

UCLA

UCLA Electronic Theses and Dissertations

Title

Salon Safety: Community-Engaged Approaches to Workplace Safety Interventions

Permalink

<https://escholarship.org/uc/item/4gm4j19r>

Author

Adewumi-Gunn, Teniope

Publication Date

2019

Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA
Los Angeles

Salon Safety: Community-Engaged Approaches to Workplace Safety Interventions

A dissertation submitted in partial satisfaction
of the requirements for the degree
Doctor of Philosophy in Environmental Health Sciences

by

Teniope Ajike Adewumi-Gunn

2019

© Copyright by
Teniope Ajike Adewumi-Gunn
2019

ABSTRACT OF THE DISSERTATION

Salon Safety: Community-Engaged Approaches to Workplace Safety Interventions

by

Teniope Ajike Adewumi-Gunn

Doctor of Philosophy in Environmental Health Sciences

University of California, Los Angeles, 2019

Professor Wendie Robbins, Chair

In California, the salon industry represents a significant small-business sector. Working in these salons are cosmetologists who are exposed to a wide array of occupational hazards at work. Toxic chemicals, musculoskeletal disorders, and psychological demands in the workplace are just a few of the hazards experienced by beauty care workers. The beauty products marketed to and used by Black women have been found to contain potentially harmful ingredients. Black hair-salon workers face serious health hazards from these products they use on clients and other health hazards at their work. Knowledge on this issue, as it relates to Black hair care professionals and potential intervention methods, is extremely limited. This dissertation includes three studies that sought to understand the occupational health status of Black salon workers in the Los Angeles region, identify workplace intervention strategies tailored to small businesses and pilot a community-engaged intervention program aimed at reducing workplace injuries and illnesses in the salon.

Based on the first study, a lack of proper health and safety training and personal protective equipment use within the salon worker community was found. Additionally, it was found that there was a willingness by stylists to learn more about workplace hazards and how to mitigate their risks. The conclusion of this study demonstrated a need for additional community-based studies with Black salon workers on workplace health intervention methods.

In the second study, it was found that the process of developing and facilitating an

intervention program for small businesses required an understanding of the community being served, developing a relationship with the community, building partnerships, and addressing barriers to information. From this second study the use of community partnerships and intermediates in the promotion of safety and environmental practices was highlighted as instrumental for success.

In the third study, it was found that a community-engaged approach in the development of a personal protective equipment use intervention program led to favorable results including an increase of salon safety knowledge and personal protective equipment use among Black cosmetologists.

Taken together, these research studies provide clear insights into comprehensive approaches for targeted occupational safety intervention programs aimed at underserved worker groups.

The dissertation of Teniope Ajike Adewumi-Gunn is approved.

Mary-Lynn Brecht

Timothy Malloy

Bhavna Shamasunder

Wendie Robbins, Committee Chair

University of California, Los Angeles

2019

fun ọkọ mi. mo ni ifẹ rẹ

TABLE OF CONTENTS

1	Introduction	1
1.1	Background	1
1.1.1	Cosmetologists	1
1.1.2	Work and Health	2
1.1.3	Policies and Legislation	3
1.1.4	Occupational Health and Small Businesses	5
1.2	Outline of this dissertation	5
2	Theoretical Framework	7
2.1	Introduction	7
2.2	Health Belief Model	7
2.2.1	Constructs of Health Belief Model	8
2.2.2	Health Belief Model and Occupational Health	8
2.3	Community-Engaged Research	10
2.3.1	Principles of Community-Engaged Research	11
3	A Preliminary Community-Based Occupational Health Survey of Black Hair Salon Workers in South Los Angeles	13
3.1	Abstract	13
3.2	Introduction	14
3.3	Methods	15
3.4	Results	16
3.4.1	Survey Participants	16
3.4.2	Health Outcomes	21

3.5	Discussion	23
3.5.1	Work Hazards in Black Hair Care Salons	23
3.5.2	Black Hair Salon Worker Health	25
3.5.3	Study Limitations	27
3.6	Conclusion	27
4	Voluntary occupational health and safety recognition programs for small businesses: an exploratory qualitative study	28
4.1	Abstract	28
4.2	Introduction	29
4.2.1	Economic pressures and lack of knowledge	29
4.2.2	Worker injury and fatality risk	30
4.2.3	Prevention and promotion strategies	30
4.3	Methods	31
4.3.1	Sampling and Recruitment	32
4.3.2	Research Instruments	32
4.3.3	Data Collection	33
4.3.4	Data Analysis	33
4.3.5	Ethics	34
4.4	Results	34
4.4.1	OHS Recognition Program Coordinators	34
4.4.2	Small Business Participants	42
4.5	Discussion	43
4.5.1	OHS Recognition Program Coordinators	43
4.5.2	Small Business Participants	45

4.6	Study Limitations	47
4.7	Conclusion	47
5	Black Cosmetologists and Personal Protective Equipment Use: Results from a pilot intervention study	49
5.1	Abstract	49
5.2	Introduction	50
5.3	Methods and Results	52
5.3.1	Phase One	54
5.3.2	Results	56
5.3.3	Phase Two	56
5.3.4	Results	67
5.4	Discussion	68
5.4.1	Salon Safety Quiz	70
5.4.2	Personal Protective Equipment Use	71
5.5	Study Limitations	72
5.6	Conclusion	73
6	Conclusions	74
6.1	Recapitulation of purpose and findings	74
6.2	Themes and Insights	76
6.2.1	Building community in occupational health interventions	76
6.2.2	Occupational health and behavior change	77
6.3	A personal note from the researcher	78
	A Supplementary material to <i>A Preliminary Community-Based Occupational Health Survey of Black Hair Salon Workers in South Los Angeles</i>	79

B	Supplementary material to <i>Voluntary occupational health and safety recognition programs for small businesses: an exploratory qualitative study</i> . . .	91
C	Supplementary material to <i>Black Cosmetologists and Personal Protective Equipment Use: Results from a pilot intervention study</i>	96
	References	101

LIST OF FIGURES

2.1	Health belief model.	9
4.1	Conception and execution of OHS recognition programs.	36
5.1	Quiz score distributions at baseline, and after each follow-up.	62
5.2	Apron usage distributions at baseline, and after each follow-up.	63
5.3	Eye protection usage distributions at baseline, and after each follow-up.	64
5.4	Face protection usage distributions at baseline, and after each follow-up.	65
5.5	Glove usage distributions at baseline, and after each follow-up.	66

LIST OF TABLES

2.1	Community-engaged research.	11
2.2	Principles of community-engaged research.	12
3.1	Demographics of Black salon worker study participants ($n = 22$).	17
3.2	Services provided by Black salon workers in South Los Angeles ($n = 22$).	18
3.3	Description of hairstyles and processes used in hair salons.	19
3.4	Description of hairstyles and processes used in hair salons (cont.).	20
3.5	Description of hairstyles and processes used in hair salons (cont.).	21
3.6	Health Outcomes Black hair salon workers attributed to working in the salon ($n = 22$).	22
4.1	Recognition program coordinator (PC) demographics.	35
4.2	Small business participant (SBP) demographics.	37
5.1	Health belief model constructs and study application.	53
5.2	Demographics of focus group participants ($n = 14$).	57
5.3	Major data themes and select quotes from focus group participants based on the Health Belief Model constructs.	58
5.4	Demographics of intervention participants ($n = 29$).	60
5.5	Baseline quiz scores and PPE usage for participants, by age group.	61
5.6	Baseline quiz scores and PPE usage for participants, by education.	61
5.7	Baseline quiz scores and PPE usage for participants, by industry years' experience.	62
5.8	Linear regression (GEE) analysis of <i>intervention</i> as a predictor of quiz scores. Quiz scores improved and intervention was statistically significant ($p < 0.05$).	68

5.9	Ordinal logistic regression (GEE) analysis of <i>intervention</i> as a predictor of PPE usage. All interventions, excluding face protection, had improved use and were statistically significant ($p < 0.05$).	69
5.10	Linear regression (GEE) analysis of quiz scores using both intervention and supplementary factors as predictors. The intervention coefficient changed negligibly from what was shown in Table 5.8.	70

LIST OF ABBREVIATIONS

ATSDR	Agency for Toxic Substances and Disease Registry
BWW	Black Women for Wellness
BBC	California Board of Barbering and Cosmetology
CSCA	California Safe Cosmetics Act
CDC	Centers for Disease Control and Prevention
CTSA	Clinical and Translational Science Awards
CEnR	Community Engaged Research
FFDCA	Federal Food, Drug and Cosmetics Act, of 1938
FDA	Food and Drug Administration
GEE	Generalized Estimating Equations
HBM	Health Belief Model
IH	Industrial Hygiene
IQR	Interquartile Range
MSD	Musculoskeletal Disorders
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Safety and Health
NIC	National Interstate Council of State Boards of Cosmetology
OHS	Occupational Health and Safety
OSH	Occupational Safety and Health, Act of 1970
OHSA	Occupational Safety and Health Administration
PGE	Pacific Gas and Electric Company
PPE	Personal Protective Equipment
PC	Program Coordinator
ROSE	Reproductive Outcomes in Salon Employees
SBP	Small Business Participant
VOCs	Volatile Organic Compounds

ACKNOWLEDGMENTS

To the women and men who participated in my research: Thank you.

