NIH GRANT PRE-PROPOSAL McElmurry

RAPID RESPONSE TO CONTAMINANTS IN FLINT DRINKING WATER

Once a robust city due to a booming automotive industry, Flint MI is now suffering a serious economic decline; so severe that it is compromising public health. The City of Flint is home to 99,002 residents, down from a peak of ~197,000 in 1960, of which 41.5% live below poverty[1]. In Spring of 2015, the economic challenges facing the city ushered in major changes to Flint's municipal water system – most notably changing the source of drinking water from Lake Huron to the Flint River. Unfortunately, the Flint River suffers from the chemical legacy of years of industrial activities. As a result, drinking water quality for Flint residents has plummeted and levels of disinfection-by-products (DBPs) in the water system have skyrocketed. In addition to exposure to carcinogenic DBPs, the director of Hurley Medical Center's pediatric residency program, Dr. Mona Hanna Attisha, reports that the percentage of children with elevated blood lead (Pb) levels has more than doubled in the areas with high water Pb levels since the changes to the water system were implemented.[2] A lead advisory was issued by the City of Flint on September 25, 2015. *A rapid assessment of children's exposure to the complex mixture of potentially toxic chemicals present in Flint's drinking water system is critically needed to protect public health. This unforeseen man-made disaster also represents a unique research opportunity as the conditions responsible for DBPs formation and Pb dissolution would be impossible to replicate in the laboratory.* Both of these characteristics require a rapid response to address this unforeseen man-made disaster.

With the goal of assessing childhood exposure to DBPs and Pb via drinking water, the project team will: (Aim 1) clearly define exposure within Flint's drinking water system; (Aim 2) quantify the concentration of DBPs and Pb that have resulted from the change in water treatment; (Aim 3) apply a high-throughput bioassay to evaluate toxicity of complex chemical mixtures; and (Aim 4) communicate results to water utility operators, government officials (city, state, and federal), public health agencies and residents using principles of risk communication through a variety of channels including social media. These aims will be achieved through a combination of intensive field sampling paired with hydraulic and geochemical models of the drinking water system as well as rapid toxicity screening.

Our team (part of the NSF funded Water@Wayne Group) is currently working together and able to respond with this rapid assessment based on our intimate understanding of the Flint regional water system and social infrastructure. Over the last 5 years the PI (McElmurry) has conducted research focused on how to best adapt Flint's existing water infrastructure to changes in population and industrial demand. As a result of this work, *the team already possesses a complete hydraulic model of Flint's drinking water system*. We will utilize this model to guide sample collection and, along with sample results, define the route of exposure. Co-PI Miller is an expert in hydraulic modeling and has experience with the drinking water distribution system that will be used during this study. She will oversee this portion of the project with Dr. McElmurry. PI McElmurry is an expert in environmental sampling and has conducted extensive research on evaluating water quality and Pb exposure[3,4,5]. The team will employ standard methods to quantify known DBPs and Pb present in drinking water samples as well as use advanced analytical methods to *identify unknown compounds using gas chromatography-time of flight mass spectrometry (GC-TOF)*. Because DBPs are a complex mixture of potentially toxic compounds a rapid, high-throughput approach for evaluating this hazard is required. PI McElmurry and co-PI Pitts have developed a bioassay system capable of measuring behavioral and physiological responses in *Daphnia*[6], a NIH model organism for biomedical research and US EPA toxicity assessment[7,8]. Although bioassay systems using other model organisms could be developed for evaluating water quality, we have already demonstrated the *ability*

Dr. Ben Pauli (FACHEP) Book Chapter

Edwards also said on the website that FACHEP's legitimacy was now "completely tied" to McElmurry's proving his claims about his earlier work in Flint.[101] It was another sign of how thoroughly divorced Edwards's understanding of credibility was from that of the Flint residents I knew. Whereas there was plenty of community interest now in FACHEP's findings, there was almost none whatsoever that I could detect—certainly among activists—in what McElmurry did or did not do in Flint prior to the water crisis. In fact, Edwards's attack, in conjunction with his

Wayne State No Hydraulic model

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August 16, 2018

Mr. Derk Wilcox
140 West Main Street
Midland, Michigan 48640

Re: Edwards v WSU

Dear Mr. Wilcox:

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As to the second part, which requests "emails between McElmurray (sic) and co-PI Miller on the 2015 NIH grant, that discuss 'McElmurry's hydraulic and EPANET Flint model of the NIH proposal' and the scope of work", Wayne State denies this request on the grounds that there are no emails responsive to the request. McElmurry had no "hydraulic and EPANET (which is a software program) model". The NIH grant proposal sought funds to support, among other things, the development of a hydraulic model consistent with the grant proposal.

