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**From:** Lasher, Geralyn (DCH)  
**Sent:** Tuesday, September 29, 2015 2:57 PM  
**To:** Wells, Eden (DCH); Hertel, Elizabeth (DCH)  
**Subject:** RE: TIME SENSITIVE: Fw: Prelim GIS results

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

I think that is the only thing we can respond with at this point.

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**From:** Wells, Eden (DCH)  
**Sent:** Tuesday, September 29, 2015 2:55 PM  
**To:** Hertel, Elizabeth (DCH) <HertelE@michigan.gov>; Lasher, Geralyn (DCH) <laserger@michigan.gov>  
**Subject:** TIME SENSITIVE: Fw: Prelim GIS results  
**Importance:** High

FYI only, and her findings below are prelim--I have sent to Corinne and Our EPI;s will review after they get their results from their analysis.

But here is how I wanted to follow-up---is it OK if I ask the following:

Hi Mona,

Quick question--

We hope to get prelim data analysis results starting this afternoon-confirmed likely in next day or so----not sure when you may be going public with the GIS but do you think will be before then? Or are you doing the overlay now? Hoping for coordination of "apples"--I have followed-up on your data request.

Eden

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**From:** Mona Hanna-Attisha <[MHanna1@hurleymc.com](mailto:MHanna1@hurleymc.com)>  
**Sent:** Tuesday, September 29, 2015 12:25 PM  
**To:** Wells, Eden (DCH)  
**Subject:** Prelim GIS results

Dr Wells, thanks for the phone call. I appreciate your reaching out. Below is our most recent analysis looking more specifically at the City of Flint and focusing on wards/neighborhoods via GIS analysis. This is very preliminary, but even more frightening. Our next steps include overlaying this with the locations of lead service lines.

I would appreciate your efforts to expedite our data request for the raw data so that we can run similar analysis with your larger sample size. Thanks again, and let me know if I can be of any assistance. Mona

**Updated Findings:**

Using GIS (Geographic Information System) map technology, we have further analyzed our blood lead level data. Our initial analysis examined children living in Flint zip codes, 48501-48507; however, this included households receiving non-Flint water. Our refined GIS-based analysis now includes only those households who receive water from the City of Flint.

The results reveal an even greater increase in the percentage of children with elevated blood lead levels (EBL). Pre-switch, the proportion of children with EBL was 2.4%, and post-switch the proportion was 4.9% ( $p=0.019$ ). This is compared with our initial zip code-based analysis that showed pre-switch 2.1% and post-switch 4.0% ( $p=0.025$ ). Once again, the change in non-Flint EBL% was not statistically significant.

Preliminary GIS analysis has identified certain areas within the city limits that experienced the greatest rate of EBL% increase. Specifically, we found the greatest increases in wards 5 and 6 (particularly in neighborhoods near Dupont St between University Ave and Pasadena Ave); the EBL% more than **tripled** in these wards. In ward 5, the EBL % increased from 4.9% to 15.7% ( $p=0.038$ ). The area of intersection between wards 3, 4, and 5 (in the east side of the city) also appeared high. Lastly, ward 7 had high pre and post-levels EBL% above 5% (specifically in the western portion of the ward).

Of note, our results continue to correlate with the high water lead levels from the Virginia Tech samples. Most notably, the high percentage of EBL% in wards 5, 6, and 7 also correspond with the high water lead levels in wards 5, 6, and 7.

**Mona Hanna-Attisha MD MPH FAAP**

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