



Assessing Occupational Exposure in Black Hair Salons

Co-Investigators:

Anna M. Abrams
Alexis J. Cooper
Jay D. Feinstein
Annie E. Fortnow
Omkar A. Kulkarni
Sarah A. Lemelman

Laura J. Goldin

Joseph G. Allen
James H. Stewart

Allison F. Marill
Ramya B. Ramakrishna
Teleah I. Slater
Cassidy L. Tatum
Raymond H. C. Trott
Sandra E. Watemberg

Theodore A. Myatt
Matthew A. Fragala



Our Partners



History and Background



the cool one

new *Epic* ~ first permanent
curl relaxer
that goes on cool ~ stays cool!

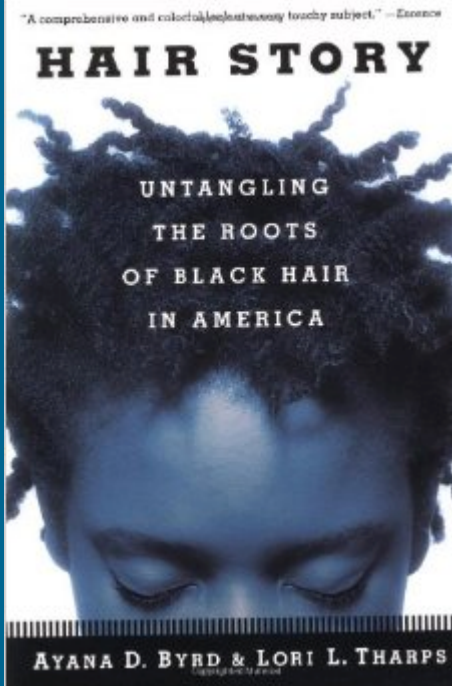
Forget hot combs and stinging chemicals. The Cool One—New Epic curl relaxing lotion—is here at last from Gillette. So gentle your hairdresser can apply it without gloves. So cool it relaxes even extra-curly or color-treated hair with comfortable ease. New cool Epic won't revert—in rain or heat. Lasts and lasts. Conditions. Leaves bounce and body for sleek styling. Why wait? Get The Cool One—now at your hairdresser.

THE EPIC PROFESSIONAL PRODUCTS CO., DIVISION  CHICAGO, ILLINOIS

"A comprehensive and colorful, least to say, timely subject." — Essence

HAIR STORY

UNTANGLING
THE ROOTS
OF BLACK HAIR
IN AMERICA



AYANA D. BYRD & LORI L. THARPS

NOW... MORE THAN EVER Fashion Demands Straight Hair!

Look around you! Today, every smart, modern hair styling must *start with straight hair!* And how to have straight hair? Why with Perma-Strate, of course, the original and world's largest selling cream hair straightener. Only Perma-Strate gives you such easy-to-manage, *natural-looking* straight hair that can be dressed, combed, or styled in any way desired. So economical to use . . . one creamy application keeps hair permanently relaxed for 3 months or longer, with no burn, no redness, no scalp irritation. Even the makers of dyes, tints, and bleaches recommend Perma-Strate because it actually reconditions the hair as it softly straightens. Yes, fashion demands straight hair. That's why you should demand Perma-Strate, the home permanent hair relaxer, preferred and recommended by top stars like Rosetta Perry and Count Basie.



A complete home kit, only \$2.25 plus tax at drug and toiletry counters, or if not available, order from Perma-Strate, 271 Vance, Memphis, Tenn.

Perma-Strate
Original and World's Largest Selling
Cream Hair Straightener



When hair is dull, dry, and brittle, get Perma-Strate HAIR SHEEN, the double-duty hair conditioner and dressing. Only \$1.00 plus tax.

Black Hair Procedures

- Chemical (relaxers, dyes, extensions)
- Natural (twists, curly styles)



Common Services and Their Health Effects

Salon Tasks	Chemicals	Associated Health Effects (from HSDB)
Relaxers	Calcium hydroxide	Moderate skin irritant, avoid inhalation
	Sodium hydroxide	Severe skin irritant, can cause second and third degree burns
	Propylene glycol	Skin irritant
	Guanidine carbonate	Skin and strong eye irritant
	Polyethylene glycol	Respiratory tract irritant. Skin and eye irritant
Brazilian Blowouts	Methylene Glycol	Carcinogen; skin, eye, and respiratory irritant
	Bixa Orellana (Annatto) Seed Extract	Can cause headache, dizziness, weakness, or nausea
	Cyclopentasiloxane	No known health effects when inhaled or when in contact with skin
	Glycerin	Eye irritant
	Limonene	Skin, eye, and respiratory irritant
	Linalool	Eye and skin irritant
	Hexyl Cinnamal	Eye and skin irritant
	Benzyl Benzoate	Eye and skin irritant

Hazardous Chemicals and Known Hazards

- Sodium Hydroxide
- Ammonia
- Ammonium Thioglycolate
- Formaldehyde



Methods: Study Design

Our study was approved by the Brandeis University Institutional Review Board (IRB).