FOIA Response to Lyon Lawyers

From: Shawn Wright <shawn.wright@wayne.edu>
Sent: Wednesday, October 31, 2018 2:55 PM
To: Tracy Evans <tracy@willeychamberlain.com>
Subject: RE: FOIA request:

Hi Tracy,

I am writing in response to your October 9, 2018, Freedom of Information Act request.

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The total cost is $280,022.88. It is based upon the hourly rate of Dr. Shawn McElmurry. Due to the highly technical nature of your requests, Dr. McElmurry is the lowest paid employee of the University who is capable of performing the necessary review. Therefore, his hourly rate is used to calculate the labor cost.

FOIA allows a public body to provide an estimate of the time-frame within which the public body will comply with the request. As noted above, the records to be reviewed are voluminous and the review must be conducted by Dr. McElmurry, who is fully occupied with teaching, research and other professional activities. Given his normal employment duties, we estimate that Dr. McElmurry can reasonably devote approximately 1 to 5 hours per week to your requests. Even assuming 5 hours per week, 557 weeks will be required to finish the review, identify applicable exemptions and prepare the records for disclosure.

We realize that the cost and time frame estimates may seem excessive to you. They are not. Rather, they are dictated by requests that are very broad and require painstaking review for responsiveness and exemptions by a fully engaged faculty member.

PLANNING FOR ENHANCED DISEASE SURVEILLANCE AND ENVIRONMENTAL MONITORING IN FLINT, MICHIGAN

Scope of Work

The overall goal of this research led by Wayne State University (WSU), in collaboration with academic and other institutions, is to scientifically evaluate the distribution of environmental and other exposures associated with human illness in the City of Flint and Genesee County. This project will require a multi-phase and multi-disciplinary approach. The first phase (**PHASE I**) will be focused on assembling a full team of experts to properly evaluate this hypothesis and develop a detailed plan for enhanced disease and environmental surveillance that is anticipated to start on March 1, 2016.

PHASE I will consist of the following elements, with community engagement and outreach occurring throughout:

1. Engage with Flint residents, community leaders, government officials and technical experts
2. Review and fully execute data use and data sharing agreements with the Michigan DHHS, DEQ and other appropriate agencies
3. Review reports and data collected by the City of Flint, Genesee County and State of Michigan agencies including Michigan DHHS, DEQ, and other agencies as needed
4. Analyze existing data and laboratory specimens to further characterize what is known about the previous legionella cases.

Analysis of environmental samples

Water samples by FACHEP team members were collected from Flint homes during October 2015, December 2016 and January 2016. Results of the chemical analysis from these sampling events provide critical information that will guide PHASE II of the proposed work. For example, measurements of chlorine residual (e.g. **Figure 4**) helps to identify regions were conditions exist that are more likely to facilitate the growth of *Legionella* spp. within the water distribution system and facilities that are likely to serve high-risk populations (Figure 4). During the January 2016 sampling event, 1L hot water samples were collected from showers and biofilm samples were collected from shower arms and other locations in 31 homes in Flint. All samples were collected and analyzed according to standard CDC protocols. All cultures were negative. PCR results for all specimens were negative for *Legionella* using two different *Legionella* specific probes. All isolates were positive for amplification of the internal 16s control, therefore the reactions were deemed valid.

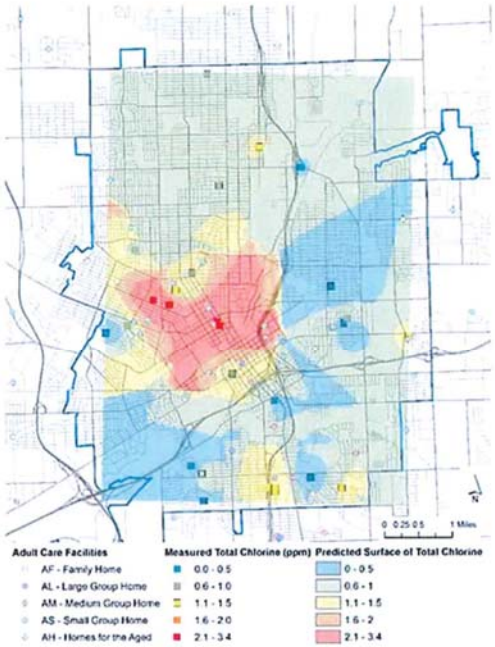

Figure 4. Location of adult care facilities and predicted chlorine levels (ppm) based on data collected January 28, 2016.