

Utilizing Adult Data in Michigan's Immunization Registry to Monitor a Hepatitis A Outbreak

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Presentation Overview

- Outbreak background
- Michigan Care Improvement Registry (MCIR) background
- How adult vaccination data from the MCIR are being used to inform public health outreach efforts
 - Dose counts
 - Coverage estimates
 - Mapping
 - Ad hoc requests
 - Successes and challenges

Outbreak Background

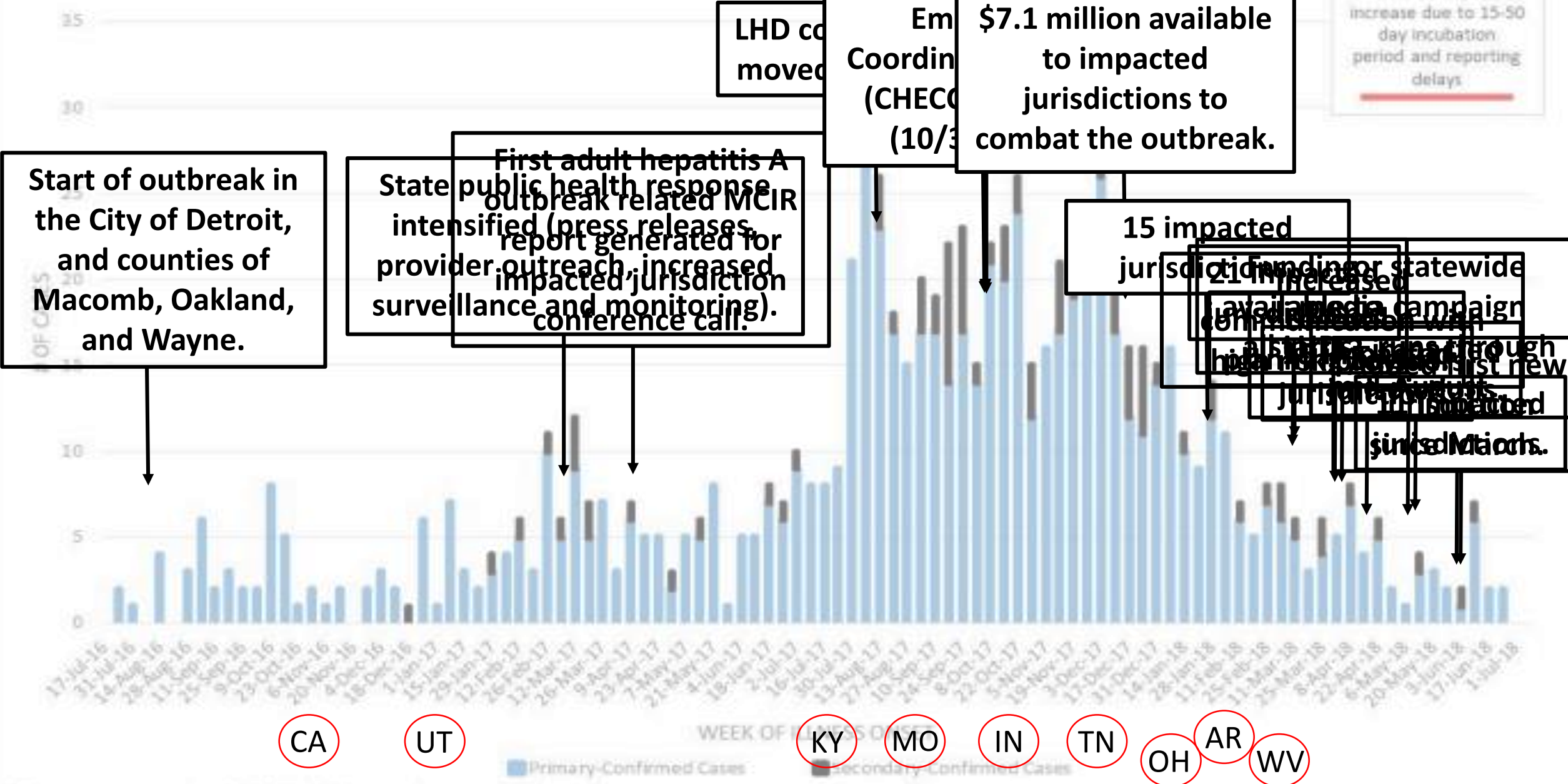
What is hepatitis A?

- Hepatitis A is a highly contagious liver disease spread fecal-oral.
- Hepatitis A can be spread through contaminated food or water, during sex, or prolonged close contact with an infected person.
- Illness can appear 15-50 days after exposure and you can be sick for several weeks.
- Symptoms may include nausea and vomiting, stomach pain, fatigue, fever, loss of appetite, yellowing of the skin and eyes, dark urine, pale-colored feces, and joint pain.

Epidemiology Summary – August 1, 2016 – July 3, 2018

Number of Confirmed Cases	856
Primary	770
Secondary	86
Hospitalized, n (%)	692 (80.8)
Deaths, n (%)	27 (3.2)
Median age, years (range)	40 (<1–90)
Female, n (%)	298 (34.8)
<i>Data below excludes secondary cases</i>	
Documented substance use, n (%)	394 (51.2)
Coinfection with hepatitis C, n (%)	204 (26.5)
Coinfection with hepatitis B, n (%)	22 (2.9)
MSM, n (%) – <i>data includes men only</i>	76 (14.6)
Homeless/transient living, n (%)	105 (13.6)
Recently incarcerated, n (%)	63 (8.2)
Healthcare worker, n (%)	23 (3.0)
Food worker, n (%)	36 (4.7)
Lost to follow-up, n (%)	152 (19.7)
Non-substance use, non-homeless, n (%)	305 (39.6)

Confirmed Hepatitis A Case Onset by Week for the Michigan Outbreak for cases referred Aug 1, 2017