Questions we investigated:

- What are the daily workplace sources and concentrations of VOCs, aldehydes, carbon monoxide, carbon dioxide and Particulate Matter (PM) 2.5 in black hair salons?
- What health concerns are associated with the services provided in the salon?



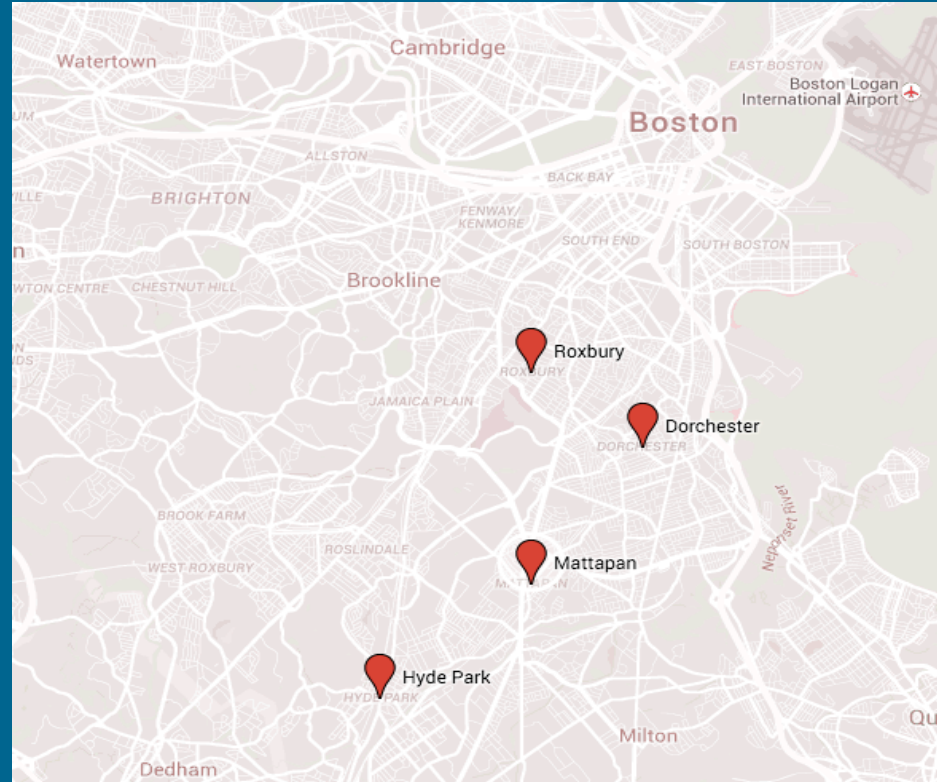
What We Tested For

- Volatile Organic Compounds (VOCs)
- Aldehydes
- Particulate Matter $2.5\ \mu\text{m}$
- Carbon Dioxide
- Carbon Monoxide
- Temperature
- Relative Humidity



Recruitment

- ❖ Online search for 90 Black hair salons
- ❖ Canvassed with a flyer and the help of the Resilient Sisterhood Project
- ❖ 10 salons agreed to participate
 - salon recruitment limited by the amount of equipment



