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

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Michigan Department of Health and Human Services
Division of Immunization
48th National Immunization Conference, May 15, 2018
Presentation Overview

• Outbreak background.

• Michigan Care Improvement Registry (MCIR) background.

• How adult vaccination data from the MCIR is 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

**MI Hepatitis A Epi Summary 01Aug2016 – 02May2018**

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Confirmed Cases</td>
<td>828</td>
</tr>
<tr>
<td>Primary</td>
<td>745</td>
</tr>
<tr>
<td>Secondary</td>
<td>83</td>
</tr>
<tr>
<td>Hospitalized, n (%)</td>
<td>665 (80.3)</td>
</tr>
<tr>
<td>Deaths, n (%)</td>
<td>26 (3.1)</td>
</tr>
<tr>
<td>Median age (range) years</td>
<td>40 (&lt;1–90)</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>291 (35.1)</td>
</tr>
</tbody>
</table>

*Data below excludes secondary cases*

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documented substance use, n (%)</td>
<td>374 (50.2)</td>
</tr>
<tr>
<td>Coinfection with hepatitis C, n (%)</td>
<td>197 (26.4)</td>
</tr>
<tr>
<td>Coinfection with hepatitis B, n (%)</td>
<td>20 (2.7)</td>
</tr>
<tr>
<td>MSM, n (%) – data includes men only</td>
<td>73 (14.6)</td>
</tr>
<tr>
<td>Homeless/transient living, n (%)</td>
<td>100 (13.4)</td>
</tr>
<tr>
<td>Recently incarcerated, n (%)</td>
<td>57 (7.7)</td>
</tr>
<tr>
<td>Healthcare worker, n (%)</td>
<td>22 (3.0)</td>
</tr>
<tr>
<td>Food Worker, n (%)</td>
<td>35 (4.7)</td>
</tr>
<tr>
<td>Lost to follow up, n (%)</td>
<td>146 (19.6)</td>
</tr>
<tr>
<td>Non-substance use, non-homeless, n (%)</td>
<td>298 (40.0)</td>
</tr>
</tbody>
</table>

Data source: Michigan Disease Surveillance System, MDHHS.
Report is a preliminary ad hoc analysis. Information to be considered DRAFT.

Start of outbreak in the City of Detroit, and counties of Macomb, Oakland, and Wayne.

Public health response intensified (press releases, provider outreach, increased surveillance and monitoring).

First adult hepatitis A outbreak related MCIR report generated for impacted jurisdiction conference call.

LHD conference calls moved to bi-weekly.

First statewide conference call.

Hepatitis A vaccine inventory reported as constrained.

Increase in MSM cases.

10 impacted jurisdictions.

Community Health Emergency Coordination Center (CHECC) activated (10/31/2017).

State appropriation of $7.1 million available to impacted jurisdictions to combat the outbreak.

15 impacted jurisdictions.

Funding available to all LHDs.

21 impacted jurisdictions.

15 impacted jurisdictions.
Michigan Care Improvement Registry (MCIR) background.
MCIR Background

• Immunization Registries:
  • Centralized record, population immunization rates, key information source during outbreaks.

• 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 implementation of HL7 messaging in 2012 and the H1N1 pandemic of 2009.
  • However, as of April 28, 2018, there are **2,423,933 child** (<18) and **7,304,594 Michigan adult** (>=18) residents in the MCIR.
Michigan adults in the MCIR by gender and age group; 2006-2017

- 20-29: 257,627 (Male: 20,299) / 404,774 (Female: 20,294)
- 30-39: 350,966 (Male: 29,991) / 520,050 (Female: 20,059)
- 40-49: 350,123 (Male: 29,991) / 444,579 (Female: 20,579)
- 50-59: 433,458 (Male: 29,991) / 516,116 (Female: 20,116)
- 60-69: 447,721 (Male: 29,991) / 530,019 (Female: 20,019)
- 70-79: 295,440 (Male: 20,299) / 349,826 (Female: 20,297)
- 80+: 177,365 (Male: 20,299) / 268,303 (Female: 20,303)
Adult doses in the MCIR by facility type; 2006-2017

- Family Practice: 38%
- Pharmacy: 17%
- Local Health Department: 13%
- Hospital: 8%
- Pediatrics: 2%
- Other Practice: 5%
- OB/GYN: 1%
- Internal Medicine: 7%
- Other: 5%
- Employee/Occ Health: 4%
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-April 2018

