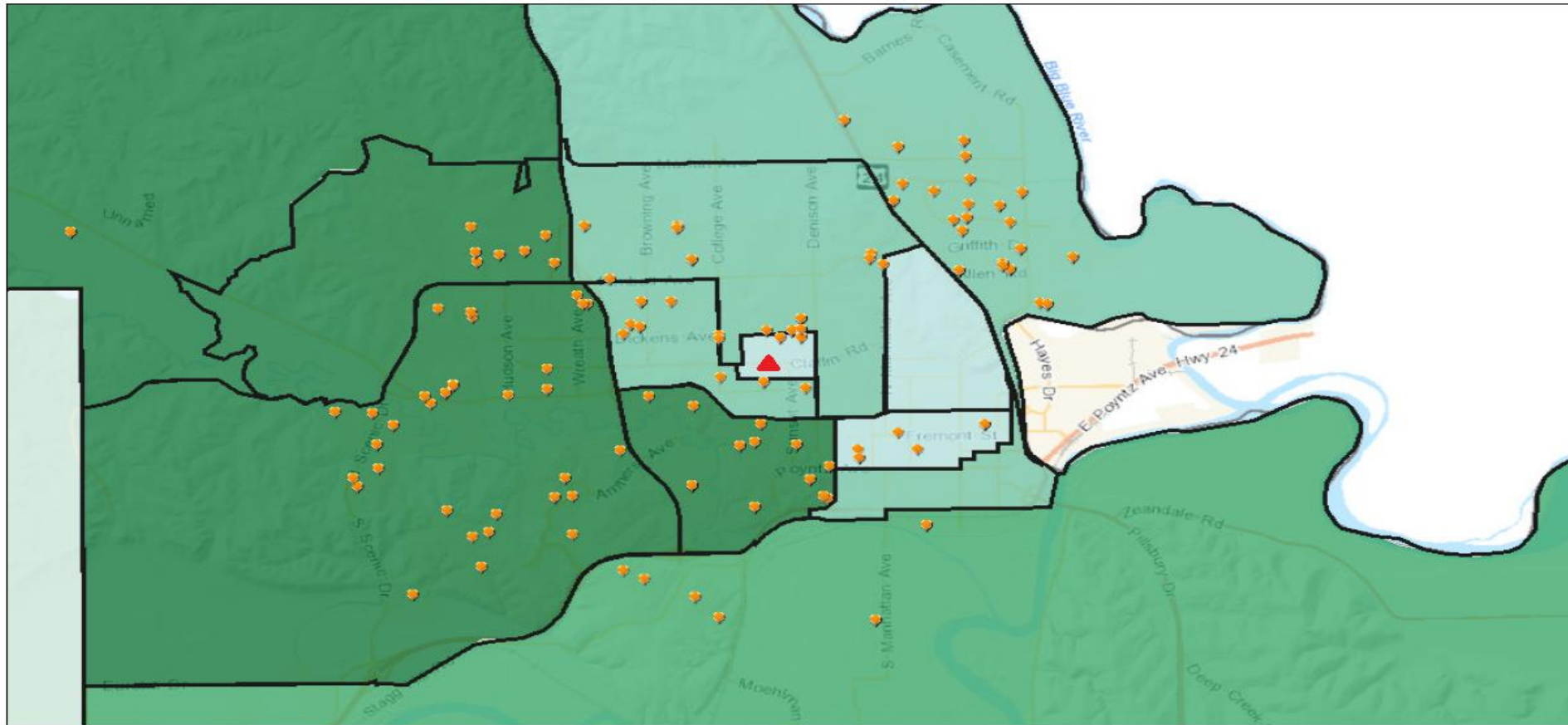
 Census Tracts 2010



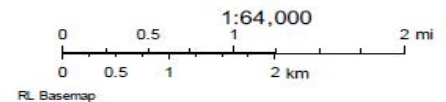
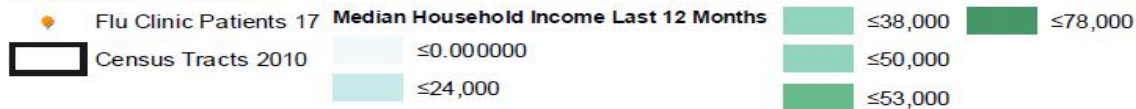
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Median Household Income

