IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

NEWARK EDUCATION WORKERS CAUCUS et al., Plaintiffs, v. CITY OF NEWARK et al., Defendants.	Case No. 2:18-cv-11025 **Judge Esther Salas** **Magistrate Judge Cathy L. Waldor**

Declaration of Stacy Woods, Ph.D., M.P.H.

I, Stacy Woods, declare as follows:

QUALIFICATIONS

1. I am a data scientist, with focused expertise in data visualization and spatial and non-spatial data analysis (statistics).

2. I am presently employed as a scientist by the Natural Resources Defense Council, Inc. (NRDC), a nonprofit health and environmental organization, and a plaintiff in this litigation. My work for NRDC focuses on data analysis and data visualization, including data mapping. My day-to-day work includes locating and analyzing (and if appropriate mapping) data, including data gathered by NRDC and data obtained from other sources. In my current position, I have applied advanced statistical methods and models as appropriate to data and research questions to support scientific research, policy analysis, and litigation at NRDC.

3. I received my Ph.D. in Environmental Health from the Johns Hopkins Bloomberg School of Public Health (JHSPH). My doctoral dissertation utilized spatial statistics and GIS (geographic information systems) to assess and visualize changes in air quality and the influence of federal and state regulations on air quality over time. During my graduate training, I taught Master's and doctoral students as the lead teaching assistant for the spatial statistics and GIS courses at JHSPH for several years. I also received a

Master of Public Health degree from JHSPH. My Master's thesis utilized statistical cluster analysis and GIS to identify and visualize hotspots of Lyme disease transmission in Howard County, Maryland. I received my Bachelor of Science degree in Entomology and Nematology from the University of Florida.

4. Before joining NRDC, I worked as an epidemiologist in the Health Effects Division, Office of Pesticide Programs, U.S. Environmental Protection Agency (EPA). Before that, I held positions as a Mirzayan Science and Technology Fellow at the National Academies of Science, Engineering, and Medicine; as a Brown Scholar in Community Health at Johns Hopkins; and as a Senior Research Assistant with the Johns Hopkins Center to Reduce Cancer Disparities. In these positions and during my graduate school training, I used statistics to analyze data, and the results of my analyses appear in a number of reports and published papers.

5. My *curriculum vitae* is attached as Exhibit A to this Declaration.

6. By virtue of my training, research, prior experience, and knowledge of pertinent scientific literature, I consider myself an expert on spatial and non-spatial data analysis (statistics).

ANALYSIS AND CONCLUSIONS

7. I was asked by counsel for NRDC to evaluate the data and information provided by the New Jersey Department of Environmental Protection (DEP)[1]. I was asked to evaluate this data with respect to two research questions:

(1) Is there a difference in the reported lead concentrations between water sampling from addresses selected by customer request, and water sampling from addresses selected by the City of Newark as part of their sampling pool, which, under the Lead and Copper Rule as I understand it, must consist of homes with specified indicia of risk for lead exposure?

(2) How do reported blood lead levels for children tested in Newark compare to reported blood lead levels for children tested in the rest of New Jersey, over time?

8. For the first question, I find that that there is a significantly greater proportion of high lead concentration samples taken at customer request

[1] It is my understanding that NRDC received the data from DEP in eight separate spreadsheets. Exhibit B lists these spreadsheets. An intern and a fellow at NRDC combined the data from these eight spreadsheets into two Excel spreadsheets (one for customer request locations and one for sampling pool locations), geocoded the addresses in ArcGIS (GIS software), and manually cleaned the data (e.g., fixed typographical errors) prior to my receiving and analyzing the data.

locations compared to sampling pool locations. The proportion of samples with lead measurements greater than 15 micrograms per liter (ug/l) is twice as high for customer-requested samples (37%) as for samples from Newark's sampling pool (16%), and this difference is statistically significant.

9. For the second question, I find that, for each year from 2012 through 2017, the proportion of children under 6 years old with elevated blood lead levels in Newark is higher than that of the rest of New Jersey, and the difference is statistically significant.

10. Attached as Exhibit B to this Declaration is a list of the data that I reviewed. All of the information in this Declaration is based upon my education, personal knowledge, and experience, as well as my personal review of the data extracted from the documents listed in Exhibit B.