I am incredibly thankful to my advisor, Dr. Wendie Robbins, whose support, mentorship and guidance have been instrumental throughout my Ph.D. Thank you for your encouragement, direction, and positivity which has allowed me to grow both personally and professionally. Thank you to Dr. Shane Que Hee, for all of your assistance during my time at UCLA. You have influenced so many industrial hygiene students throughout the years and I am proud to be a part of that community.

Thank you to my committee members: Dr. Mary-Lynn Brecht, Dr. Bhavna Shamasunder, and Timothy Malloy, for your time and incredibly helpful feedback. I am so fortunate to have been surrounded by your constant source of encouragement throughout my dissertation.

Thank you to Drs. Michael Jerrett, Niklas Krause, and Oscar Arias for your financial support through the UCLA Center for Occupational and Environmental Health and the National Institutes for Occupational Safety and Health (NIOSH) Southern California Education and Research Center. Thank you to my program peers: Charlene Nguyen and Katherine McNamara for being great people to discuss ideas with.

Thank you to Rebecca Greenberg, Nancy Arroyo, Kevin Riley, and Linda Delp for your help over these past six years. Thank you to Janette Robinson-Flint and Nourbese Flint for your mentorship at Black Women for Wellness. Thank you to Marissa Chan for all the wonderful coffee conversations. Thank you to my friends: Anastasia, Autumn, and Brittannie for being some of the strongest women I know.

Thank you to my family. To Phil, Barbara, and Rory Gunn: Thank you so much for your love and support. Thank you to Konyinsope Adewumi for being the brightest of lights and the best sister in the world. To my parents, Abayomi and Olufunke Adewumi: I am a product of your sacrifices and I am forever grateful. I love you both so much.

Lastly, to my husband, Cameron: words are not enough to convey the love and support you have given throughout my graduate career. Thank you, Cam.

VITA

Education

- 2015 M.S., Environmental Health Sciences (Industrial Hygiene), University of California, Los Angeles
- 2013 B.S., Health Sciences, Environmental Health, California State University, San Bernardino

Experience

- 2017 Industrial Hygiene Intern, State Accident Insurance Fund, Salem, Oregon
- 2014–2016 Environmental Justice Research and Policy Manager, Black Women for Wellness, Los Angeles, CA
- 2012–2013 Environmental Health and Safety Intern, Medtronic, Santa Ana, CA

Honors

- 2019 Edward A. Bouchet Graduate Honor Society
- 2018 Robert & Patricia Switzer Foundation Environmental Fellowship
- 2017 American Society of Safety Engineers James P. John Memorial Scholarship
- 2016 American Industrial Hygiene Association Board of Certified Safety Professional Scholarship

- 2015–2019 National Institute of Occupational Safety and Health (NIOSH) Ph.D. Fellowship
- 2014 Southern California American Industrial Hygiene Association (SCAIHA) Outstanding Student Scholarship

Journal Article

Adewumi-Gunn, T. A., Ponce, E., Flint, N., & Robbins, W. (2018). *A preliminary community-based occupational health survey of black hair salon workers in South Los Angeles*. *Journal of immigrant and minority health*, 20(1), 164–170.

Presentations

Lessons Learned from the Field. American Industrial Hygiene Association Annual Conference, May 2018, Philadelphia.

Toxic Beauty: Adverse Impacts to Salon Workers. Toxics in everyday life. UCLA Center for Occupational and Environmental Health, June 2017, Los Angeles.

From the roots: Black hair care and reproductive justice in South Los Angeles. American Public Health Association Conference, October 2016, Denver.

Community Advocacy and Environmental Justice. Reproductive Health and the Environment: Best Practices for Los Angeles County. The California Endowment, June 2016, Los Angeles.

Salon Worker Health and You Concerned Beauty Professionals. The Concerned Beauty Professionals, March 2015, Atlanta.

CHAPTER 1

Introduction

The occupational health and safety hazards faced by beauty care professionals are an increasingly important concern to consumers, occupational health practitioners, and policy officials. Toxic chemicals, musculoskeletal disorders, and psychological demands in the workplace are just a few of the hazards experienced by beauty care workers. These workplace hazards coupled with inadequate training and education have left professionals in the beauty industry vastly uninformed and under-protected. Various populations are exposed differently depending on the products and services they provide. Knowledge on this issue, as it relates to Black hair care professionals and potential intervention methods, is extremely limited.

There are three motivations for this dissertation. The first is to provide insights into the occupational health status of Black salon workers in the Los Angeles region. The second is to understand approaches to intervention programs focused on safety and health in small businesses. The third is to develop and pilot a community-engaged intervention program aimed at reducing workplace injuries and illnesses in the salon.

1.1 Background

1.1.1 Cosmetologists

Cosmetologists provide a wide array of hair and beauty care services to enhance clients' appearance. In the United States there are 1.2 million people employed in the beauty and personal care sector [Lab16, Aka17]. The beauty services industry is made up of a number of professions including barbers, cosmetologists, nail salon workers, and other beauty care workers [CM18]. The industry is largely female-dominated with women making up 95%

of the workforce [Sal14]. Nationwide cosmetologists earn a mean annual wage of \$30,490, compared to a national average of \$50,320 [Lab16]. California has the highest level of employment in this occupation with 53,000 licensed salon businesses and over 312,000 licensed cosmetologists. The Los Angeles metropolitan region has the highest employment level in the state with 58,900 licensed cosmetologists.

Cosmetologists provide a number of beauty care services, such as shampooing, conditioning, coloring, cutting, hair styling, and scalp massaging and treatment [Fer16]. In addition, cosmetologists may provide make-up, hair removal, nail and skin care services [Bra01]. Various tools are used by cosmetologists including scissors, hairbrushes, blow dryers, flat irons, and curlers. Depending on the services they provide, cosmetologists work with a number of products including creams, bleach, shampoos, conditioners. This work is typically done in a beauty salon or shop, although some hair care professionals work in spas, mobile services, or hotels. Most salons are categorized as small businesses [SGS17]. Over 43% of cosmetologists are self-employed workers and will often lease booth space from a salon owner [Lab16].

The process of becoming a cosmetologist varies by state. In California, prospective cosmetology students must adhere to rules determined by the California Board of Barbering and Cosmetology (BBC) [BC18]. The BBC is the state agency tasked with protecting and educating consumers who seek barbering and cosmetology services. The BBC also regulates individuals and salons that provide beauty care services. Cosmetology students must be 17 years of age and have received a high school diploma or general educational development (GED) [BC18]. Students must enroll in a BBC accredited cosmetology school, complete 1600 hours of education, and sit for the National Interstate Council of State Boards of Cosmetology (NIC) board exam.

1.1.2 Work and Health

Cosmetologists are exposed to a variety of hazards in the workplace [GGM14, AAU19, SCY19]. Hazards cosmetologists are exposed to include physical agents (noise, temperature), ergonomic hazards (repetitive motion, inappropriate posture during work), psy-

chological demands for service quality, fast work pace, long work hours without breaks, and chemical agents (products for hair) [APF18, Tho16]. A number of products can be used by cosmetologists in a given work shift. These include flat iron sprays, glues, relaxers, Brazilian blowouts, bleaches, dyes, and developers. Within each of these products can be a number of chemicals and some with potential hazardous impacts to health [SAC16, Hal16, IOO18]. Some of the most hazardous chemicals in salon products are dibutyl phthalate, formaldehyde, toluene (together often referred to as the “toxic trio”), and trichloroethylene [QVT18, XZZ17, KSC17]. These chemicals are consistently linked to reproductive and developmental disorders [JSS94, LPC87, Hal15]. Hairdressers in particular face increased risk of infertility and spontaneous abortion [PPL13, GMG11, GCY01, IOI18]. Additional adverse health impacts faced by beauty care professionals include dermatitis, occupational asthma, and cancers [SMK13, MKG09, LL13a, Big17, Hor18] .