OktFLUber Fest and Median Household Income



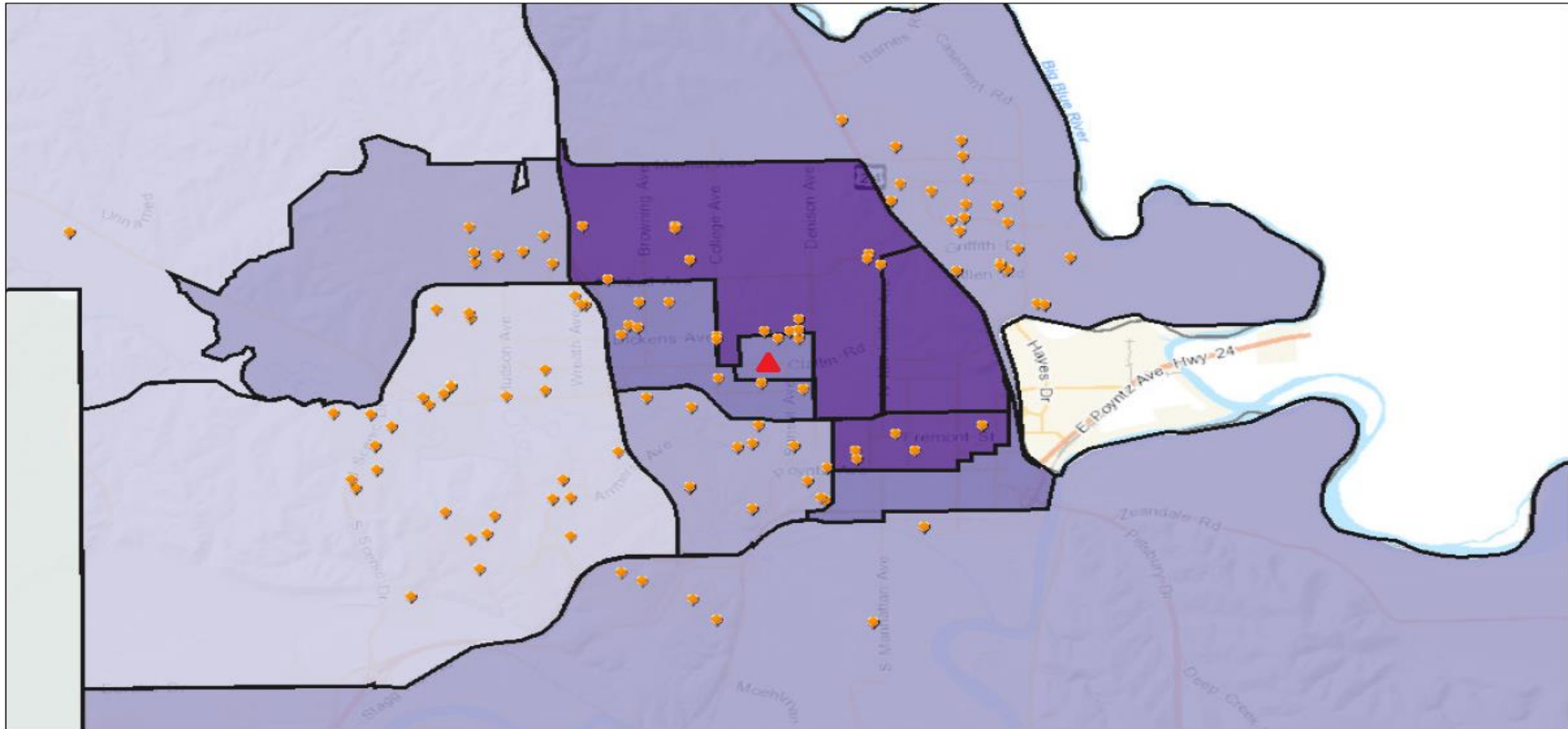
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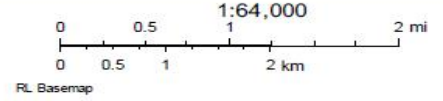
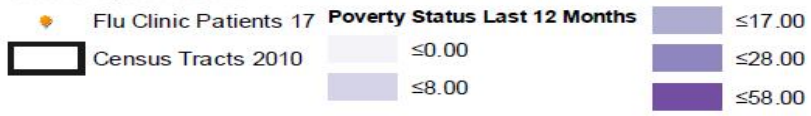
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Poverty Level