*N=821 includes primary, secondary, tertiary confirmed or probable cases from July 2016 April 25, 2018 using MDSS
MCIR data as of April 28, 2018
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 outbreak county, Michigan, April 2018\(^{b,c,d,e}\)

<table>
<thead>
<tr>
<th>Month and year jurisdiction included in outbreak summary(^f)</th>
<th>Total outbreak doses(^g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 1-7</td>
<td>April 8-14</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Oakland</td>
<td>523</td>
</tr>
<tr>
<td>Wayne</td>
<td>414</td>
</tr>
<tr>
<td>Macomb</td>
<td>349</td>
</tr>
<tr>
<td>Detroit</td>
<td>206</td>
</tr>
<tr>
<td>St. Clair</td>
<td>241</td>
</tr>
<tr>
<td>Monroe</td>
<td>58</td>
</tr>
<tr>
<td>Washtenaw</td>
<td>245</td>
</tr>
<tr>
<td>Ingham</td>
<td>105</td>
</tr>
<tr>
<td>Livingston</td>
<td>59</td>
</tr>
<tr>
<td>Lapeer</td>
<td>25</td>
</tr>
<tr>
<td>Sanilac</td>
<td>17</td>
</tr>
<tr>
<td>Isabella</td>
<td>11</td>
</tr>
<tr>
<td>Genesee</td>
<td>133</td>
</tr>
<tr>
<td>Shiawassee</td>
<td>29</td>
</tr>
<tr>
<td>Calhoun</td>
<td>51</td>
</tr>
<tr>
<td>Grand Traverse</td>
<td>44</td>
</tr>
<tr>
<td>Eaton</td>
<td>42</td>
</tr>
<tr>
<td>Clinton</td>
<td>24</td>
</tr>
<tr>
<td>Saginaw</td>
<td>38</td>
</tr>
<tr>
<td>Mecosta</td>
<td>7</td>
</tr>
<tr>
<td>Gratiot</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,629</strong></td>
</tr>
</tbody>
</table>

\(^{a}\) 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 April 28, 2018; data are updated weekly.

\(^{f}\) 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).

\(^{g}\) Includes hepatitis A and hepatitis A – hepatitis B vaccines.
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 – April 28, 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 – April 28, 2018
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

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Hepatitis A vaccination (at least 1 dose), ever (n)*</th>
<th>2018 MCIR 1+ Coverage Estimate (%)**</th>
<th>Hepatitis A vaccination (at least 2 doses), ever (n)*</th>
<th>2018 MCIR 2+ Coverage Estimate (%)</th>
<th>2016 Census Estimates (n)†</th>
<th>2016 NHIS % (95% CI)¶</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥19 yrs</td>
<td>1,099,068</td>
<td>14.5</td>
<td>662,539</td>
<td>8.7</td>
<td>7,601,340</td>
<td>9.5 (8.9-10.2)</td>
</tr>
<tr>
<td>19-49 yrs</td>
<td>918,654</td>
<td>23.6</td>
<td>581,232</td>
<td>14.9</td>
<td>3,897,113</td>
<td>13.4 (12.4-14.4)</td>
</tr>
<tr>
<td>≥50 yrs</td>
<td>180,414</td>
<td>4.9</td>
<td>81,307</td>
<td>2.2</td>
<td>3,704,227</td>
<td>5.4 (4.9-6.0)</td>
</tr>
</tbody>
</table>

*Michigan adults 19 years and older as of April 21, 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. April 21, 2018

HepA 1+ % Difference

- <1%
- 1.0 - 1.9%
- 2.0 - 2.9%
- >=3%

Estimated change in coverage for adults 20 years and older as of August 1, 2016 based on data in the MCIR as of April 21, 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 an underestimation of coverage.
  - Coverage estimate increases are impacted by increased 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 – August 2016 – January 2018
Ratio of Total Vaccine Doses Administered per Case by Zip Code of Home Residence, Compared with Total Cases by Zip Code – Jan-Mar, 2017
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.
Key Takeaways

• Ability to provide timely data to leadership, local public health, and key stakeholders.

• Increase awareness of availability and importance of adult data in the MCIR.

• Increase the quantity and quality of adult data for routine use by providers and future vaccine-preventable disease outbreaks.