Black hair care professionals are potentially most at risk due to the type of products used by and marketed to Black women [HNB18, TTH18, TMM17]. These products often contain highly corrosive ingredients (lye in hair relaxers) and potentially endocrine-disrupting ingredients (placenta in hair treatments) [ZGC19]. Black hair care professionals are a particular group of concern because they are exposed to these products multiple times daily at work and from potential use on themselves [WRW18, MTF18, SAC16]. There are significant research gaps looking at the health impacts of this specific group.

1.1.3 Policies and Legislation

Federal and state policies fail to fully address many of the hazards faced by cosmetologists and beauty care professionals [HBZ17, How17, JK15]. The primary law overseeing workplace safety of cosmetologists is the Occupational Safety and Health (OSH) Act of 1970 [Act70, JLT17, Goe10b]. The aim of this law is to reduce hazards in the workplace and implement safety and health programs for both employers and their employees [Goe10a, AD14]. The law requires salon owners to provide a number of occupational health protections for their employees including personal protective equipment (PPE) and safety

training. These provisions and protections only occur if there is an owner and employee relationship [How17, CC17a, HHS16, GG10]. This leaves the nearly 43% of cosmetologists who are self-employed without much required training, education, and appropriate PPE [App17, TS17].

Additional federal policies also leave cosmetologists and beauty care professionals unprotected from the products they work with [RRR16, KWX17, Kes15, Rob17]. The Federal Food, Drug and Cosmetics Act (FFDCA) of 1938 governs food, medicine and personal care products [Foo12]. While food and drugs go through a series of rigorous examination and evaluation by the Food and Drug Administration (FDA) before being placed on shelves, personal care products do not [McN97, KWX17, WJX18]. Companies are not required to test their products for safety before releasing them for sale. The FDA has no practical authority to regulate cosmetics products and cannot recall those that are misbranded or proven to be hazardous [CMM17, Kra15]. Nationwide this leaves beauty care professionals uninformed about the potential adverse impacts they face [Kra15]. Several federal bills have been introduced to combat this issue, including the Safe Cosmetics and Personal Care Products Act of 2018 which would allow the FDA to ban some of the most toxic chemicals in cosmetics, assess ingredients for safety, and recall products found to be unsafe or misbranded [FC18].

States have taken the lead in passing legislation relating to personal care products and the health of beauty care professionals [US, Dor18, Mac18, Gro18]. In 2005, California passed the California Safe Cosmetics Act (CSCA) which required manufacturers to disclose any product ingredient that is on state or federal lists of chemicals that cause cancer or birth defects [Wat14, Was06a, Was06b]. In 2018, California also passed a law requiring cosmetics used in professional settings to bear a label listing the product ingredients [ca2, Boo18]. The new law provides beauty care professionals with ingredient transparency and increased awareness of potentially hazardous chemicals in the products they work with leading to more informed workplace health decisions.

1.1.4 Occupational Health and Small Businesses

Small businesses are an important part of the United States economy. Unfortunately, they face a number of unique occupational health and safety challenges that directly impacts the health of workers in this sector [SHB07, AN10, LOL15]. Employees in small- and medium-sized businesses experience higher levels of work-related injuries and illnesses than employees in large businesses [Nak11, HTG97]. Financial instability, general knowledge, and lack of resources and dedicated safety staff are some of the barriers that small businesses encounter [LH01, GUR03, KHC15, JRN18]. Like many other small businesses, salons are also impacted by these challenges. Blanket workplace safety information, policies and legislation often do not fit the reality of small businesses [CS15, CJH17, ZML18, TB18]. When it comes to occupational health and safety, small businesses such as salons need tailored approaches and services to their needs.

1.2 Outline of this dissertation

Chapter 2 will review the underlying theory used in this dissertation. This includes a review of Community Engaged Research (CEnR) and the Health Belief Model (HBM) as it relates to this dissertation work.

Chapter 3 will present findings from an occupational health survey on Black women cosmetologists in South Los Angeles beauty salons. This pilot project was conducted in order to understand the workforce and workplace exposures, and to identify need for future health research aimed at reducing hazardous occupational exposures faced by this unique worker population. Results and recommendations from the community survey that are detailed in this chapter point to the need for tailored interventions to increase knowledge of safety practices.

Chapter 4 presents findings from a qualitative research study on the perspectives of intermediaries and participants in worker health and safety recognition programs geared towards small businesses. This work was conducted to help inform tailored intervention pro-

grams aimed at addressing the unique occupational health challenges faced by small businesses. Results from this study highlighted the benefits of using comprehensive approaches such as not-for-profit intermediaries and no-cost incentive programs in the promotion of safety and environmental practices for small businesses.

Chapter 5 presents results from an intervention study aimed at increasing the use of personal protective equipment among Black salon workers in Los Angeles. The development and evaluation of this intervention program were informed by findings from Chapters 3 and 4. Findings from this study showed an increase in workplace safety knowledge and PPE use among the cosmetologists participating in the study. Finally, **Chapter 6** contains concluding remarks and future work.

CHAPTER 2

Theoretical Framework

2.1 Introduction

There are a variety of theories that have been developed to provide frameworks for understanding and predicting change in health behavior [AF80, WS06, Wil97, FY03, MVW11]. The first section of this chapter discusses the constructs of one of the most widely used models for understanding health behaviors, the Health Belief Model (HBM) [RR05, Mas18, ROP13, BM11]. The HBM is used as a guiding theory to understand the behavior change potential within the cosmetologist community.

Increasingly, public health practitioners have recognized that traditional research approaches alone have failed to fully solve complex health disparities. Community involvement and collaboration have emerged as ways of identifying how health problems exist within the context of people's lives, and how to adequately address them. These community partnerships have been essential to programs tackling a range of health concerns including smoking cessation, heart disease, and cancer. The second section of this chapter discusses the origins and characteristics of community engaged research (CEnR) as it relates to this dissertation.

2.2 Health Belief Model

The Health Belief model was developed by Hochbaum, Rosenstock and Kegels in the 1950s while working for the US Public Health Service, following the failure of preventative screening programs [Ros74a, MB74, Ros74b]. Later updated in the 1980s, the model aims to explain and predict health-related behaviors [JB84, RSB88]. The HBM theorizes that a person's

willingness to change their health behaviors is based on their belief in the personal threat of an illness coupled with their belief in the effectiveness of the recommended action. According to the model this will predict the likelihood a person will adopt the behavior [STC15, HMG92, SA96].

2.2.1 Constructs of Health Belief Model

The HBM, shown in Fig. 2.1, explains health-related behaviors focusing on the attitudes and beliefs of individuals. The model is made up of six constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy [Ros74c, Kir74, MB14, Cha84, HMG92, NKP11]. *Perceived susceptibility* is an individual's opinion of the chance that they will acquire an illness or disease [RB15]. *Perceived severity* is an individual's opinion on the seriousness of developing an illness or disease and the subsequent medical and social consequences [FK15]. *Perceived benefits* are an individual's opinion of the efficacy of the actions advised to reduce the risk or seriousness of illness or disease. *Perceived barriers* are an individual's opinion of the obstacles and costs of performing the advised health action.

The first four constructs of the HBM focus on an individual's perceptions in wanting to change health behaviors. The last two constructs focus on what is required to shift an individual from wanting to change to actually changing behavior [AS05]. These last two constructs are cues to action and self-efficacy. *Cues to action* are strategies needed to activate the decision-making process in individuals to accept a recommended health action. *Self-efficacy* is an individual's level of confidence to effectively perform the recommended behavior.