Equipment



Summa Canister



Q-Trak



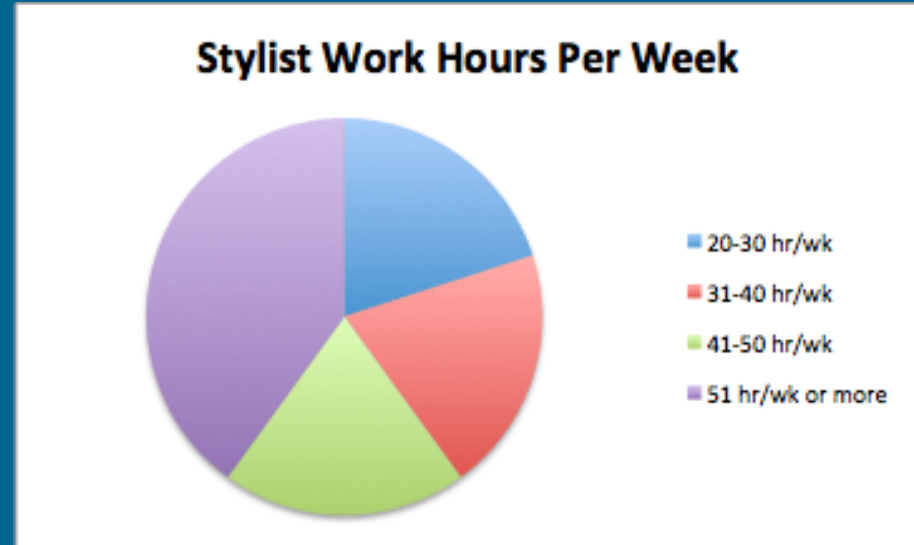
Dust-Trak



Carbonyl

Demographics

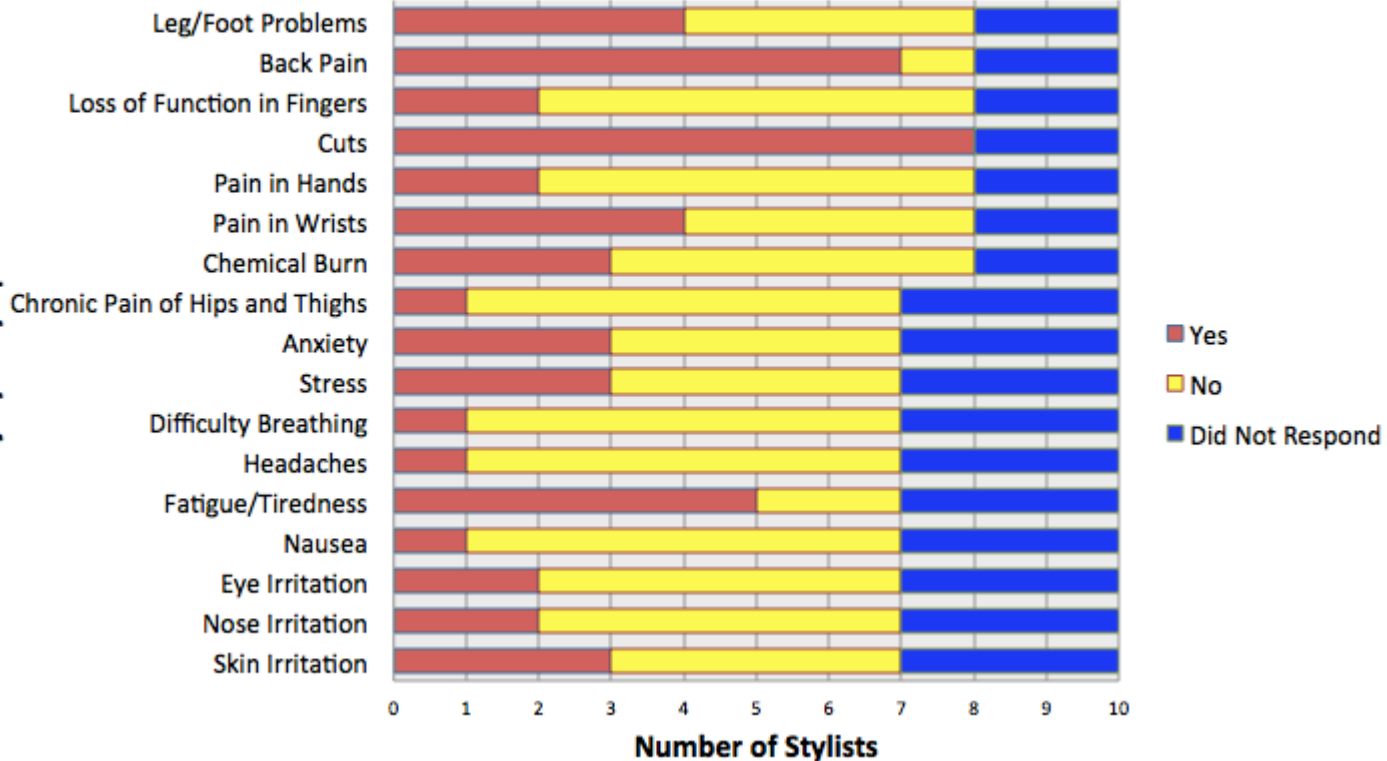
- 6/10 stylists 45 years or older
- Average of 22 years of experience
- Size of hair salons varied
- No standard ventilation system



