California Wildfires are analogous to the World Trade Center disaster, Military Burn Pits/K2, and the East Palestine, Ohio Train Derailment

Anthony M. Szema, MD, ATSF

Chair, ATS Section on Terrorism and Inhalation Disasters (TID)

DISCLOSURES

•2024-6 NIH NCI SEER Covid-19 Real World Data Infrastructure (CRWDi) Northwell Research Group (Crawford, PI) "Examining the synergistic effect of COVID-19 infection and Vaping on Respiratory Illness" (PI Szema)

• 2022-5 Site PI and co-investigator $3.5 million CDMRP Congressionally Directed Medical Research Program DOD Department of Defense Peer Reviewed Medical Research Program (PRMRP) PR211133 - "A Wearable Device for Airborne Hazard and Burn Pit Exposure Monitoring"(PI Cridge)

•2022-present Northwell Health Veterans Liaison Service Department grant for remote monitoring devices(PI Szema)

•2021-Present Principal Investigator, New York State "A Manufacturing and Technology Resource Consortium (MTRC) Supplemental Award Agreement" MTRC Project No. 20211012.1605 (PI Szema)

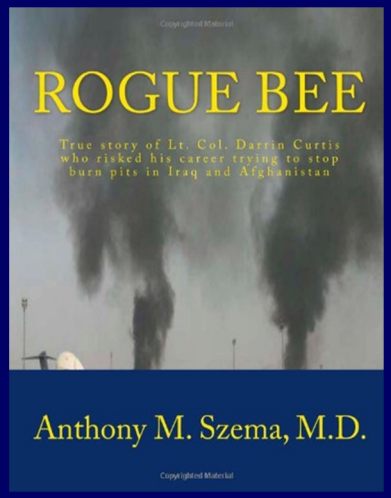
•2021-2026 Site PI and co-investigator CDC NIOSH SW3U01 OH012264 Longitudinal Follow-Up of 9/11Directly Exposed Children in their Age of Transition: Independence, Occupation and Morbidity (Hoven PI)

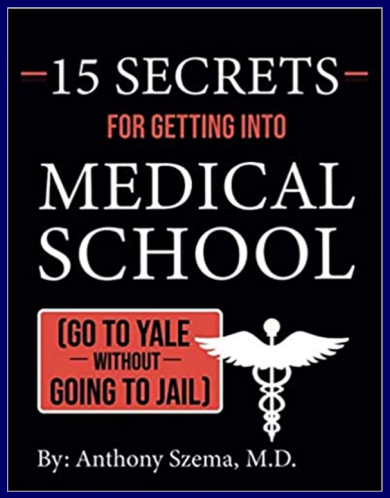
•2020-2024 Consultant, NIH NHLBI R01 HL152385 05/01/20-04/30/24, "Childhood Mass Trauma Exposure, Inflammatory Programming, and Psychopathology in Young Adulthood" extended due to Columbia University research pause (Hoven, Amsel, MPIs)

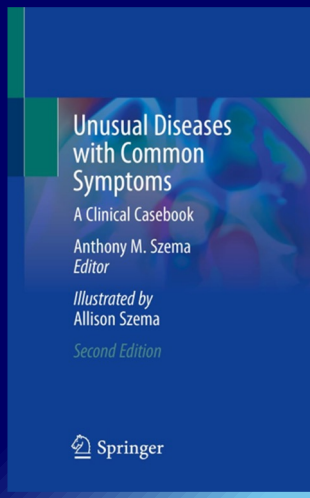
•2020-Present Butterfly Ultrasound Unlimited Cloud Storage Grant for Resource Limited Studies (PI Szema)

•2018-Present Site PI and Co-Investigator Centers for Disease Control Grant CDC NIOSH U01 OH011308 "9/11 Trauma and Toxicity in Childhood: Longitudinal Health and Behavioral Outcomes" (PI Hoven)

DISCLOSURES







CME Slide deck for primary care providers at Warrior Centric Health on Burn Pits

RDS2 solutions

Home Our Work Our Team Contact

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(LIHTI)
25 Health Sciences Drive, Suite 214A, Stony Brook, NY 11790
Tel: (631) 3740607 FAX: (631) 444-8825
szemasolutions@gmail.com
rds2solutions.com

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PHONE: 631-675-6474
FAX: 631-675-6475
threevillageallergy.com

Reflections on 9/11:

- Asthma, allergy, lung injury in children and rescue workers post 9/11
- Comparison to Military Burn Pits/K2
- California/Canadian Wildfires
- East Palestine, Ohio Train derailment of 2023

Reflections on 9/11:

- Asthma, allergy, lung injury in children and rescue workers post 9/11
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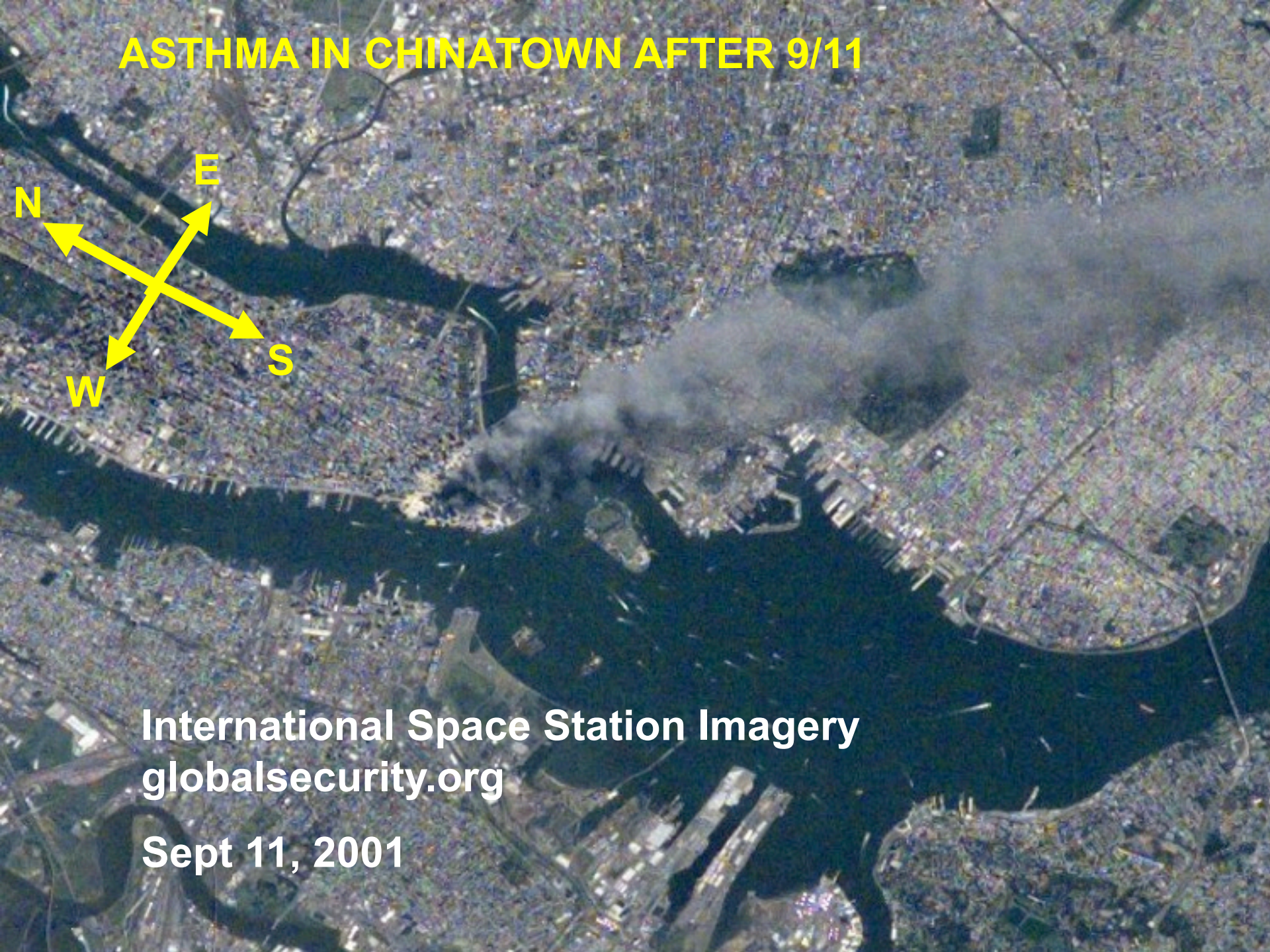
ASTHMA IN CHINATOWN AFTER 9/11



International Space Station Imagery
globalsecurity.org

Sept 11, 2001

This man , who was pulled from the debris by co-workers on the 91st floor of the World Trade Center's north tower, covers his mouth as he walks through debris after the collapse of one of the World Trade Center Towers. Photo by Stan Honda/AFP.

A woman covered in dust takes refuge in an office building after the top of one of the World Trade Center towers collapsed. The woman was caught outside on the street as the cloud of smoke and dust enveloped the area. Photo by Stan Honda/AFP.

COMPOSITION OF DUST AND SMOKE AEROSOL FROM THE COLLAPSE OF THE WTC

(collected on September 16 and 17, 2001)

- Polycyclic aromatic hydrocarbons (>0.1% of the mass)
- Polychlorinated biphenyls
- Polychlorinated dibenzodioxins
- Polychlorinated dibenzofurans
- Pesticides
- Phthalate esters

- Plastic

- Partially burned jet fuel
- Soot

- Inorganic metals
- Radionuclides
- Ionic species

- Asbestos (0.8%-3.0% of the mass)

Lioy P, Weisel CP, Millette JR, et al. Characterization of the dust/smoke aerosol that settled east of the World Trade center (WTC) in Lower Manhattan after the collapse of the WTC 11 September 2001. Environ Health Perspect 2002;110:703-712.

COMPOSITION OF DUST AND SMOKE AEROSOL FROM THE COLLAPSE OF THE WTC

(collected on September 16 and 17, 2001)

70% of samples comprised construction materials:

- **Office furnishings**
- **Pulverized cement**
- **Glass fibers (mineral wool and fiberglass)**
- **Wallboard**
- **Paint (leaded and unleaded)**

Lioy P, Weisel CP, Millette JR, et al. Characterization of the dust/smoke aerosol that settled east of the World Trade center (WTC) in Lower Manhattan after the collapse of the WTC 11 September 2001. Environ Health Perspect 2002;110:703-712.

- Dust samples collected at the World Trade Center site on September 12, 2001 were found to be rich in calcium-based compounds

- Calcium-based compounds are known to irritate the upper airways

McGee JK, Chen LC, Cohen MD, et al. Chemical analysis of World Trade Center fine particulate matter for use in toxicological assessment. Environ Health Perspect 2003;111:972-980.

Composition of inhalants from the World Trade Center Disaster

- Organo-chlorine pesticides
- Phosgene
- Cadmium
- Mercury
- Diesel exhaust
- Hydrogen Sulfide

Composition of inhalants from the World Trade Center Disaster

- Carbon Monoxide
- Nitrogen Dioxide
- Nitric oxide
- Smog
- Sulfur dioxide
- Chlorine
- Phosgene
- Freon

NYC Households With At Least One Person With Asthma (2000 Census data)

• Non-Hispanic white	11.0
• Non-Hispanic black	15.8
• Puerto Rican	28.0
• Dominican	14.8
• Central/South American	13.0
• Mexican	5.0
• Other Hispanic (Cuban)	16.8
• Chinese	6.8
• Asian Indian	7.3
• Other Asian	11.7

Other Asian comprises Korean, Japanese, Filipino, Vietnamese, and other Pacific Islanders)

Rosenbaum E. Racial/ethnic differences in asthma prevalence: the role of housing and neighborhood environments. *J Health Soc Behav*. 2008 Jun;49(2):131-45.

ASTHMA IN CHINATOWN AFTER 9/11

HYPOTHESES

1. Pediatric asthma patients exposed to the World Trade Center disaster may experience increased asthma severity.

2. Some previously healthy children may be newly diagnosed with asthma after September 11, 2001.

ASTHMA IN CHINATOWN AFTER 9/11
STUDY POPULATION

- Chinese-American pediatric asthmatic patients who live in New York City

- Receive medical care at the Charles B. Wang Community Health Center (CBWCHC), located in lower Manhattan's Chinatown, approximately 1.5 miles from the WTC.

ASTHMA IN CHINATOWN AFTER 9/11

Charles B. Wang Community Health Center

王嘉廉社區醫療中心

ASTHMA IN CHINATOWN AFTER 9/11

Demographic Characteristics of Chinese-American Pediatric Asthmatic Patients

CHARACTERISTICS	ALL PATIENTS
Age (y)	8.18±3.47
Sex	
Female, n (%)	69 (34.2)
Male, n (%)	133 (65.8)
Height (in)	
Before 9/11	48.69±9.71
After 9/11	50.63±8.05
Weight (lbs)	
Before 9/11	63.94±31.45
After 9/11	71.43±34.43

ASTHMA IN CHINATOWN AFTER 9/11

Demographic Characteristics of Chinese-American Pediatric Asthmatic Patients

CHARACTERISTICS	REGION 1 (<5 mi WTC)
Age (y)	7.81±3.07
Sex	
Female, n (%)	27 (33.3)
Male, n (%)	54 (66.7)
Height (in)	
Before 9/11	47.53±7.38
After 9/11	49.99±7.08
Weight (lbs)	
Before 9/11	59.80±26.26
After 9/11	66.58±28.91

ASTHMA IN CHINATOWN AFTER 9/11

Demographic Characteristics of Chinese-American Pediatric Asthmatic Patients

CHARACTERISTICS	REGION 2 (>5 mi WTC)
Age (y)	8.42±3.70
Sex	
Female, n (%)	42 (34.7)
Male, n (%)	79 (65.3)
Height (in)	
Before 9/11	49.40±10.98
After 9/11	51.24±8.67
Weight (lbs)	
Before 9/11	66.57±34.30
After 9/11	74.93±37.48

ASTHMA IN CHINATOWN AFTER 9/11

Demographic Characteristics of Chinese-American Pediatric Asthmatic Patients

CHARACTERISTICS	REGION 1 (<5 mi WTC)	REGION 2 (>5 mi WTC)	P Value
Age (y)	7.81±3.07	8.42±3.70	NS
Sex			
Female, n (%)	27 (33.3)	42 (34.7)	NS
Male, n (%)	54 (66.7)	79 (65.3)	NS
Height (in)			
Before 9/11	47.53±7.38	49.40±10.98	NS
After 9/11	49.99±7.08	51.24±8.67	NS
Weight (lbs)			
Before 9/11	59.80±26.26	66.57±34.	NS
After 9/11	66.58±28.91	74.93±37.48	NS

ASTHMA IN CHINATOWN AFTER 9/11

ASTHMA CLINIC VISITS AND ASTHMA PRESCRIPTIONS INCREASED

ASTHMA IN CHINATOWN AFTER 9/11

Map of New York City with zip codes from patients seen at the Charles B. Wang Community Health Center.

ASTHMA IN CHINATOWN AFTER 9/11

TABLE III. Asthma treatments in Chinese American pediatric patients treated at the CBWCHC, September 11, 2000–September 10, 2002, according to region of residence

Clinical parameter	Region 1			Region 2		
	9/11/2000–9/10/2001	9/11/2001–9/10/2002	*P* value	9/11/2000–9/10/2001	9/11/2001–9/10/2002	*P* value
Clinic visits for asthma (no. of visits per child)	3.95 ± 3.07	5.10 ± 4.01	.013	3.71 ± 3.26	4.40 ± 3.21	.063
Asthma prescriptions (no. of prescriptions per child)	2.15 ± 1.51	2.46 ± 1.14	NS	2.00 ± 1.46	2.23 ± 1.22	NS
Rescue inhaler doses per week (no. of doses per child)	4.61 ± 7.70	4.89 ± 8.41	NS	8.87 ± 10.17	7.57 ± 9.21	NS
Oral steroid use (% yes)	0.23 ± 0.45	0.20 ± 0.44	NS	0.18 ± 0.45	0.17 ± 0.45	NS

NS, Not significant.

MORE ASTHMA VISITS FOR CHILDREN WITHIN 5 MILES

ASTHMA IN CHINATOWN AFTER 9/11

Asthma treatments in Chinese-American pediatric patients treated at the CBWCHC, September 11, 2000-September 10, 2002, according to region of residence

	REGION 1		
Clinical Parameter	**9/11/2000 -9/10/2001**	**9/11/2001 -9/10/2002**	**P Value**
Clinic visits for asthma (no. visits per child)	3.79±3.18	4.69±3.54	.002
Asthma prescriptions (no. of prescriptions per child)	2.05±1.48	2.33±1.19	.018
Rescue inhaler doses per week (no. of doses per child)	7.15±9.46	5.25±8.85	.058
Oral steroid use (% yes)	20±45	19±45	NS

ASTHMA IN CHINATOWN AFTER 9/11

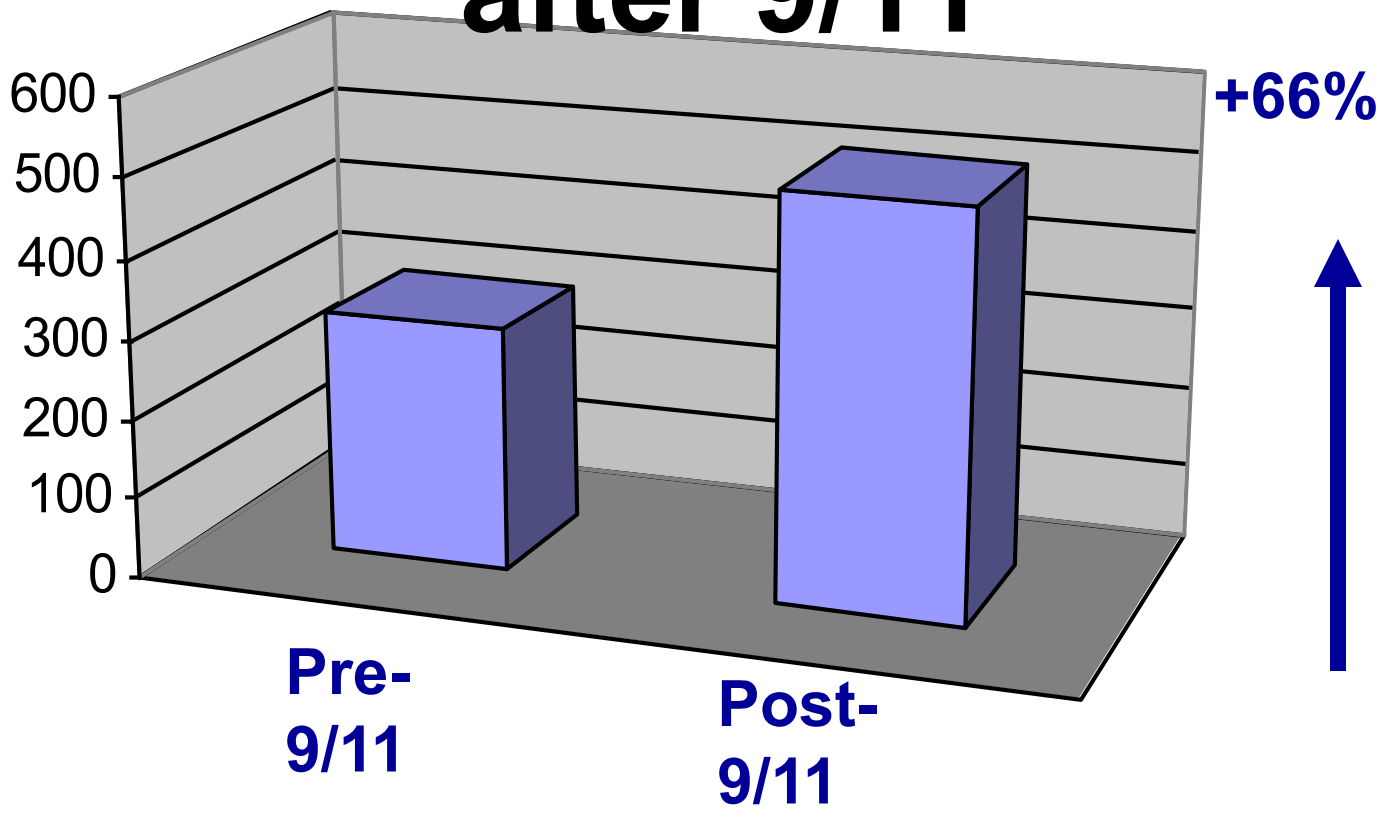
MORE ASTHMA VISITS FOR CHILDREN WITHIN 5 MILES

ASTHMA IN CHINATOWN AFTER 9/11

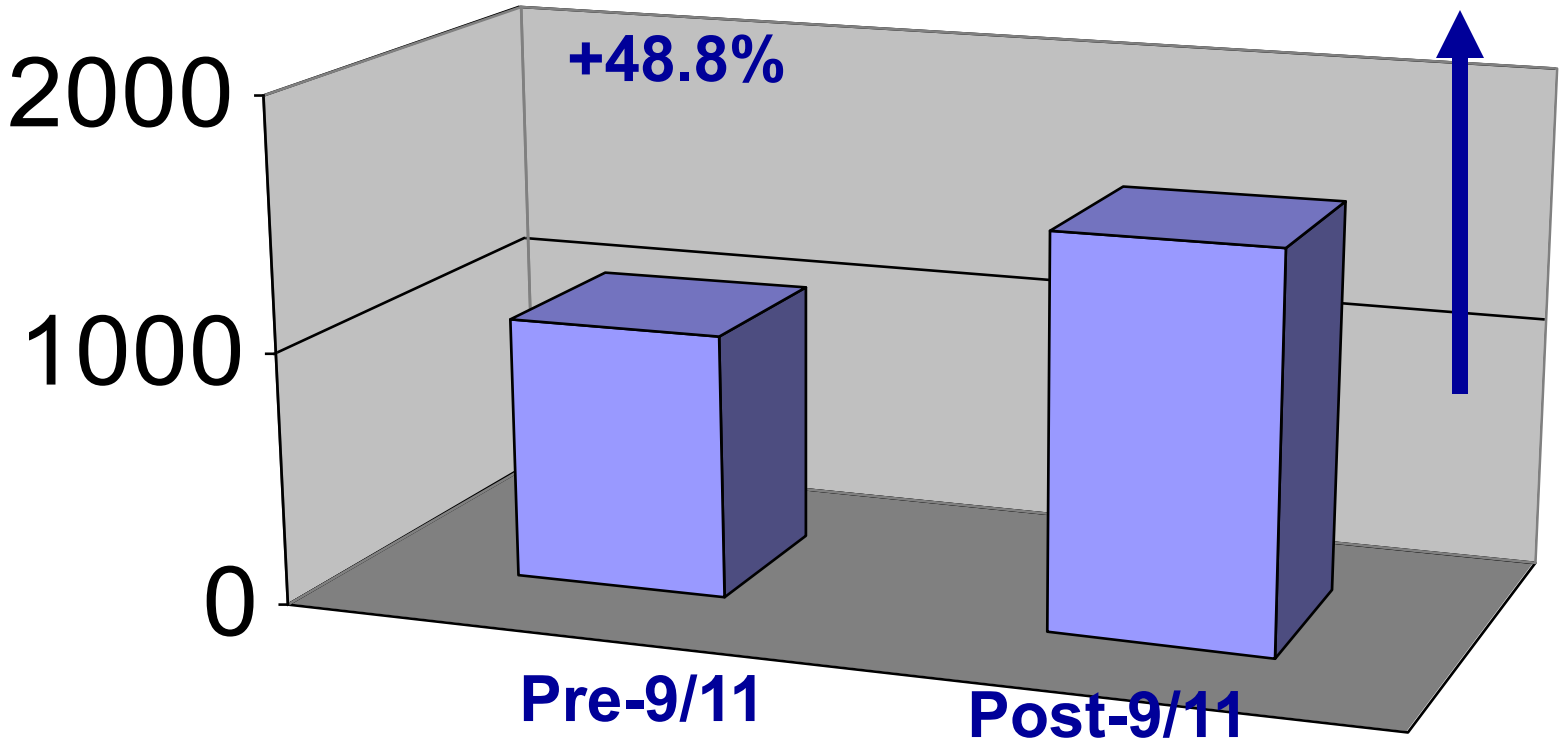
- Number of children with asthma increased 66%
- Pediatric asthma visits increased 48.8%