2.2.2 Health Belief Model and Occupational Health

The HBM has been used to guide several occupational health education and promotion programs [HCD07, HNM10, GS03]. The National Institute of Occupational Safety and Health (NIOSH) used the HBM as the initial building blocks in the development of key core

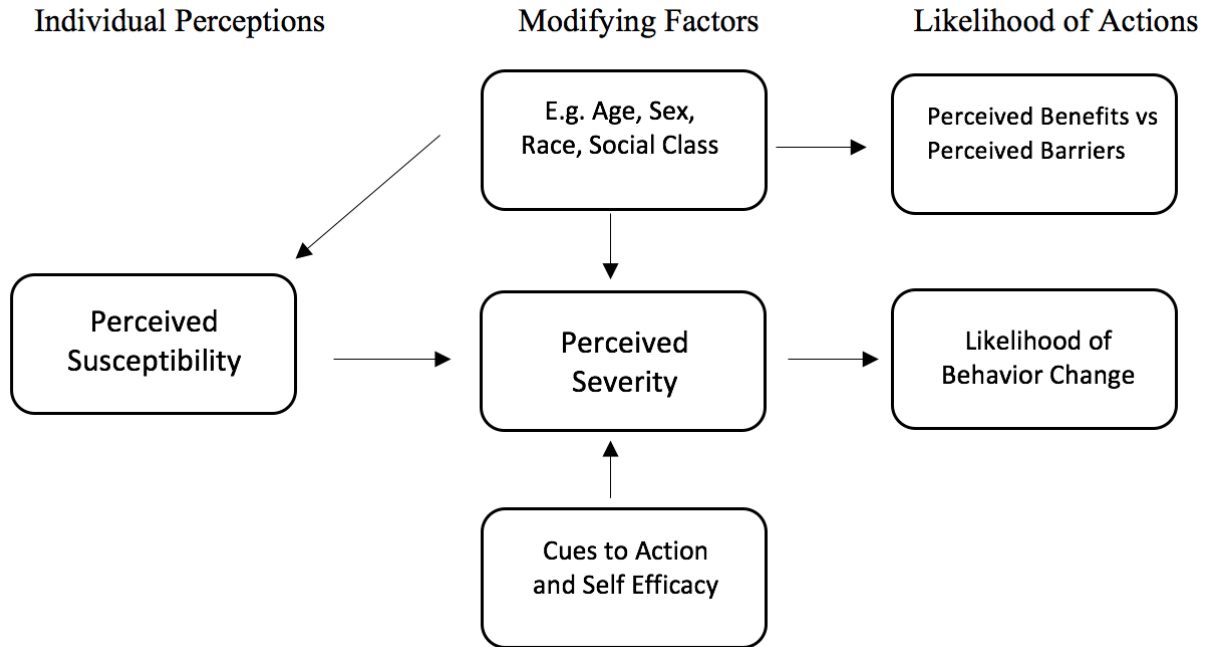


Figure 2.1: Health belief model.

competencies for their safety curricula targeted at young workers [OGS16]. Literature on the HBM in the occupational health field suggests that safety-related behavior is based on the perceived susceptibility to injury or illness, severity of the potential injury or illness, and perceived benefits of and barriers to safe action [ALM10, Seo05]. With respect to research relating to safety behavior, high threat perceptions have been shown to decrease risky decision-making and to increase the willingness of employees to participate in safety improvement programs [TGS05, PP12].

In Chapter 5, the HBM is utilized as a guiding theoretical framework to better understand the underlying beliefs that motivate or impede safety behaviors in cosmetologists. The HBM was used in the development of a personal protective equipment (PPE) intervention program designed to increase the use of protective safety clothing worn by cosmetologists. Identified in the study were notions on perceived benefits and cues to action that would make cosmetologists more likely to adhere to health behaviors relating to workplace safety. Perceived threats that would potentially reduce adherence were also identified and support was provided for cosmetologists to overcome such barriers.

Like all models and theories there are limitations to the HBM. For example, it does not take into account behaviors for non-health related reasons and other modifying factors. Modifying factors are factors that enable a person to engage in health behavior. These factors include demographic variables (e.g. age, sex, race, education), psychosocial variables (e.g. personality, social class, and peer group pressure), and structural variables (e.g. knowledge about the disease and prior contact with the disease) [STC15]. Research suggests there should be integration with other models that take into account these modifying factors and propose strategies for change to lead to improved outcomes [MTF95, Pos01, CBM80, SOF15].

2.3 Community-Engaged Research

Addressing the health challenges faced by vulnerable and underserved communities can be complex. Traditional research methods and interventions often fail to fully address nuances in these communities. Community is defined as a group of people with shared attributes or affiliations. This can be through identity (attributes one has), affinity (what one likes to do), or geography (where one lives). In this dissertation, the community of focus is Black cosmetologists. The Centers for Disease Control and Prevention (CDC) defines community-engagement as: “the process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues affecting the well-being of those people” [MBK13, MW03].

Community-engaged research (CEnR) is not a method but an approach for bringing together interdisciplinary teams in collaboration to study health problems in real-world contexts [LCA12, MBK13, ASH12, Ven07]. Shown in Table 2.1, the collaborative process of CEnR is often between the researcher and community partner in which links between research and practice are strengthened, and translational results are enhanced [SCK07, RLN10, WD10, Meu11]. CEnR includes research with the community and Community-based Participatory Research (CBPR). CBPR is a partnership approach to research that equitably involves community members, researchers, and others in all aspects of the research process, with all partners in the process contributing expertise and sharing in the decision-making

Table 2.1: Community-engaged research.

	Traditional Research	Community Engaged Research	Community Based Participatory Research
Research Problem	Defined by researcher	Defined with or in the community	Problem identified by community
Research Focus	Research on or in community	Research with community as a participant or partner	Research with community as a full partner
Study Design and Process	Developed and executed by researcher	Researcher controls research; community may assist in process	Researcher and community share control equally
Skills and Knowledge	Gained by researcher	Gained by researcher; may be gained by community	Researcher and community collaboratively obtain new skills
Data and Dissemination	Owned and controlled by researcher	Data is owned by researcher; community may assist in dissemination	Data is shared; research and community determine data usage and dissemination

and dissemination [WD10, MM13, KMS16].

2.3.1 Principles of Community-Engaged Research

The Principles of Community Engagement, shown in Table 2.2, was developed by the National Institutes of Health (NIH), the Centers for Disease Control and Prevention (CDC), the Agency for Toxic Substances and Disease Registry (ATSDR), and the Clinical and Translational Science Awards (CTSA) [DP97].

The principles highlight how researchers can equitably engage and work with communities. They also highlight an important trait of community engagement in that it is a blend of science and art [DP97, CSP15, SU05, SSG10]. In the traditional research approach a researcher identifies and defines the problem, and then the research is conducted on the community; community organizations may assist. The skills and knowledge gained from the research is often just by the researcher. The researcher also controls the process, resources, data interpretation, and dissemination. In contrast, CEnR research is done in the community, with the community as a partner, and people as participants and/or collaborators

Table 2.2: Principles of community-engaged research.

1.	Be clear about the purposes of engagement and the populations you wish to engage
2.	Become knowledgeable about the community
3.	Establish relationships
4.	Collective self-determination is the responsibility and right of the community
5.	Partnering is necessary to create change and improve health
6.	Recognize and respect the diversity of the community
7.	Mobilize community assets and develop community capacity to take action
8.	Release control of actions and be flexible to meet changing needs
9.	Collaboration requires long-term commitment

[WT14, FAR10, Sch10, Sch12]. Community organizations may serve in advisory roles or as full partners. In CEnR the control of research, data, and dissemination may be shared by researchers and community partners.

In Chapter 3, a CEnR-CBPR approach is used to gather the occupational health status of Black cosmetologists in partnership with Black Women for Wellness (BWW). BWW is a community-based organization focused on the health and wellbeing of Black women and girls. BWW was a partner in all aspects of the research process from study design to result dissemination. In Chapter 5, the CEnR approach is used in which BWW and other community stakeholders served on an advisory board in the creation of personal protective equipment intervention program from cosmetologists.

CHAPTER 3

A Preliminary Community-Based Occupational Health Survey of Black Hair Salon Workers in South Los Angeles

This chapter and its corresponding tables and figures were originally published in the Journal of Immigrant and Minority Health, and are reprinted with permission from the journal. The citation for the published chapter is as follows:

Adewumi-Gunn, T. A., Ponce, E., Flint, N., & Robbins, W. (2018). *A preliminary community-based occupational health survey of black hair salon workers in South Los Angeles*. Journal of immigrant and minority health, 20(1), 164-170.