Results: Questionnaire

Self Reported Health Symptoms and Physical Injuries Experienced at Work

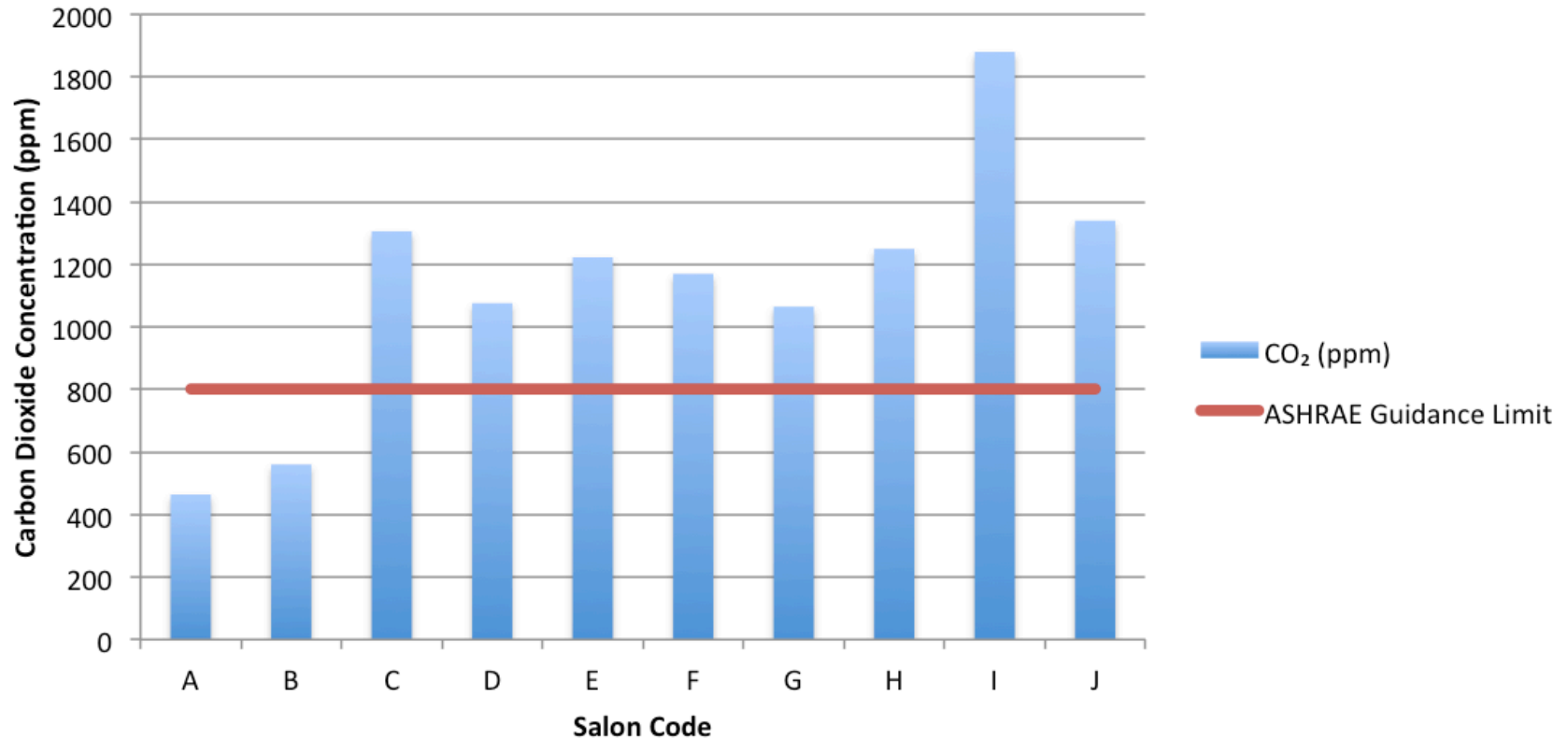
Injury or Symptom

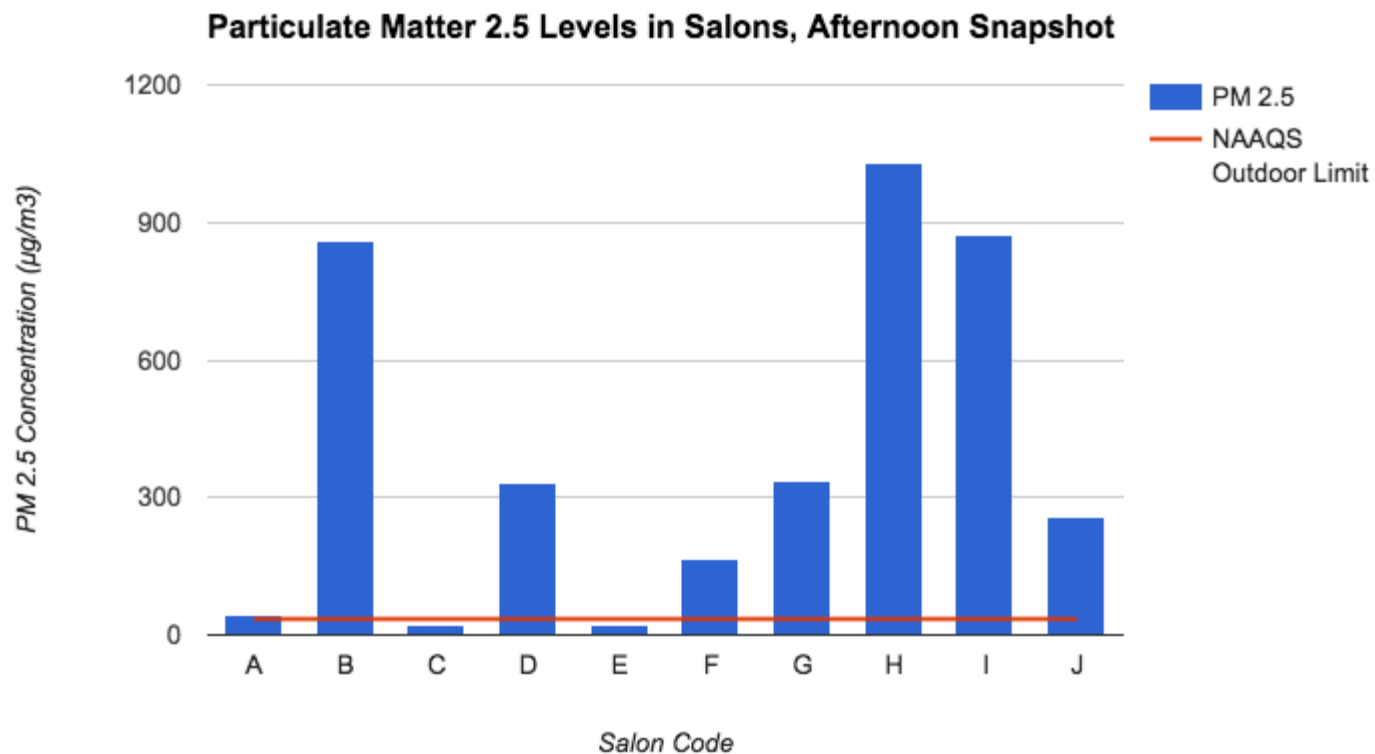


Summary of Findings

Parameter	Measured in # of Salons	Average	Minimum	Median	Maximum	Guideline	Source
CO2(ppm)	10	1133	464	1197	1880	800 ppm	ASHRAE
PM2.5(ug/m3)	10	394	22	295	1030	35 ug/m3	EPA
Formaldehyde (ug/m3)	10	2.67	0.15	2.255	6.52	0.18 ppb 8 ppb	EPA ATSDR MRL (Chronic)
Benzene (ug/m3)	10	1.33	0.59	1.15	2.4	0.36 ug/m3 3 ppb	EPA ATSDR MRL (Chronic)
Tetrachloroethylene (ug/m3)	8	104.09	0.58	2.18	810	11 ug/m3 400 ppb	EPA NIOSH REL
Dichlorobezene- 1,4(ug/m3)	6	8.66	0.72	1.2	34	0.26 ug/m3 10 ppb	EPA ATSDR MRL (Chronic)
Chloroform(ug/m3)	5	0.97	0.51	0.65	2.2	0.12 ug/m3	EPA
Total Chronic VOCs (ppb)	10	23.13	3.03	9.92	133.34		
Total Aldehydes (ppb)	10	20.15	1.03	11.135	107.15		