ASTHMA IN CHINATOWN AFTER 9/11

Increase in pediatric patients in Chinatown after 9/11



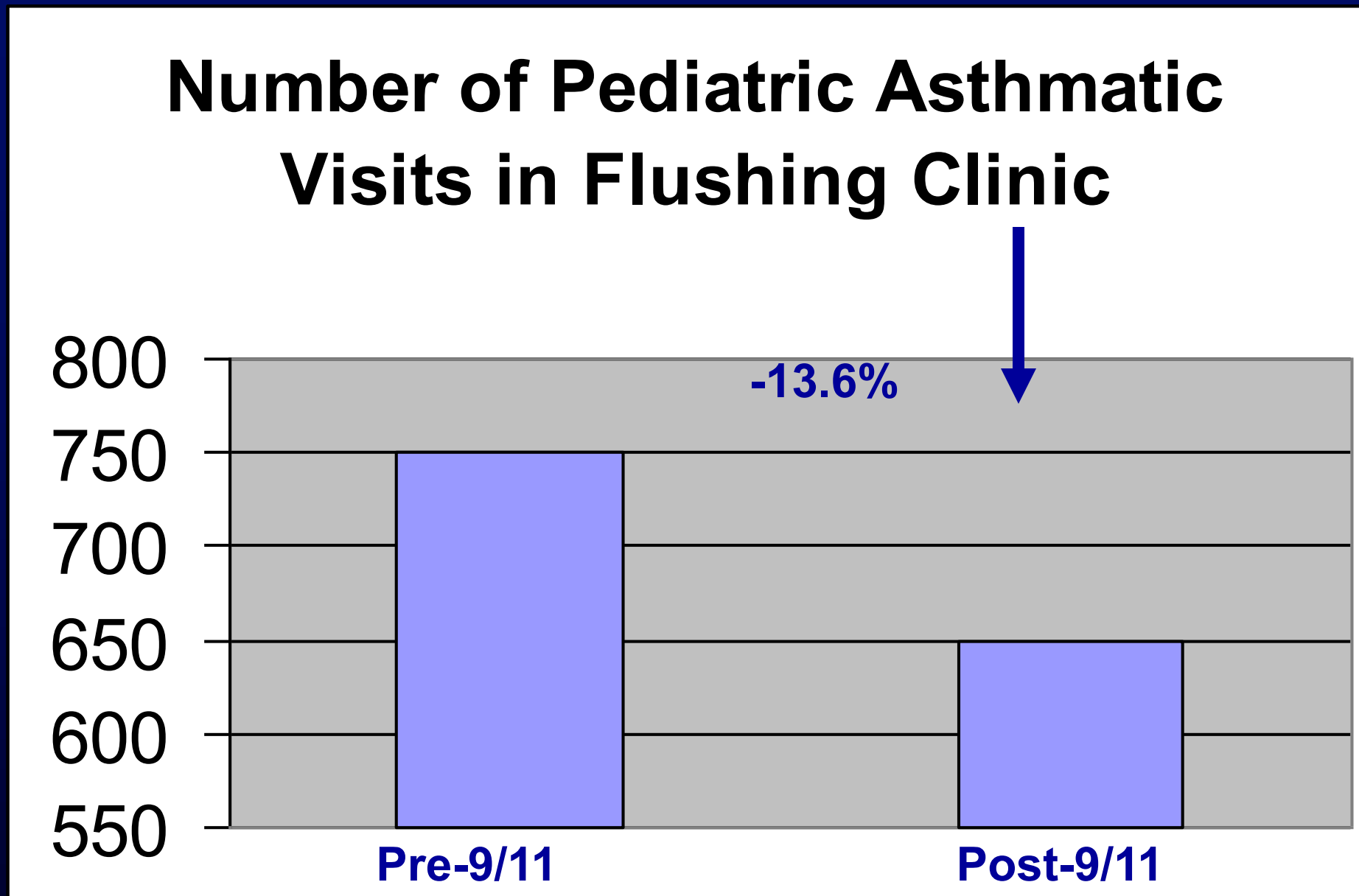
Increase in pediatric asthma visits in Chinatown after 9/11



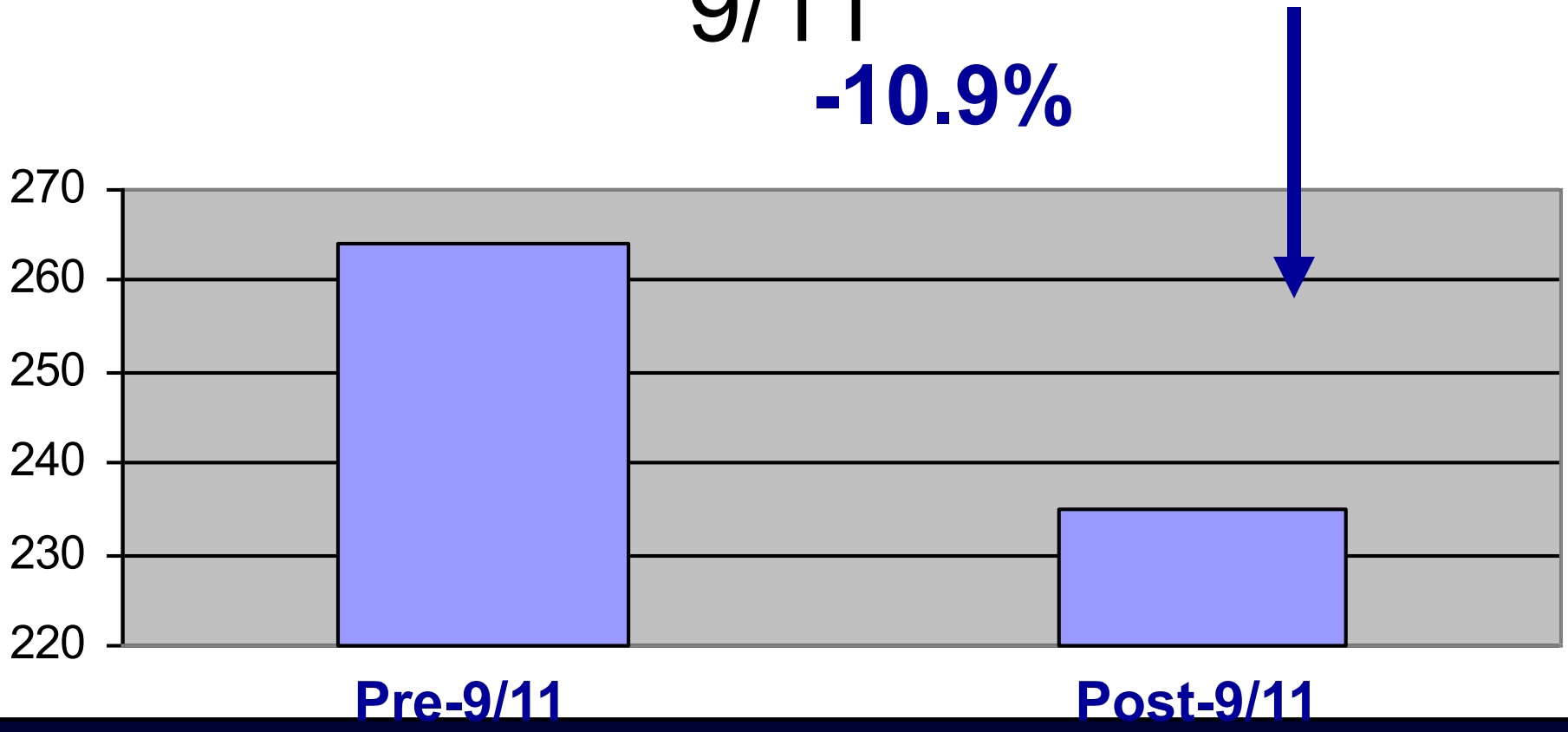
ASTHMA IN FLUSHING AFTER 9/11

- Number of children with asthma decreased 10.9% 
- Pediatric asthma visits decreased 13.6% 

ASTHMA IN FLUSHING AFTER 9/11



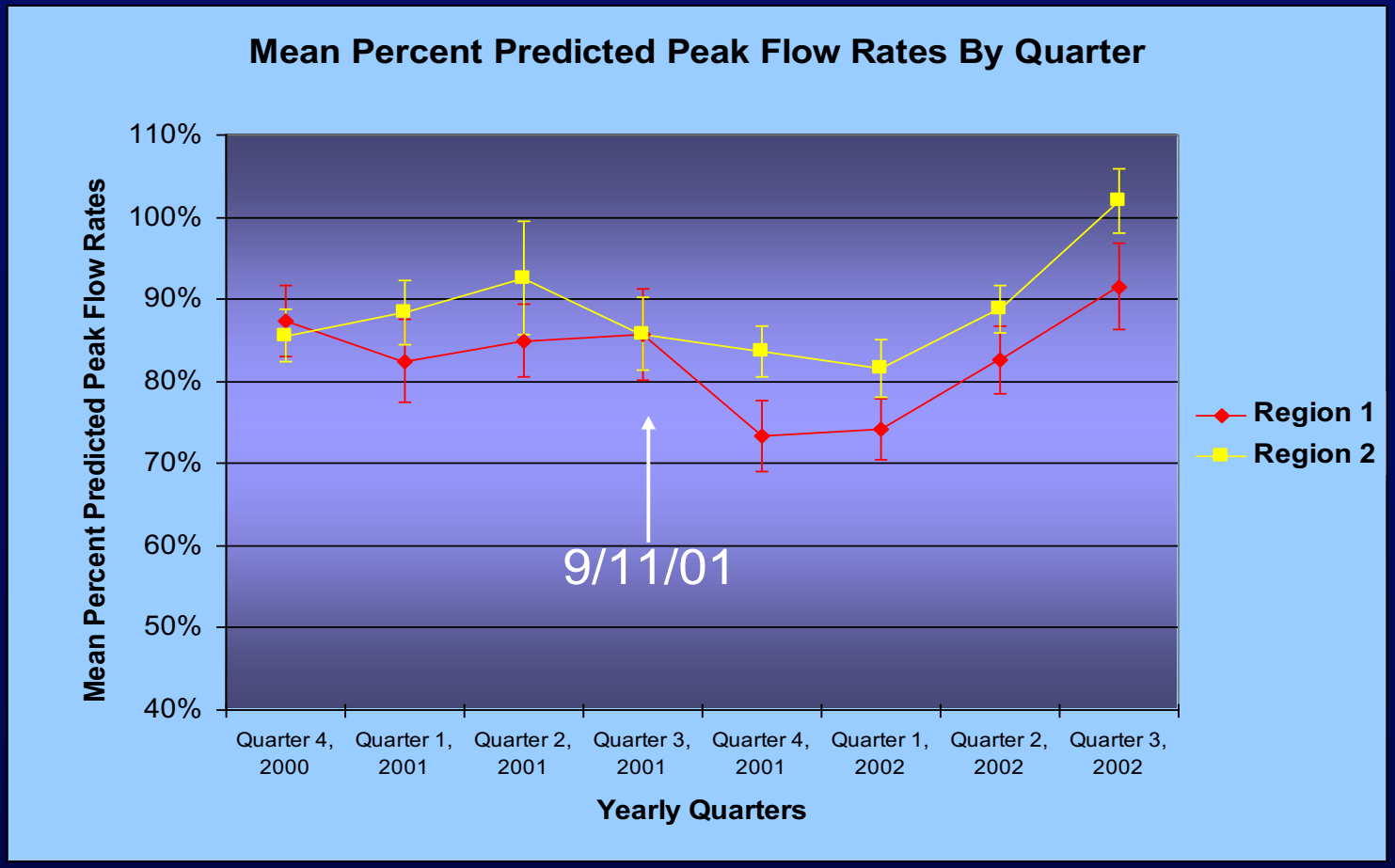
Decrease in pediatric asthma patients in Flushing after 9/11



ASTHMA IN CHINATOWN AFTER 9/11

Mean percent predicted peak flow rates decreased below 80% for 6 months for those living < 5 miles from Ground Zero

ASTHMA IN CHINATOWN AFTER 9/11



All values in Region 2 were within normal limits (greater than 80% predicted) throughout the two-year study period.

In Region 1, however, values fell below normal (73.4%) for the quarter following 9/11/01 and gradually returned to baseline (within the normal range) two quarters after the disaster.

ASTHMA IN CHINATOWN AFTER 9/11

CONCLUSIONS

- Residential proximity to Ground Zero was predictive of the degree of decrease in asthma health

ASTHMA IN CHINATOWN AFTER 9/11

CONCLUSIONS

Exposure to the World Trade Center disaster led to:

INCREASED ASTHMA SEVERITY

ASTHMA IN CHINATOWN AFTER 9/11

CONCLUSIONS

- After September 11, 2001 these children had more asthma-related clinic visits (p=.002)

ASTHMA IN CHINATOWN AFTER 9/11

CONCLUSIONS

- These children received more prescriptions for asthma medications (p=.018)

ASTHMA IN CHINATOWN AFTER 9/11

CONCLUSIONS

- Those children living within 5 miles had more clinic visits after September 11, 2001 (p=.013)

ASTHMA IN CHINATOWN AFTER 9/11

CONCLUSIONS

- The increase in visits for children living further than 5 miles from Ground Zero was not significant

ASTHMA IN CHINATOWN AFTER 9/11

CONCLUSIONS

- Mean percent predicted peak expiratory flow rates decreased solely for those patients living within 5 miles of Ground Zero after September 11, 2001

ASTHMA IN CHINATOWN AFTER 9/11

CONCLUSIONS

- Asthma severity worsened after September 11, 2001, in pediatric asthmatic patients living near Ground Zero.

ASTHMA IN CHINATOWN AFTER 9/11

RESEARCH TEAM

Stony Brook Allergy/Immunology Fellows

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- Holly Lee, F.N.P.

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- Hongtu Chen, Ph.D.

Post 9/11: High Asthma Rates Among Children in Chinatown, New York

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Kevin Lai, M.D.

Stony Brook Medicine

Disclosures

Support

- Stony Brook MD with Recognition in Research Program for student funding
- NSpire Corp. who loaned 3 spirometers
- NYC Department of Education for approval of study
- NYS Department of Environmental Conservation for air pollution data

Spirometry

- Spirometry calibrated daily and results adjusted for temperature, barometric pressure, age, height, gender, and race.

- A minimum of 8 forced vital capacity (FVC) maneuvers were performed to achieve 3 acceptable flow-volume loops with 2 being within 200 mL for FVC and forced expiratory volume at 1 second (FEV1).

- The value assigned to a participant was the largest acceptable value within 200 mL of a second value.

Outdoor Air Pollution

Thermo Scientific 1400ab TEOM monitor.

2 fine particulate sampler monitors were deployed on the roof (14m above ground) of the elementary school.

Installed by NYS Department of Environmental Conservation, 2.5 µm-sized particulate mass samples collected continuously every 3 days.

Indoor Air Pollution - Aeroallergens

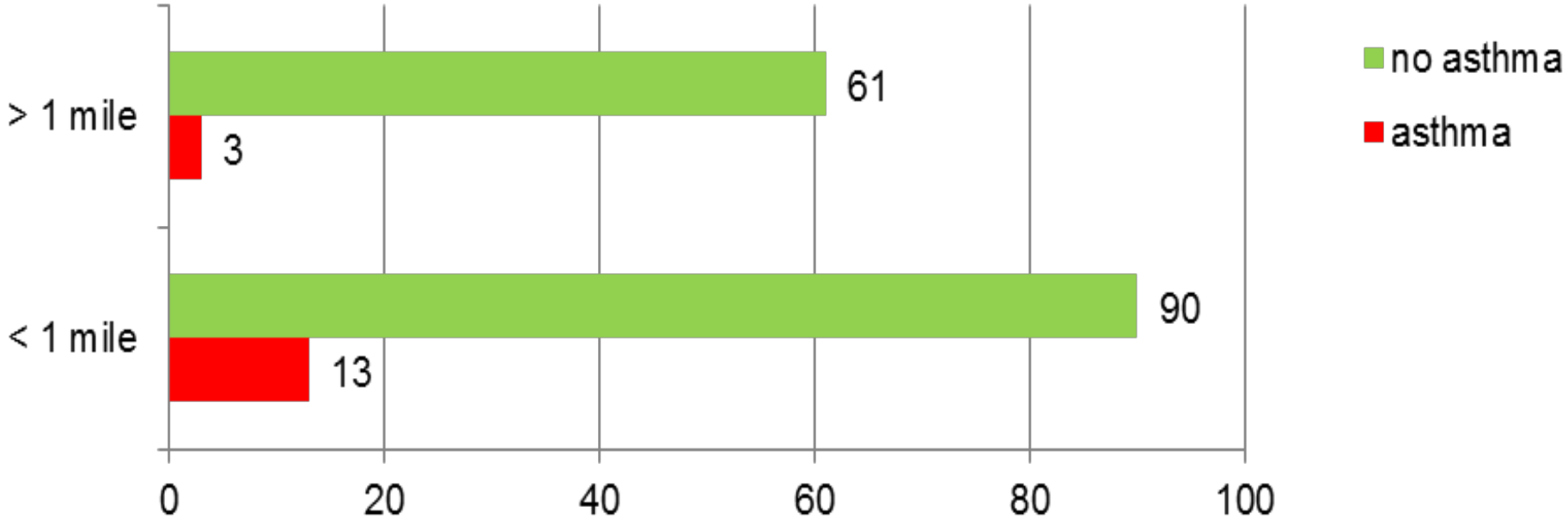
- Using a DUSTREAM ™ vacuum collection system, dust from around the school was collected and sent to Indoor Biotechnologies (Charlottesville, VA) to be analyzed by ELISA for concentrations of antigens
  - Mouse
  - Rat
  - Feline (cat)
  - Cockroach
  - 3 groups of dust mites
  - Dog



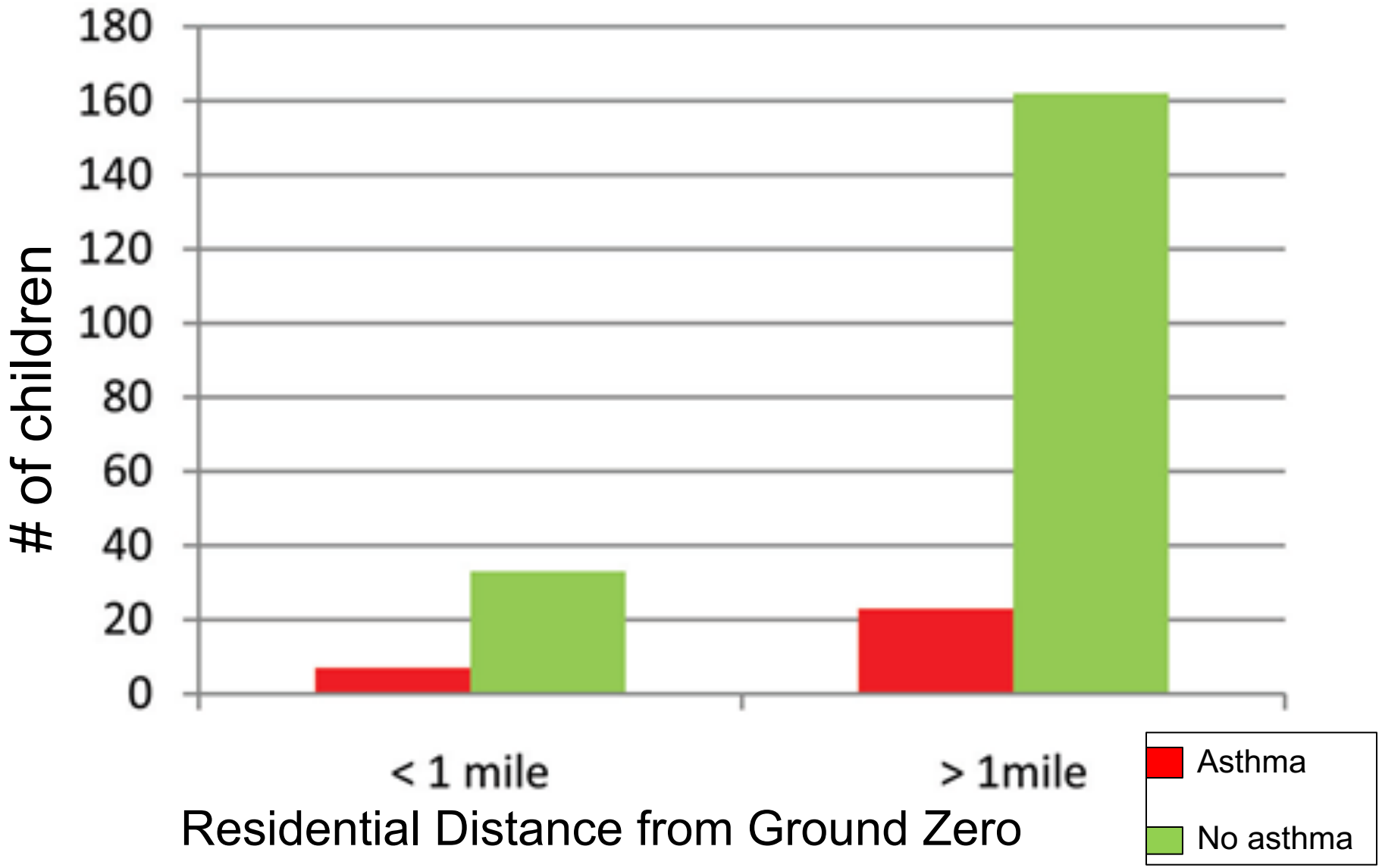


Self-Reported Asthma Rates Among Students Without Spirometry

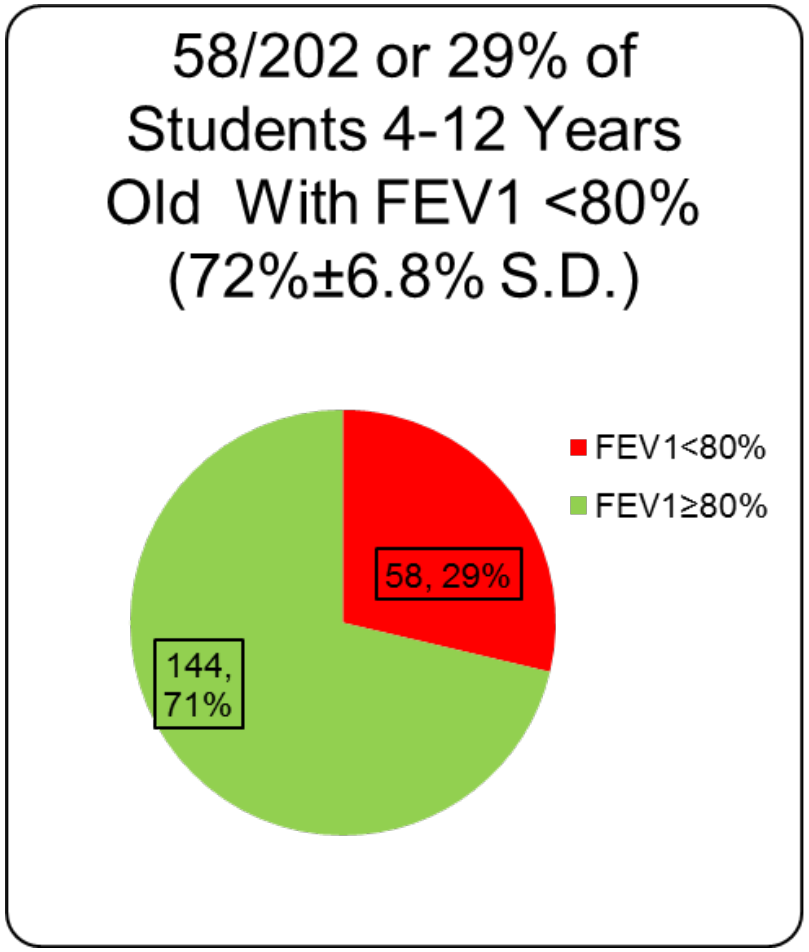
12.6% for those Living < 1 Mile from Ground Zero
vs. 4.8% for those living further away