3.1 Abstract

Black hair-salon workers face serious health hazards from the products they use on clients and other health hazards at their work. Currently there is a significant research gap in understanding the prevalence of workplace related exposures and health outcomes. The primary objective of this study was to gather preliminary data on workplace exposures and health outcomes of hair care workers in South Los Angeles. We conducted 22 surveys of salon workers at 16 salons. The results suggest the need for proper health and safety training within the salon worker community, specifically around chemical hair services. The results also suggest ergonomic workstation assessments and recommendations would be beneficial to reduce musculoskeletal disorders. Willingness of stylists to learn more about workplace

hazards and how to mitigate their risks was high. Our findings indicate the need for a larger community based participatory research study on the workplace exposures of Black salon workers.

3.2 Introduction

Over 1.2 million people are employed as hairdressers, hairstylists, cosmetologists, nail salon workers and other beauty care workers in the United States [PS14]. The beauty industry is one of the fastest growing sectors with 20% of salons owned by Black or African Americans [Sal14]. Women represent over 95% of hairstylists in the field and 12% percent of hairstylists are African American[Lab11]. Hair dressers and cosmetologists are exposed to high concentrations of many toxic and potentially hazardous chemicals such as formaldehyde, toluene, and styrene. Hair dyes, chemical straighteners, and other salon products have been linked to dermatitis, asthma, cancer and reproductive harm [PPL13, SMK13, GMG11]. Beauty product complaints to the Food and Drug Administration (FDA) are largely with regards to hair relaxers and straighteners, products used almost exclusively in the Black community [Bla07]. The adverse symptoms reported to the FDA include skin irritation, eye irritation, drying of eyes, and drying of skin. Despite the numerous complaints, relaxers represent 21% of hair care market expenditures [Min14].

Research studies focusing on the health of salon workers have been few but published research focusing on African American hair salons and employees is virtually nonexistent. The products used and marketed for use by women with “ethnic” hair contain a number of chemicals and mixtures that have not been assessed for their safety. Black hair salon workers are a vulnerable population at the forefront of the Black haircare industry and face unique occupational exposures.

A community-based participatory research project was initiated by nonprofit Black Women for Wellness. As part of the overall research project, this pilot study sought to collect preliminary data on Black women currently employed in South Los Angeles beauty salons in order to understand the workforce and exposures and to help inform future health interventional

research aimed at reducing hazardous occupational exposures faced by this unique worker population.

3.3 Methods

Since January 2009, Black Women for Wellness (BWW) has been working with salon workers on issues related to health and safety. Building on this existing community groundwork, BWW staff, university researchers, and community advocates formed partnerships to conduct needed research on these issues. Through the collaboration of an advisory group, objectives and research aims were determined. The first aim was to conduct a pilot study to assess the workplace health and safety needs of Black hair salon workers. The health and wellness survey would be used to understand the prevalence of workplace physical, mechanical and chemical hazards, worker knowledge of these hazards, and related health outcomes of Black hair salon workers. The data gathered would then be used towards the design and implementation of appropriate workplace interventions and assessment of their effectiveness in a larger study.

We designed surveys informed by BWW's knowledge gained through meetings with salon workers and walkthroughs of the workspaces. Survey design was also informed by previous successful health and safety surveys published in peer-reviewed literature [WF98, CC17b]. Project coordinators designed questions with input from BWW staff and advisors. Two professional salon workers served as content experts and reviewed the draft questions. The survey was subsequently adjusted based on feedback from the salon workers who participated in the pilot project.

The survey tool included data on sociodemographics, health status, work-related health concerns, work history and environment. The final instrument was a 33-item interviewer-assisted questionnaire in English that took an average of 20 minutes to complete. Interview questions were read to the salon workers to mitigate literacy bias. Survey participants received a \$5 gift card for their participation.

The inclusion criteria for participation in the pilot study survey were: Black hair salon

workers; currently working in a South Los Angeles salon; minimum age of 18; and English speaking. South Los Angeles was chosen because of the density of Black salons in the area and the relationships BWW has built with the community. To recruit salon worker participants, researchers visited salons, hair shows, and community events. BWW staff accompanied researchers during outreach as their relationships with community members helped to recruit participants. Surveys were administered in a private area of the salons so as to insure privacy.

We entered survey responses into a form built using Google Forms, a free web-based application. Data were analyzed using MATLAB, a high-performance language for technical computing created by MathWorks [Mat18].

3.4 Results

3.4.1 Survey Participants

Twenty-two surveys were collected from participants at sixteen salons from June 2014 to August 2014. Salons were located in Inglewood, Leimert Park and other areas within South LA. Demographics are shown in Table 3.1. Survey respondents were 82% female and 18% male. The ages of respondents were <29 years (9.1%), 30–44 years (45.5%), and 45 and over (45.5%). The median [IQR] worktime as a stylist was 12 [2.5–21] years. 59% of stylists learned to perform their job from attending cosmetology school.

Services provided by stylists, shown in Tables 3.2, fell into two categories: services that required chemical products; and natural hair care services. Permanent waves and texturizers were provided by 22% of salon workers and permanent straighteners and relaxers were provided by 27%. Hair dyes were the most commonly offered chemical hair service with 45% of stylists providing them. Natural hair care services were more popular among the stylists than chemical services. Twists were the most provided service with 60% of stylists offering the service. Locs were provided by 50% of stylists, and 41% of stylists provided braids and short natural styles.

Table 3.1: Demographics of Black salon worker study participants ($n = 22$).

Characteristic	n	%
Gender		
Male	18	82
Female	4	18
Age		
<29 years	2	9
30–44 years	10	45.5
>45 years	10	45.5
Years in field		
<5 years	5	22
5–20 years	4	18
>20 years	13	60
Job-related education		
Cosmetology school	13	59.1
Friends or family	4	18.2
Other (online, books, self-taught)	5	22.7

Table 3.2: Services provided by Black salon workers in South Los Angeles ($n = 22$).

Proportion of workers providing service	n	%
Hair dyes	10	45
Permanent straighteners or relaxers (non-lye or lye relaxers)	6	27
Permanent waves and texturizers	5	22
Press and curl (chemically treated hair)	5	22
Hair extensions (i.e. weaves, clip ins, etc)	4	18
Brazilian Blowout	1	0.04
Twists	13	59
Locs	11	50
Braids	9	41
Short natural	9	41
Curly styles	8	36
Press and curl	7	31
Sister locs	5	23
Afros	3	13

Descriptions of these styles are provided in Tables 3.3–3.5.

Permanent waves and texturizers were performed on average 1 to 3 times a week by all of the stylists who provided the services. Relaxers were done on average 2 to 4 times a week and hair dyes were done on average 2 to 5 times a week. The least frequent chemical hair service performed by stylists was Brazilian blowouts, which only one stylist provided on average 1 to 3 times a week. Natural hair styles were performed more frequently with sister locs being the most frequent at 4 to 6 times a week on average by stylists who provided the service. Braids and locs were also performed frequently at 3 to 5 times a week by stylists offering the services.

The prevalence of personal protective equipment use reported among the survey population varied. When asked how often they wore an apron, 68% of the hair salon workers responded always and 18% never or rarely wore aprons. 81% of stylists reported never wearing eye protection when working with chemical products or when working with clients. Glove use had the greatest variation with 45% of stylists responding that they never or rarely

Table 3.3: Description of hairstyles and processes used in hair salons.