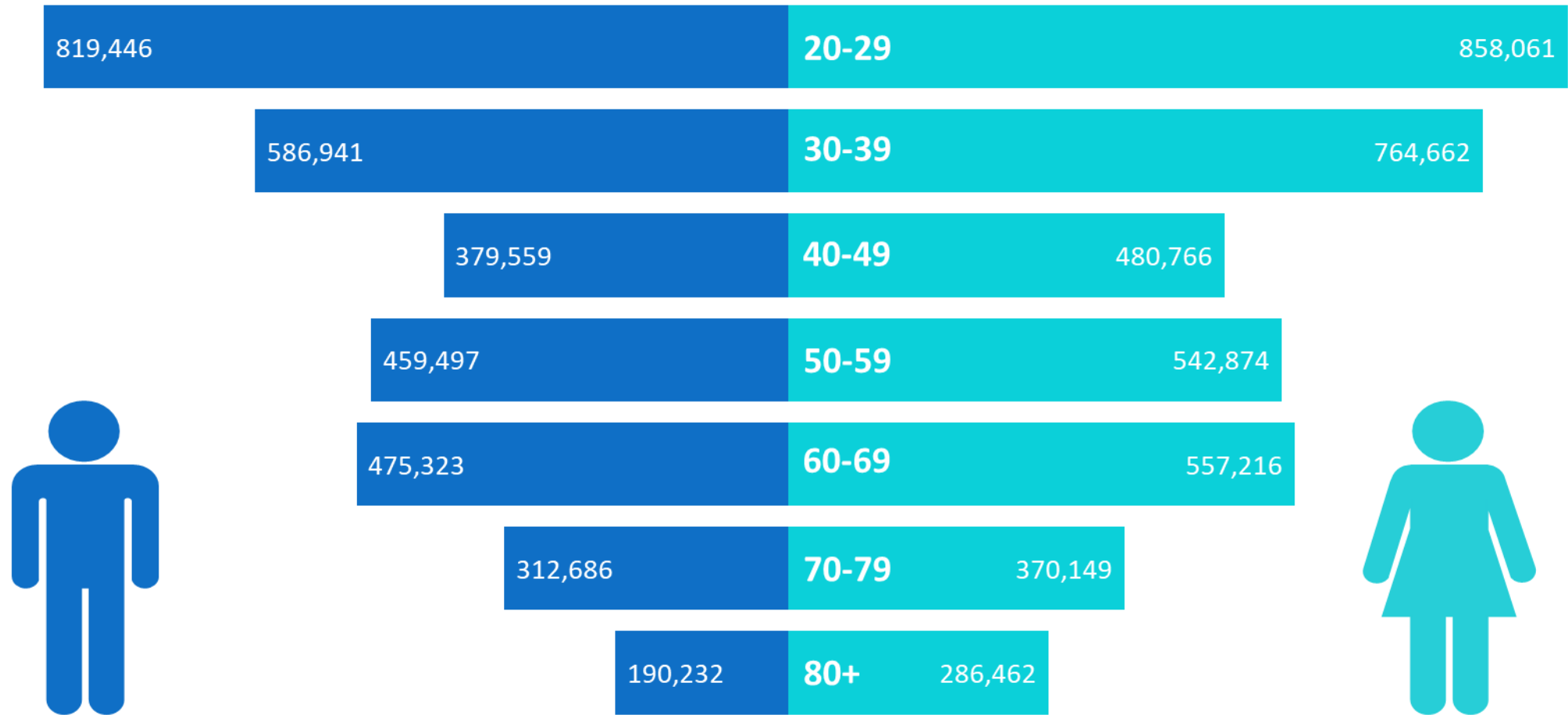


Michigan Care Improvement Registry (MCIR) Background

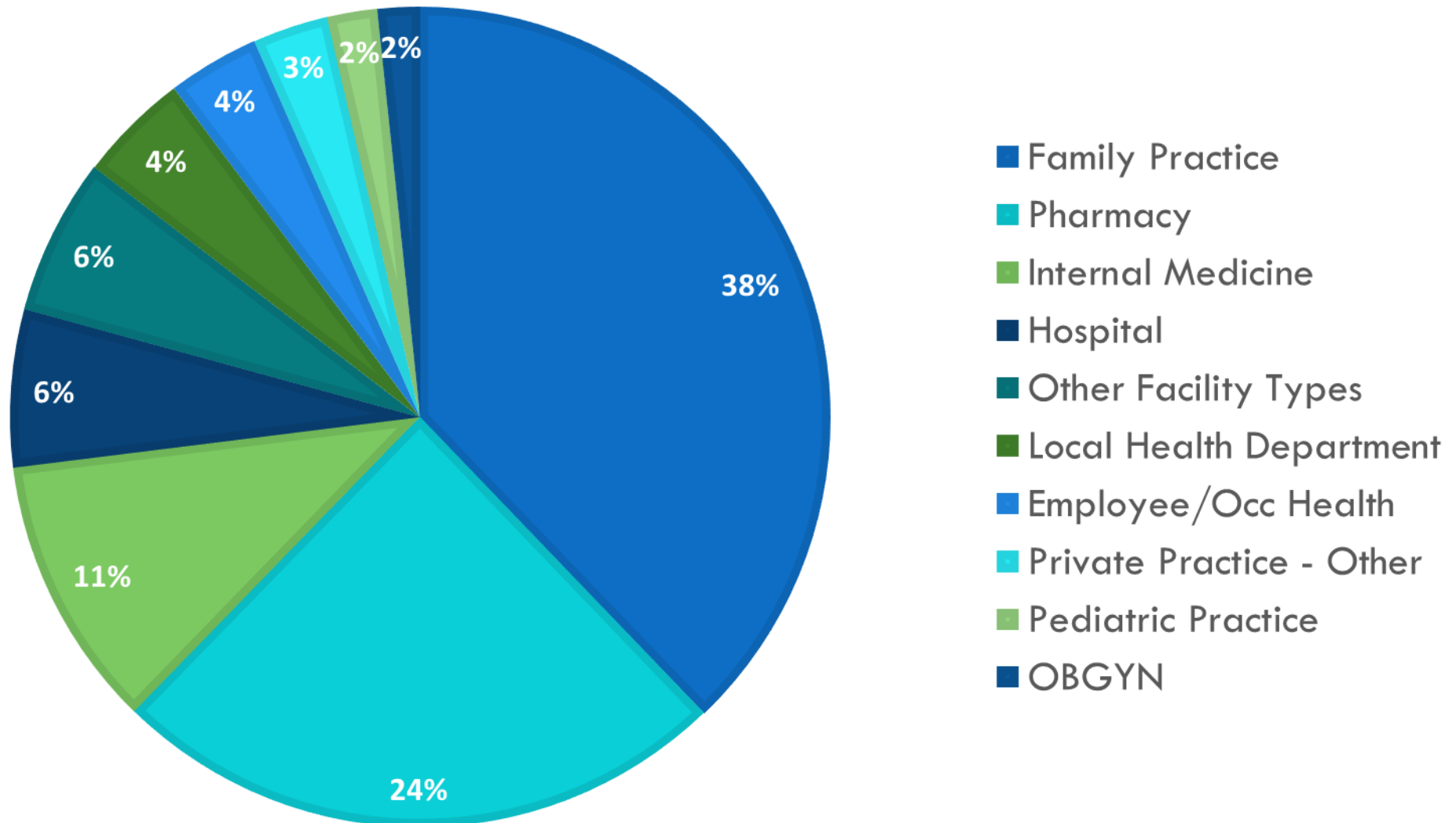
MCIR Background

- Started in 1998, lifespan registry since 2006.
- Vaccination record submission for adults 20 years and older is strongly encouraged but is not required.
 - Adult vaccination data reporting has been increasing in quality and quantity, most notably since the H1N1 pandemic of 2009 and the implementation of HL7 messaging in 2012.
 - As of June 30, 2018, there are **2,419,091 child** (<18) and **7,361,149 Michigan adult** (>=18) residents in the MCIR.

Distribution of Michigan adults with a record in the MCIR by age and gender as of July 7, 2018



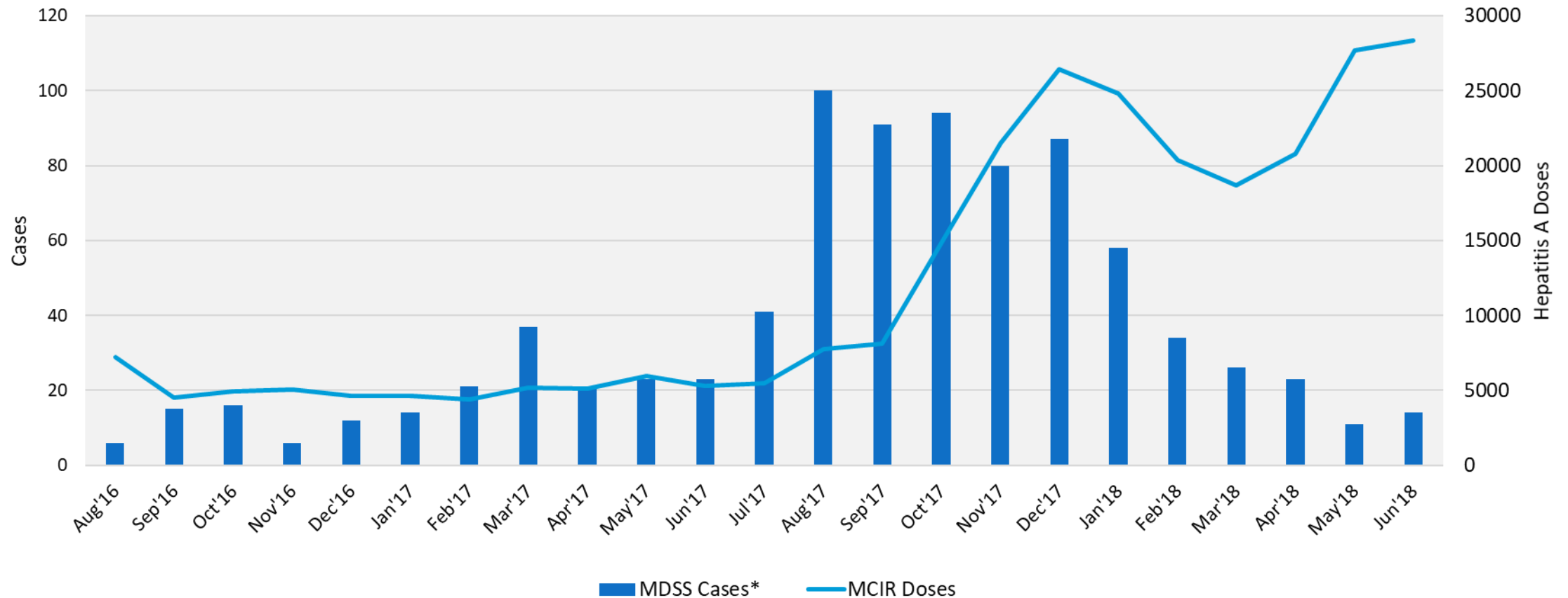
Percentage of doses reported to the MCIR for adults 20 years of age and older by MCIR facility type, 2017



MCIR & the Hepatitis A Outbreak

Dose Counts

Hepatitis A cases vs. hepatitis A doses administered and reported to the MCIR for adults 18 years of age and older by month, Michigan, August 2016 - June 2018



*N=847 includes primary, secondary, tertiary confirmed or probable cases from August 2016

MDSS data as of July 6, 2018

MCIR data as of July 7, 2018

Preliminary Data