Investigation of lead concentrations: customer request versus sampling pool locations

11. The dataset of lead concentration measurements from water sampling done at Newark residences obtained from DEP included the results of 962 samples conducted between January 19, 2017, and December 31, 2018. This dataset included sampling results from 667[2] unique locations (residential

[2] The data obtained from DEP included typographical errors and various spellings of common address terms (e.g., "ave.", "Avenue", "ave", etc.). It is

addresses), which represents approximately 0.60%[3] of all housing units in Newark.

12. Table 1 illustrates the number of samples by location included in the dataset.

my understanding that, after NRDC received the data, an intern and a fellow worked to standardize address styles and correct typographical errors by geocoding the data using ESRI's ArcGIS software and manually inspecting and editing. However, despite this effort, errors and non-standardized spellings may have persisted in the cleaned dataset, and thus the counts of unique locations and summaries of numbers of samples per location may not be exact.

[3] This figure was calculated based on 111,812 housing units in Newark, New Jersey in 2017. U.S. Census Bureau, *ACS Demographic and Housing Estimates*, 2013-2017 American Community Survey 5-Year Estimates, https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP05&prodType=table (accessed Jan. 13, 2019).

	All	Sampling Pool	Customer Requests
Number of samples (% of all)	962 (100%)	429 (44.6%)	533 (55.4%)
Unique sampling locations	667[†]	168	528
Range of number of samples per location	(1, 6[‡])	(1, 5)	(1, 2)
Mean (standard deviation (s.d.)) of number of samples per location	1.44 (0.94)	2.55 (1.24)	1.01 (0.10)
Median number of samples per location	1	3	1

Table 1: Number of water samples tested for lead concentrations at residential homes in Newark, New Jersey, 1/19/17 – 12/31/2018.
[†]*The number of unique locations for all samples does not equal the sum of the number of unique locations for the sampling pool plus the number of unique locations for customer requests due to crossover locations (*i.e.*, addresses that are listed as both sampling pool and as customer request locations in the dataset).*
[‡]*The maximum number of samples per location for all samples is greater than the maximum for either the sampling pool or the customer request locations due to one crossover location (29 Smith Street), which was sampled twice as a customer request and four times as a sampling pool location.*

13. For the 962 samples taken from January 19, 2017, through December 31, 2018, the average lead concentration was 15.11 ug/l (s.d. = 37.59).[4] For the 429 samples taken from locations selected from the sampling pool, the average lead concentration was 7.99 ug/l (s.d. = 16.70). For the 533

[4] For concentrations in water, one microgram per liter (ug/l) is equal to one part per billion (ppb).

samples taken from locations selected by customer request, the average lead concentration was 20.83 ug/l (s.d. = 47.48), over two and a half times greater than the average lead concentration for sampling pool locations.

14. Table 2 illustrates the outcomes of the sampling results in the dataset.

	All	Sampling Pool	Customer Requests
Total number of sampling results *Not all samples taken from unique locations*	962	429	533
Number (%) results with non-zero lead concentration measurement	540 (56.13%)	180 (41.96%)	360 (67.54%)
Number (%) results with 15+ ug/l lead concentration measurement	268 (27.86%)	70 (16.32%)	198 (37.15%)
Number (%) results with 10+ ug/l lead concentration measurement	355 (36.90%)	96 (22.38%)	259 (48.59%)
Number (%) results with 5+ ug/l lead concentration measurement	529 (54.99%)	180 (41.96%)	349 (65.48%)
Mean (s.d.) lead concentration (ug/l)	15.11 (37.59)	7.99 (16.70)	20.83 (47.48)
Median lead concentration (ug/l)	6.63	0	9.66
90th percentile lead concentration (ug/l)	35.29	25.74	44.56
Range* of concentrations (ug/l) **Limits of detection not defined*	(0, 620.00)	(0, 182.00)	(0, 620.00)

Table 2: Summary of outcomes of water samples tested for lead concentration at residential homes in Newark, New Jersey, 1/19/17 – 12/31/2018.