OktFLUber Fest and Poverty Level



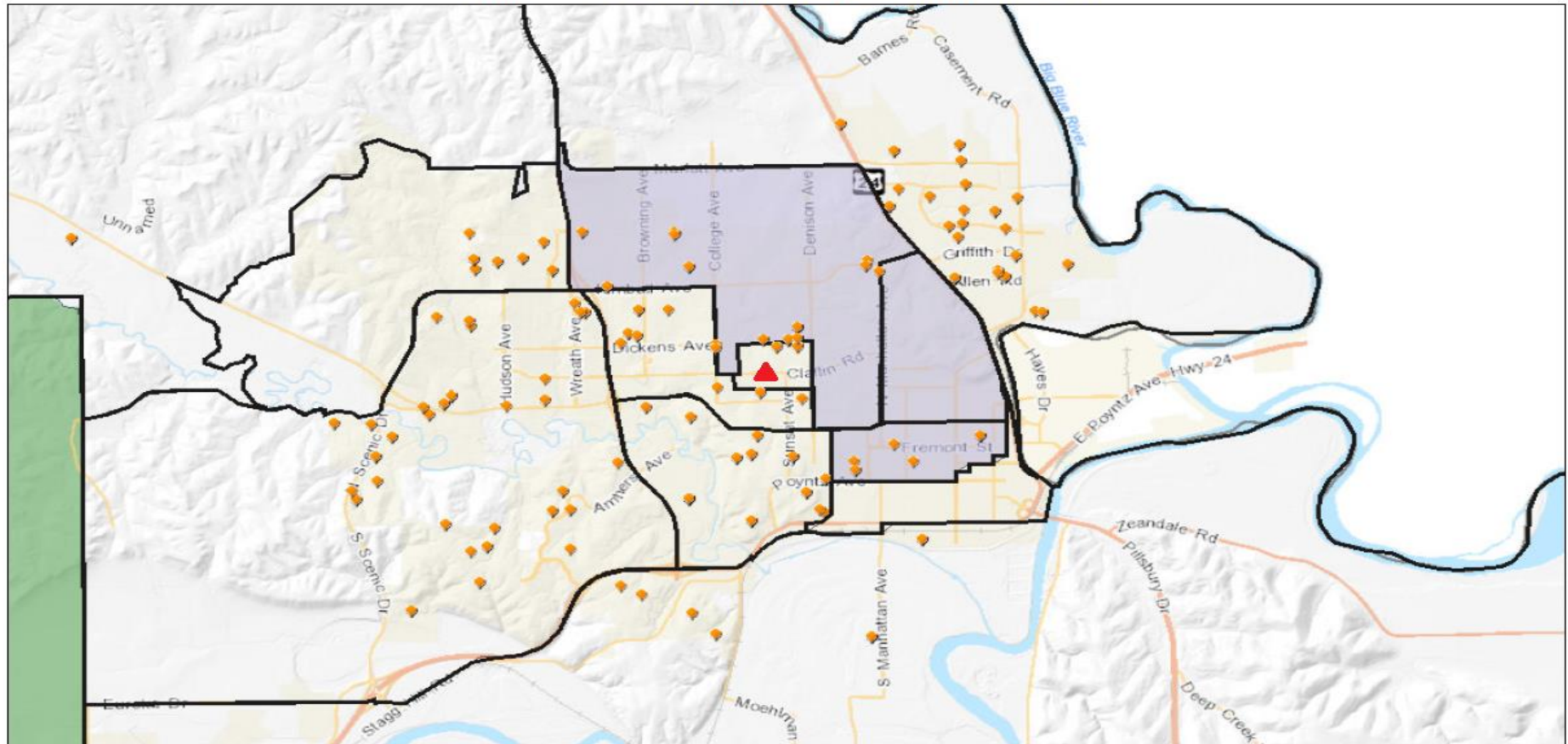
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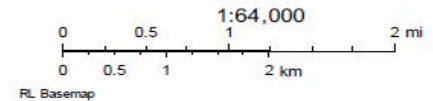
Vehicle Access

OktFLUber Fest and Low Vehicle Access



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- Flu Clinic Patients 17
- Tract Low Vehicle Access
- Census Tracts 2010
- Medium or High Vehicle Acces
- Low Vehicle Acces



Web AppBuilder for ArcGIS
RL Basemap | Basemap | Aerial 16 |

Conclusion

- Okt-FLU ber Fest is economically beneficial
- Successful overall in outreach to the community and reaching target population
- For future events:
 - Increase education efforts
 - Increase advertising
 - Strategic placement mobile clinics

Limitations

- Official vaccine efficacy (VE) could change
 - 2017-2018 flu season was not over when 36% VE was reported
- Influenza is not a reportable disease

MPH Core Competencies

Competency	Description
3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate.	Graphic Information Systems (GIS) was used to interpret quantitative and qualitative data regarding Okt-FLU-ber Fest attendance.
4. Interpret results of data analysis for public health research, policy or practice.	Data from Okt-FLU-ber Fest was collected and the results were analyzed in order for the Riley County Health Department to improve the event in the future to benefit the community.
7. Assess population needs, assets and capacities that affect communities' health.	Potential health inequities in the community were assessed such as low income, poverty status, and low vehicle access. The relationship between these factors and attendance at Okt-FLU-ber Fest was evaluated.
11. Select methods to evaluate public health programs.	Okt-FLU-ber Fest, a public health program, was evaluated based on a cost-benefit analysis and outreach success in the community.
21. Perform effectively on interprofessional teams.	Internship/field experience required working with Riley County Health Department employees.

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