Table 1. Hepatitis A doses^a administered and reported to the Michigan Care Improvement Registry (MCIR) for adults 18 years and older residing in outbreak counties by week and county, Michigan, June 2018^{b,c,d,e}

	June 3-9	June 10-16	June 17-23	June 24-30	Month and year jurisdiction included in outbreak summary ^f	Total outbreak doses ^g
Oakland	1094	977	922	727	August 2016	40,364
Wayne	757	779	770	750	August 2016	32,911
Macomb	685	615	580	515	August 2016	25,981
Detroit	263	323	321	306	August 2016	15,863
St. Clair	202	183	134	128	July 2017	8,153
Monroe	217	187	175	242	September 2017	10,172
Washtenaw	300	349	305	285	October 2017	13,070
Ingham	167	198	210	178	October 2017	5,984
Livingston	114	105	121	82	October 2017	3,711
Lapeer	45	74	79	58	October 2017	1,368
Sanilac	31	67	47	46	October 2017	983
Isabella	51	43	61	23	November 2017	1,287
Genesee	542	402	340	251	December 2017	6,786
Shiawassee	53	72	108	106	December 2017	1,597
Calhoun	118	97	103	47	January 2018	2,302
Grand Traverse	34	51	75	47	January 2018	1,494
Eaton	74	95	99	106	January 2018	1,691
Clinton	48	88	56	64	February 2018	900
Saginaw	79	82	61	64	February 2018	1,295
Mecosta	12	13	15	13	February 2018	351
Gratiot	13	31	28	13	March 2018	334
Midland	69	70	66	41	June 2018	253
Total	4,968	4,901	4,676	4,092	-	176,850

^a Includes hepatitis A and hepatitis A – hepatitis B vaccines.

