

MDHHS Response to Flint Area Community Health and Environment Partnership, Proceedings of the National Academy of Sciences Article February 5, 2018

- In “A Retrospective Study of Legionnaire’s Disease in Flint Michigan: Water Regime and Free Chlorine Suppression Effects”, researchers claim that the Michigan Department of Health and Human Services (MDHHS) scientific personnel told them “the date of referral is the most reliable and valid indication of timing” when looking at each case of Legionnaires in the data. This is not an accurate statement.
 - The purpose of selecting a date for each case is to understand what environmental exposures (such as source of water) a person with Legionella had during their incubation period.
 - MDHHS scientific personnel tried numerous times to explain to researchers that referral date is important for ensuring they identify all cases of Legionella in their data set, but that date of the onset of symptoms is the most appropriate date to identify incubation period for each case. The mean difference between onset and referral dates is 11.9 days. The outbreak definition of incubation period was 14 days prior to onset of symptoms. Out of the 90 cases, 10 had an onset to referral date difference greater than a full incubation period and another 27 had onset to referral date differences greater than half the incubation period (7 days).
- The use of referral date instead of symptom onset date for determining incubation period exposures introduces substantial error into not only the determination of the number of healthcare exposures, but also the determination of each case patient’s exposure to Flint water, free chlorine levels, precipitation, temperature, and any other potential exposures of concern assessed by the researchers. This underscores how fundamental onset date determination is when conducting epidemiological investigations of legionellosis cases, which is why state and local health personnel often spend hours and even days conducting relevant interviews, reviewing medical records, and gathering additional data as needed to determine the onset for every confirmed case of legionellosis.
- In this article, the researchers use referral date to assess health care exposures and as a result, the figures they portray in the study represent only half the cases of Legionnaires disease that was present at McLaren Flint Hospital. The information that is used by the researchers to conclude that they can rule out an exclusively hospital based argument uses data with misclassified exposures.
- The researchers used the residential address of each case to classify the case’s water exposure. However, cases, particularly people who have had prior illnesses, may not have been at their place of legal residence during their incubation period. It is unclear from the article if these researchers took into account the extensive work done by MDHHS and Genesee County Health Department (GCHD) staff in assessing where Legionella patients spent their incubation period.
- Recognizing an increase in Legionellosis incidence in townships and municipalities in Genesee County outside of the city of Flint, the researchers hypothesized that this

increase could be due to these people traveling into Flint for work, leisure or other activities. They relied on commuter flow data to test this hypothesis.

- MDHHS and GCHD staff spent significant time interviewing patients and reviewing medical and other records to determine travel history and exposures in these patients, data which did not seem to be used by these researchers. People at risk for becoming infected with Legionella are frequently older and have pre-existing comorbidities. Many are retired or infirm at the time of their infection. The commuter data may not be representative of the population that cases arose from. Overall these researchers relied on estimates when there were actual data that should have been utilized rather than estimates.
- When the results of interview and record reviews are used, it is evident that:
 - 29 case patients resided on the Flint water system, 61 case patients had residences served by other water sources outside of Flint
 - 54 possible or definite healthcare-associated cases, of which 51 were associated with McLaren Flint, including 46 case patients associated with McLaren Flint Hospital and no other healthcare facilities. Combining these data, 27 cases had exposure to McLaren Flint Hospital and at least one other location on Flint water. For 24 case patients, their only exposure to Flint water was at McLaren Flint Hospital.
 - 28 case patients had no residence on Flint water and were not exposed to McLaren Flint Hospital during their incubation period. Of these, only two had exposure to Flint water, including only one who commuted to Flint on a regular basis for work. 26 case patients had no exposure to Flint water.
 - Of the 64 case patients with any exposure to Flint water (including the 24 whose only exposure was at McLaren Flint), 13 had an exposure to Flint water but no exposure to McLaren Flint Hospital.
 - With regards to the commuter theory, the raw epidemiological data suggest that the case patient population is significantly different than the average working population that is characterized in the Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics data employed by this model. Notably, the mean case patient age is 65, which is substantially higher than the average age of the working population. Also, of the 90 case patients, only 19 noted that they were employed at the time of their diagnosis. Of these, 5 lived on Flint water and 14 lived at residences supplied by non-Flint water. Of the 14, four were at McLaren Flint (only 2 of the 4 commuted into Flint to visit other destinations) and 10 had no exposure to Flint water.