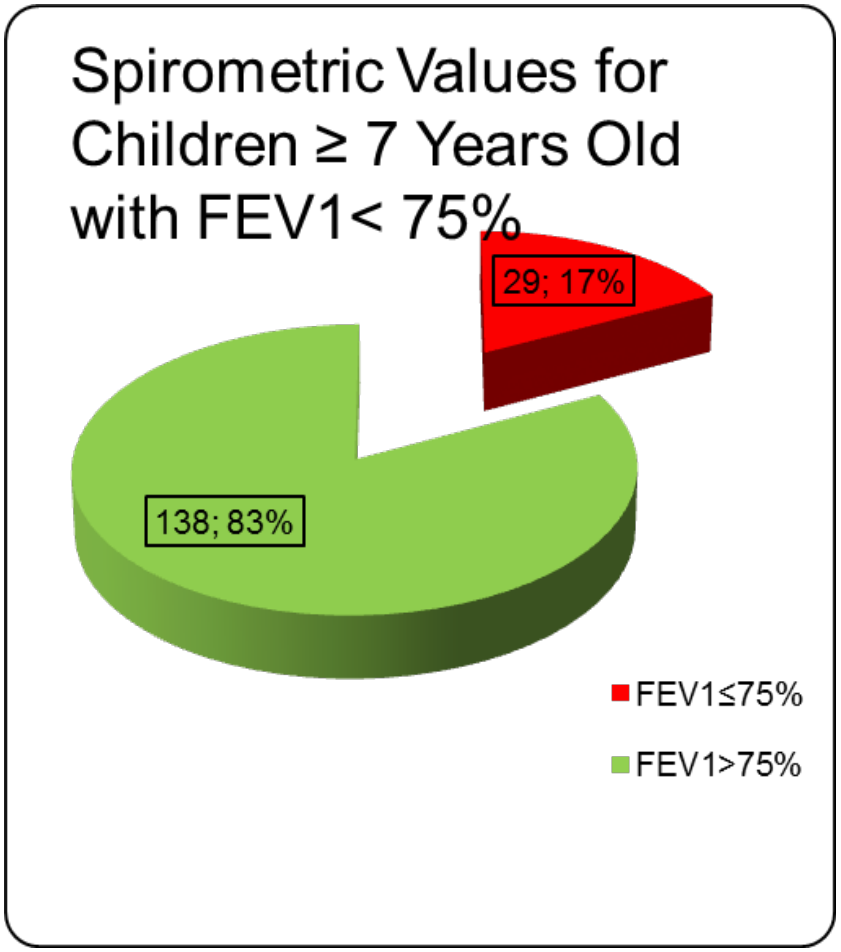


Self Reported Asthma From Children with Spirometry

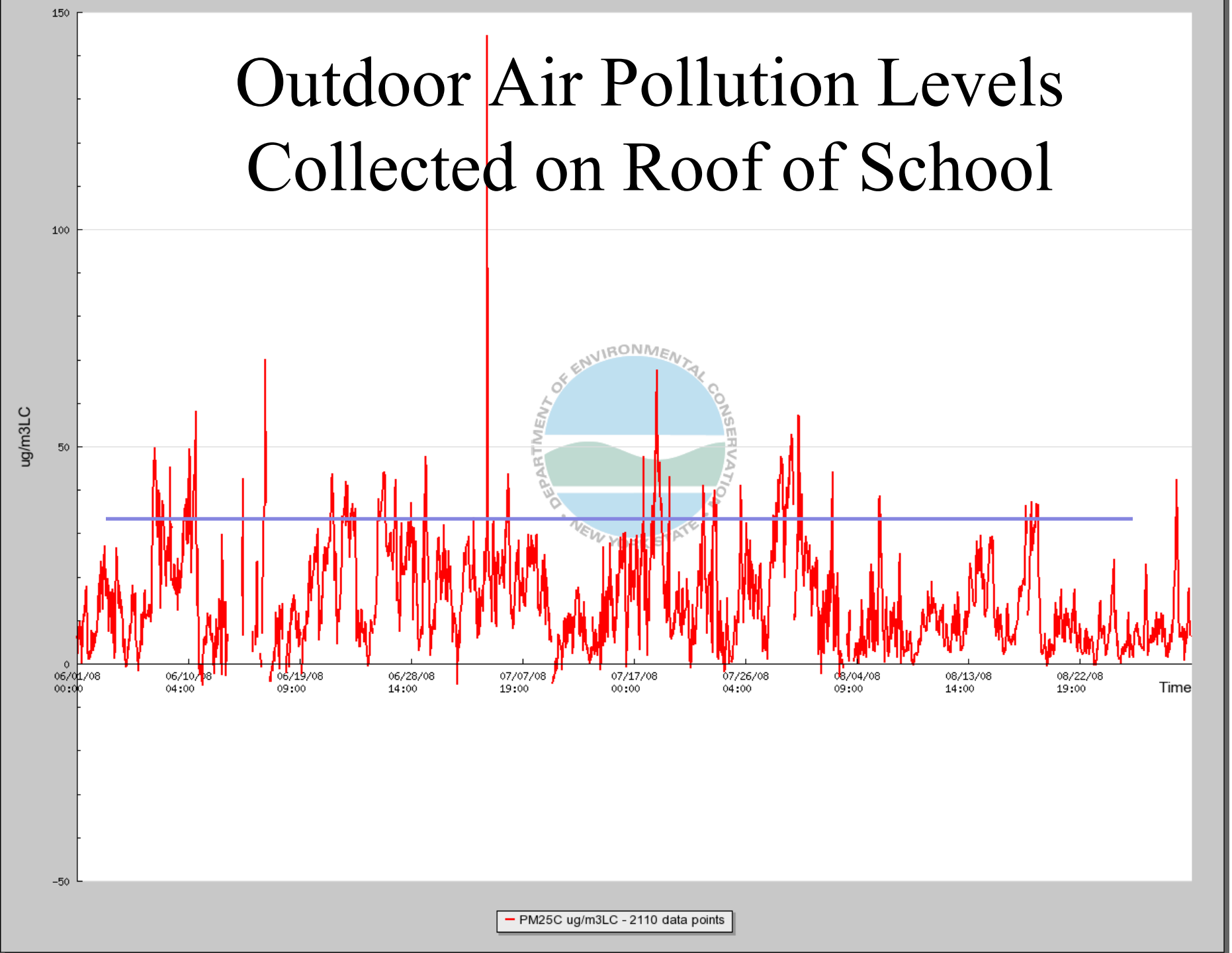


Post 9/11: High asthma rates among children in Chinatown, NY





Outdoor Air Pollution Levels Collected on Roof of School



Indoor Aeroallergens

Mite Allergens			Cat	Dog	Cockroach	Rat	Mouse
Der p 1	Per f 1	Mite Group 2	Fel d 1	Can f 1	Bla g 2	Rat n 1	Mus m 1
0	0	0	0.31	0	0	0	0.068

Conclusions

1. Chinatown asthma rates are still higher than other groups (29% *vs.* the NYC reference rate of 13%). These rates indicate persistence of elevated rates, as suggested by Lin and colleagues.

2. Air pollution levels exceed EPA standards and are unhealthy (> 35 $\mu g/m^3/d$). This may account for increased asthma incidence. It is possible that exposure to various toxins on 9/11 accentuated the effect of subsequent exposure to air pollution.

3. The difference between parent-reported prevalence of asthma (12.6%) and tested prevalence (29% overall) corresponds to those reported by the Harlem Children's Zone Asthma Initiative and suggests a high degree of unmet need for asthma treatment and lower-than-necessary child well-being and health status.

Acknowledgements

Yeseniya Aronova, MS3
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Wei Chen, MD
Dennis Daniel, MD
Jackie Lee, MD
Tom Gold, PhD
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INDOOR Biotechnologies Inc.

ALLERGY SYMPTOMS & ELEVATED AIRWAYS RESISTANCE AMONG CHILDREN LIVING NEAR THE WORLD TRADE CENTER

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Yi-Feng Chen, B.S.
Yan Yan, M.S.
Khalil Savary, M.D.
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Stony Brook Medicine

Disclosures

Support

- Stony Brook MD with Recognition in Research Program for student funding
- NYC Department of Education for approval of study
- NYS Department of Environmental Conservation for air pollution data
- Carefusion Corporation for Impulse Oscillometer agreement

Allergy Symptoms, Airway Resistance Near the WTC

- Background
- Hypotheses
- Study Population
- Methods/Data Collection
- Results
- Conclusions

Redline Questionnaires

STUDENT QUESTIONNAIRE

Name _____ Age ____ Grade ____ Teacher _____

Race: ☐ African American ☐ Asian American ☐ Hispanic ☐ White ☐ Native American ☐ Other

Please tell us how often you have any of the following:

1.	My breathing sounds noisy or wheezy.	O NEVER	O SOMETIMES	O A LOT
2.	It is hard to take a deep breath.	O NEVER	O SOMETIMES	O A LOT
3.	It is hard for me to stop coughing.	O NEVER	O SOMETIMES	O A LOT
4.	My chest feels tight or hurts after I run, play hard, or do sports.	O NEVER	O SOMETIMES	O A LOT
5.	I wake up at night coughing.	O NEVER	O SOMETIMES	O A LOT
6.	I wake up at night because I have trouble breathing.	O NEVER	O SOMETIMES	O A LOT
7.	I cough when I run, climb stairs or play sports.	O NEVER	O SOMETIMES	O A LOT
8.	My eyes get itchy, puffy or burn.	O NEVER	O SOMETIMES	O A LOT
9.	I have problems with a runny or stuffy nose.	O NEVER	O SOMETIMES	O A LOT

Please answer the following questions:

10.	A doctor or nurse told me that I have asthma.	O YES	O NO
11.	I stayed in the hospital overnight for asthma or trouble breathing this past year.	O YES	O NO
12.	I take medicine or use an inhaler for asthma.	O YES	O NO
13.	I take medicine for allergies.	O YES	O NO

Impulse Oscillometry

PARENT OR GUARDIAN QUESTIONNAIRE

Student's Name _____ Age ____ Grade ____ Teacher _____

Student's Race: ❒ African American ❒ Asian American ❒ Hispanic ❒ White ❒ Native American ❒ Other

Please tell us how often your child has any of the following. (If your child has more problems in some seasons of the year, please tell us about problems during the *worst* season.) Does your child . . .

1. Make noisy or wheezy sounds when breathing?	O NEVER	O SOMETIMES	O A LOT	❒ Don't Know
2. Have a hard time taking a deep breath?	O NEVER	O SOMETIMES	O A LOT	❒ Don't Know
3. Develop coughs that won't go away?	O NEVER	O SOMETIMES	O A LOT	❒ Don't Know
4. Complain about a chest that feels tight or hurts after running, playing hard, or doing sports?	O NEVER	O SOMETIMES	O A LOT	❒ Don't Know
5. Wake up at night coughing?	O NEVER	O SOMETIMES	O A LOT	❒ Don't Know
6. Wake up at night because of trouble breathing?	O NEVER	O SOMETIMES	O A LOT	❒ Don't Know
7. Cough when running, climbing stairs or playing sports?	O NEVER	O SOMETIMES	O A LOT	❒ Don't Know
8. Miss days of school (absent from school) because of breathing problems?	O NEVER	O SOMETIMES	O A LOT	❒ Don't Know
9. Have eyes that itch, get puffy or burn.	O NEVER	O SOMETIMES	O A LOT	❒ Don't Know
10. Have problems with a runny, stuffy nose.	O NEVER	O SOMETIMES	O A LOT	❒ Don't Know

Please answer the following questions about your child:

11. Has a doctor or nurse told you that your child has asthma, reactive airway disease or wheezy bronchitis?	O YES	O NO	❒ Don't Know
12. Has your child stayed in the hospital overnight for asthma or for trouble breathing this past year?	O YES	O NO	❒ Don't Know
13. Does your child take medicine (or use an inhaler) for asthma?	O YES	O NO	❒ Don't Know
14. Does your child take medicine for allergies?	O YES	O NO	❒ Don't Know

家長或監護人問卷調查（7歲以下小孩）

學生姓名 ______________________ 年齡 _____ 年級 _____ 教師姓名 __________

學生種族：□ 非裔美國人 □ 亞裔美國人 □ 西班牙裔美國人 □ 白人 □ 美洲印第安人 □ 其他

請告訴我們你有否經常發現你孩子有以下特徵。(如果你的孩子在某些季節裡產生特別多的問題，請告訴我們在最嚴重的季節裡有哪些問題。) 你的孩子有.....

1. 呼吸不暢順或有雜音嗎？ O 從來沒有 O 有時 O 很多 □ 不知道
2. 深呼吸困難嗎？ O 從來沒有 O 有時 O 很多 □ 不知道
3. 是否有長時間性的咳嗽？ O 從來沒有 O 有時 O 很多 □ 不知道
4. 在跑完步玩得激烈或運動完之後，抱怨胸口緊或不舒服嗎？ O 從來沒有 O 有時 O 很多 □ 不知道
5. 在半夜因咳嗽而醒來嗎？ O 從來沒有 O 有時 O 很多 □ 不知道
6. 因呼吸不順而導致半夜起床嗎？ O 從來沒有 O 有時 O 很多 □ 不知道
7. 在跑步，爬樓梯或運動時咳嗽嗎？ O 從來沒有 O 有時 O 很多 □ 不知道
8. 因呼吸道的問題而不上學（缺席）嗎？ O 從來沒有 O 有時 O 很多 □ 不知道
9. 覺得眼睛發癢，紅腫，刺痛嗎？ O 從來沒有 O 有時 O 很多 □ 不知道
10. 流鼻涕或鼻塞的問題嗎？ O 從來沒有 O 有時 O 很多 □ 不知道

請回答以下有關於你孩子的問題：

11. 是否曾經有醫生或護士有告訴過你，你孩子有哮喘病？ O 是 O 否 □ 不知道
12. 在過去的一年，你孩子是否曾經因哮喘病或呼吸性疾病而住院？ O 是 O 否 □ 不知道
13. 你孩子是否服用哮喘病藥物或使用哮喘噴霧器？ O 是 O 否 □ 不知道
14. 你孩子有否因過敏而服用藥物嗎？ O 有 O 否 □ 不知道

學生問卷調查（7至14歲）

姓名 _____ 年齡 ____ 年級 ____ 教師姓名_____

種族: □ 非洲裔美國人 □ 亞裔美國人 □ 西班牙裔美國人 □ 白人 □ 美洲印第安人 □ 其他

	是 有沒有	有時	很多
1. 呼吸不暢順或有雜音。	o	0	O
2. 深呼吸有困難。	o	0	O
3. 我咳嗽時，咳嗽不會容易停止。	o	0	O
4. 當跑完步，玩得激烈，或運動完之後，會覺得胸口緊或不舒服。	o	0	O
5. 我會在半夜因咳嗽而醒來。	o	0	O
6. 我會因為呼吸不順而導致半夜起床。	o	0	O
7. 當我跑步，爬樓梯或運動時，我會咳嗽。	o	0	O
8. 我的眼睛會覺得發癢，紅腫，刺痛。	o	0	O
9. 我有流鼻涕或鼻塞問題。	o	0	O

請回答以下的問題:

	有	沒有
10. 曾經有醫生或護士告訴我，我有哮喘病。	○	○
11. 在過去的一年，我曾經因哮喘病或呼吸性疾病而住院。	○	○
12. 我有服用哮喘病藥物或使用哮喘噴霧器。	○	○
13. 我因過敏而服用藥物.。	○	○


R5
X5
R20
Z5
FEV1

Results

Table 1. Correlations of Parent and Child Responses for Asthma and All Allergy Symptoms from the Validation Sample*(n = 158)

Student Question# (Paired with Parent Questions**)	Sample Size	Responses Spearman r	Two-sided P value
Making noisy or wheezing (1)	87	0.748	<0.001
Hard to take a deep breath (2)	84	0.895	<0.001
Hard to stop coughing (3)	90	0. 646	<0.001
Chest feels tight after run (4)	85	0.880	<0.001
Wake up at night coughing (5)	93	0.749	<0.001
Wake up at night because of Trouble breathing (6)	87	0.713	<0.001
Cough when climbing stairs (7)	85	0.738	<0.001
Have eyes itch, get puffy (8)	89	0.870	<0.001
Have problems with a runny, Stuffy nose (9)	89	0.824	<0.001
A doctor or nurse told me that I have asthma (10)	89	0.935	<0.001
Stayed in hospital overnight (11) * **			
Take medicine for asthma (12)	90	0.848	<0.001
Take medicine for allergies (13)	93	0.832	<0.001

R5 is a measure of Total Resp System Resistance and includes central *vs.* peripheral airways (small airways) and is decreased linearly with increase in height among: 1) students with a self-diagnosis of asthma (S_group); 2 students whose parents noted the child has asthma (P_group); 3) those with both student and parent diagnosis of asthma (In_group) and 4) those students who believe they do not have asthma and their parents agree with then (Ex_group).

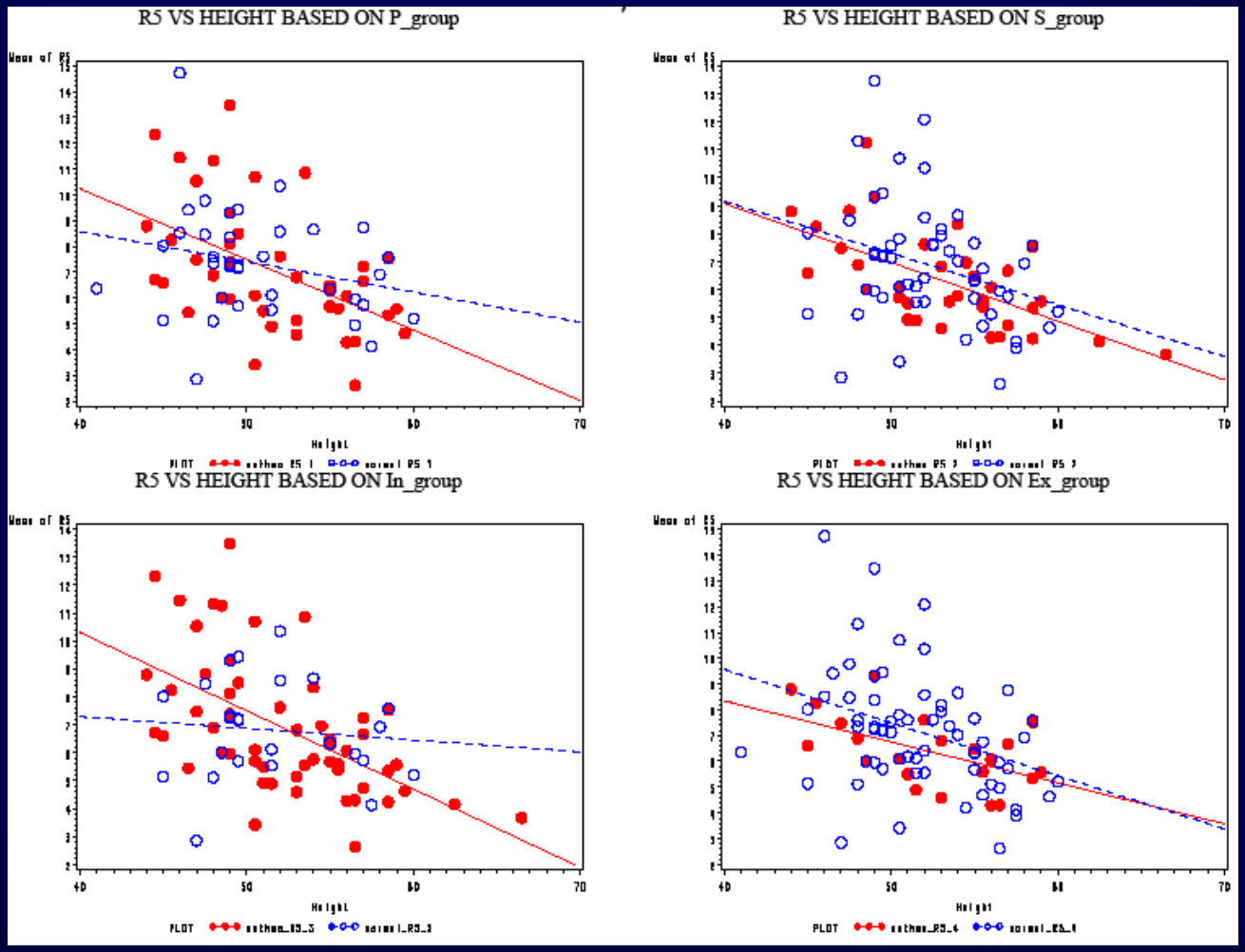


Table1 (n = 114)

Variables	Boys(57) Means ± SD	Girls(57) Means ± SD
Age(year)	8.20±1.86	8.35±1.79
Height(cm)	131.57±11.65	132.28±11.08
Weight(kg)	31.24±8.92	30.08±8.66
Mean_R5	7.24±2.14	6.74±2.28
Mean_R20	3.42±1.13	3.28±0.80
Mean_x5	-2.77±2.58	-2.74±2.94

When comparing boys higher vs. girls

Results

- **Mean R5, X5 and R20 (resistance at 5 Hz, reactance at 5 Hz, and resistance at 20 Hz, respectively) given in centimeters of H20 per liter per second were high.**

- **Boys and girls with average ages of 8 years, height of 132 cm, and weight 31 kg, had: Boys values of R5=7.2, X5=-2, and R20=3; and Girls values of R5=6.7, X5=-2.7, R20=3.2.**

- **Mean values for the entire group of boys and girls were: R5=6.99, X5=-2.75, R20=3.35.**

R5, Resistance at 5 Hz; *X5,* reactance at 5 Hz; R20, Resistance at 20 Hz

†IOS measurements are given in centimeters of H_2O per liter per second, except for resonant frequency, which is given in Hertz. IOS measurements are given as resistance and reactance at 5 and 20 Hz.