^b Vaccination record submission to the MCIR for adults 20 years and older is strongly encouraged but is not required.

^c In the MCIR, there is no way to tell if the vaccine was administered in response to the outbreak.

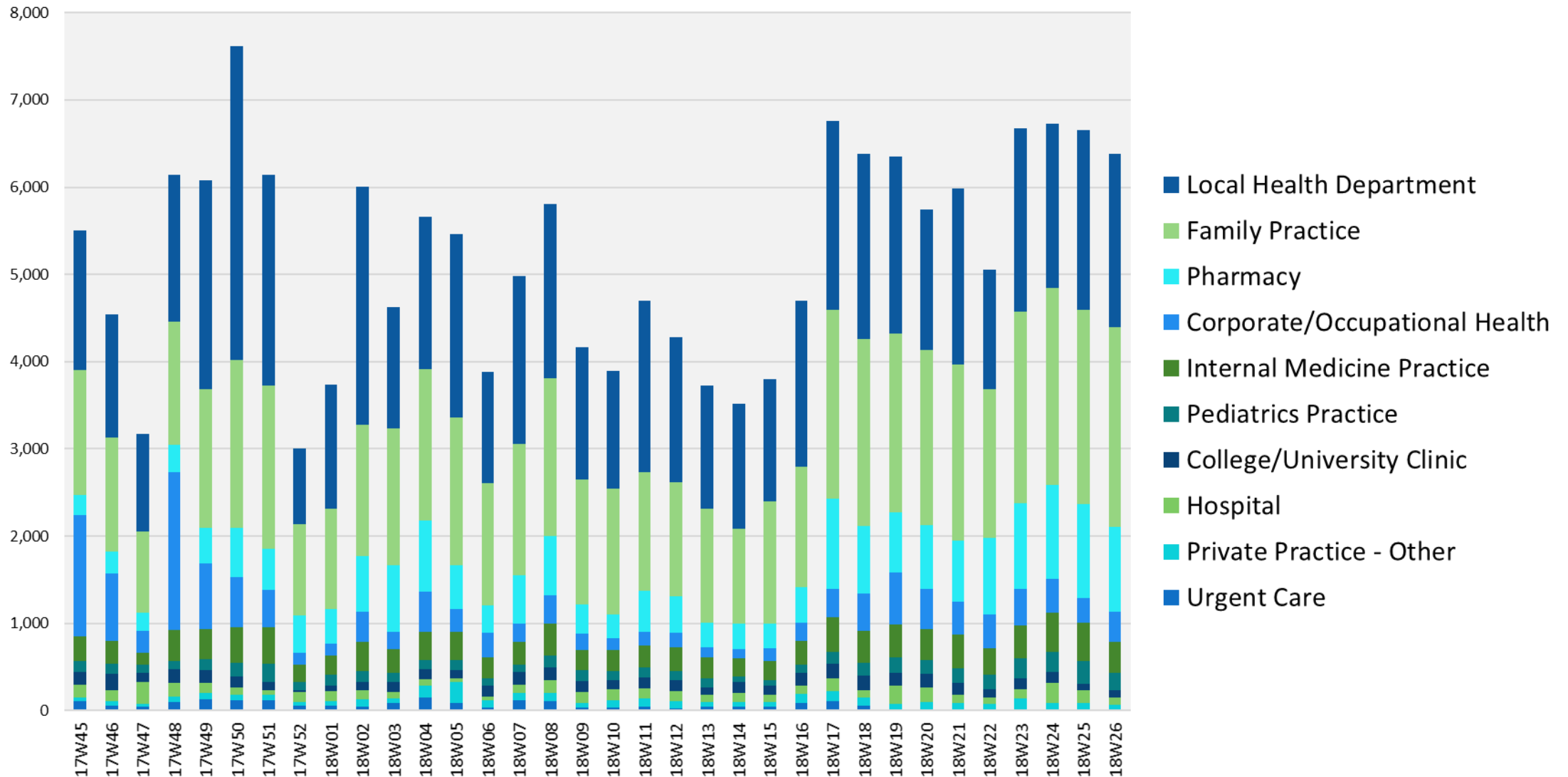
^d MCIR dose counts may vary week to week due to historical dose entry and routine record deduplication. This may be more noticeable with doses administered at mobile clinic locations and if dose entry is performed offsite.

^e MCIR data as of June 30, 2018; data are updated weekly.