<p>Hair dyes</p> <p>Category: Chemical process</p> <p>Description: A permanent or semi-permanent process that dyes the hair a different color</p> <p>Process: Hair dye is added to the hair using the hands or a brush. The dye is left on the hair for a set time then rinsed off. The dye can last days or months.</p>
<p>Permanent straighteners or relaxers (non-lye or lye relaxers)</p> <p>Category: Chemical process</p> <p>Description: A permanent process that straightens the hair</p> <p>Process: The relaxer is added to the hair using the hands or a brush. The relaxer is left on the hair for a set time then rinsed off. The process breaks down the chemical bonds of the hair to make it straight. The relaxer can last until new hair grows and needs to be relaxed.</p>
<p>Permanent waves and texturizers</p> <p>Category: Chemical process</p> <p>Description: A permanent process that curls or waves the hair</p> <p>Process: The permanent is added to the hair using the hands or a brush. The perm is left on the hair for a set time then rinsed off. Waving lotion is then used to set the hair into waves or curls. The process breaks down the chemical bonds of the hair to allow it to mold into curls. The relaxer can last until new hair grows and needs to be permed</p>
<p>Brazilian Blowout</p> <p>Category: Chemical process</p> <p>Description: A semi-permanent process of temporarily straightening hair</p> <p>Process: A sealing liquid of keratin and a preservative solution is applied onto the hair then the hair is straightened with a flat iron. The process lasts several months and then is reapplied.</p>
<p>Hair extensions (e.g. weaves, clip-ins)</p> <p>Category: Natural or chemical process</p> <p>Description: A process in which synthetic or artificial hair is attached to the head to make a longer, fuller, or different hairstyle.</p> <p>Process: The hair is affixed to the head using glue, clip ins, thread, or other methods. The hair extensions can last days or months depending on style and condition.</p>

Table 3.4: Description of hairstyles and processes used in hair salons (cont.).

<p>Press and curl</p> <p>Category: Natural or chemical process</p> <p>Description: A process in which curly or wavy hair is pressed straight with a flat iron then styled using a curling iron</p> <p>Process: The hair is pressed with a flat iron and then styled using various other tools such as a curling iron</p>
<p>Locs</p> <p>Category: Natural process</p> <p>Description: Locs are a hairstyle in which the hair is twisted or matted into strands</p> <p>Process: Strands of hair are taken and twisted together to form thicker ropes of hair. Locs are done on non-chemically straightened hair. Depending on the growth of new hair locs are retwisted every few weeks to months</p>
<p>Braids</p> <p>Category: Natural process</p> <p>Description: A hairstyle made up of three or more strands of hair</p> <p>Process: Strands of hair are taken and braided together. Hair extensions can be added to the braids to extend their length</p>
<p>Short natural</p> <p>Category: Natural process</p> <p>Description: A hairstyle where the natural hair is cut and styled</p> <p>Process: N/A</p>
<p>Curly styles</p> <p>Category: Natural process</p> <p>Description: A hairstyle where the natural hair is curled to a desired style</p> <p>Process: N/A</p>
<p>Twists</p> <p>Category: Natural process</p> <p>Description: A hairstyle made up of two strands of hair</p> <p>Process: Strands of hair are taken and twisted together. Hair extensions can be added to the twists to extend their length</p>

Table 3.5: Description of hairstyles and processes used in hair salons (cont.).

<p>Sister locs</p> <p>Category: Natural process</p> <p>Description: Sister locs are a hairstyle in which the hair is twisted or matted into small strands</p> <p>Process: Strands of hair are taken and twisted together to form thicker ropes of hair. Sister locs are done on non-chemically straightened hair. Depending on hair growth sister locs are retwisted every few weeks to months</p>
<p>Afros</p> <p>Category: Natural process</p> <p>Description: A hairstyle where the natural hair is combed out and styled</p> <p>Process: N/A</p>

wore gloves and 50% of salon workers responding that they always or often wore gloves. All stylists indicated never or rarely wearing a face mask at work.

Ventilation equipment use among the stylists included 72% using a table fan, 45% having a salon ventilation system, 54% having an open window, and 54% having a second door left open during work hours. 18% of stylists responded that they did not use any form of ventilation technique in their salons.

3.4.2 Health Outcomes

68% of survey participants indicated that they currently had health insurance. Those without health insurance indicated expense, lack of information, and use of herbal remedies as reasons.

Health responses are shown in Table 3.6. When asked how they would rate their overall health, 68% of survey participants responded “excellent”. Fewer than 13% rated their health as poor or fair. Top occupational related health issues reported were irritation (skin, nose, and eye), fatigue, stress, and difficulty breathing. Top physical injuries experienced while at work included pain in wrists, cuts, loss of wrist function, and loss of finger function, back pain, and leg/foot problems. When asked if they had ever worked at a hair salon while pregnant 11% of female stylists responded that they had, a majority of respondents (88%)

Table 3.6: Health Outcomes Black hair salon workers attributed to working in the salon ($n = 22$).

Health outcomes attributed to work experienced	Respondents	%
Fatigue/tiredness	13	59
Nausea	12	54
Pain in wrists	12	54
Pain in fingers	12	54
Stress	12	54
Pain in hands	9	40
Nose irritation	8	36
Cuts	8	36
Back pain	8	36
Eye irritation	7	31
Skin irritation	6	27
Headaches	6	27
Anxiety	6	27
Difficulty breathing	5	22
Loss of function in wrists	4	18
Loss of function in fingers	4	18
Nausea	3	13
Loss of function in hands	3	13
Migraines	2	0.09

said they left the workforce while they were pregnant. Reproductive health outcomes among female survey participants included uterine fibroids (28%) and miscarriage in the past (22%). When asked if they had received any training on health effects of chemical hair products, 59% replied they had not. Of those who did receive training, beauty school (59.1%) and independent research (22.7%) were the most common sources. Over 82% expressed concern about the effects of chemical products on their health and 89% were concerned about the potential for chemicals to cause health effects for their clients. 73% of stylists indicated interest in learning more about safe healthier workplaces and meeting with other workers or owners to talk about safer salons.

3.5 Discussion

This pilot study was a collaborative effort between BWW staff, university researchers, and community advocates in order to begin to understand health hazards faced by Black hair salon workers. A survey was developed, and pilot tested with 22 salon workers in 16 salons in the South Los Angeles community. The survey was administered in an interview format. Specifically, the survey tool asked about services provided by hair salon workers, frequency of the services, personal protective equipment use, ventilation measures, and health of the stylists. The goal of the study was to identify potential health hazards in order to guide development of future research interventions and education programs in hopes of mitigating exposures.

3.5.1 Work Hazards in Black Hair Care Salons

Identifying the services provided by salon workers is important in classifying what specific exposures may be present. Almost one-third of all products on the market contain one or more ingredients classified as possible human carcinogens [Gro04]. Cancer causing chemicals for both consumers and hair salon workers are of special concern given the frequency of which chemical processes such as relaxers are used within the Black community.

A case-control study found that deep-colored dyes when used over a prolonged period of time can increase the risk of both non-Hodgkin's lymphoma and multiple myeloma in women who used permanent hair dyes and hairdressers [KBB09]. Similarly, a cross-sectional study reported that those who use permanent hair dyes are 2.1 times more likely to develop bladder cancer [GCY01]. Understanding which chemical hair services are provided in salons can help narrow the focus for intervention and product substitutions. In our study hair dyes were the most commonly offered services (45%) and were done the most frequently (1 to 3 times a week).

Hair salon workers are subject to increased ergonomic risks, most specifically musculoskeletal disorders (MSD) [CCL10]. Natural hair services are important in understanding ergonomic risk factors hair stylists face. Twists, sister locs, locs, and braids were natural

hair styles provided and performed frequently. These services can take upwards of 12 hours to complete depending on client preferences. Working for such long hours, using intricate braiding techniques, standing long periods, and working through breaks can lead to serious ergonomic problems. Poor posture, standing for long periods, working long hours, and working through breaks are risk factors that lead to increased MSD risks.

Pain in wrists, pain in fingers, cuts, loss of wrist function, loss of finger function, back pain, and leg/foot problems were common within our study participants with up to 54% reporting a MSD. These can possibly be attributed to the long hours, intricate hair styling techniques, and lack of ergonomically efficient workstations. Specific MSDs include lower back problems from standing for long periods, shoulder problems from holding arms above shoulder level for extended periods of times, neck problems from constant head turning, and wrist problems from forceful repetitive movements [MKG09]. MSDs are the greatest illness burden in the United States contributing to unnecessary pain and suffering, stress, and ultimately loss of income [Lee94].

Personal protective equipment use among the hair dressers in this pilot study varied by the type of equipment. Aprons were most frequently (68%) used followed by gloves (50%) then eye protection (20%); no respondents used face masks or respirators. Aprons are important for all stylists to wear to protect against chemicals splashing on clothes. All stylists interviewed did not have separate work clothes and went home in their work clothes. This can cause exposure to chemicals and other hazards being carried home on clothes and potentially exposing family members. Glove use is very important in protecting stylists from chemical exposures and occupational illnesses such as dermatitis. In the United States contact dermatitis is commonly found in hairdressers and cosmetologists. The most common contributing factors to skin damage include water, shampoos, conditioners, hair dyes, bleaches, permanent wave solutions, and the components of gloves [LL13a, WWM12]. Our study results were alarming in that only 50% of stylists used gloves while working.