Total PM2.5 Levels from 6/1/08 to 8/31/08 at the Bronx, Queens, and Manhattan Sites

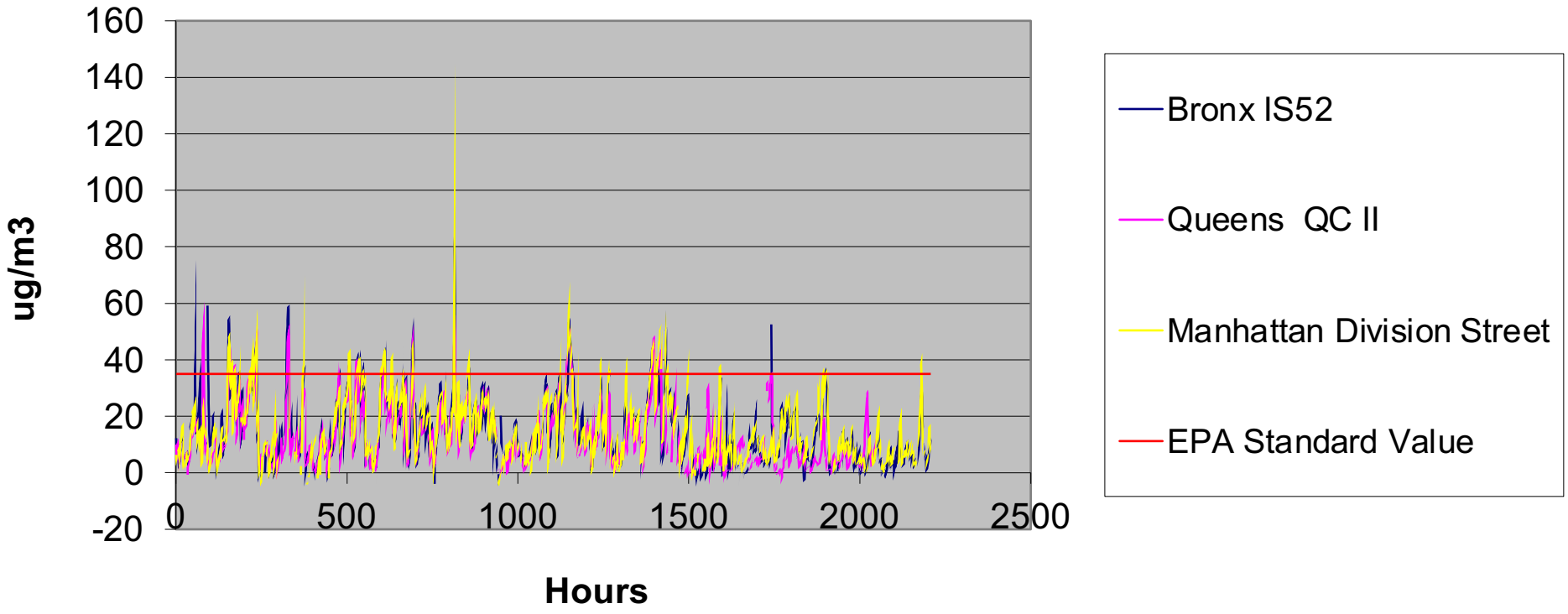
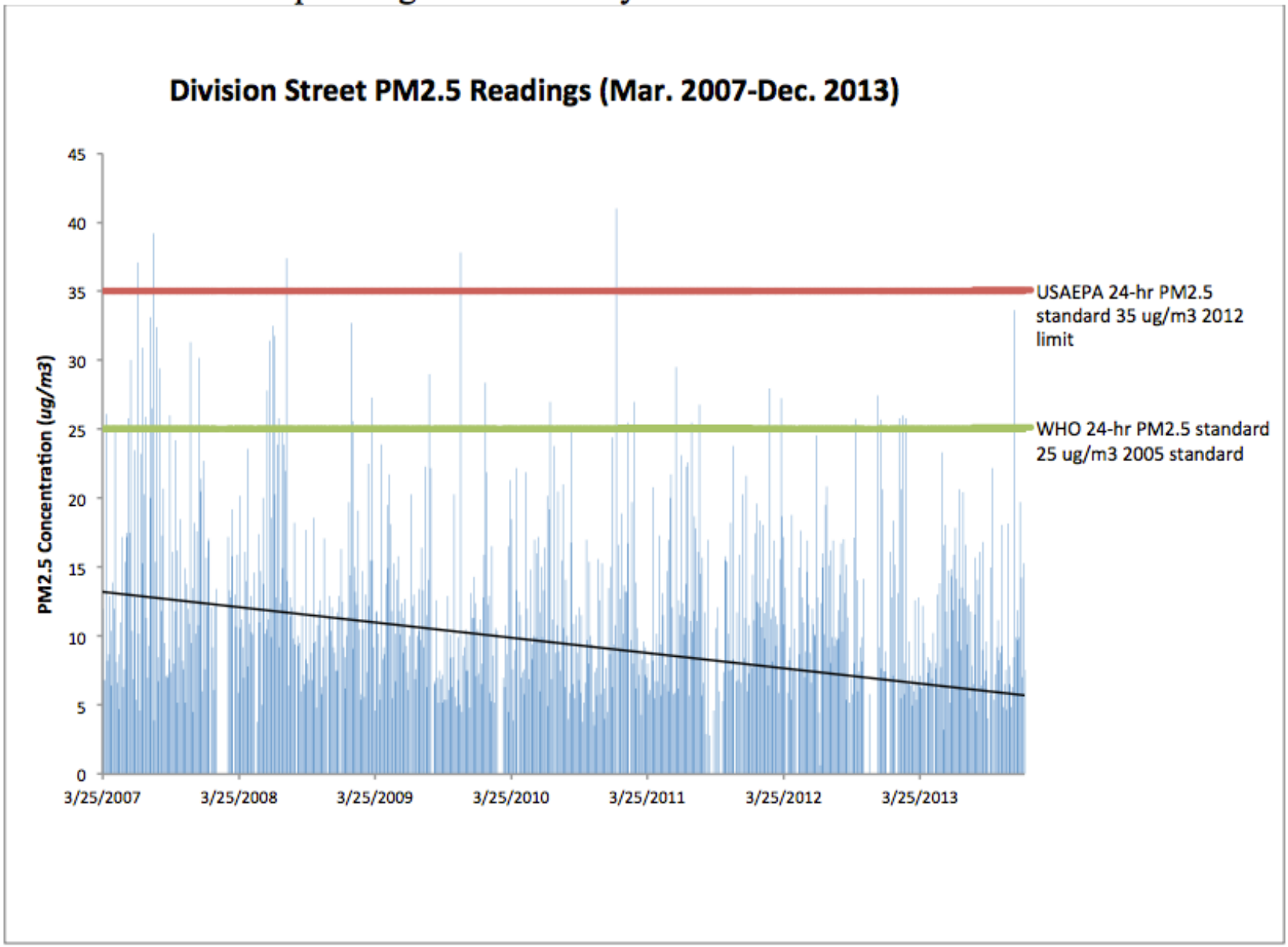
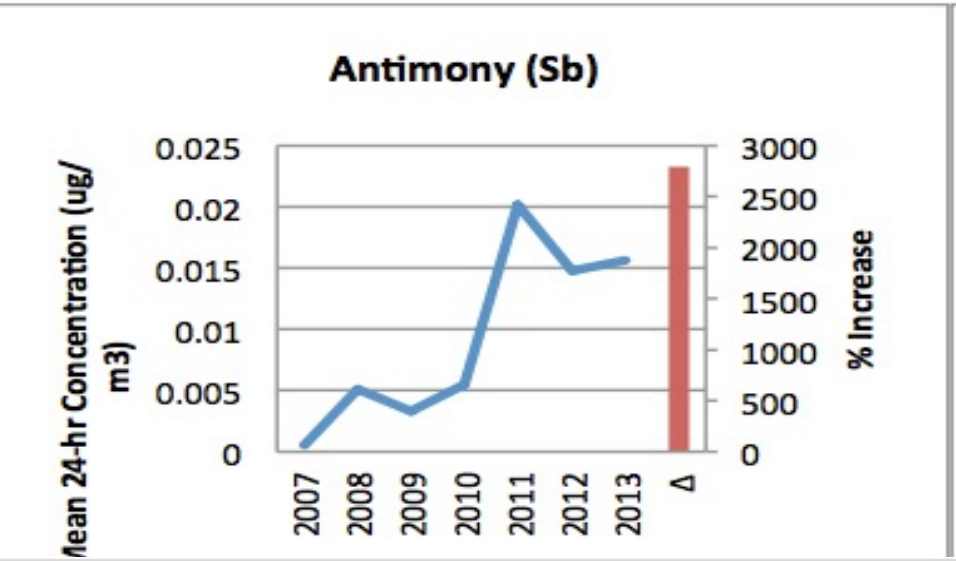
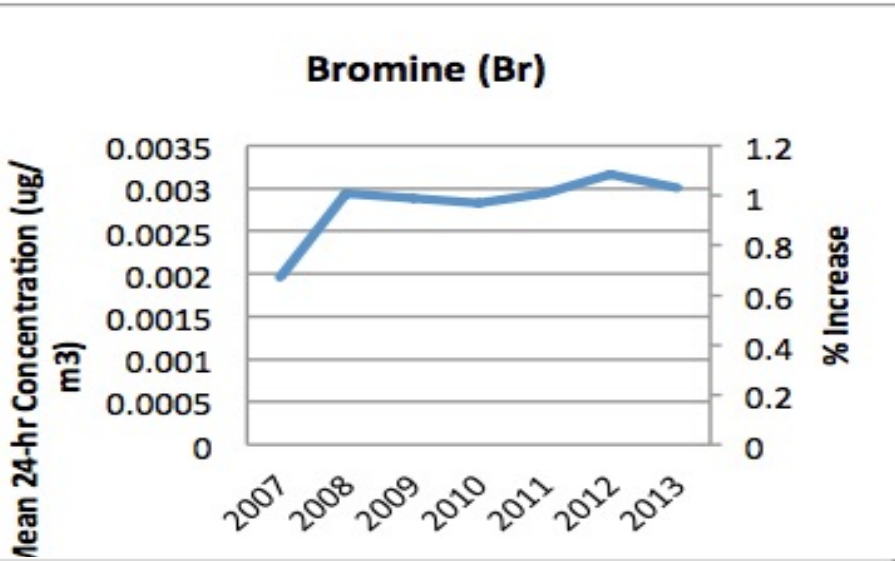


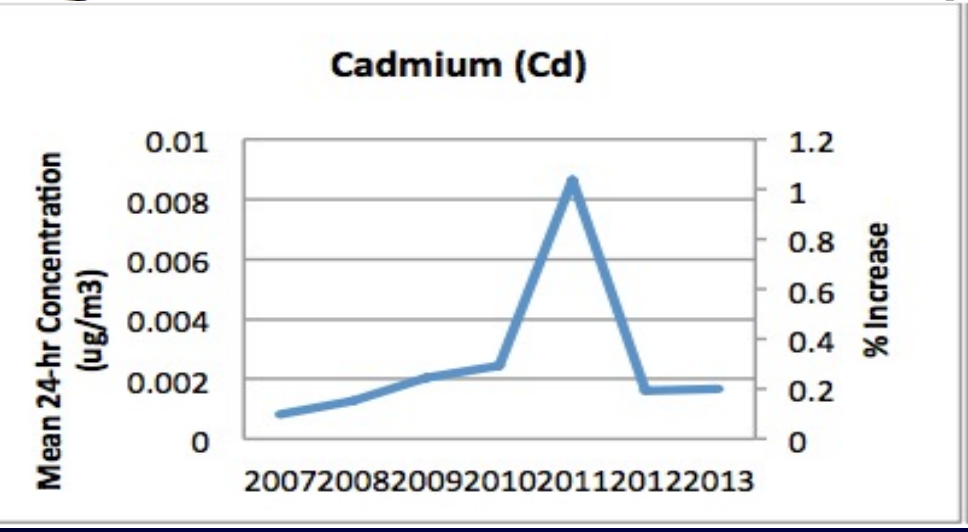
Figure 3: Division St. PM2.5 Readings between 03/2007 to 12/2013 and two different exposure guidelines set by the USEPA and the WHO.

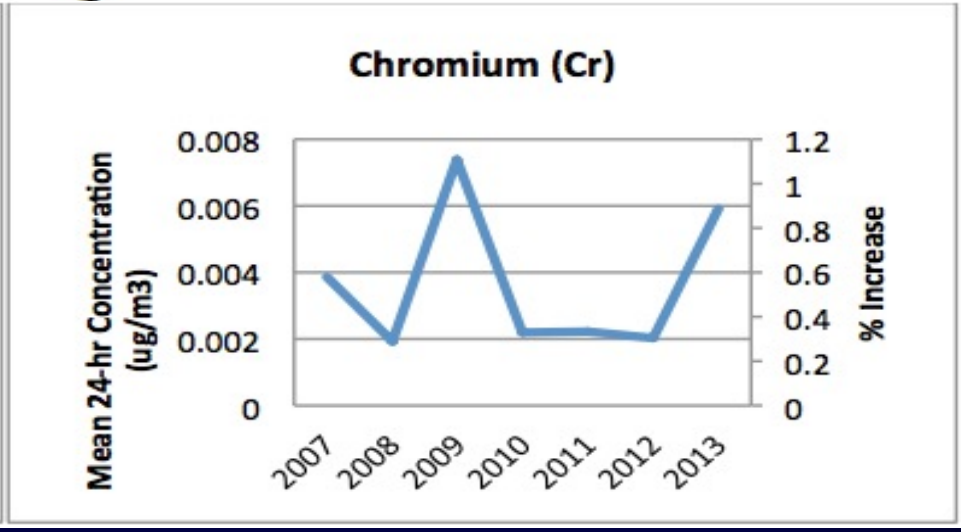


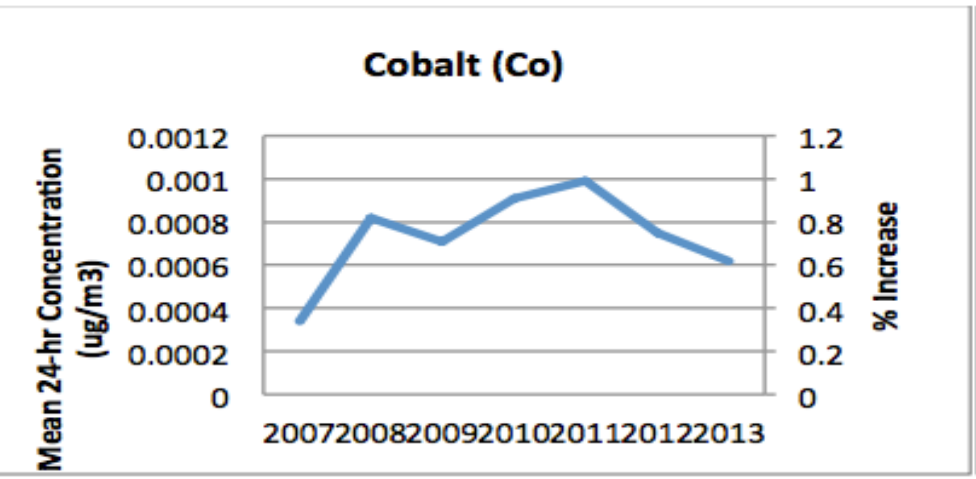
Speciation Data for Specific Metals at Division St.

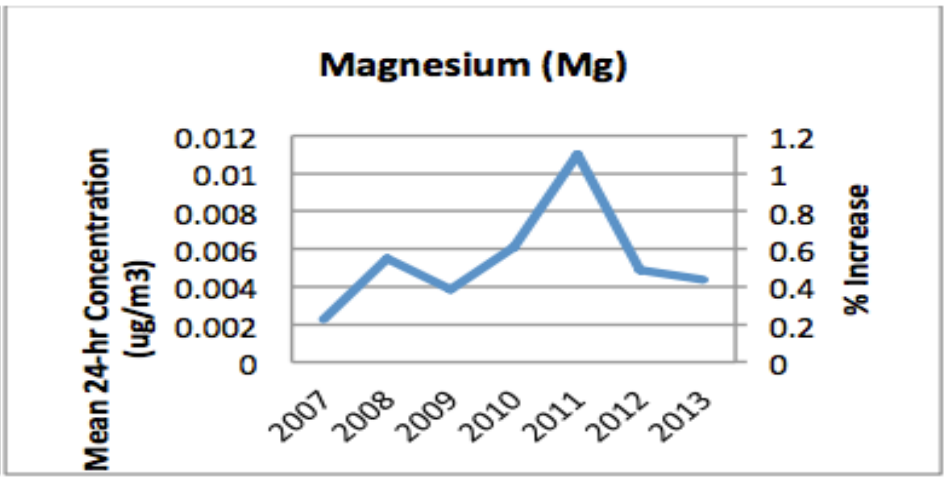


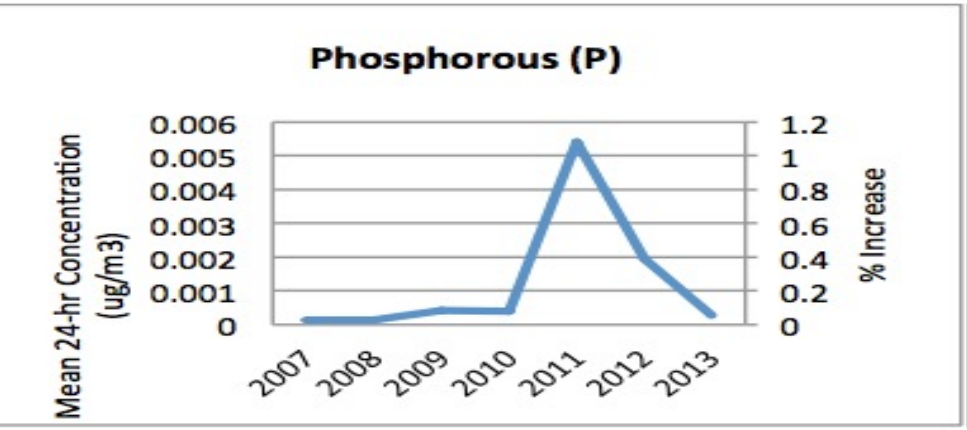


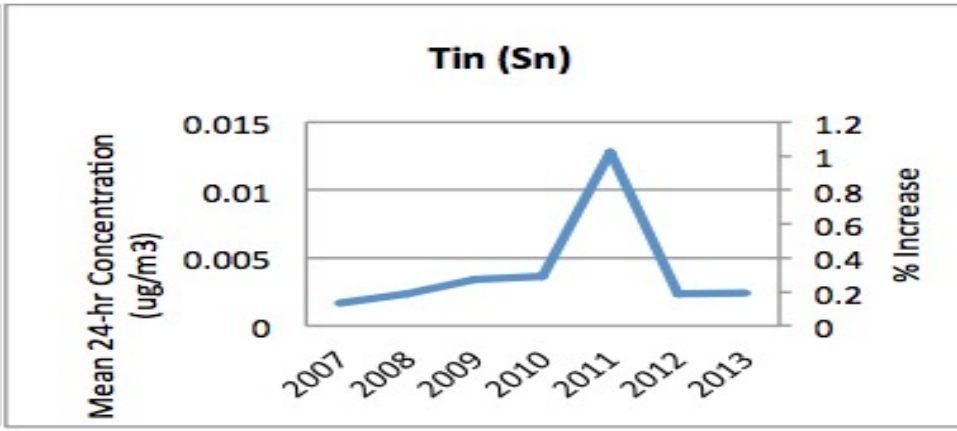


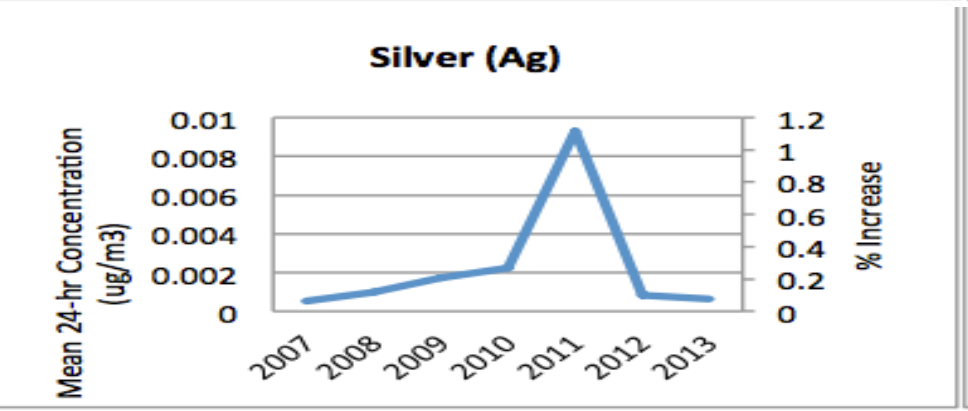


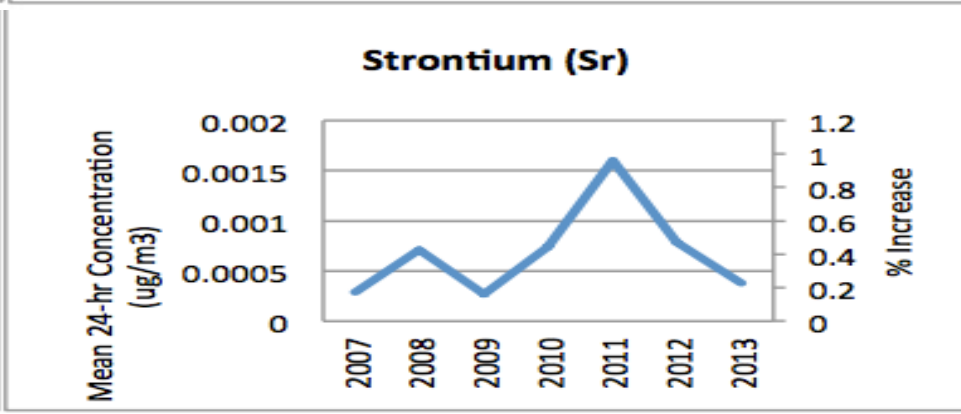

Cobalt (Co)
Mean 24-hr Concentration (ug/m3)
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
1.2
1
0.8
0.6
0.4
0.2
0
% Increase
2007 2008 2009 2010 2011 2012 2013