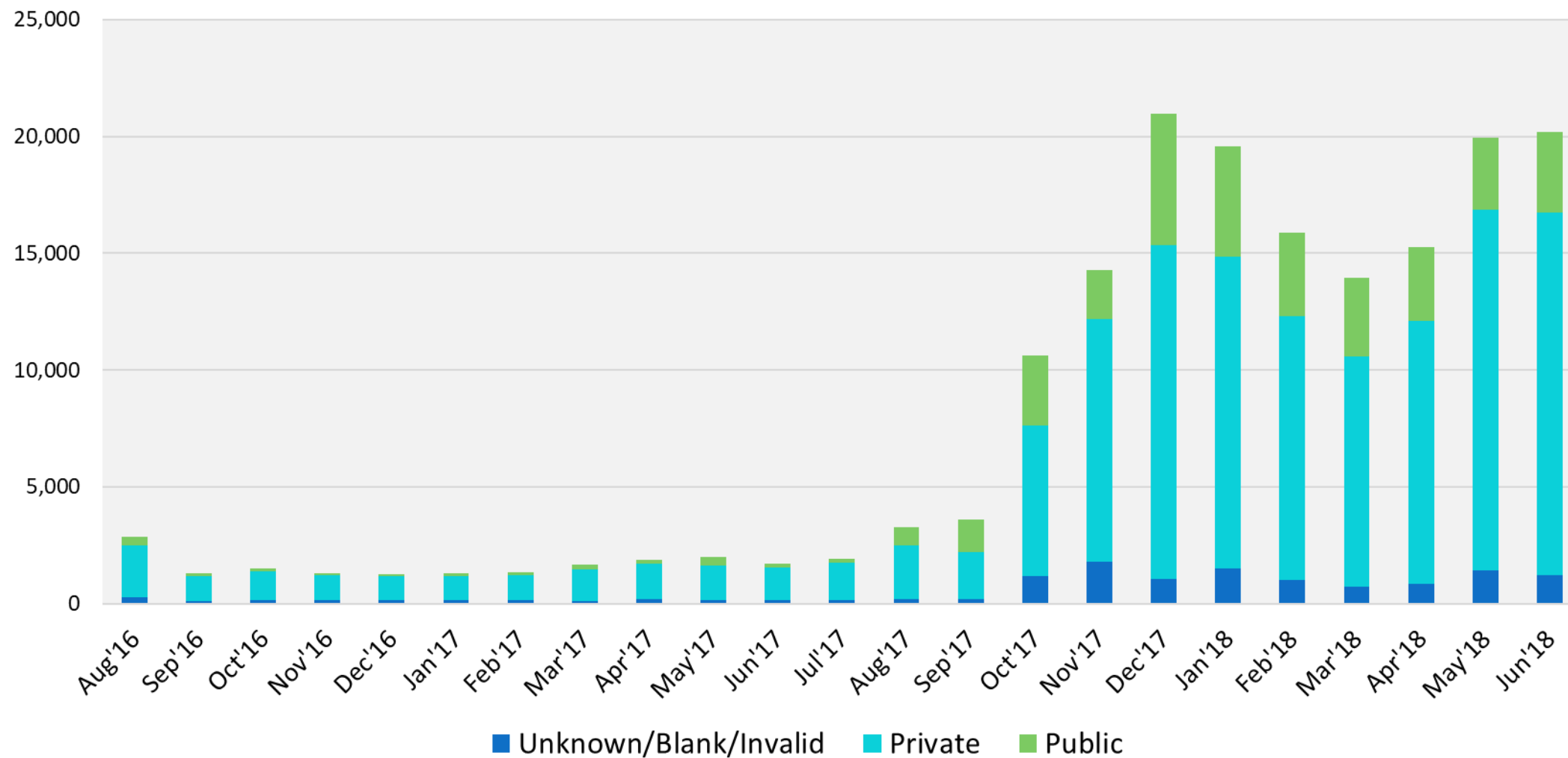
^f Based on the first-time county was included in the MDHHS outbreak summary and met outbreak county definition.

^g Outbreak doses are defined as doses administered and reported since the first month the county was included in the MDHHS hepatitis A outbreak county definition (≥2 (unrelated) outbreak strain cases).

Hepatitis A vaccine doses administered and reported to the MCIR for adults 18 years of age and older residing in outbreak counties by the top ten MCIR facility types and week, Michigan, November 5, 2017 – June 30, 2018



Hepatitis A vaccine doses administered and reported to the MCIR for adults 18 years of age and older residing in outbreak counties by dose eligibility and month, Michigan, August 1, 2016 – June 30, 2018



Preliminary Data

Coverage Estimates

Table 2. Estimated proportion of Michigan adults ≥19 years who received hepatitis A vaccination, by age group, MCIR; Compared to the [2016 National Health Interview Survey \(NHIS\) coverage estimates](#)

	Hepatitis A vaccination (at least 1 dose), ever (n) [*]	2018 MCIR 1+ Coverage Estimate (%) ^{**}	Hepatitis A vaccination (at least 2 doses), ever (n) [*]	2018 MCIR 2+ Coverage Estimate (%)	2016 Census Estimates (n) [†]	2016 NHIS % (95% CI) [‡]
≥19 yrs	1,159,298	15.3	694,363	9.1	7,601,340	9.5 (8.9-10.2)
19-49 yrs	958,268	24.6	605,246	15.5	3,897,113	13.4 (12.4-14.4)
≥50 yrs	201,030	5.4	89,117	2.4	3,704,227	5.4 (4.9-6.0)

^{*}Michigan adults 19 years and older as of June 23, 2018 that have at least 1 or 2 doses of a hepatitis A vaccine (Hep A or Hep A-Hep B) ever recorded in the MCIR; adult vaccination record submission to the MCIR is not required.

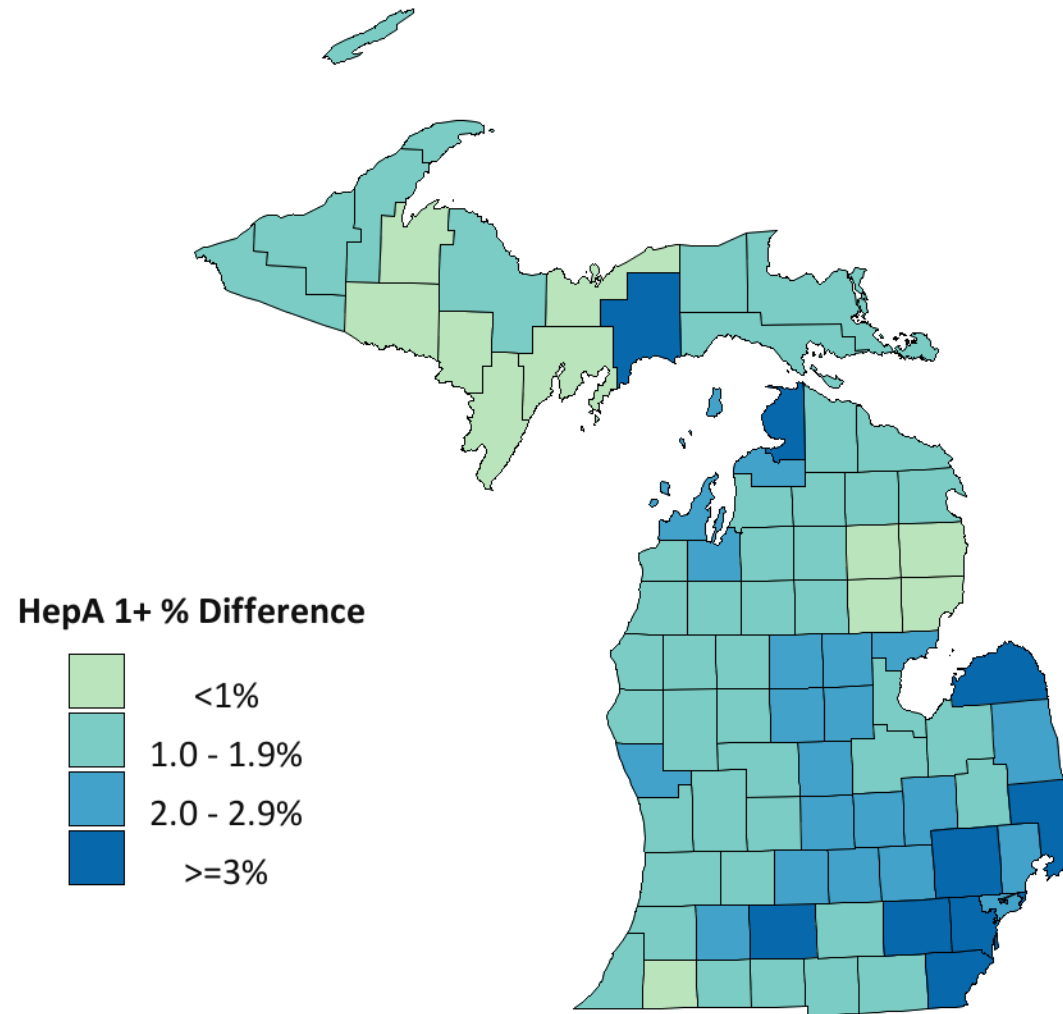
[†]2016 Michigan census estimates by age group.