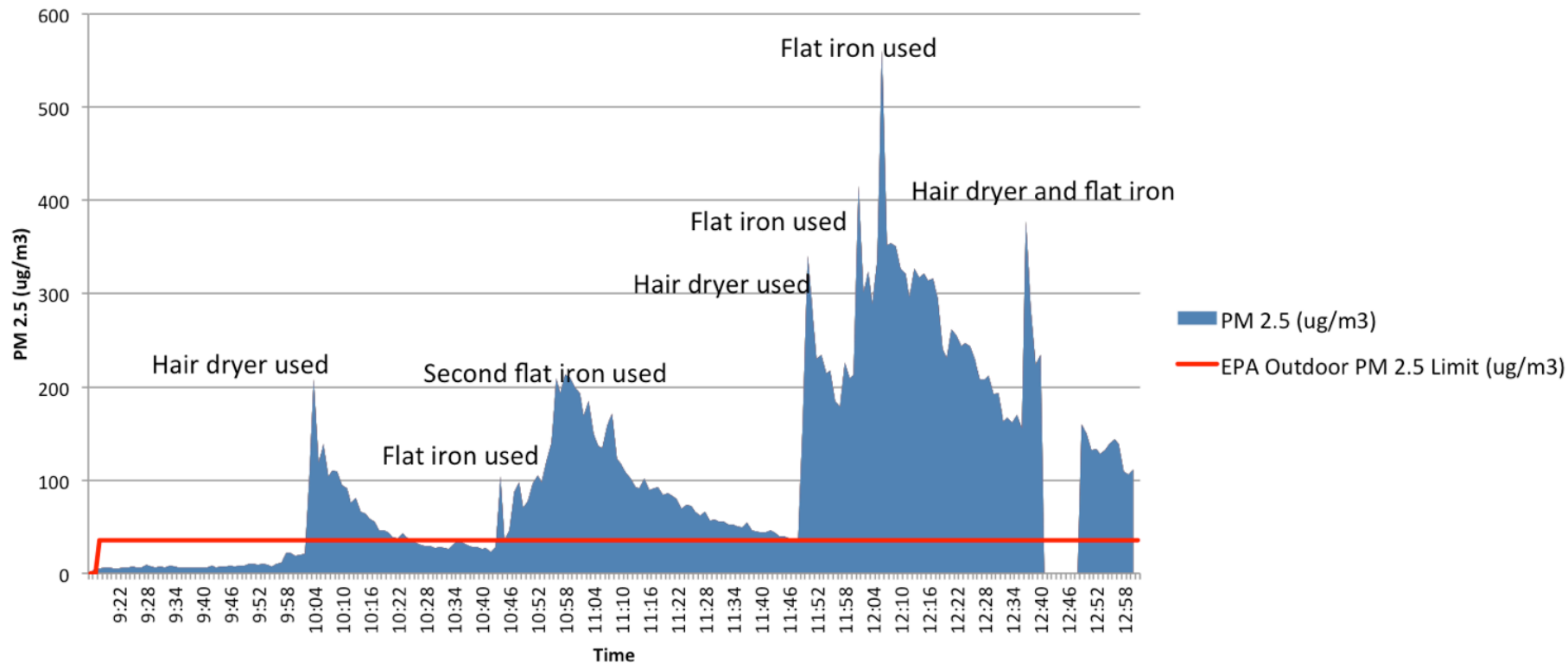
Indoor Carbon Dioxide Level (Afternoon Snapshot) vs Guidance Limit