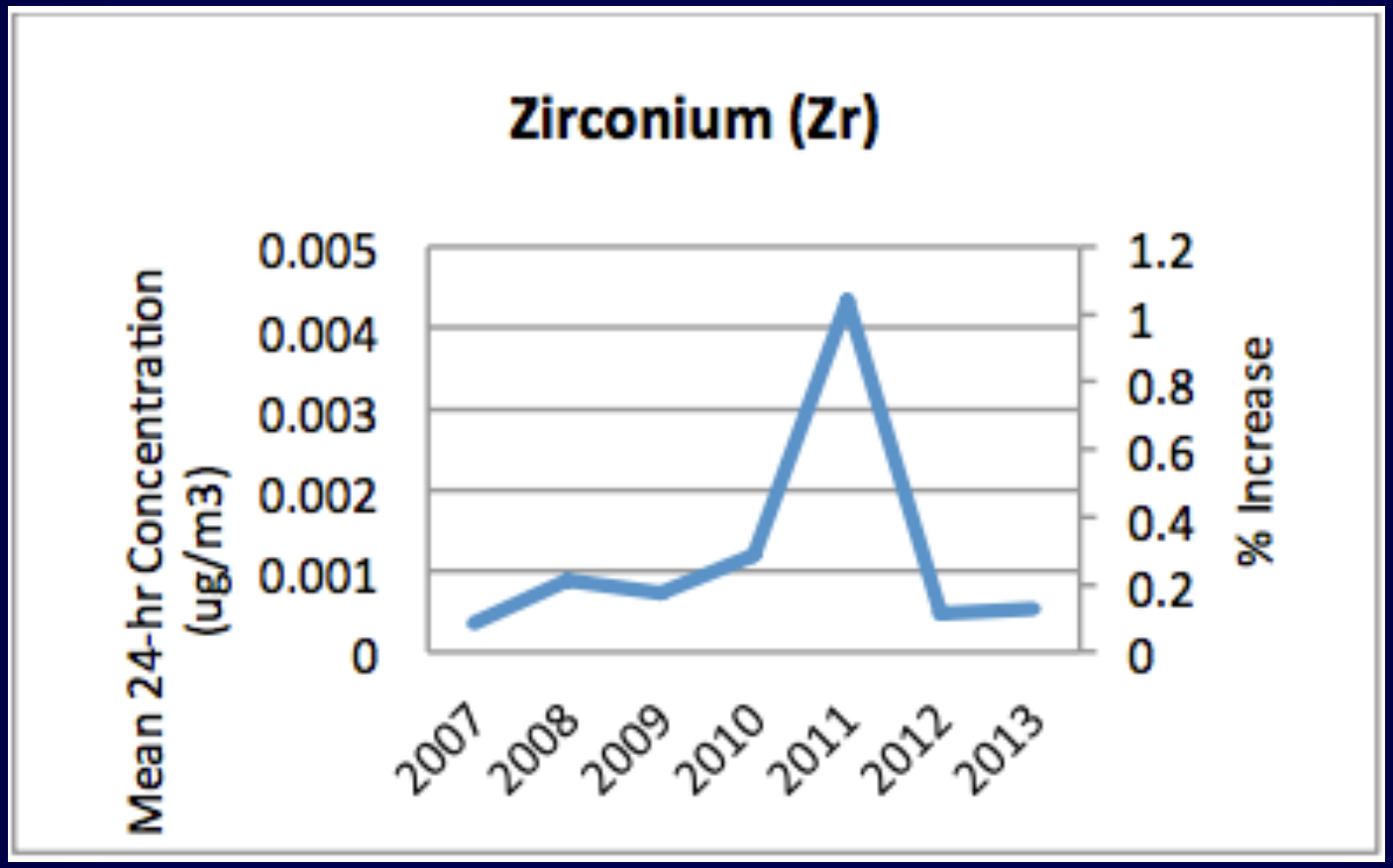

Magnesium (Mg)
Mean 24-hr Concentration (ug/m3)
0.012
0.01
0.008
0.006
0.004
0.002
0
1.2
1
0.8
0.6
0.4
0.2
0
% Increase
2007 2008 2009 2010 2011 2012 2013


Phosphorous (P)
Mean 24-hr Concentration (ug/m3)
0.006
0.005
0.004
0.003
0.002
0.001
0
1.2
1
0.8
0.6
0.4
0.2
0
% Increase
2007 2008 2009 2010 2011 2012 2013

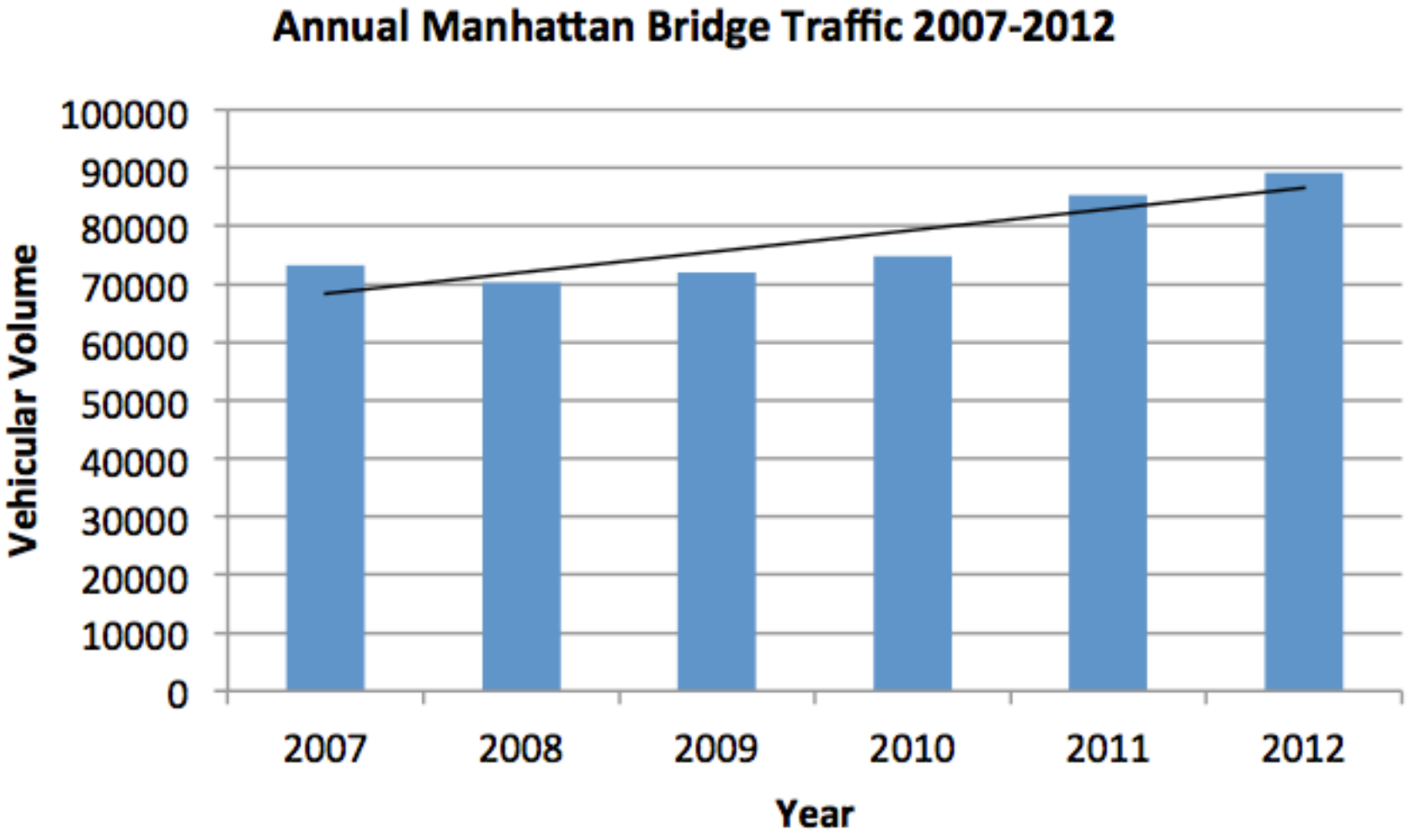

Tin (Sn)
Mean 24-hr Concentration (ug/m3)
0.015
0.01
0.005
0
1.2
1
0.8
0.6
0.4
0.2
0
% Increase
2007 2008 2009 2010 2011 2012 2013


Silver (Ag)
Mean 24-hr Concentration (ug/m3)
0.01
0.008
0.006
0.004
0.002
0
1.2
1
0.8
0.6
0.4
0.2
0
% Increase
2007 2008 2009 2010 2011 2012 2013


Strontium (Sr)
Mean 24-hr Concentration (ug/m3)
0.002
0.0015
0.001
0.0005
0
1.2
1
0.8
0.6
0.4
0.2
0
% Increase
2007 2008 2009 2010 2011 2012 2013


Zirconium (Zr)
Mean 24-hr Concentration (ug/m3)
0.005
0.004
0.003
0.002
0.001
0
1.2
1
0.8
0.6
0.4
0.2
0
% Increase
2007
2008
2009
2010
2011
2012
2013

Manhattan Bridge Traffic 2007-2012



Elements with +%Δ Correlated with Traffic Volume

Chemical	Correlation with Traffic volume (Pearson's R)	Strength of interdependence between chemical quantities and amount of traffic
Sb	88%	Very strong
P	75%	Very strong
Sr	64%	Strong
Cd	50%	Strong
Mg	50%	Strong
Sn	47%	Strong
Br	45%	Strong
Ag	45%	Strong
Zr	42%	Strong
Co	33%	Moderate
Cr	-42%	Strong (negative)

Conclusions

- Allergy and respiratory symptoms are common among those children (confirmed by parents) responding to the survey distributed among classrooms at the closest elementary school to the World Trade Center site.
- There were strong correlations between responses from children and their parents.
- Frequent severe symptoms such as wheezing and chest tightness, juxtaposed with use of allergy and asthma medications, supports the concept that these patients are not clinically well-controlled.

Conclusions

- Boys and girls in this cohort had increased values of airway resistance at 5 Hz, with boys having higher values than girls.
- Frequency dependence between resistance values at 5 Hz and 20 Hz suggest small airways dysfunction rather than central airways narrowing.
-

Conclusions

- **Air pollution levels are high and contain detectable lead, vanadium, and indium.**

Allergy and Lung Injury Among Rescue Workers Exposed to the World Trade Center Disaster Assessed 17 Years After Exposure to Ground Zero

- Rescue and cleanup workers exposed to the WTC fallout had a high incidence of allergic hypersensitivity and had evidence of permanent small airways dysfunction characterized by distal airways narrowing and airway hyperresponsiveness.

- This is severe lung injury with only partial reversibility.

Caruana et al., JOEM, 2020

Reflections on 9/11:

- Asthma, allergy, lung injury in children and rescue workers post 9/11
- Comparison to Military Burn Pits/K2
- California/Canadian Wildfires
- East Palestine, Ohio Train derailment of 2023

http://www.labspaces.net/images/news/155fire.jpg

http://bioweb.uwlax.edu/bio203/s2008/miller_melo/

http://www.wired.com/images_blogs/dangerroom/images/2008/04/24/iraqiexplosion_ied.jpg

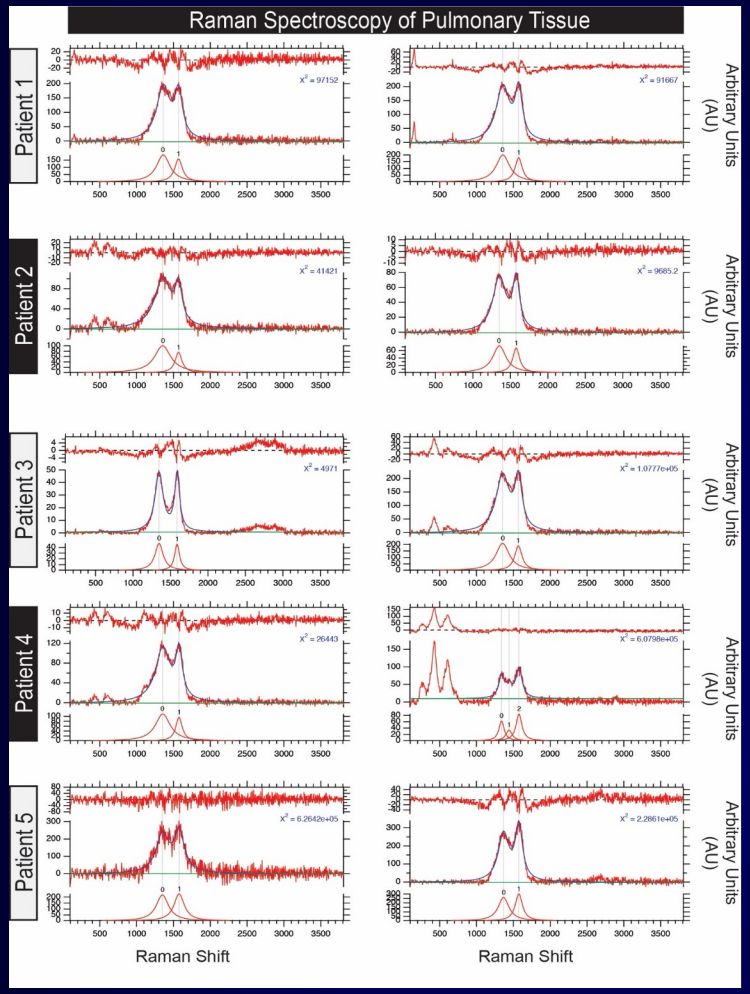
http://www.armytimes.com/xml/news/2008/10/military_burnpit_102708w/102708af_burn_pit_800.JPG

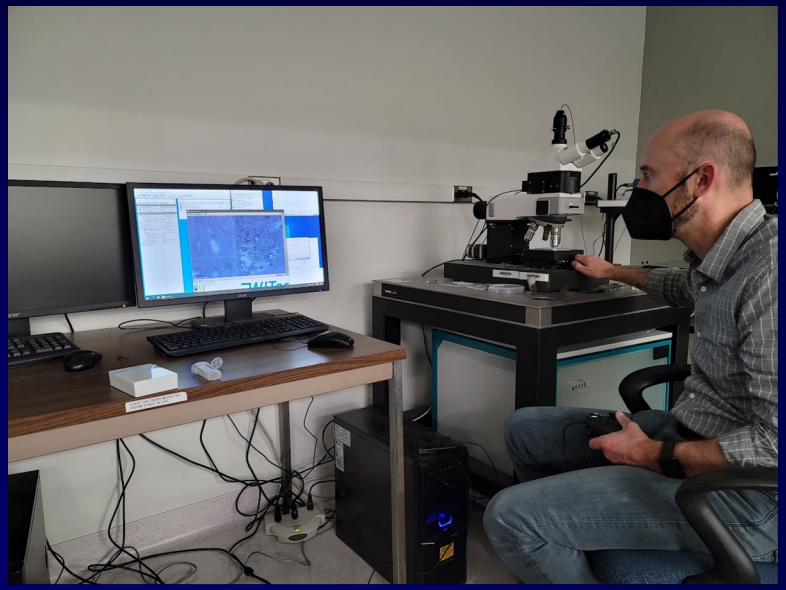
http://www.fruitipedia.com/Date%20Palm.htm

http://ipac.kacst.edu.sa/eDoc/eBook/4489.pdf

http://www.greenprophet.com/wp-content/uploads/2011/04/sandstorm-iran-560x342.jpg

WITec alpha300R Micro-Imaging Raman Spectrometer





JP-8 burned jet fuel in lung tissue of Veterans exposed to burn pits in Iraq and Afghanistan

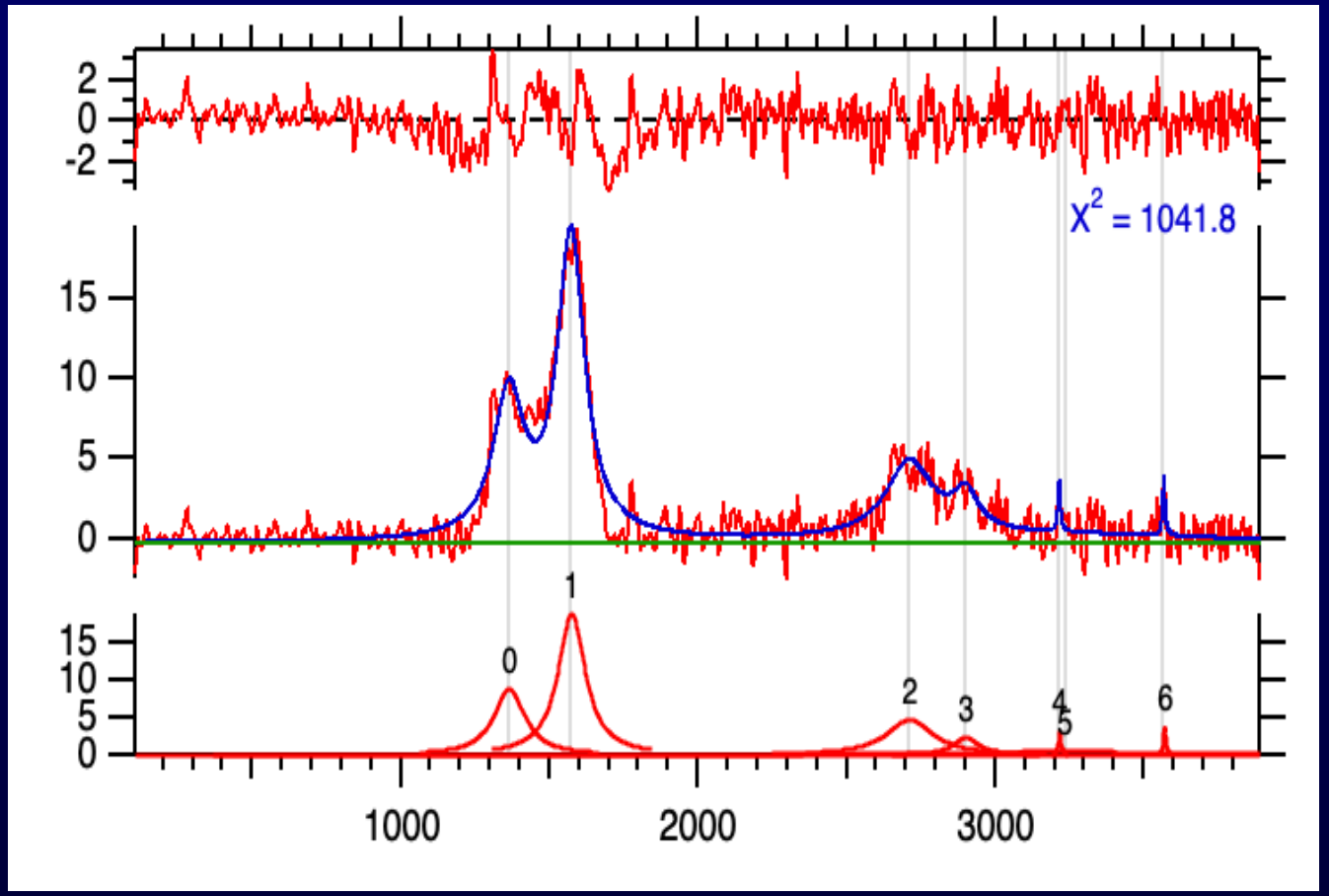
nature SCIENTIFIC REPORTS

Olsen et al., Sci Rep, 2022

DONALD AND BARBARA
ZUCKER SCHOOL *of* MEDICINE
AT HOFSTRA/NORTHWELL

Burned JA-1 commercial jet fuel in center of lung cancer from patient exposed to world trade center

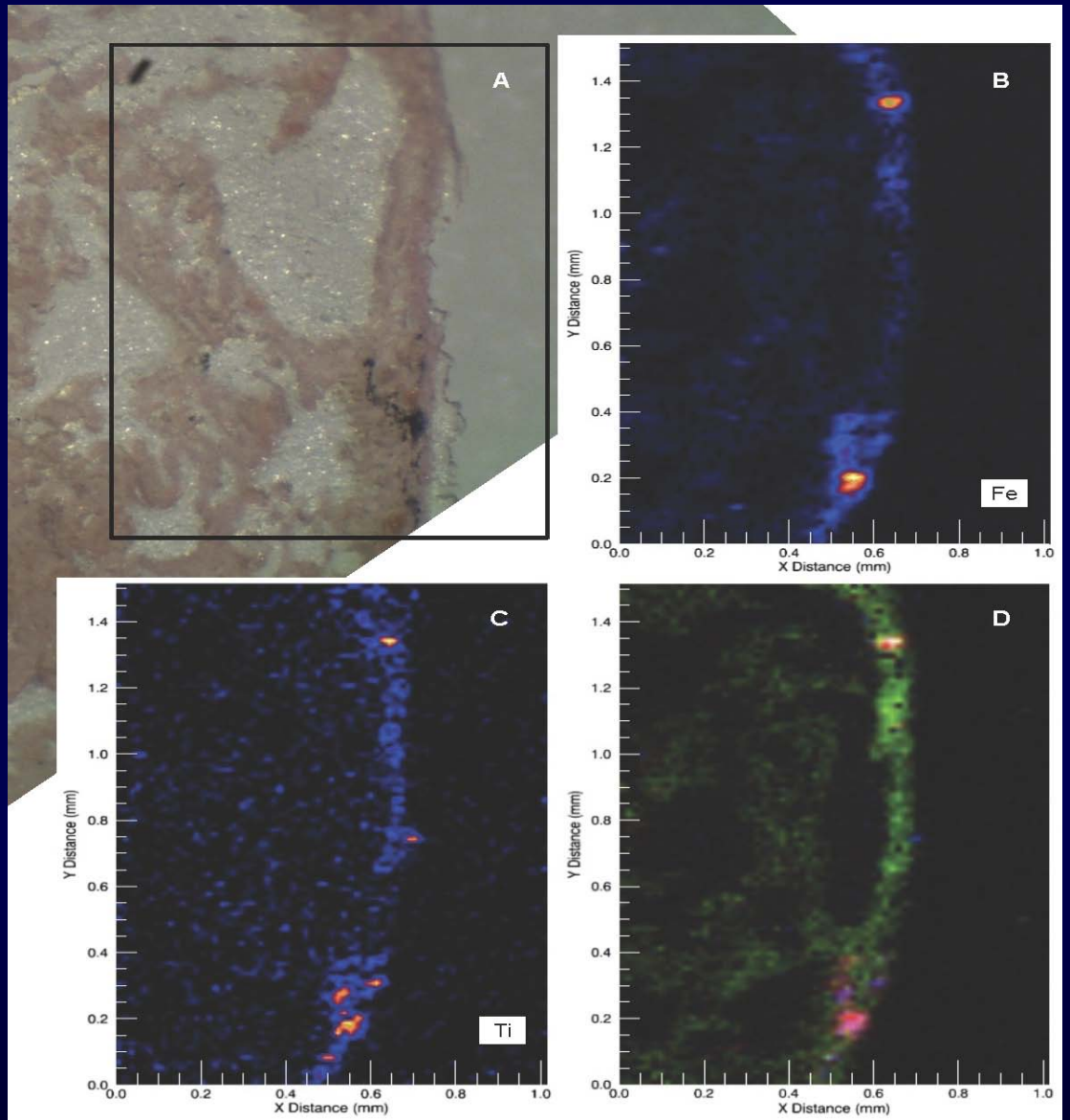
(by Dorian Poussiant, ZSOM)



On December 7, 1854, as dean of the brand new Faculty of Sciences at Lille, Louis Pasteur gave the opening speech in which he said,

"in the fields of observation, chance only favours the mind which is prepared…"

Titanium and iron in lung of a soldier with nonspecific interstitial pneumonitis and bronchiolitis after returning from Iraq, was asymptomatic post-WTC



Szema et al., JOEM, 2012

The US Army testing team found yellow cake powder and pellets consistent with enriched uranium at K2. We photographed the radiological testing because the readings were extremely high.