All stylists interviewed had some form of ventilation source in their salon. The most common source was a table fan. The location of table fans in the salon varied from being behind the stylist to being directly in-front or on the floor. Several stylists had multiple

sources of ventilation including a table fan, leaving a back door open, and opening a window.

A recent research study examined 12 hair salons in Italy to address the following: (1) assess individual exposure of salon staff, hairdressers and customers to volatile organic compounds (VOCs) and (2) identify the products used in each hair salon and activities that were responsible for the presence of VOCs in the salon environment. The study found four VOCs (benzene, naphthalene, ethylbenzene and tetrachloroethylene) in high concentrations in two of the 12 hair salons studied [GGM14].

de Gennaro and his colleagues identified hair sprays, hair foam, shampoo, balms, hair masks, oils and hair dyes as the hair products responsible for the presence of butane, hexane, methyl ethyl ketone (MEK), isopropanol, 1-methoxy-2-propanol, benzyl alcohol, limonene and menthol at indoor concentrations higher than outdoor levels. The study also identified that VOC levels remained constant regardless of the salon being closed Sundays and Mondays. They hypothesize that this may be due to the lack of adequate ventilation [GGM14]. Circulation of air is important in salons to keep the shops from filling with fumes from hair processes.

3.5.2 Black Hair Salon Worker Health

Fifty percent of hair dressers interviewed in this study indicated that they believed their current health was excellent. Although the stylists believed their general health to be excellent many experienced irritation (skin, nose, and eye), fatigue/tiredness, stress, and difficulty breathing. These symptoms are similar to those published in the literature for hair stylists in general. Prolonged exposure to irritants, exposure to potential allergens such as hair dyes, and pre-existing sensitive skin can greatly increase skin irritation. Hair salon workers work with many chemicals that are known to cause adverse effects on the respiratory system and are at a greater risk than the general public for developing respiratory problems and allergies. Chemicals such as formaldehyde, ammonia, and bleaching agents have been known to lead to breathing difficulties such as coughing and wheezing, heightened sensitivity, and in some cases occupational asthma [LTP99]. Respiratory problems such as asthma are a

growing problem in the Black community. More than 3 million African-Americans are currently living with asthma, at a higher prevalence than Caucasians [CSH01]. Increased risks from traditional asthma factors such as air pollution and occupational exposures could leave Black hair dressers at a greater risk of harm when exposed to hair products known to cause adverse respiratory symptoms.

Notable reproductive health outcomes reported by the surveyed group included uterine fibroids (28%) and miscarriages (22%). Although not specific to Black hair salon workers, several published studies have shown similar adverse reproductive health outcomes among female hair salon workers.

For example, menstrual abnormalities, infertility, miscarriage, spontaneous abortion, pre-term delivery low birth weight and small for gestational age infants have been reported more frequently in hairdressers than compared to working women in other occupations or the general population [JSS94, CBG97, LPC87, MAC91]. These studies were not done specifically on Black female cosmetologists.

The Reproductive Outcomes in Salon Employees (ROSE) study by Gallicchio et al compared health outcomes in children born to cosmetologists compared to children born to women working in other occupations [GMG10]. Four hundred and fifty women participated in the study, of which 9.8% were African-American women. Results indicated that children born to cosmetologists had a statistically significant risk of being born with a learning disorder, mood disorder (example: drug addiction, depression, obsessive compulsive disorder (OCD)), or gastrointestinal problems when compared to children born to non-cosmetologists. Similar studies also found adverse reproductive health impacts in cosmetologists [ARL06, KRZ97].

A link between relaxers and uterine fibroids in young Black women and girls has been reported by Wise et al. [WPR12]. Uterine fibroids were the most notable reproductive health outcome of the salon workers in the pilot study. In addition to fibroids ingredients found in relaxers, lye (sodium hydroxide) and no-lye (calcium hydroxide) formula pose a similar likelihood of scalp lesions and burns. Women who often use lye relaxers have a higher risk

of scalp lesions or burns, which increases dermal absorption of chemicals directly into their bodies.

3.5.3 Study Limitations

This study used a cross-sectional design with a convenience sample. Salon workers self-reported work exposures, health outcomes and perceived educational needs. The cross-sectional design does not allow conclusions about causation. However, this pilot project data provides a first step in understanding work processes and exposures faced by stylists that might potentially affect health that can be used to guide future study designs.

3.6 Conclusion

Black women spend more money in the beauty industry and disproportionately use products containing toxic chemicals such as hair relaxers (which contain ingredients such as sodium hydroxide, thioglycolic acid, and lithium hydroxide) compared to other races. In addition to using products on themselves, Black hair salon workers also encounter additional risk of exposure during their work. Occupational workplace exposures faced by surveyed salon workers included chemical hazards, musculoskeletal disorders, respiratory problems, and reproductive health outcomes such as menstrual abnormalities.

The results of this pilot project suggest that there is a need for additional research into occupational safety hazards of Black salon workers.

CHAPTER 4

Voluntary occupational health and safety recognition programs for small businesses: an exploratory qualitative study

4.1 Abstract

Small businesses present particular challenges for the promotion of occupational health and safety (OHS). They often face barriers including the lack of resources for effective OHS programming and may require external assistance with health and safety. Several environmental and public health organizations have developed not-for-profit preventative programs which provide small businesses with technical resources and support relating to environmental and workplace safety. In turn, participating businesses are recognized for their participation in these programs in the form of no-cost incentives. This study examines perspectives, challenges and approaches of program coordinators from voluntary OHS recognition programs and experiences of small businesses that participate in the program. Factors that influenced small business to elect participation in OHS programs were also explored. Semi-structured interviews with eight coordinators from four OHS programs and three small business participants were conducted. An inductive thematic analysis was used to identify themes within the data. Five main overarching themes emerged from the interviews with program coordinators: needs assessment, relationship building, partnerships, capacity, and language. Two main overarching themes that emerged for small business participants were value of program and consumer expectations. Findings from this study can be used to further develop a framework for OHS recognition programs targeted at small businesses that incorporate

diverse stakeholders. The promotion of safety and environmental practices using intermediaries and no-cost incentives for small businesses has highlighted the need for and benefit from comprehensive approaches to solving occupational health challenges.

4.2 Introduction

Small businesses are a significant economic driving force, employing 34 percent of the U.S. workforce in private industry [Lab16]. Small businesses are defined as businesses with less than 100 employees [Lab11]. Research, policy, and interventions related to occupational health and safety (OHS) has largely focused on larger businesses; however, small businesses present particular challenges for the promotion of OHS [LOL15]. Challenges include fewer health and safety resources, absence of dedicated safety staff and lack of ability to identify hazards and conduct workplace surveillance [SHB07, MKS10, CS15].

4.2.1 Economic pressures and lack of knowledge

Small businesses face economic pressures and financial limitations that reduce their ability to invest in OHS strategies and interventions [Leo04]. Small business managers are often reluctant to spend additional resources and labor on issues such as OHS that do not arise on a regular basis. These economic pressures have been found to encourage both long hours and work intensification leaving little energy or time for OHS management [MQB96]. In turn OHS knowledge, understanding, and regulatory comprehension is often low in small businesses. Lack of industry specific OHS knowledge can inhibit small businesses owners' ability to effectively deal with OHS issues when they arise [HLY99, MBM05, HL06]. Research on small business owners' knowledge on OHS has found that OHS risks are often discounted and owners tend to underestimate the seriousness of hazards in their business [FOC97]

4.2.2 Worker injury and fatality risk

The consequences of limited OHS resources and knowledge are severe as small businesses face increased worker injury and fatality risks [HLY99]. A review of literature suggests small businesses endure a greater relative burden of occupational injuries, illnesses, and fatalities than their larger counterparts [HLY99, Leo04, DFR11, MGD18]. Workforce characteristics for smaller businesses differ from larger ones as employees are often temporary, economically disadvantaged, and already suffer from health disparities due to race, language and other structural barriers to prevention [Hea00, Lam14, YKS18]. For example, young Hispanic immigrants in construction are more likely to work for small businesses than other racial groups [DFR11]. The average nonfatal injury and illness incidence rate for construction businesses with 11-49 employees in 2015 was 4.1 per 100 full-time workers. In contrast construction businesses with 1000 or more employees had a nonfatal injury and illness incidence rate of 1.3 per 100 full-time workers [Lab16]. Another study looking at 260 small businesses in Colorado found that many of the employees suffered from chronic illnesses and poor health behaviors. Study participants experienced depression, chronic back pain and sleeping problems amongst other illnesses [NSM15]. Additional studies on small business wellness found comparable, or poorer, health status among small business workers [MSS14, STD18, APF18].