[‡]Adults who have received at least 2 doses ever of hepatitis A. NHIS hepatitis A vaccination defined by respondents that were asked if they had ever received the hepatitis A vaccine, and if yes, were asked how many doses were received.

^{**}More than 95% of adults will develop protective antibody within 4 weeks of a single dose of monovalent vaccine, and nearly 100% will seroconvert after receiving two doses ([Epidemiology and Prevention of Vaccine-Preventable Diseases, 13th edition](#)).

Adult Hepatitis A Coverage Percent Difference by County, MCIR

August 1, 2016 vs. June 23, 2018



Estimated change in coverage for adults 20 years and older as of August 1, 2016 based on data in the MCIR as of June 23, 2018 by county.
Prepared by the Michigan Department of Health and Human Services Immunization Division using data from the Michigan Care Improvement Registry (MCIR).

Coverage Estimates

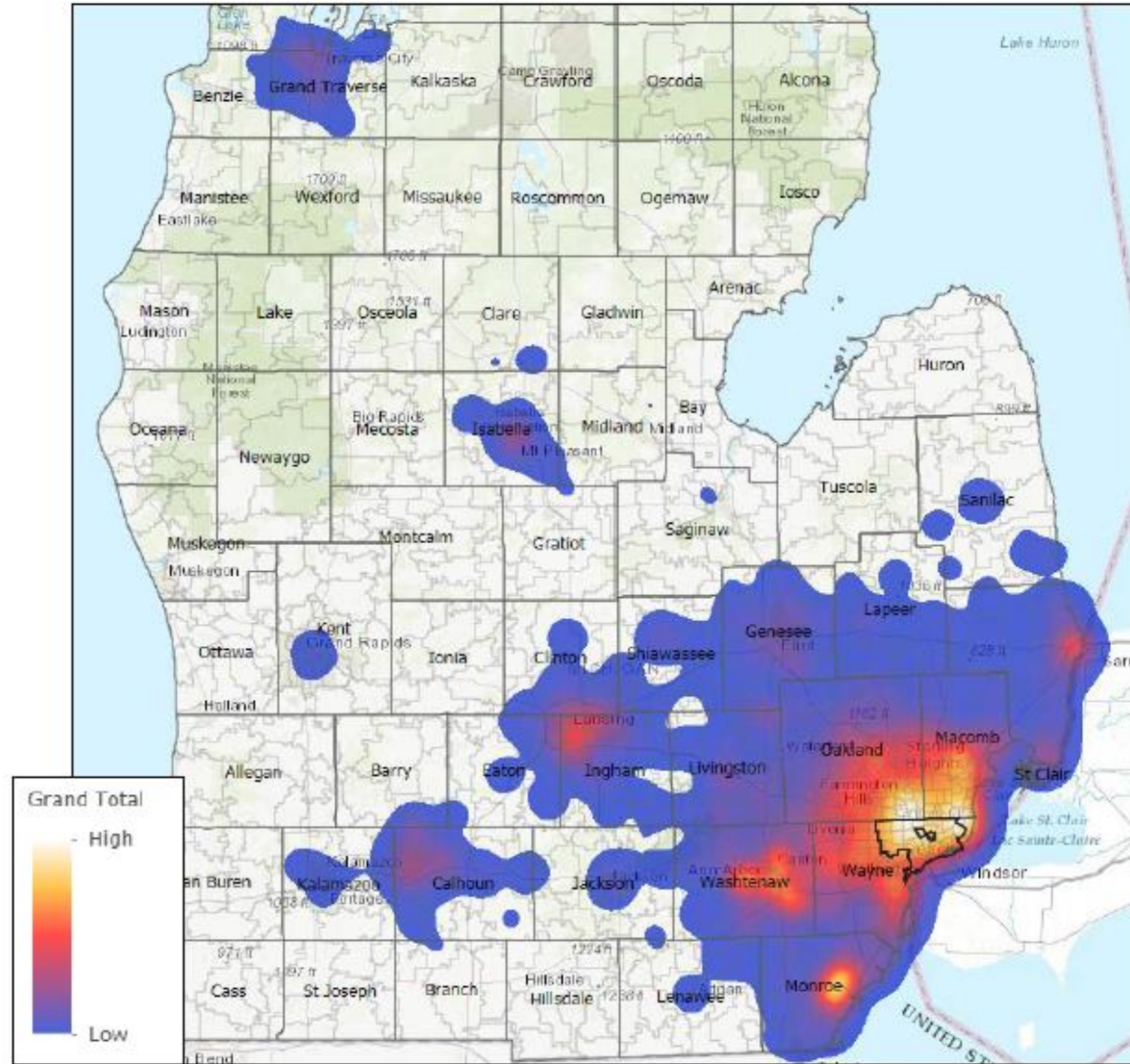
- Best method available to calculate coverage estimates at a statewide level.
- Limitations:
 - Use census denominators.
 - Dose reporting is not mandatory, so a likely underestimation of coverage.
 - Coverage estimate increases are impacted by immunized adolescents aging into adulthood, increased adult dose reporting, and increased dose administration.