15. I used the chi-square (χ^2) test of independence to assess whether there was a statistically significant difference in lead concentration

measurements between sampling pool locations versus customer request locations, using three different cutoff values[5] to denote "high" lead concentrations in water (15 ug/l, 10 ug/l, and 5 ug/l). χ^2 statistical tests assess the relative frequencies of an outcome between two groups.[6] In this application, χ^2 was used to test whether the outcome (high lead concentration measurements, defined as 15, 10, and 5 ug/l in three separate χ^2 tests) was independent from the testing group (sampling pool or customer request); *i.e.*, whether there was a relationship between the outcome and the testing group.

16. The χ^2 test of independence is a versatile and commonly used statistical technique to assess independence.[7] The test compares the observed proportions (in this case, the proportion of samples with high lead measurements) to the proportions that would be expected if there is in fact no

[5] The three cutoff values selected for testing were the U.S. Environmental Protection Agency (EPA) action level for lead in drinking water (15 ug/l), the World Health Organization (WHO) guideline value (10 ug/l), and the U.S. Food and Drug Administration (FDA) action level (5 ug/l). *See* EPA, *Lead and Copper Rule*, https://www.epa.gov/dwreginfo/lead-and-copper-rule (accessed Feb. 18, 2019); WHO, *Guidelines for Drinking-Water Quality* 383 (4th ed. 2011), https://apps.who.int/iris/bitstream/handle/10665/44584/9789241548151_eng.pdf; FDA, *Bottled Water Everywhere: Keeping it Safe* (June 28, 2010), https://www.fda.gov/ForConsumers/ConsumerUpdates/ucm203620.htm.

[6] *See generally* Beth Dawson & Robert G. Trapp, *Basic & Clinical Biostatistics* (4th ed. 2001).

[7] *See generally id.*

relationship between group type (in this case, sampling pool versus customer request) and outcome (in this case, high lead concentrations).

17. If, in reality, there is no relationship between group type and outcome, then the observed proportions are approximately equal to the expected proportions. In this case, no relationship between group type and outcome would mean that the frequency of high lead measurements at sampling pool locations is roughly the same as the frequency of high lead measurements at customer request locations. If this is true, the test will return a χ^2 statistic less than the critical value[8] of the χ^2 distribution. If, on the other hand, there *is* a real relationship between group type and outcome, then the observed proportions do not approximate the expected proportions, and the test will return a χ^2 statistic larger than the critical value. In this case, a relationship between group type and outcome would mean that the frequency of high lead measurements at sampling pool locations differs from the frequency of high lead measurements at customer request locations. The χ^2 test of independence does not require that observed proportions exactly equal expected proportions to determine group/outcome independence; rather, the test allows for sampling variability, *i.e.*, the variation among all of the possible

[8] The critical value of the χ^2 distribution is based on the number of groups and the number of possible outcomes. This is called the degrees of freedom of the distribution for the given parameters. *See generally id.*

samples that could have been selected from among the population (in this case, the population is all of the residential homes that *could have been* sampled for lead concentrations in water, and the sample is made up of the specific homes that *were* sampled).

18. In addition to the χ^2 statistic, the computer program (in this case, the R statistical computing program) returns a p-value. A p-value is a measurement of the compatibility between the observed outcome and the expected outcome.[9] In this case, the expected outcome is that there will be roughly the same proportion of samples with high lead concentration measurements in the sampling pool group and in the customer request group.

19. Very small p-values indicate that the observed data is not compatible with our expectations; in this application of the χ^2 test of independence, a small[10] p-value indicates that the observed proportions of high lead concentration measurements in the sampling groups differ from the proportions we would expect to see if the outcome (high lead concentration measurements) was independent of the sampling group (sampling pool versus customer request sample locations).

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[9] Sander Greenland et al., Statistical Tests, *P Values, Confidence Intervals, and Power: A Guide to Misinterpretations*, 31 Eur. J. Epidemiology 337 (2016).

[10] Statistical convention considers p-values "small" if they are less than 0.05. *See id.*

20. Three χ^2 tests were run comparing the proportion of high lead concentration measurements at locations selected for sampling from the sampling pool to the proportion of high lead concentration measurements at locations selected for sampling by customer request. The first χ^2 test defined "high lead concentration" as 15 ug/l (*i.e.*, the EPA action level for lead in drinking water[11]), the second χ^2 test defined "high lead concentration" as 10 ug/l (*i.e.*, the World Health Organization (WHO) guideline value[12]), and the third χ^2 test defined "high lead concentration" as 5 ug/l (*i.e.*, the U.S. Food and Drug Administration (FDA) action level[13]).