STARS AND STRIPES

Volume 61, No. 54 © EPSS 2002 MONDAY, JUNE 10, 2002 50¢

Uzbek base evacuated

Sections cleared after nerve, blister agents found at K-2; Army chemical experts inspect other former Soviet bases Page 2

A step into

Photos from Matthew Erbelding, USAFA '98

Portable Near Infrared Spectroscopy to Identify Chemicals

Nirlab.com

Photos courtesty of Lt. Col Gordon Peters, MD

ATS 2025

Reflections on 9/11:

- Asthma, allergy, lung injury in children and rescue workers post 9/11
- Comparison to Military Burn Pits/K2
- California/Canadian Wildfires
- East Palestine, Ohio Train derailment of 2023

Photo by Edward Forsyth, MD, miles from epicenter of Malibu, CA wildfires spring 2025

ATS 2025

ANALYSIS OF CALIFORNIA WILDFIRE DUST

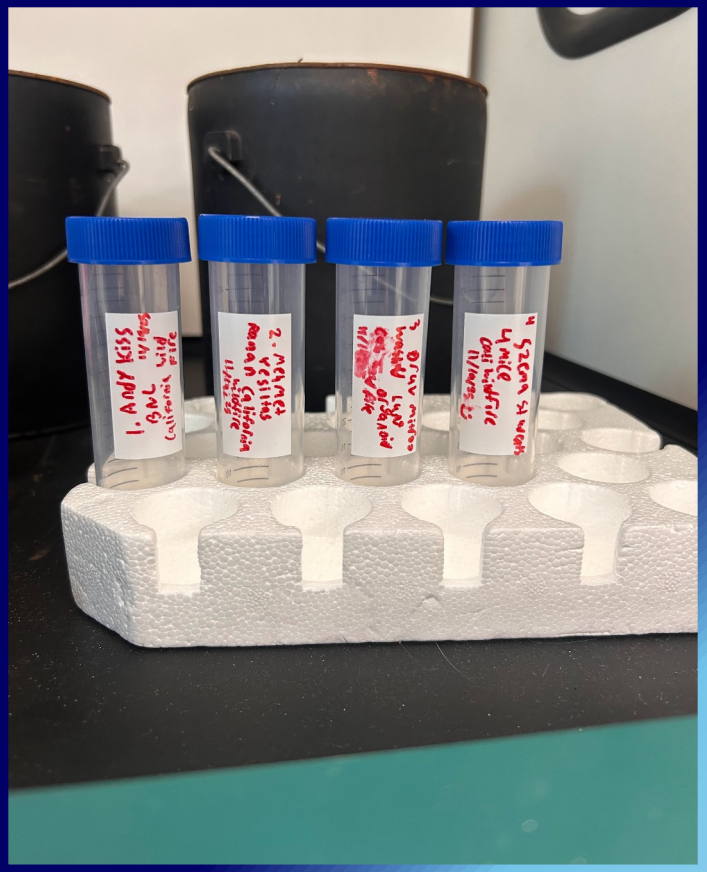
Our Team in Los Angeles

- Edward Forsyth, MD Chief, Urology
- Los Angeles General Medical Center, 12/3/25
- Collected CA wildfires dust on this sidewalk January 18, 2025

Los Angeles General Medical Center

USC University of Southern California

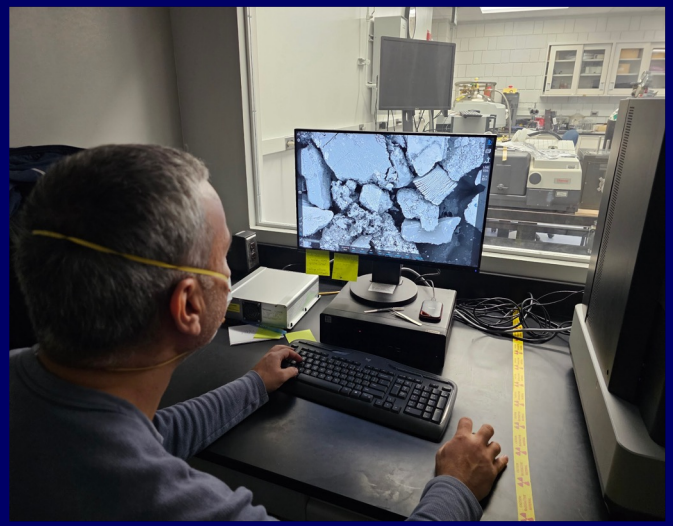
California Wildfire Dust

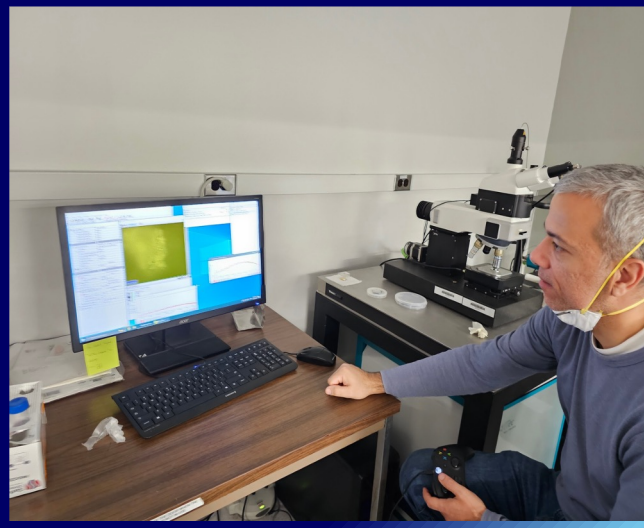


Raman Spectroscopy & Electron Microscopy
California Wildfire Dust

- Mehmet Yesiltas, PhD
- Research Associate
  Professor
- Department of Geosciences at
  Stony Brook University

Electron Microscopy Analysis





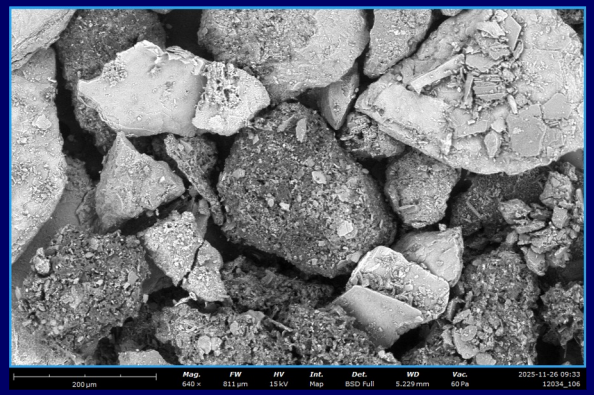
Raman Spectrometer Analysis

Stony Brook University | Department of Geosciences

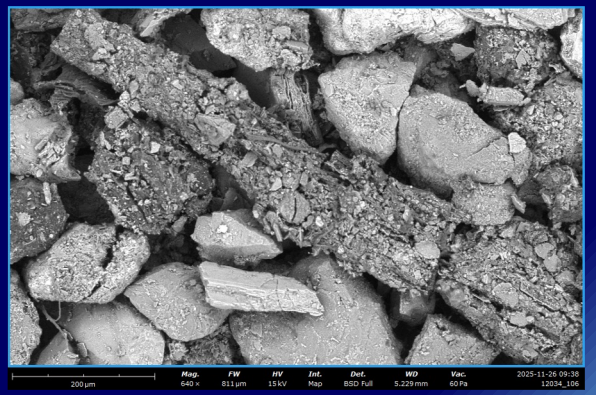
Dust Samples

Dust samples obtained outside the LA General Medical Center analyzed under an electron microscope.

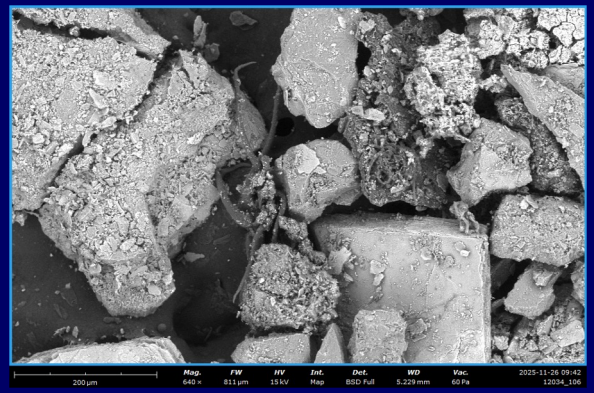
Sample 1



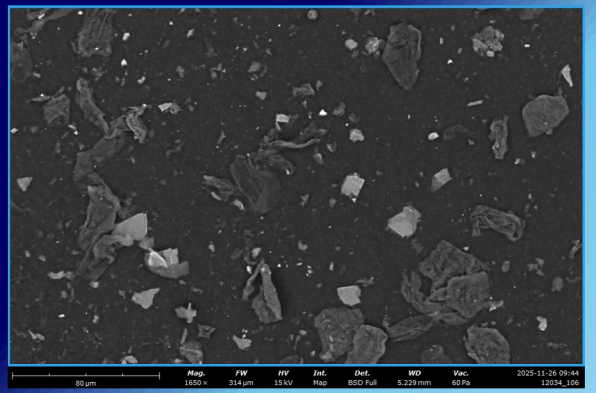
Sample 2



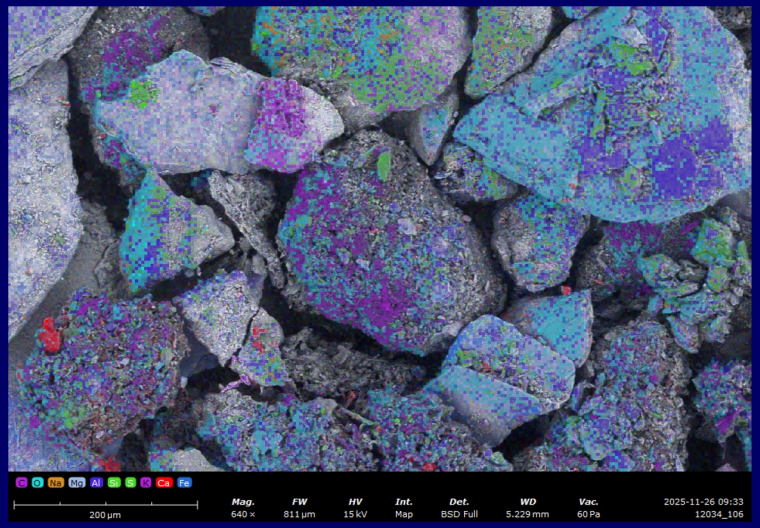
Sample 3

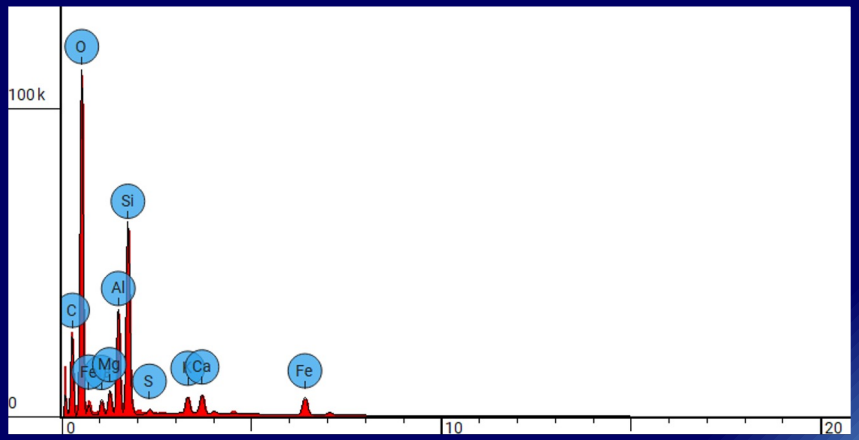


Sample 4



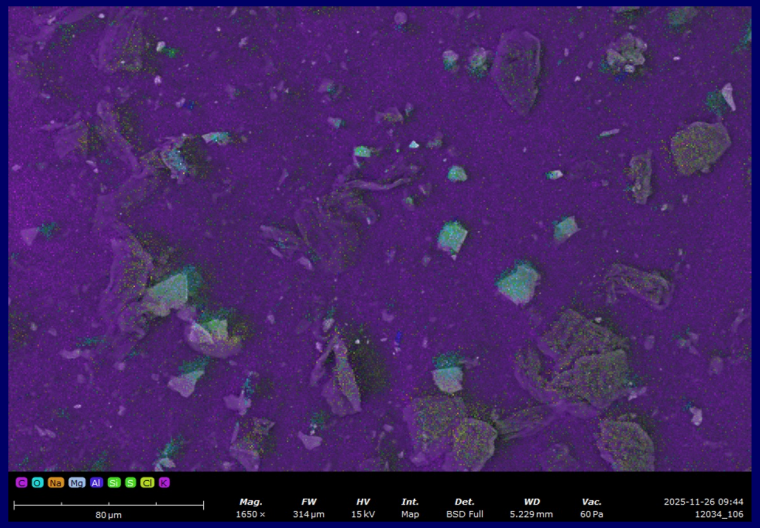
Further Analysis: Sample 1

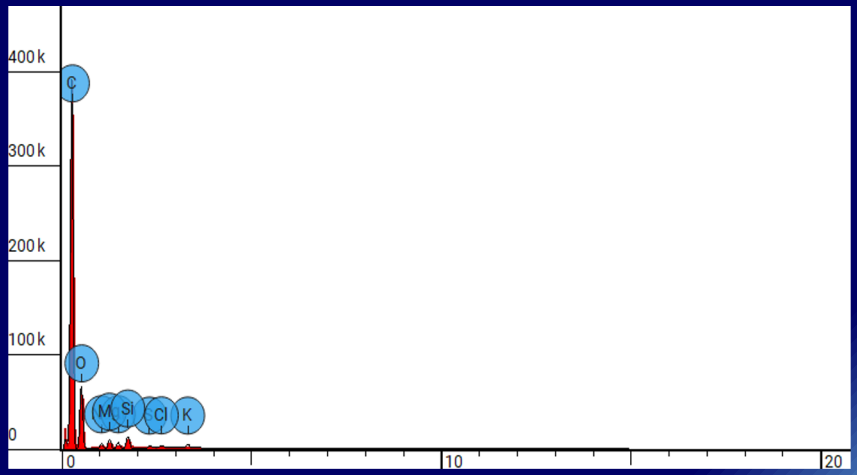




	Element Number	Element Symbol	Element Name	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. Weight Conc.
	6	C	Carbon	27.453	18.300		
	8	O	Oxygen	53.601	47.600		
	11	Na	Sodium	1.097	1.400	Na2O	3.256
	12	Mg	Magnesium	0.963	1.300	MgO	3.719
	13	Al	Aluminum	4.275	6.400	Al2O3	20.873
	14	Si	Silicon	7.569	11.800	SiO2	43.562
	16	S	Sulfuric	0.225	0.400		
	19	K	Potassium	1.152	2.500	K2O	5.197
	20	Ca	Calcium	1.214	2.700	CaO	6.520
	26	Fe	Iron	2.452	7.600	FeO	16.873

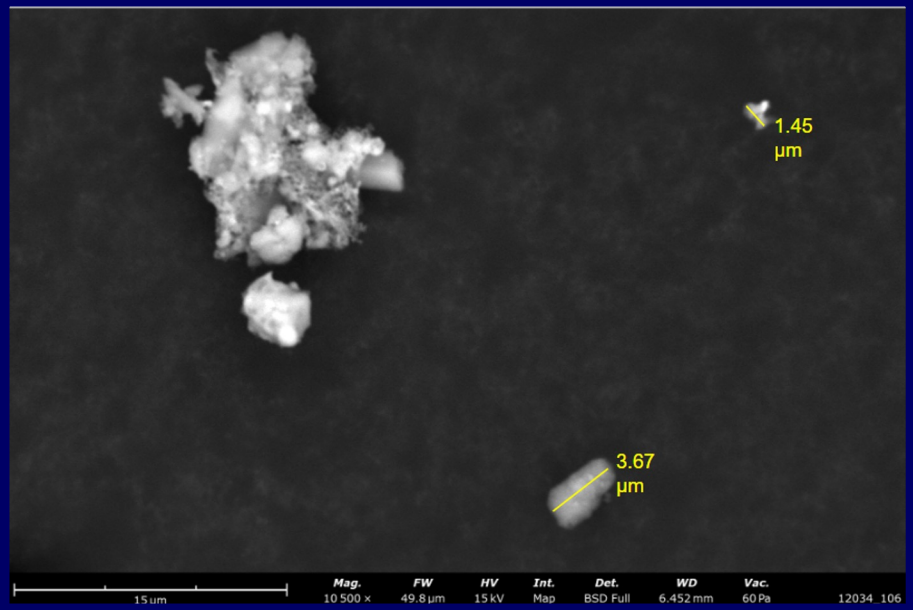
Further Analysis: Sample 4





	Element Number	Element Symbol	Element Name	Atomic Conc.	Weight Conc.	Oxide Symbol	Stoich. Weight Conc.
	6	C	Carbon	72.407	64.800		
	8	O	Oxygen	25.078	29.900		
	11	Na	Sodium	0.467	0.800	Na2O	13.686
	12	Mg	Magnesium	0.497	0.900	MgO	18.938
	13	Al	Aluminum	0.348	0.700	Al2O3	16.791
	14	Si	Silicon	0.621	1.300	SiO2	35.296
	16	S	Sulfur	0.126	0.300		
	17	Cl	Chlorine	0.114	0.300		
	19	K	Potassium	0.343	1.000	K2O	15.289

Respirable Particles <5 microns

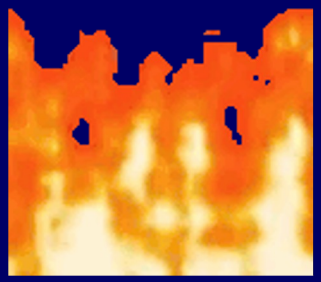


Peak Temperature: Based on D and G Carbon Bands of 3 Spectra

- **Busemann model (based on D band width):**

T_{peak} (Spec-16): 216.68 C
T_{peak} (Spec-36): 259.32 C
T_{peak} (Spec-43): 247.64 C

- **Cody model (based on D band width):**

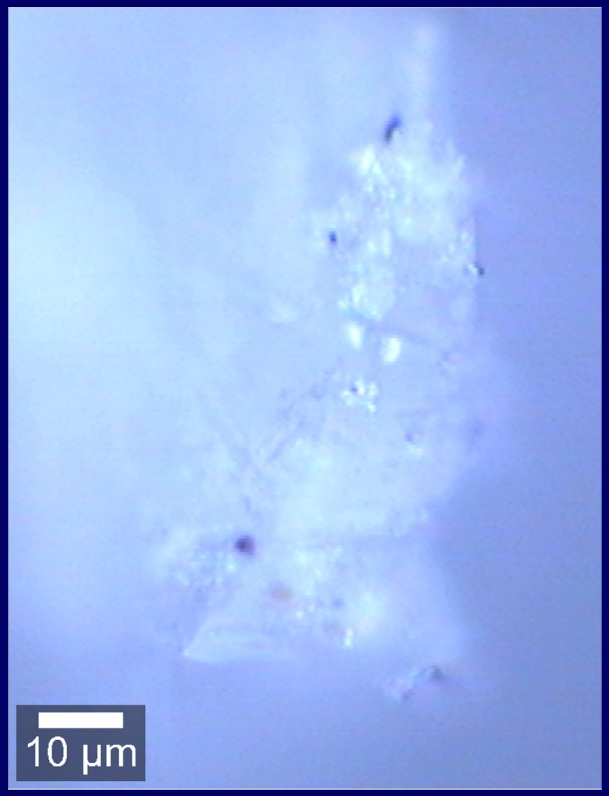


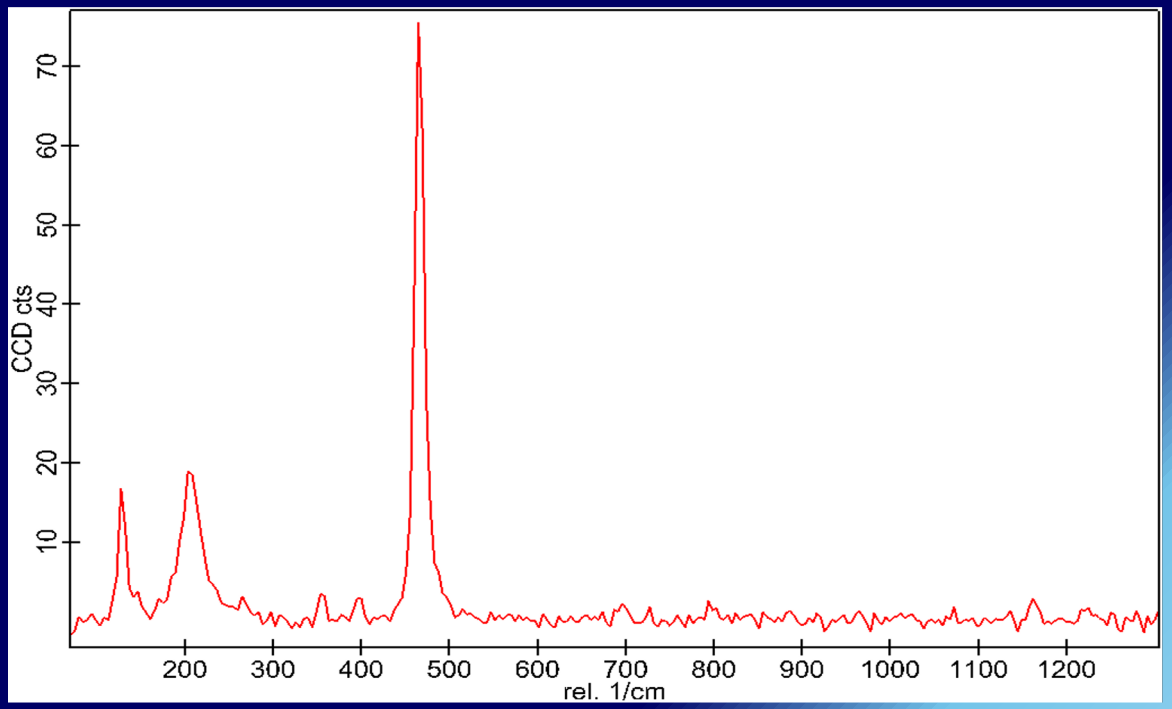
T_{peak} (Spec-16): 180.70 C
T_{peak} (Spec-36): 327.85 C
T_{peak} (Spec-43): 303.68 C

- **Cody model (based on G band width):**

T_{peak} (Spec-16): 157.77 C
T_{peak} (Spec-36): 328.58 C
T_{peak} (Spec-43): 341.25 C

Detection of Quartz in the Sample





Fine Quartz Dust=Respirable Crystalline Silica

- Occupational hazard in construction, mining, stone fabrication
- Silicosis is incurable when silica dust particles lodge deep in lungs leading to inflammation and permanent scarring (pulmonary fibrosis)
- Lung Cancer risk: respirable crystalline silica is classified as a Group 1 carcinogen by the International Agency for Research on Cancer (IARC), meaning a definite cause of cancer in humans.