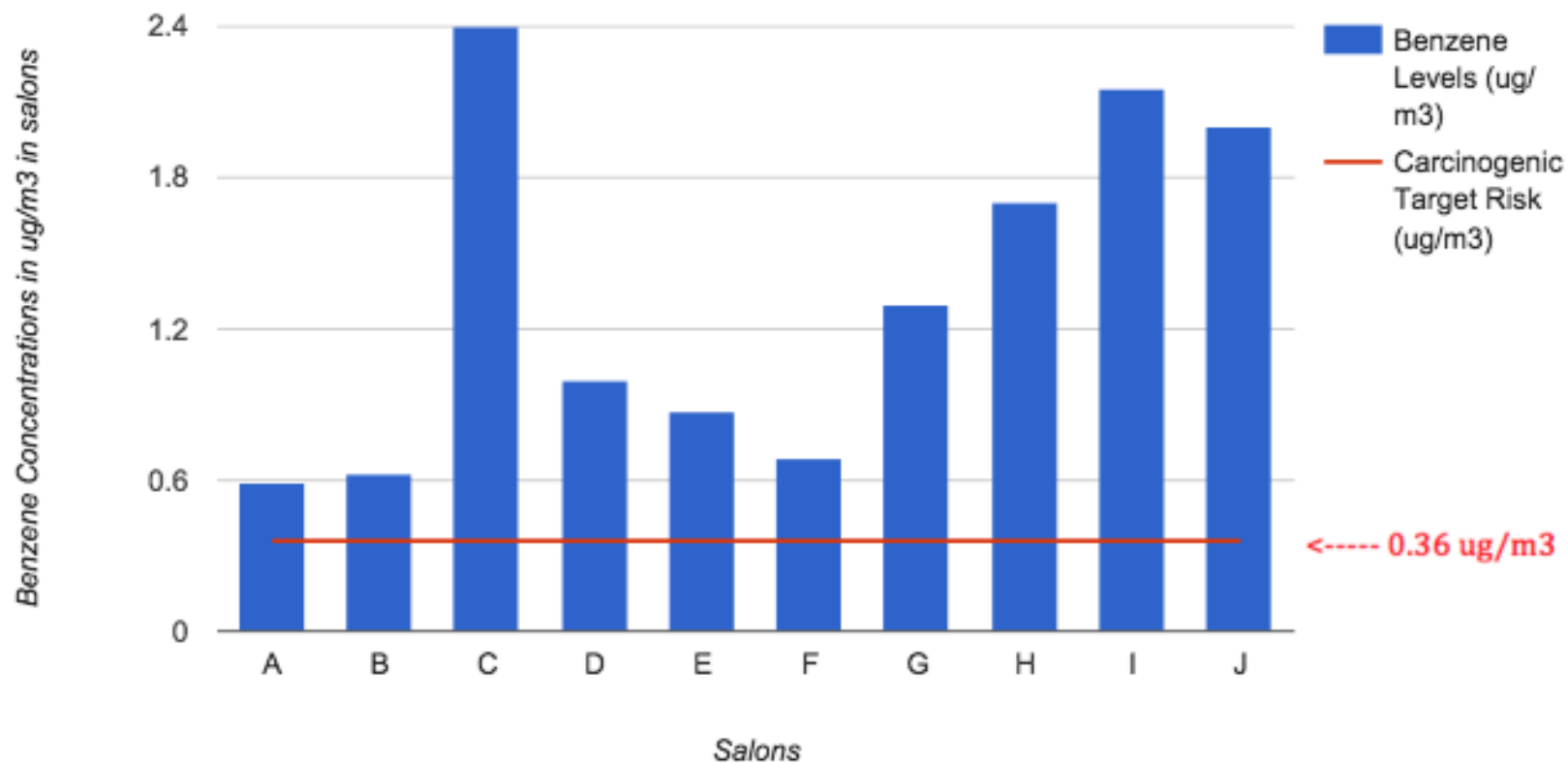


Follow-Up Testing

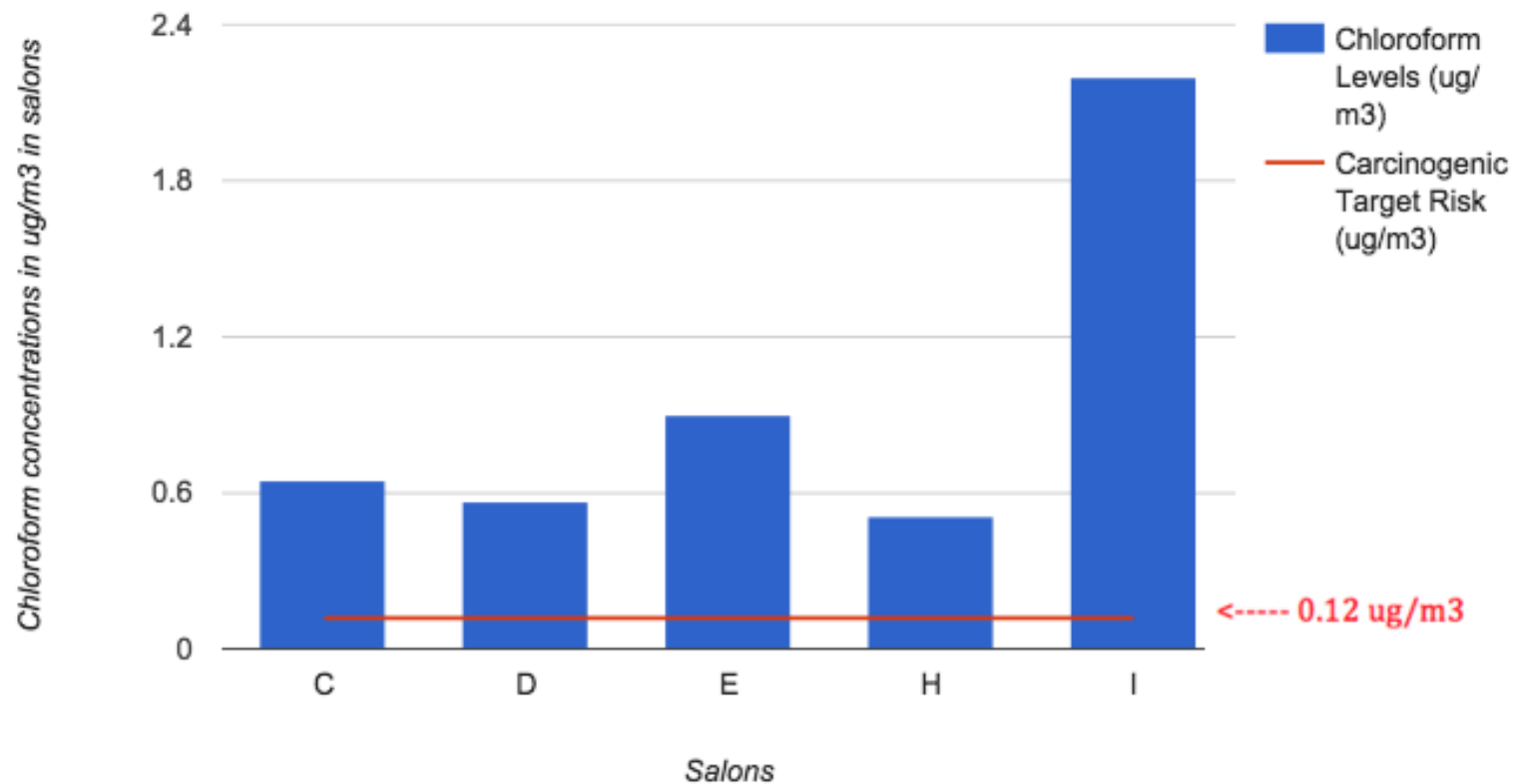
4 Hour Levels of PM 2.5 in Salon E



Concentrations of Benzene Levels in Salons compared to EPA's Risk-Based Screening Carcinogenic Target Risk Levels



Concentrations of Chloroform Levels in Salons compared to EPA's Risk-Based Screening Carcinogenic Target Risk Levels



Conclusion

- Insignificant data to correlate air quality with negative health effects
- Most salons had levels of CO₂ that were above the ASHRAE ventilation standard of 800 ppm
- Some VOC concentrations were found to exceed EPA guideline and at least some VOCs were found in all salons
- PM_{2.5} was detected at levels significantly above outdoor regulations in 80% of the salons

Study Limitations

- Malfunctioning equipment
- PM_{2.5} and CO₂ readings were done in snapshots
- Selection bias
- Short time frame to perform study

Recommendations

- Explore PM_{2.5} further in salons
- PM Characterization
- Ventilation assessment
- Increase number of health survey participants



Outstanding Questions

- How do these workplace exposures impact black hair salon workers and clients short and long term health problems?
- What methods (ie. better ventilation, different products, protective equipment) can help reduce these exposures?
- Is there a direct correlation between flat irons and high levels of particulate matter in hair salons?