21. In all χ^2 tests run on the lead concentration measurement data, the χ^2 statistic was much larger than the critical value[14] and the associated p-value was very small (p-value < 0.01 for all tests), indicating a statistically significant difference between the frequency of high lead concentrations at locations selected for sampling from the sampling pool and the frequency of high lead concentrations at locations selected for sampling by customer request. Coupled with the outcome of the summary statistics illustrated in Table 2 (specifically,

[11] *See* EPA, *supra* note 5.
[12] *See* WHO, *supra* note 5.
[13] *See* FDA, *supra* note 5.
[14] χ^2 = 51.32, 70.15, and 53.13 for tests that defined "high lead concentration" as 15, 10, and 5 ug/l, respectively; χ^2 critical value = 3.84.

the higher mean, median, 90th percentile, and upper range limit lead concentration values for customer request versus sampling pool locations), this indicates that there was a significantly higher proportion of high lead concentrations (defined as greater than or equal to 15, 10, or 5 ug/l) at customer request locations compared to sampling pool locations.

22. Because some addresses were sampled repeatedly over the time period (Table 1), the data were investigated for longitudinal effects by location; that is, an analysis was run that recognized that some locations in the dataset had multiple samples taken over time. Samples taken from the same location on different days share environmental similarities that may include drawing water from the same source, using the same service lines, running through the same plumbing fixtures, etc., and since these environmental similarities may be related to the outcome of interest in the analysis (*i.e.*, the lead concentration measurements), results should be investigated for any influence of this repeated sampling at some locations. In statistical terminology, we say that two different samples of lead concentrations in tap water taken at the same house are *clustered by location.*[15]

23. To investigate whether clustering by location affected the analytical results, the analysis described above (paragraphs 15-21) was re-run,

[15] *See generally* Garett Fitzmaurice et al., *Applied Longitudinal Analysis* (2004).

assigning a single value that represented a summary of all of the samples taken at each unique location. Two summary values were considered: the mean (average) and the median (middle value) of all water sample lead measurements done at each location.[16]

24. This investigation found that repeated sampling of some locations over the time period did not change the results of the analyses (paragraph 21); even accounting for clustering by location, there were significant differences between the sampling pool and the customer request locations, with a significantly higher proportion of samples with high lead concentrations (defined as greater than or equal to 15, 10, or 5 ug/l in separate χ^2 tests) at customer request locations than at sampling pool locations.

25. The data were also investigated for the effect of extremely high lead concentration measurement values on the analytical results. The highest 1% of the lead concentration measurements (N = 10 samples) were dropped from the dataset, and the analysis described above (paragraphs 15 - 21) was re-run. This extreme values investigation found that the highest lead concentration measurements did not drive the results of the analyses

[16] There were locations in the dataset that were classified differently on different sampling dates (*e.g.*, a single address listed as a customer request location on first sample and on subsequent samples marked as a sampling pool location). In the longitudinal analysis, these cross-over locations were considered separately in the dataset for each testing category.

(paragraph 21); even when the 10 highest lead concentration measurements were discarded (*i.e.*, removed from the dataset), a significantly higher proportion of samples with high lead concentrations (defined as greater than or equal to 15, 10, or 5 ug/l in separate χ^2 tests) was still found at customer request locations compared to sampling pool locations.

Investigation of blood lead levels: Newark versus New Jersey

26. It is my understanding that the State of New Jersey requires children under 6 years old to be assessed for lead exposure via screening for blood lead levels.[17] Since the fall of 2017, New Jersey has required intervention in cases where children's blood lead levels were greater than or equal to 5 micrograms per deciliter (ug/dl) of blood.[18]

27. The blood lead levels of children under 6 years old was investigated to compare the proportion of children with elevated blood lead levels (EBLL), defined as 5 ug/dl of blood or greater (*i.e.*, the action level for intervention), in Newark to the proportion of children with EBLL in the rest of

[17] N.J. Dept. Health, *Childhood Lead Exposure in New Jersey: State Fiscal Year 2016*, 9 (2016), https://www.state.nj.us/health/childhoodlead/documents/reports/childhoodlead2016.pdf ("In New Jersey, per N.J.A.C. §8:51A, all children are required to be tested at both 12 and 24 months of age. Any child three (3) years of age or older must be tested at least once before their sixth birthday (if they had not been screened at age one (1) and two (2) years).").