Fine Quartz Dust=Respirable Crystalline Silica

- Chronic Obstructive Pulmonary Disease (COPD)
- Bronchitis, Emphysema
- Kidney Disease
- Autoimmune Diseases (Rheumatoid Arthritis)
- Tuberculosis (TB)
- Possible cancer risk

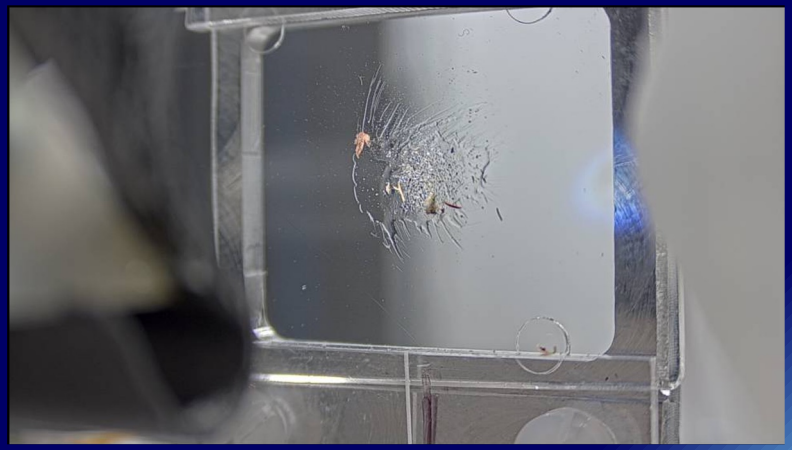
Palisades Fire Ash
Preliminary Analysis

Andrew M. Kiss, PhD
Brookhaven National Laboratory
National Synchrotron Light Source II (NSLS II)
Beamline ID-5

Brookhaven
National Laboratory

Sample Mounting

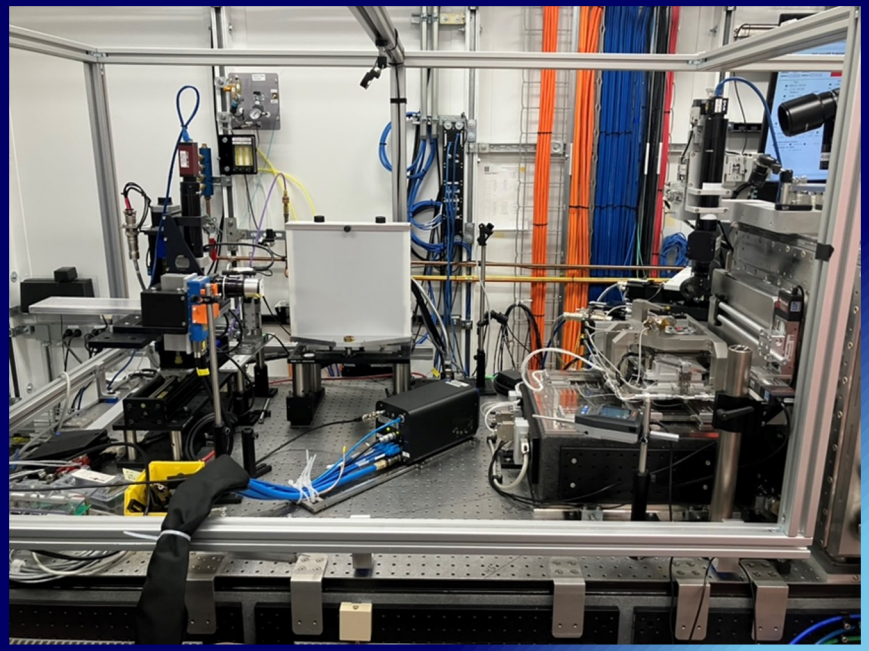
Ash was spread on 200 nm thick SiN window. Windows are very fragile and this one broke.



Ash was spread on an acrylic microscope slide.

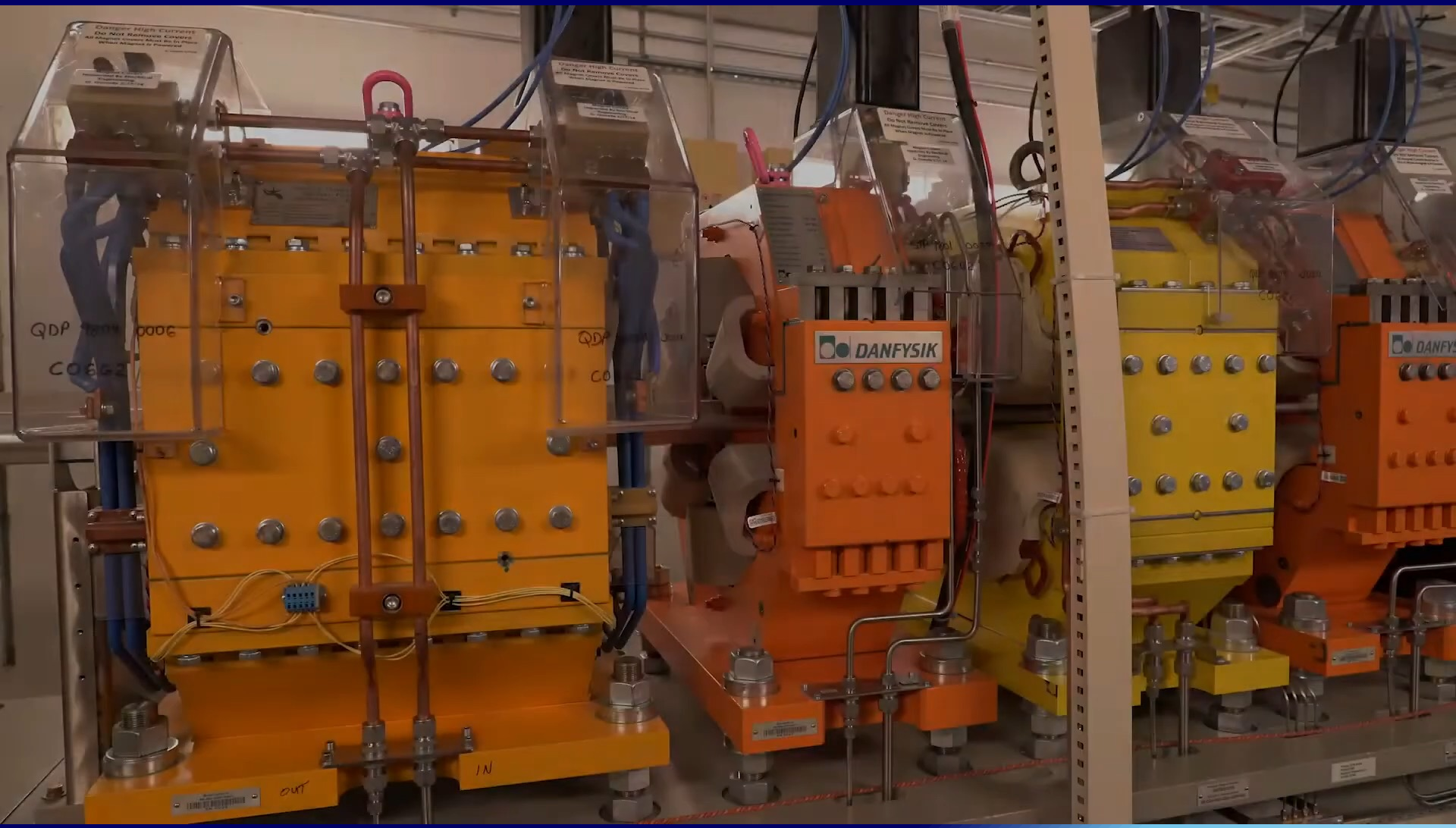
NSLS-II SRX Beamline

Beamline workstations

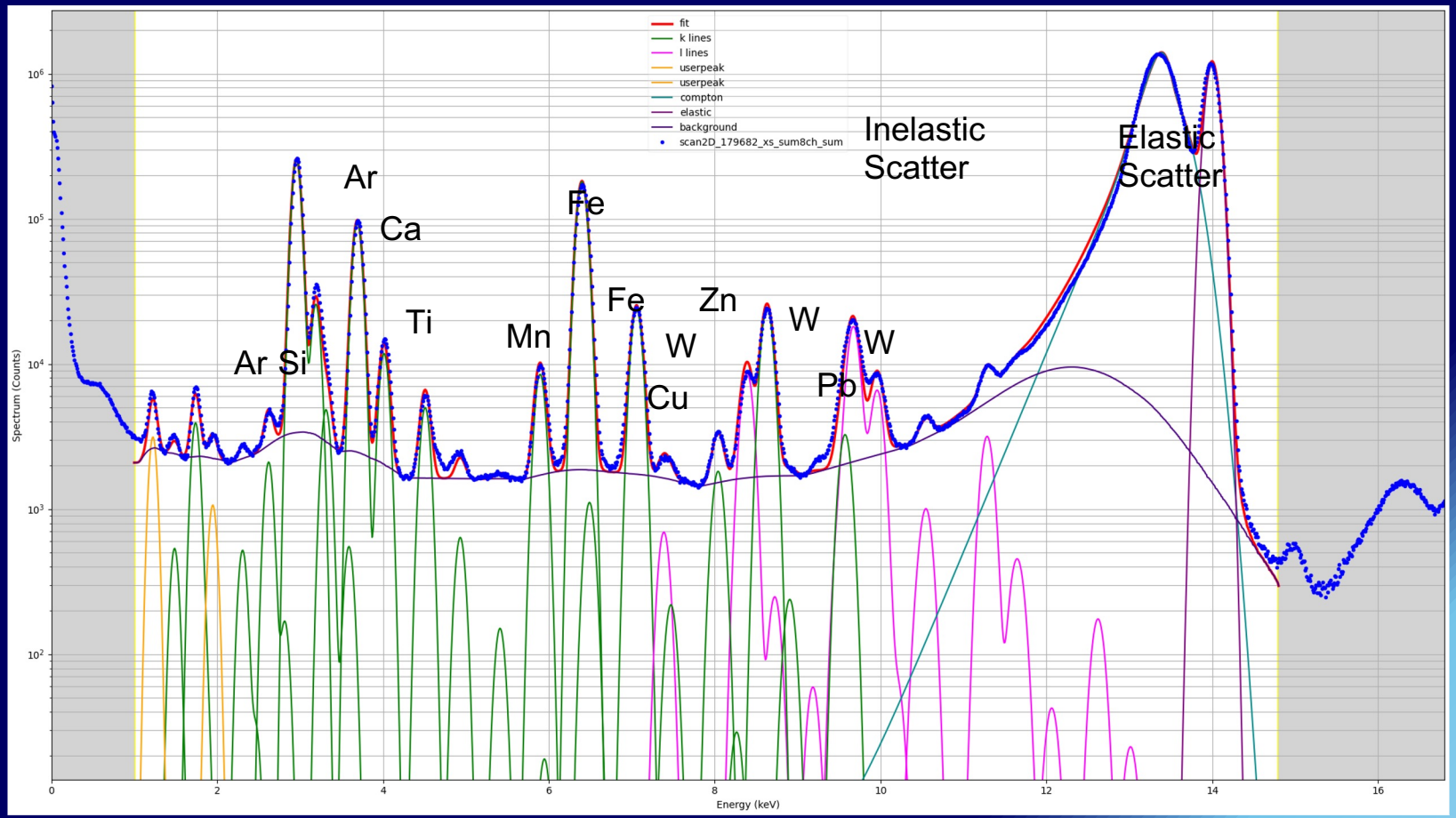


SRX endstation

NSLS-II Virtual Tour Lisa Miller, PhD, Biophysical Chemist

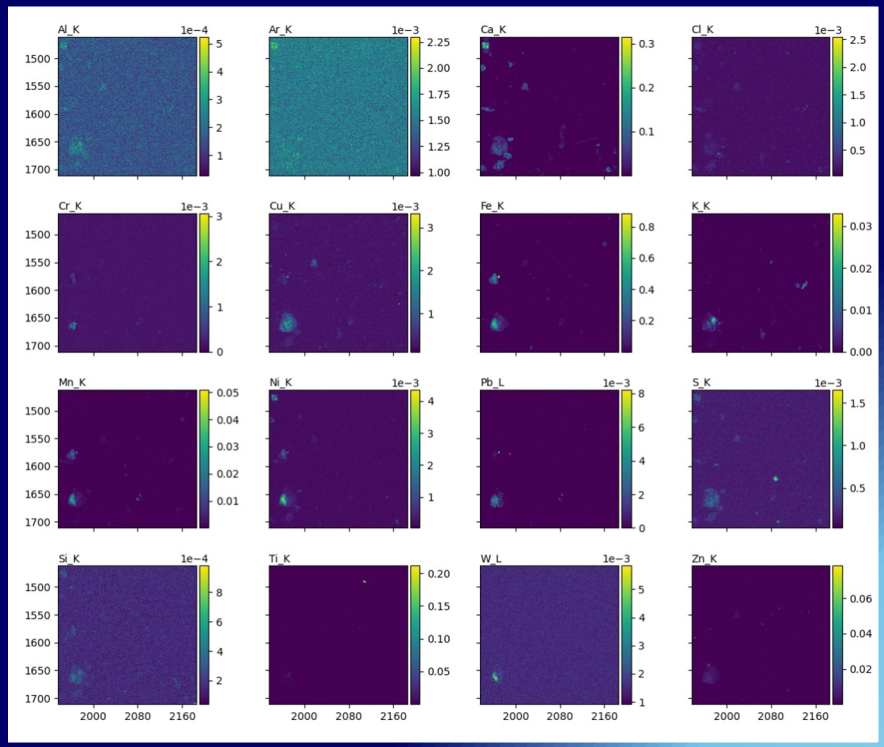


Brookhaven National Lab Fluorescence Lines



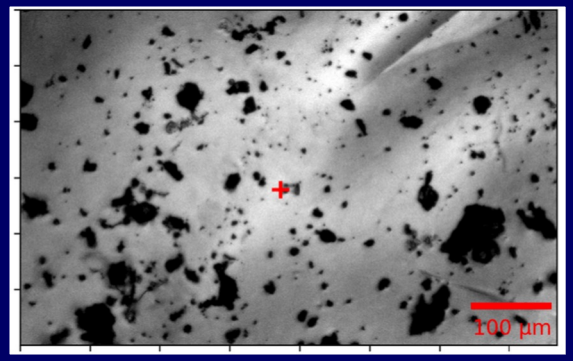
Elemental Mapping

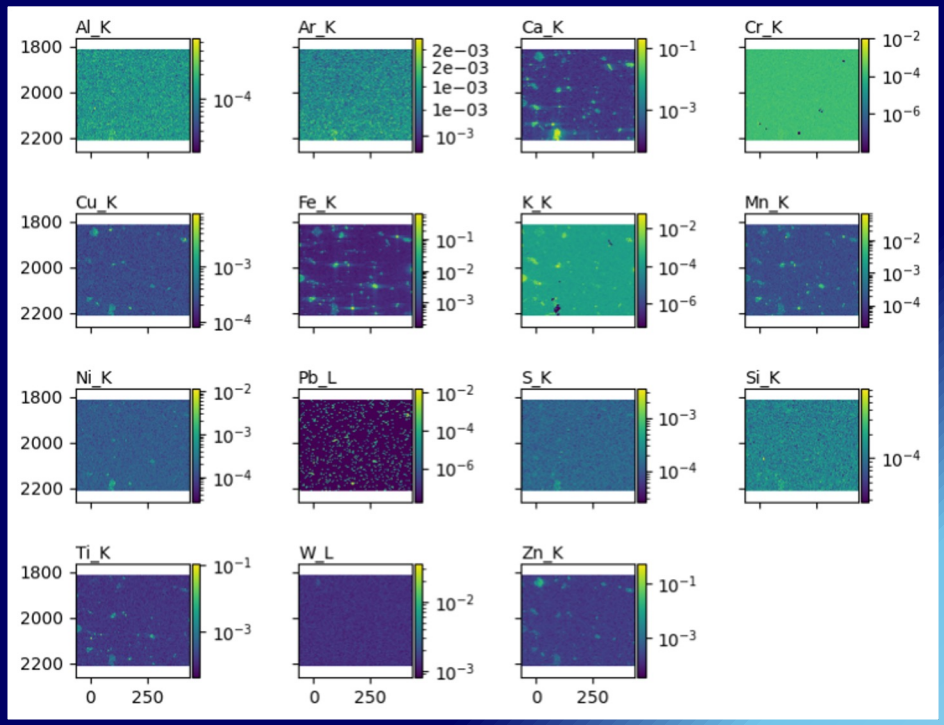
- XRF map at 14 keV
- Scan area 250 x 250 µm with 1.0 µm resolution
- Total collection time: ~2 hour



Elemental Mapping

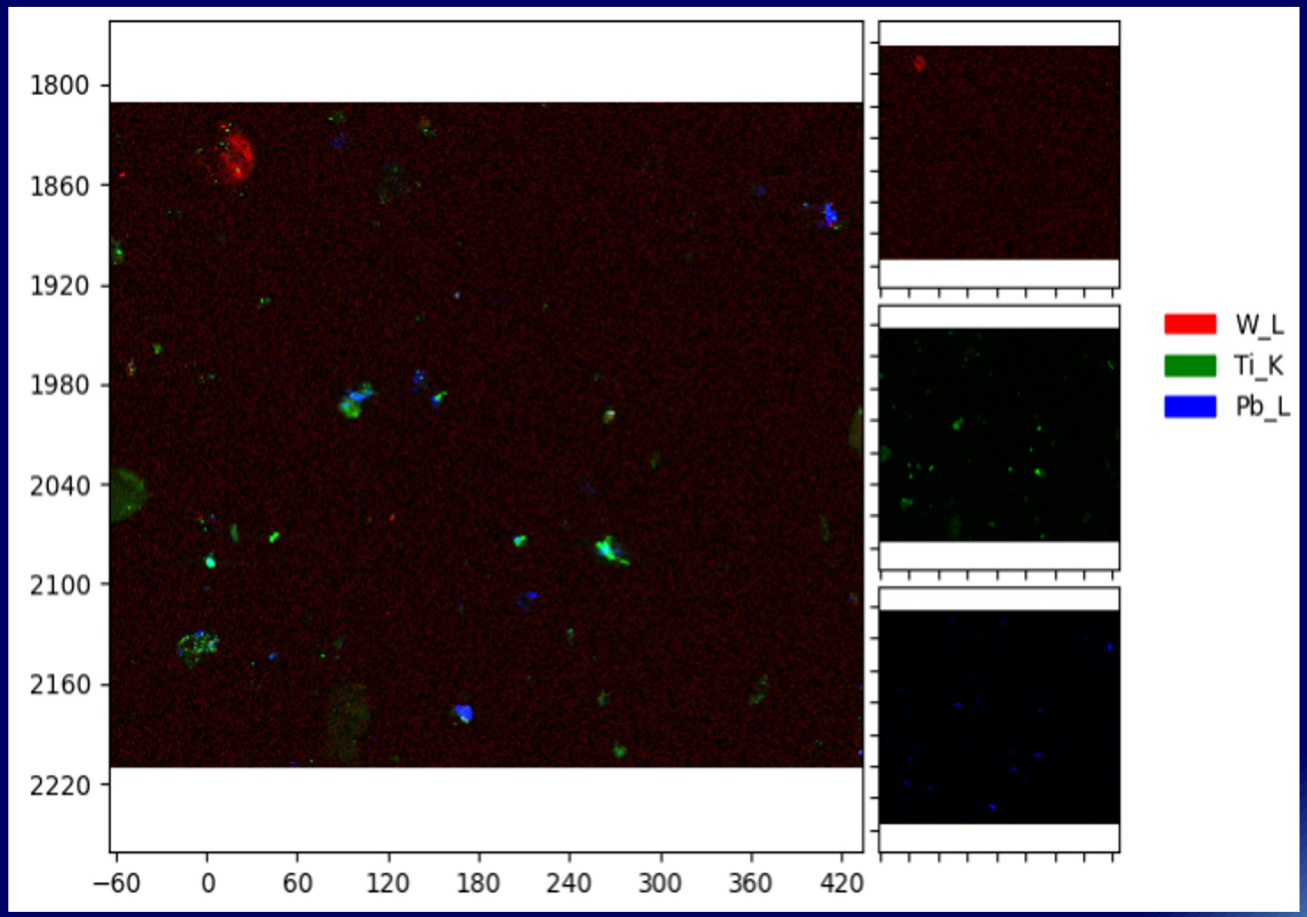
- XRF map at 14 keV
- Scan area 500 x 400 μm with 1.0 μm resolution
- Total collection time: ~6 hour