- What are the implications of particulate matter spikes on health of workers?
- If we did further tests in black hair salons of urine or rinse water, would we find additional chemicals that could negatively affect human health?

Thank You

Laura Goldin

Susanna Kroll

Briana Sheehan

Joseph G. Allen

Matthew A. Fragala

Theodore A. Myatt

James H. Stewart

Participating Salon Owners

Lilly Marcelin

Deborah Brown

Peter Philbrook Dan Curran Dan Boudreau

Black Women for Wellness

MA OTA

Paul Shoemaker

Silent Spring Institute

Clean Water Action

Healthy Cosmetology Committee

ACE

Sources:

<https://www.flickr.com/photos/easy-pics/>

<https://www.flickr.com/photos/stevendepolo/>

<https://www.flickr.com/photos/29069717@N02/>

<https://www.flickr.com/photos/freefoto/>

<https://www.flickr.com/photos/fiveten/>

<https://www.flickr.com/photos/22750018@N05/>

<https://www.flickr.com/photos/53199633@N02/>

<http://imgbuddy.com/black-hair-stylist.asp>

<http://www.epa.gov/risk/risk-based-screening-table-generic-tables>

https://www.flickr.com/photos/ni_mykon/

<http://www.cleanaireurope.com/fr/content/q-track-item-452>

<http://www.idesigntech.com/Portfolio.html>

<http://www.environmentalcare.com/engineering.html>

<http://www.waters.com/webassets/other/catalogimages/spdnphs.jpg>

http://easyscienceforkids.com/wp-content/uploads/2013/04/breathing_system.jpg

<http://thetomorrowcompany.com/importance-of-good-ventilation/>