[18] *See id.*

New Jersey (*i.e.*, New Jersey excluding Newark), from 2012[19] – 2017. The blood lead level data from 2012 – 2016 was extracted from the yearly Annual Childhood Lead Report.[20] It is my understanding that the 2017 data was obtained by NRDC from the Advocates for Children of New Jersey (ACNJ).

28. Since 2012, the proportion of children under 6 years old with EBLL has been significantly higher every year in the City of Newark compared to the rest of New Jersey (*i.e.*, New Jersey excluding Newark) (Figure 1).

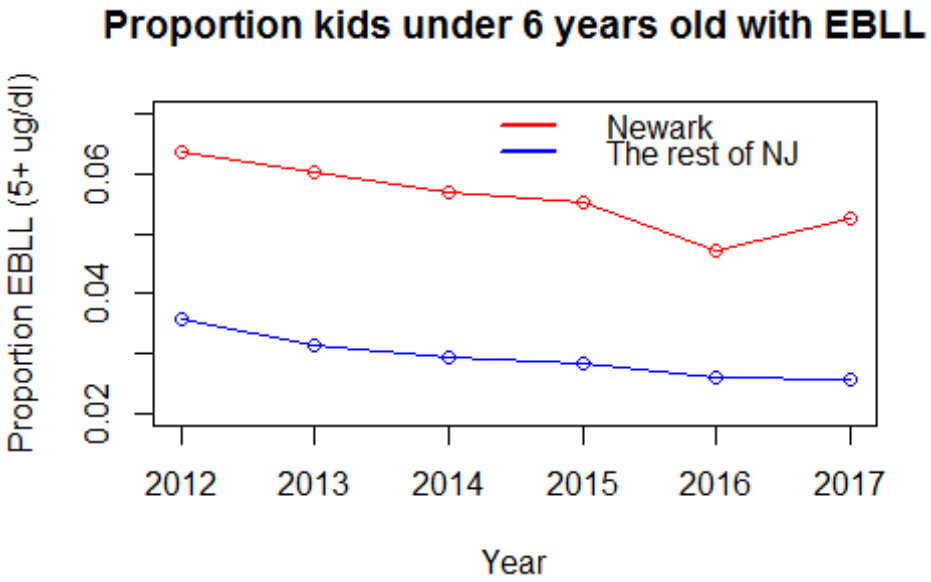

Figure 1: Proportion of children under 6 years old with elevated blood lead levels (EBLL), defined as 5 ug/dl of blood or greater, in Newark (red) and in the rest of New Jersey (*i.e.*, excluding Newark; blue), 2012 – 2017.

[19] 2012 was the first year that the data was available at the level of 5 ug/dl of blood and greater from New Jersey Department of Health's annual reports on childhood lead exposures. Prior years reported only blood lead levels of 10 ug/dl and greater. *See generally Childhood Lead Poisoning in New Jersey Annual Reports*, https://www.state.nj.us/health/childhoodlead/data.shtml (accessed Jan. 24, 2019).

[20] *Id.*

29. The proportion of children with EBLL in Newark was compared to the proportion of children with EBLL in the rest of New Jersey with the χ^2 test of independence for all years separately to determine if the outcome, *i.e.*, the proportion of EBLL, was independent of the geographic group, *i.e.*, Newark versus the rest of New Jersey (see paragraphs 15-19 for a more detailed explanation). In all χ^2 tests, the χ^2 statistic was much larger than the critical value[21] and the associated p-value was very small (p-value < 0.01 for all tests), indicating a statistically significant difference between the frequency of EBLL in Newark compared to the frequency of EBLL in the rest of New Jersey for all years (2012 – 2017). Coupled with the yearly proportions of EBLL cases in Newark compared to the rest of New Jersey (Table 3), the outcomes of the χ^2 tests indicated that there was a significantly higher proportion of EBLL in children in Newark compared to children in the rest of New Jersey for every year, from 2012 through 2017.