Mapping

Utilizing the MCIR for Mapping

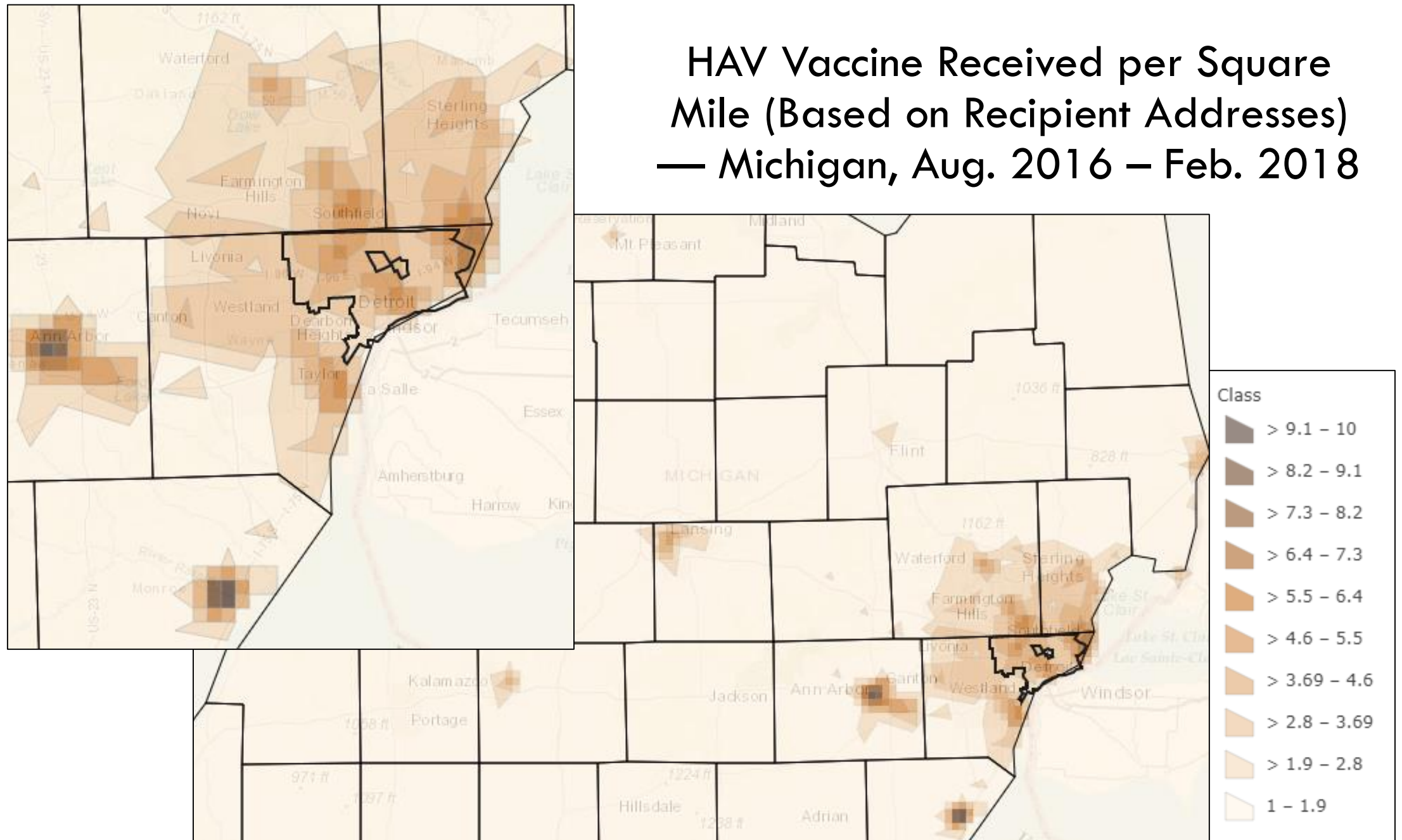
- Based on person and facility jurisdiction.
- Public or private doses.
- Facility type.
- Combine MCIR data with Michigan Disease Surveillance System data.