* log(intensity) is displayed

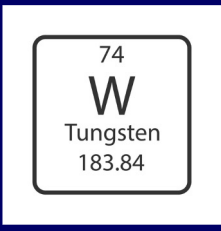
Element Correlation Map



Elemental distribution of:

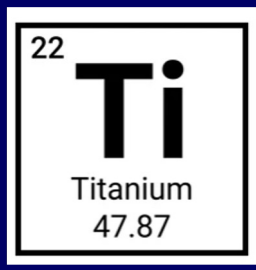
- **Tungsten**
- **Titanium**
- **Lead**

Health Hazards of Tungsten Inhalation



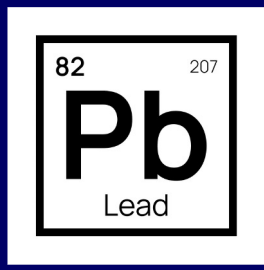
- Pulmonary Fibrosis
- Cardiovascular issues (hypertension, stroke)
- Risk of Cancer
- Systemic accumulation (bone, kidney, liver, spleen)
- Neurological Effects
- Memory Sensory Deficits

Health Hazards of Titanium Inhalation



- Nasal and throat irritation
- Metal Fume Fever (low- grade fever, headache, fatigue, myalgia)
- Pneumoconiosis (deposition in lungs, tissues, and lymph nodes)
- Corrosive injury
- Risk of cancer
- Bronchitis
- Lung fibrosis

Health Hazards of Lead Inhalation



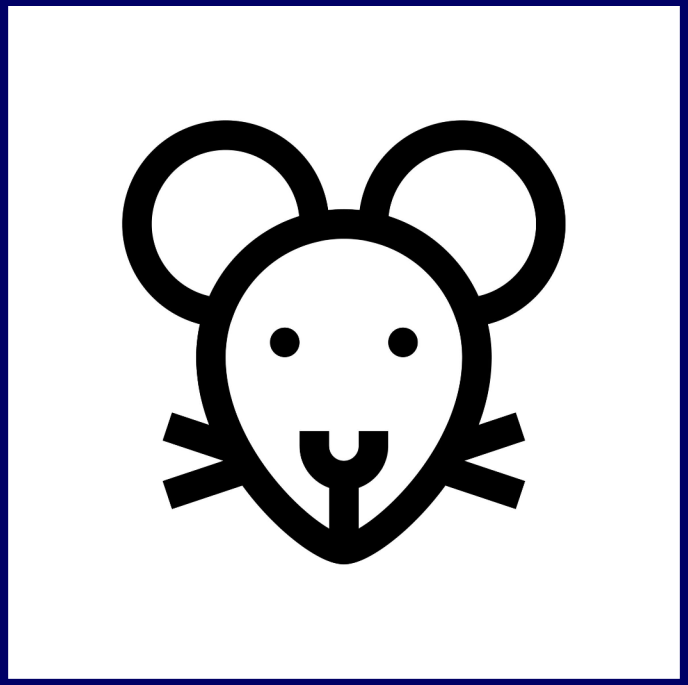
Impacts on Children

- Learning Disabilities
- Attention Problems
- Behavioral Issues
- Stunted Growth
- Hearing Problems
- Seizures
- Death

Impacts on Adults

- Compromised Nervous System
- High Blood Pressure
- Decreased Kidney Function
- Infertility
- Joint Pain
- Decreased Lung Function

Future Experiments:
Utilizing mice for intratracheal inhalation.



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Maimonides Medical Center

Robert Promisloff, DO, FCCP

DREXEL UNIVERSITY College of Medicine

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Ali Hassan, BS

Luke Cacic, BS

Matthew Lenis

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The Circul+ Device is Accurate Across Racial Disparaties

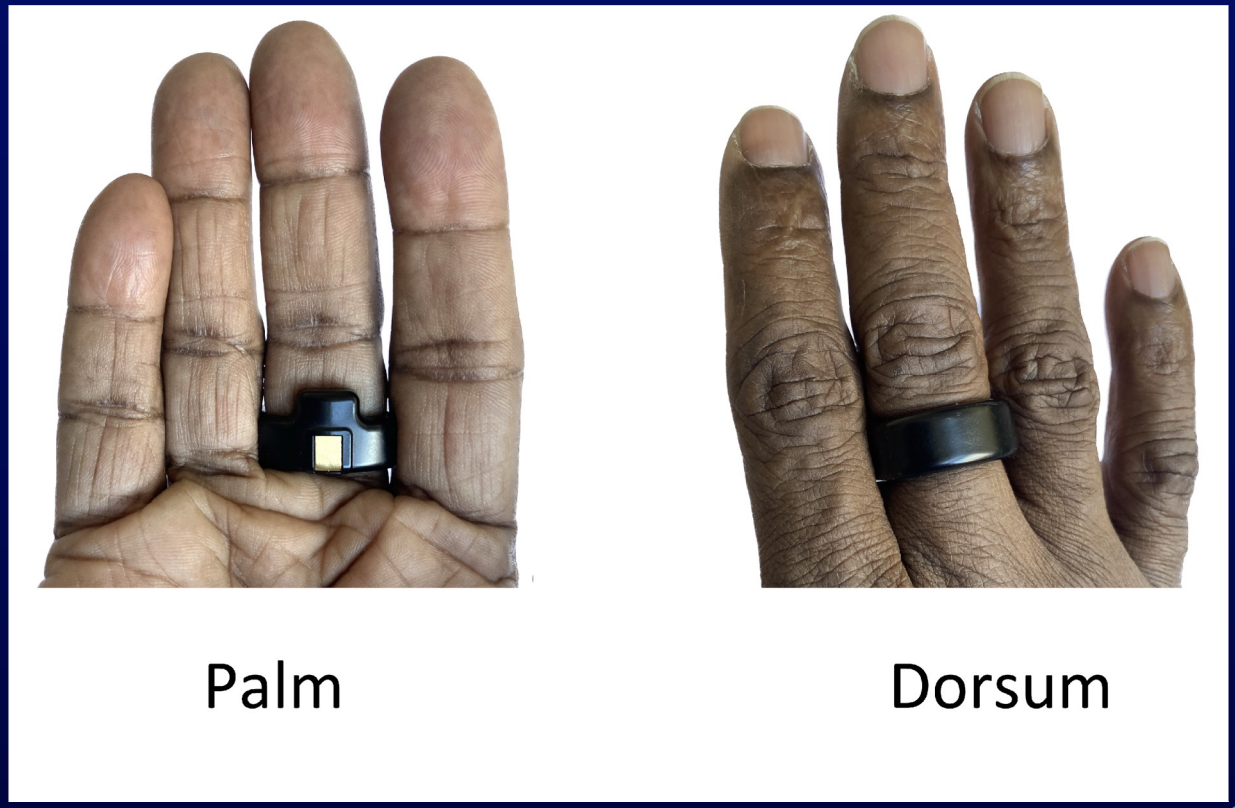
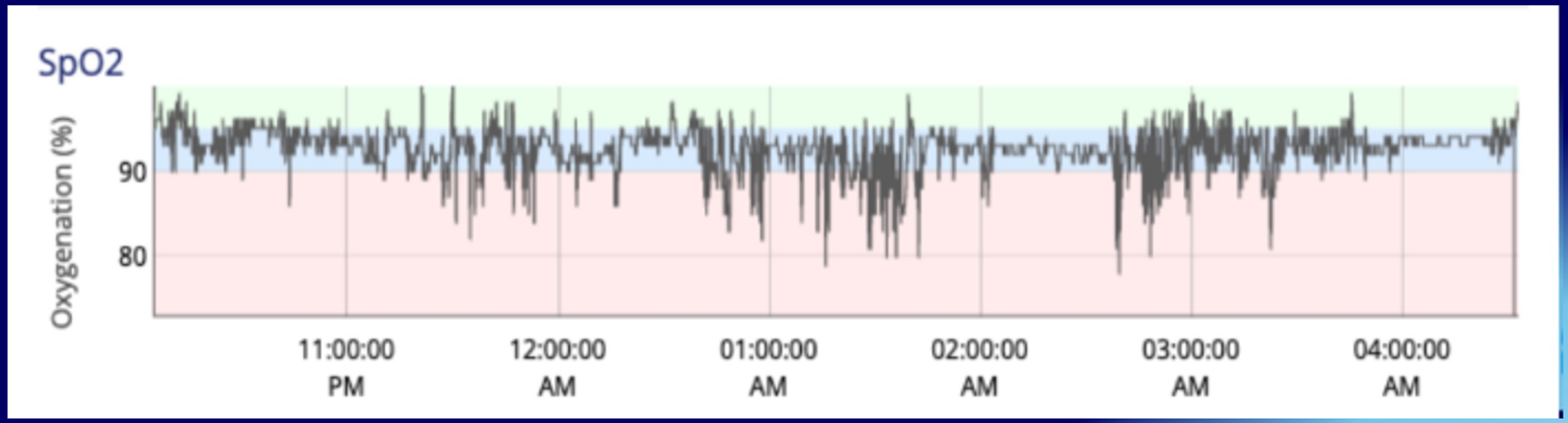


Photo from Meir Kryger, MD

ATS 2025

Clinical Case : Initial Evaluation

Initial Evaluation Demonstrated Severe Desaturation at Night



Time Saturation Below 90%: 50:28min/sec

ATS 2025

Reflections on 9/11:

- Asthma, allergy, lung injury in children and rescue workers post 9/11
- Comparison to Military Burn Pits/K2
- California/Canadian Wildfires
- East Palestine, Ohio Train derailment of 2023

Scientists warn of potentially serious health risks following Ohio train derailment

NEW YORK POST

February 16, 2023

Wearable Sensors

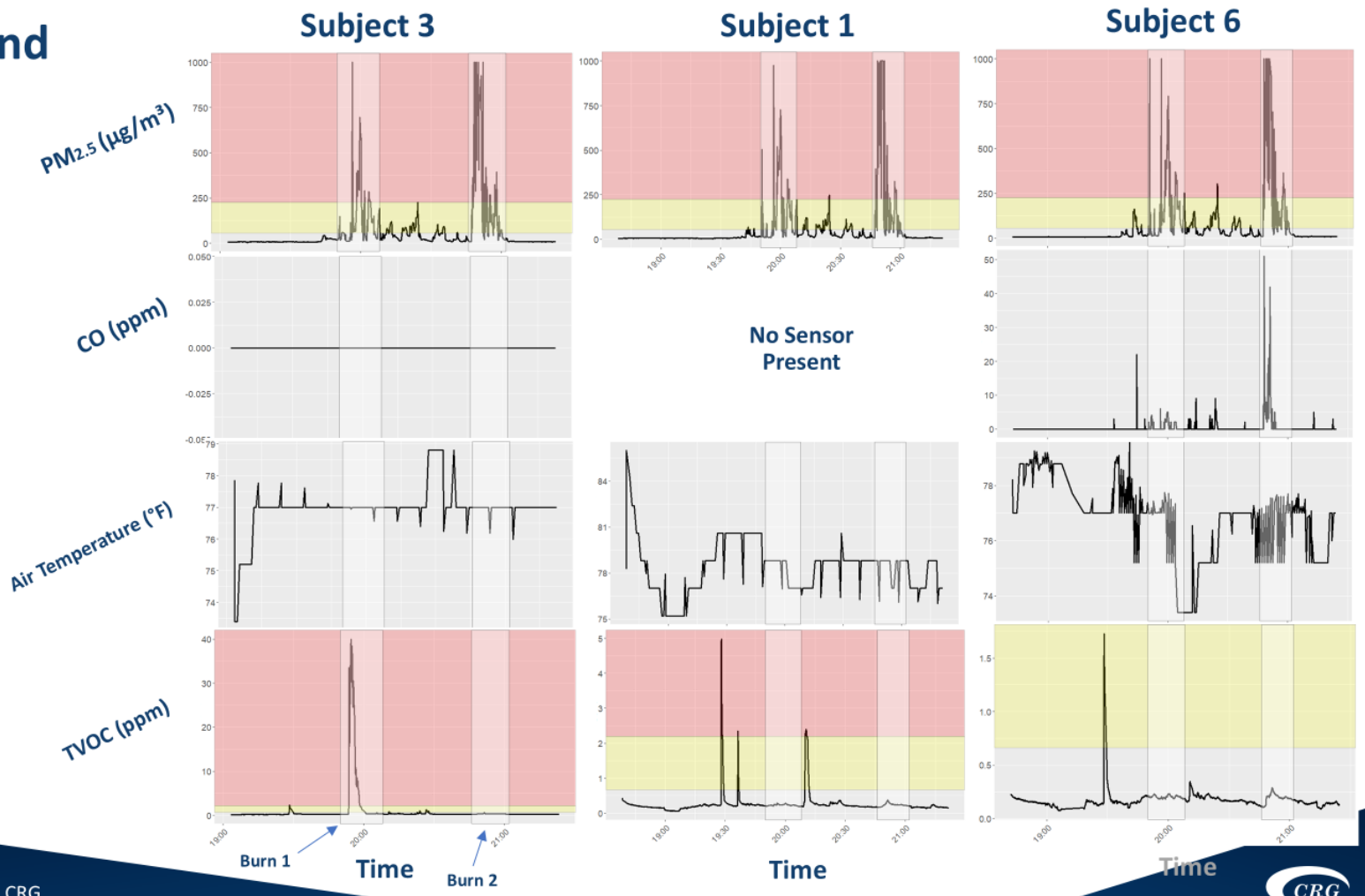
Supported by Department of Defense Proposal Number PR211133, Award Number W81XWH-22-1-1062; E03756.1a - OHRO Approval Memorandum WCG 20241990

ATS 2025

July 22nd

Simultaneous capture of multiple data types can be time-synched across users

Differences in exposure can be easily evaluated, as seen here with TVOC exposure



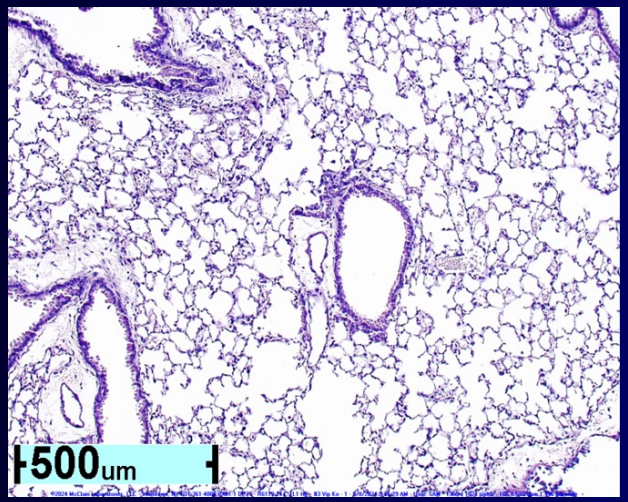
Kayla Keenan, MHA, Penn State College of Medicine,'27

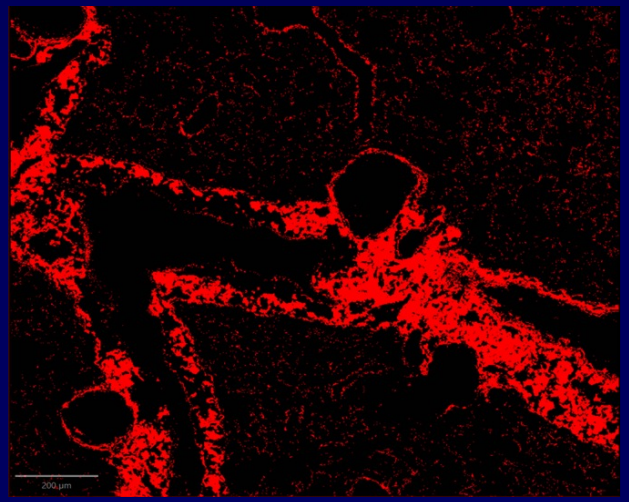
Kayla Keenan, PSCOM '

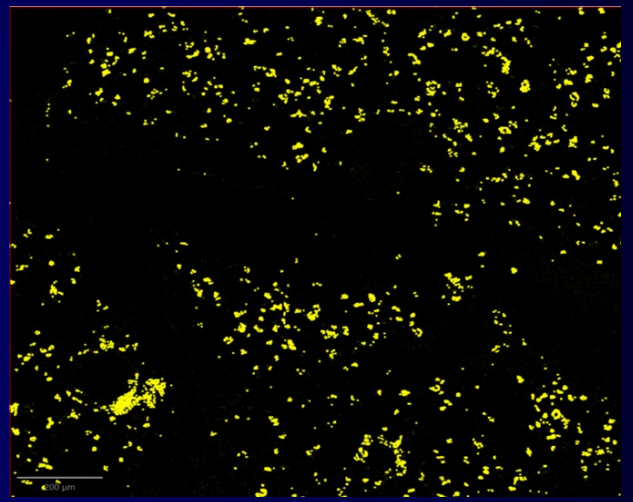
Reflections on 9/11:

- Asthma, allergy, lung injury in children and rescue workers post 9/11
- Comparison to Military Burn Pits/K2
- California/Canadian Wildfires
- East Palestine, Ohio Train derailment of 2023

Imaging Mass Cytometry shows WTC-induced Collagen and CD45 deposition before light microscopy changes, worse in VIP KO Mice







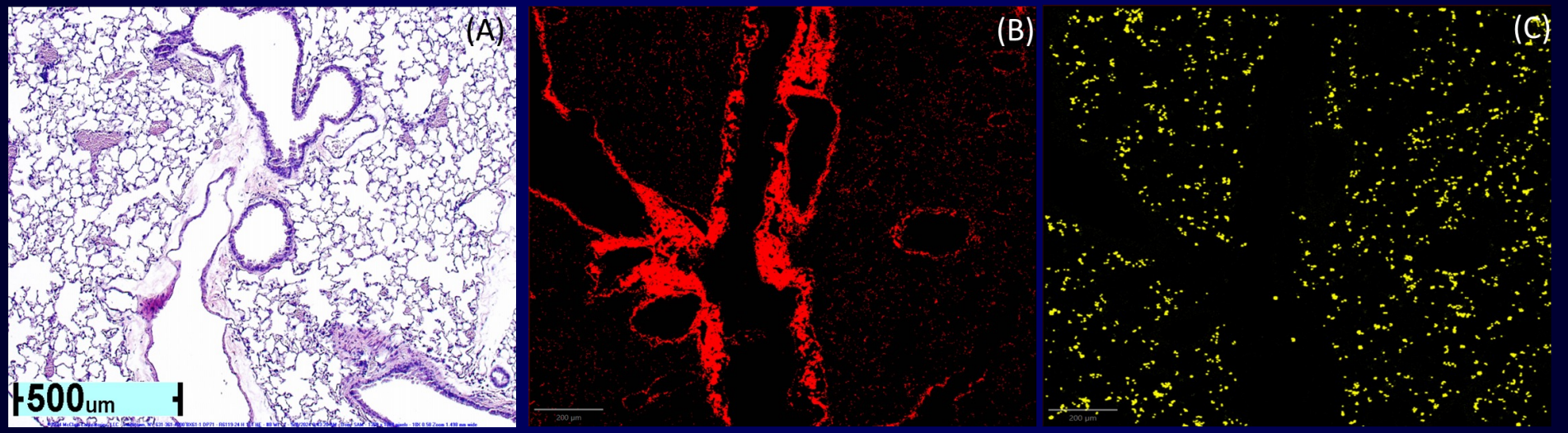
(A) H & E stain of a VIP-KO w/ WTC dust

(B) IMC of VIP-KO w/ WTC dust highlighting areas of type I collagen deposition

(C) IMC of VIP-KO w/ WTC dust highlighting CD45 expression.

Nick Favazza, MD, MPH

Imaging Mass Cytometry detects WTC-induced Collagen and CD45 deposition before light microscopy shows damage



Fi(A(A(A) H & E stain of a WT w/ WTC dust

(B) IMC of WT w/ WTC dust highlighting areas of type I collagen deposition

(C) IMC of WT w/ WTC dust highlighting CD45 expression.

B) IM

Nick Favazza, MD, MPH

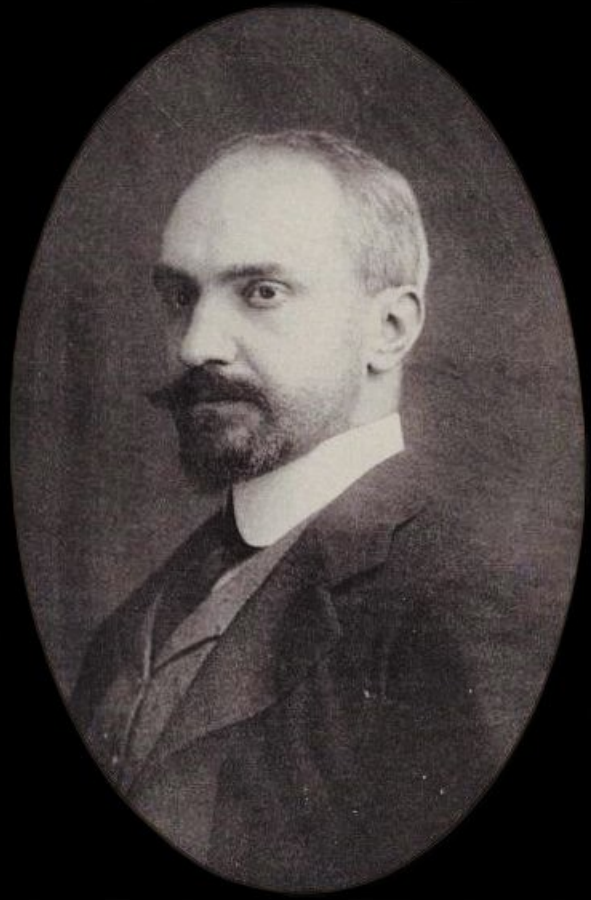
Reflections on 9/11

- Starting with the world trade center disaster, our community concern about exposure in Chinatown, Manhattan, prepared us to understand military burn pits, California and Canadian wildfires, and now the East Palestine, Ohio train derailment.

- These are not isolated incidents but rather are harbingers of future disasters.

Those who **cannot remember the past** are condemned to **repeat it.**

— *George Santayana*



AZ QUOTES

Reflections on 9/11:
Comparison to Military Burn Pits/K2, California/Canadian Wildfires, and the East Palestine, Ohio Train Derailment

Anthony M. Szema, MD, ATSF

Chair, ATS Section on Terrorism and Inhalation Disasters (TID)