[21] χ^2 = 272.11, 348.41, 322.95, 315.52, 224.06, and 331.02 for 2012, 2013, 2014, 2015, 2016, and 2017, respectively; χ^2 critical value = 3.84.

Year	Newark		New Jersey excluding Newark	
	# Screened	% EBLL†	# Screened	% EBLL†
2012	13,879	6.37%	169,738	3.59%
2013	14,607	6.02%	161,913	3.12%
2014	14,030	5.70%	157,241	2.93%
2015	14,257	5.51%	158,602	2.84%
2016	14,190	4.73%	160,812	2.58%
2017	13,536	5.24%	155,765	2.56%

Table 3: Elevated blood lead levels (≥ 5 ug/dl) in Newark and in the rest of New Jersey (*i.e.*, New Jersey excluding Newark), 2012 – 2017.
†Elevated blood lead level (EBLL), defined as ≥ 5 ug/dl

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: February 21, 2019

Stacy E. Woods, Ph.D., M.P.H.

Exhibit A

EXHIBIT A TO DECLARATION OF STACY WOODS, Ph.D., M.P.H.

Stacy E. Woods, MPH, PhD
1152 15th Street NW, Suite 300
Washington, DC 20005
(202) 513 - 6260 ext. 2260
Swoods@nrdc.org

EDUCATION

Doctor of Philosophy, Environmental Health Sciences
Johns Hopkins Bloomberg School of Public Health, Baltimore, MD
June 2016
Risk Sciences and Public Policy Certificate (2013)
Dissertation: "Investigating the space-time variation in fine particulate matter pollution in the Northeastern United States, 2000 – 2014"

Master of Public Health
Johns Hopkins Bloomberg School of Public Health, Baltimore, MD
December 2010
Capstone: "Spatial analysis of Lyme disease in Howard County, Maryland"

Bachelor of Science, Entomology and Nematology
University of Florida, Gainesville, FL
December 2001

WORK HISTORY

Staff Scientist, Natural Resources Defense Council (NRDC), Washington, DC (November 2017 – present).

- Conduct statistical analysis for scientific research projects
- Provide advice on use of spatial and non-spatial data, statistics, and visual displays of data including maps and graphs to NRDC colleagues
- Create static and interactive maps for various NRDC research projects, policy analyses, and litigation
- Serve as manager of ArcGIS software package and provide trainings on ArcGIS to NRDC staff

Epidemiologist, United States Environmental Protection Agency, Office of Pesticide Programs, Washington, DC (July 2016 – November 2017).

- Composed systematic literature reviews for pesticides undergoing registration review

Mirzayan Science & Technology Policy Fellow, The National Academies of Science, Engineering, and Medicine, Washington, DC (January 2015 – April 2015).

- Drafted internal reports and study prospectuses for the Board on Environmental Sciences and Toxicology (BEST)
- Attended ad hoc committee meetings at the National Academy of Sciences, which included members of academia, policy makers, nonprofits, and industry

C. Sylvia and Eddie C. Brown Scholar in Community Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD (August 2011 – June 2016).

- Developed innovative approach to evaluate small-scale variability of particulate pollution to identify area-specific pollution trends and represented area of potential public health concern through static and interactive maps
- Applied original small-scale methodology to investigate how the fracking industry has influenced particulate pollution variability across Pennsylvania
- Collected and analyzed ambient air quality samples for benzene in South Baltimore
- Executed spatial and temporal analyses of neighborhood drug markets and sexually transmitted infections in Baltimore City, and created static maps for publication

Teaching Assistant (Lead), Geographic Information Systems (GIS) and Spatial Statistics, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD (January 2012 – April 2015).

- Gave lectures, held office hours, prepared assignments, and graded graduate students of the GIS and spatial statistics courses

Senior Research Assistant, Center to Reduce Cancer Disparities, Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD (January – August, 2011).

- Collaborated on papers for public dissemination to technical audiences regarding longitudinal epidemiology studies of cancer disparities
- Provided spatial assessment of socio-economic and health outcomes in Prince George's County, Maryland, including creating maps for communication of health outcomes to non-technical audiences

Public Health Intern, Howard County Health Department, Columbia, MD (October 2009 – March 2010).