Administered Adult Hepatitis A Doses, MCIR, August 1, 2016-January 21, 2018



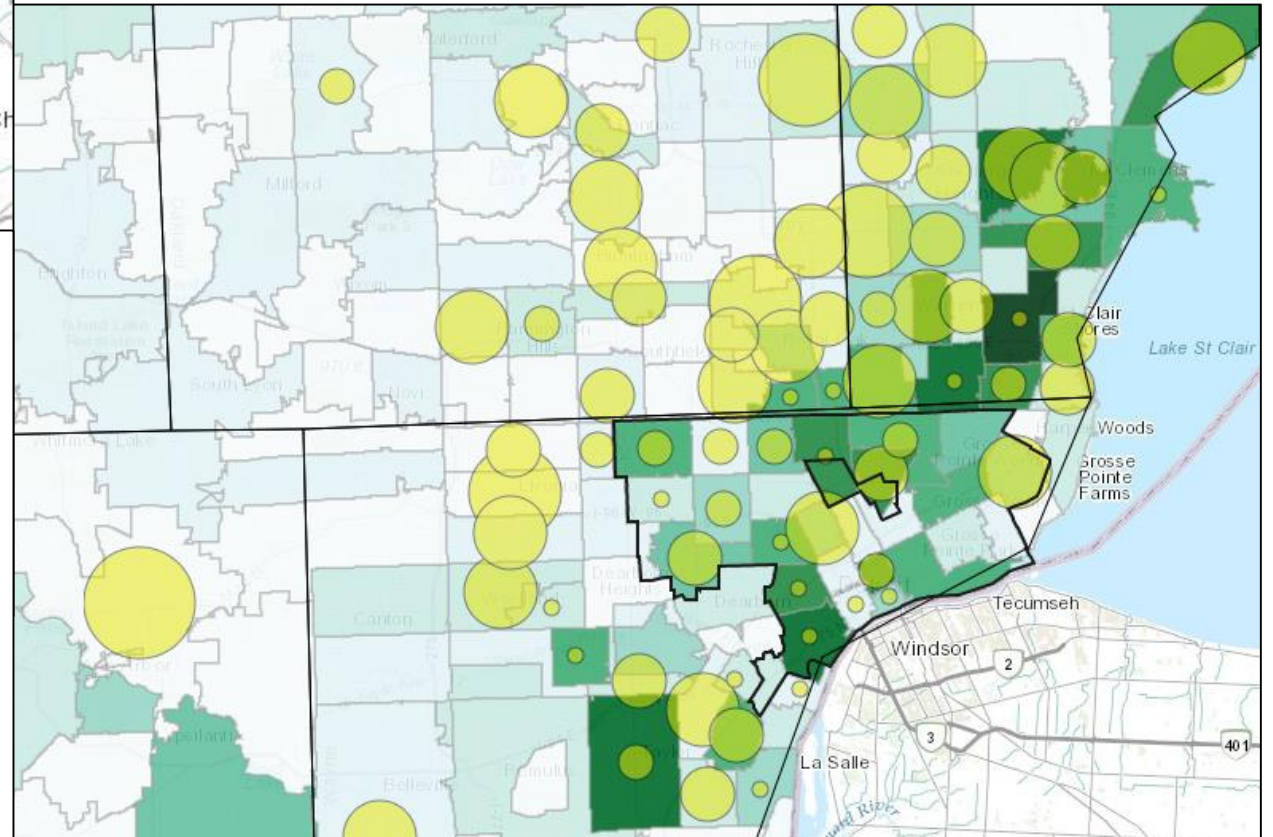
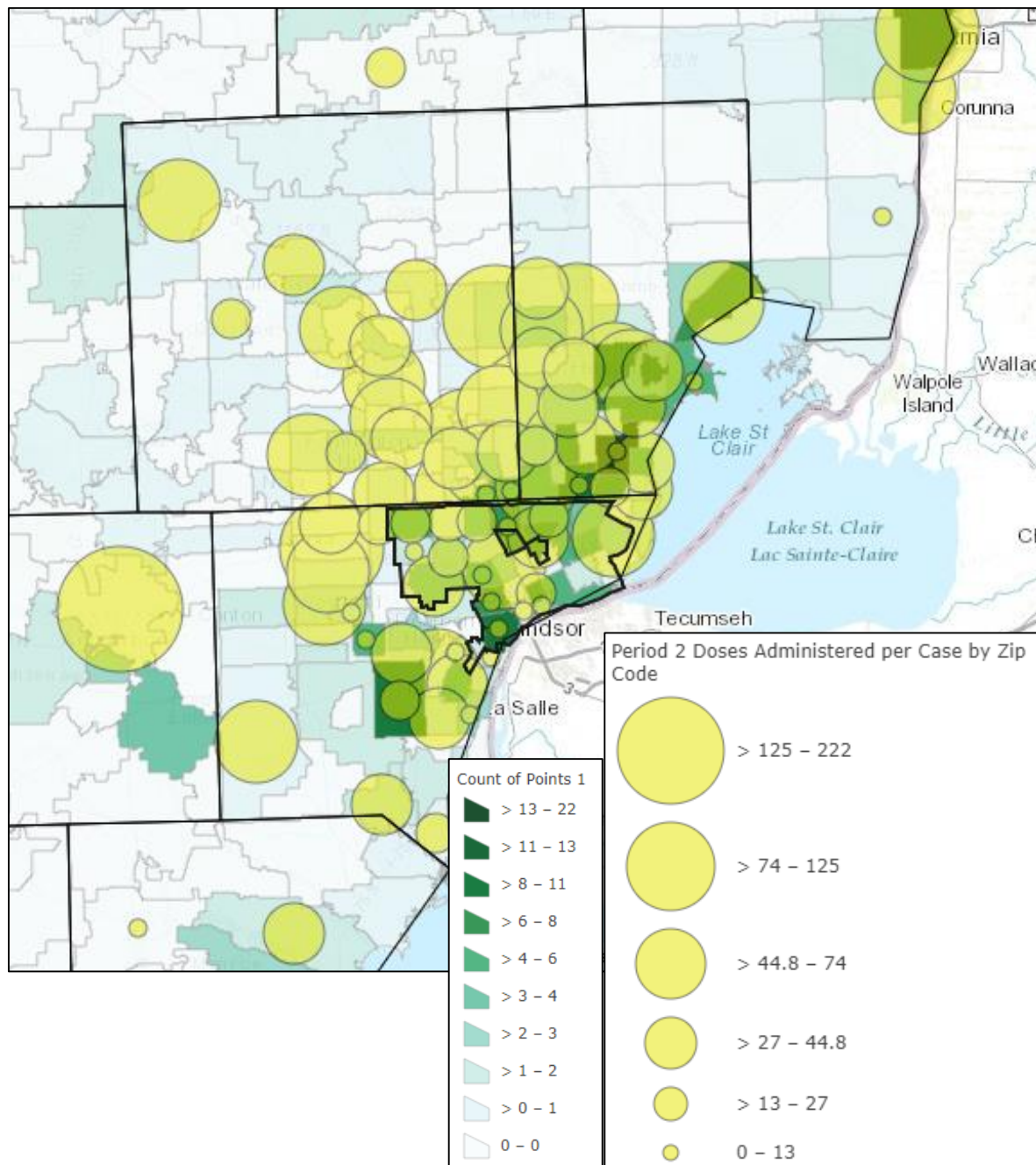
Preliminary Data

HAV Vaccine Received per Square Mile (Based on Recipient Addresses) — Michigan, Aug. 2016 – Feb. 2018



Preliminary Data

Ratio of Total Vaccine Doses Administered per Case by Zip Code of Home Residence, Compared with Total Cases by Zip Code – Jan-Mar, 2018



Ad Hoc Request Examples

- Identify facilities reporting adult doses within a target region.
- Track doses reported by specific facility types such as emergency departments, federally qualified health centers, and pharmacies.
- Immune globulin dose counts.
- Checking case immunization status.

Challenges

- Adult dose reporting to the MCIR is not required. Dose increases are likely impacted by increased administration and reporting of adult data.
- Missing historical doses for adults in the MCIR.
- Due to the immaturity of adult data in the MCIR, census denominators are used in coverage calculations.
- MCIR cannot differentiate between outbreak response and routine administration.
- Providing data pertinent to all parties involved: local health departments, programs serving high risk groups, stakeholders.

Successes

- Ability to provide data at the individual, zip code, county, region, or state-level.
- Historical adult data already recorded in the MCIR.
- Centralized record to check adult immunization status.
- Many adult providers were already enrolled and familiar with the MCIR due to previous pandemic preparedness work.
- Enrollment of new immunization sites in the MCIR (emergency rooms and correctional facilities).

Key Takeaways

- Ability to provide timely data to leadership, local public health, and key stakeholders.
- Increasing awareness of availability and importance of adult data in the MCIR.
- Increasing the quantity and quality of adult data for routine use by providers and future vaccine-preventable disease outbreaks.