- Designed and implemented study to characterize geographic distribution of Lyme disease and identify significant disease clusters in Howard County, Maryland

Biologist, University of Florida, Florida Medical Entomology Laboratory, Vero Beach, FL (September 2005 – August 2007).

- Conducted species surveys and characterized changes in relative abundance of Florida mosquitoes in response to control activities

PUBLICATIONS

Woods, SE, Waugh, DW, Koehler, KA, Davis, MF, Fox, MA, Rule, AM, and Curriero, FC (2019). Investigating the large scale trends and small scale spatial variation in PM2.5 pollution and the efficacy of federal emissions regulations in reducing fine particulate pollution in the northeastern United States. [In Progress]

Woods, SE, Waugh, DW, Koehler, KA, Davis, MF, Fox, MA, Rule, AM, and Curriero, FC (2019). The association of the fracking industry with small scale variability in PM2.5 pollution in Pennsylvania, 2004 - 2014. [In Progress]

Meyer, WK, . . . Woods, SE, et al. (2018) Ancient convergent loss of PON1 yields deleterious consequences for modern marine mammals Science 361.6402 (2018): 591-594.

Jennings JM, Woods SE, Curriero FC (2013). The spatial and temporal association of neighborhood drug markets and rates of sexually transmitted infections in an urban setting. Health & Place Volume 23, September 2013, Pages 128–137.

DISCIPLINARY SKILLS

GIS and statistical skills and software:

- Education in and advanced application of spatial, multilevel, and longitudinal data analyses
- Statistical coding and analysis in R, STATA, SAS, and SaTScan
- Mapping, data management, and analysis in GIS (ArcGIS including Desktop Suite and Online, qGIS, R)

Additional computer skills and software:

- Online literature databases including PubMed, Scopus, Web of Science, Science Direct, and Google Scholar
- Citation manager software including Endnote, RefWorks, and Zotero
- Adobe Creative Suite including Photoshop

Exhibit B

EXHIBIT B TO DECLARATION OF STACY WOODS, Ph.D., M.P.H.

The following is a list of the data that I reviewed for my declaration:

1. Lead concentration measurements for samples taken at locations identified for sampling by customer requests, 1/19/2017 – 12/31/2018.

2. Lead concentration measurements for samples taken at locations identified for sampling by sampling pool, 3/24/2017 – 12/31/2018.

3. Blood lead levels for children under 6 years old, 2012 – 2016, extracted from the New Jersey Department of Health's Annual Childhood Lead Report. Accessed 1/24/2019 from https://www.state.nj.us/health/childhoodlead/data.shtml2017.

4. Blood lead levels for children under 6 years old, 2017, Newark and New Jersey. It is my understanding that this was obtained by NRDC from Advocates for Children of New Jersey (ACNJ).

It is my understanding that the lead concentration data (numbers 1 and 2 above) were compiled by an intern and a fellow at NRDC from the following documents:

1. All Pb Cu Sample Results for Newark 1.1.2017 to 09.30.2018 (101918) (1).xlsx, received by NRDC from Peter Chen, ACNJ, on 11/20/18.

2. Newark Lead Data 10.01.2018 to 10.31.2018 (11.19.2018).xlsx, received by NRDC from Peter Chen, ACNJ, on 11/20/18.

3. OPRA 239967 - Newark Lead Data 06_30_2018_to_11_27_2018 (Revised).xlsx, received by NRDC from NJDEP in response to OPRA request, on 12/6/18.

4. 01.10.2019 Newark Pb Cu data 07-01-2018 to 12-31-2018.xlsx, received by NRDC from Peter Chen, ACNJ, on 1/11/19.

5. CITY_NEWARK_000482.xlsx, received through discovery from City of Newark, on 12/12/18.

6. CR Lead Results January2017 .xlsx, received through discovery from City of Newark, on 1/18/19.

7. CR Lead Results for DEP JULY2018 .xlsx, received through discovery from City of Newark, on 1/18/19.

8. CITY_NEWARK_000581_CONFIDENTIAL, received through discovery from City of Newark, on 1/4/19.