4.2.3 Prevention and promotion strategies

With increased injury and illness rates, lack of OHS knowledge, and limited resources, the promotion of health and injury prevention presents unique challenges for small businesses. Literature on strategies and programs to address these health and safety gaps include increased Occupational Safety and Health Administration (OSHA) inspections, supplemental OHS funding, and updated legislation [OLS01, HL06]

The use of intermediaries as support systems to reduce incidences of injury has been studied. Intermediaries are for-profit or not-for-profit entities offering occupational health services and preventative measures to small businesses [HBG10]. Intermediaries can include insurance companies, labor unions, health clinics, public authorities, and other OHS service

providing organizations. Programmatic and engagement strategies used by intermediaries vary widely.

Several environmental and public health organizations have developed targeted OHS recognition programs for small businesses [RSS10]. Recognition programs are voluntary not-for profit preventative programs in which environmental or public health organizations provide small businesses with technical resources and support relating to environmental and workplace safety. In turn participating businesses are recognized for their participation in these programs in form of certifications from government officials, logos to display in their businesses, access to consumer marketing, and other no-cost incentives.

Resources provided by voluntary not-for profit OHS programs vary and include technical assistance, grants for safety equipment, and train the trainer programs [QVT18, RRV15]. Additionally some of these programs have been developed with the aim of specifically engaging high hazard small businesses such as auto body shops, dry cleaners and salons [OSN11]. There are currently no recognition programs that target Black cosmetologists and Black hair salons.

The perspectives of intermediaries and participants in these types of voluntary not-for profit OHS recognition programs have not been well studied. This information could be important to inform future health promotion and intervention research on the best ways to reduce occupational injuries and illness faced by small businesses. Therefore, the purpose of this research study was to gather the perspectives, challenges, and approaches of program coordinators of entities providing no-cost OHS and environmental preventative measure services. In addition, this study explores the factors that influence small businesses' decisions to participate in such programs and their experiences.

4.3 Methods

Because literature on this topic is limited, an exploratory design using qualitative research methods was conducted. Qualitative research methods provide an avenue to explore people's experiences and perceptions. This methodology provides rich, descriptive data that may be

missed by quantitative research which seeks to answer the question of “how often” versus the “what” or “why” [Bla94]. Integration of qualitative methods into occupational health research enhances collaboration by offering a forum for discussing particular problems within workplaces, and the development of feasible intervention programs [BCL04].

4.3.1 Sampling and Recruitment

OHS and environmental health programs eligible for inclusion in this study had to meet the following criteria: voluntary not-for-profit program, catering to small businesses, and providing no-cost resources on environmental health and safety and some form of external recognition for participation in the program. Programs were identified on Google Scholar by using search terms including “safety recognition program”, “small business environmental program”, “workplace health certification program”, “safe business program”, “small business safety programs. Twenty-five programs were identified but not all met the criteria for the study. The main reasons for exclusion were: for-profit (52%), did not have an external recognition component (23%), and lacked any mention of safety (25%). Six programs were identified that met all eligibility criteria and were contacted by email. One program was no longer in existence. The remaining five eligible programs were invited to participate in the study and 4 accepted the invitation.

Small business participants in the study used OHS services provided by these 4 recognition programs. The recognition programs informed small business participants in their programs about the research and small businesses who wished to participate contacted the researchers directly.

4.3.2 Research Instruments

Interview questions were informed by previous occupational health qualitative interviews published in peer-reviewed literature [HBG10, MKS10]. Primary questions were designed with the intention that they might be modified or discarded in view of emerging findings.

The interview guide for program coordinators of recognition programs included nine

main topics: (1) Organizational history; (2) Motivation for creating program; (3) Program development; (4) Program implementation; (5) Key program components; (6) Evaluation; (7) Future of program; (8) Lessons learned, and (9) Recommendations.

Interview questions for small business participants included seven main topics: (1) Business structure; (2) Motivation for enrollment in program; (3) Program components; (4) Experiences in program; (5) Perceived benefits and challenges; (6) Lessons learned, and (7) Recommendations.

4.3.3 Data Collection

Between January and June 2016, 11 interviews were conducted: 8 program coordinators from 4 recognition programs, and 3 managers from small businesses participating in the programs. For OHS program coordinators interviews were conducted in their offices. This enabled study participants to feel comfortable in their work environment [TBD15]. To encourage dialogue rich in detail a conversational style of interviewing was adopted [RR11]. The interview guides were used as a reference to ensure that all key topics were covered. For small business participants interviews were conducted at their worksites. Site visits were also conducted at the three participating small businesses to better understand the respective industries and workplace hazards. The small businesses included an autobody shop, nail salon, and grocery store.

The interviews and site visits lasted between 60 and 90 minutes. Sessions were audio recorded and transcribed. Interviewees received a modest monetary incentive reimbursement for their participation where permitted by their employer. Participants provided informed consent in accordance with the Institutional Review Board of the University of California, Los Angeles.

4.3.4 Data Analysis

Data from interviews were transcribed verbatim from digital recording. The qualitative research software Dedoose (Version 7.6.) was used to support coding, management, and

analysis of data [Ver] An inductive thematic analysis was used to identify themes and patterns within the data [Boy98, VTB13]. Repeated reading of the entire data set was done to enable familiarization with data. The data was then organized into initial codes. The codes were sorted into potential themes using identification of meaningful patterns across all codes [L B04]. Themes were identified capturing an important element of the views of the program coordinators and small business participants.

4.3.5 Ethics

Ethics approval for this study was sought and granted by The University of California, Los Angeles Institutional Review Board (IRB 16-001988)

4.4 Results

Demographic details of OHS program coordinators (N=8) and small business participants (N=3) are shown in Table 4.1 and Table 4.2. Figure 4.1, details a simplified overview of the participants' recognition programs from conception to execution. There are differences in each section of the overview for each program, but the general conceptual idea is the same for all programs. Prior to the program development stage, a needs assessment was done to understand the needs of the target population. A program based on the needs assessment was developed, piloted, and then launched. Once launched recruitment and enrollment was done for the program using collaboration with community partners and stakeholders. After execution of the program, feedback and continuous improvement are utilized to make any necessary changes or adjustments.

4.4.1 OHS Recognition Program Coordinators

4.4.1.1 Themes

Five main overarching themes emerged from the interviews with the recognition program coordinators: needs assessment, relationship building, partnerships, capacity, and language.

Table 4.1: Recognition program coordinator (PC) demographics.

Coordinator	Org. Type	Target Population	US Region	Num. years	Number of businesses	Staff Size	Staff-to-participant ratio
PC1	Green Business Program	All Small Businesses	Pacific Northwest	22	850	10	1:85
PC2	Green Business Program	All Small Businesses	Pacific Northwest	22	850	10	1:85
PC3	Public Health Organization	Nail Salon, Hair Salon, Auto Body Shops	North-east	15	70	4	1:17.5
PC4	Public Health Organization	Nail Salon, Hair Salon, Auto Body Shops	North-east	15	70	4	1:17.5
PC5	Public Health Organization	Nail Salon, Hair Salon, Auto Body Shops	North-east	15	70	4	1:17.5
PC6	Environmental Health Organization	All Small Businesses	West	13	350	4	1:87.5
PC7	Environmental Health Organization	All Small Businesses	West	13	350	4	1:87.5
PC8	Green Business Program	All Small Businesses	West	5	600	3	1:200

Green Business Program: Provides resources and assistance to small businesses wanting to be greener and more sustainable.

Public Health Organization: Provides a wide variety of public health services including disease prevention, physical and mental health promotion, infectious diseases control, and organization of health services. Recognition program is a program housed within the organization.

Environmental Health Organization: Provides services dedicated to all aspects of the natural and built environment affecting human health. Recognition program is a program housed within the organization.

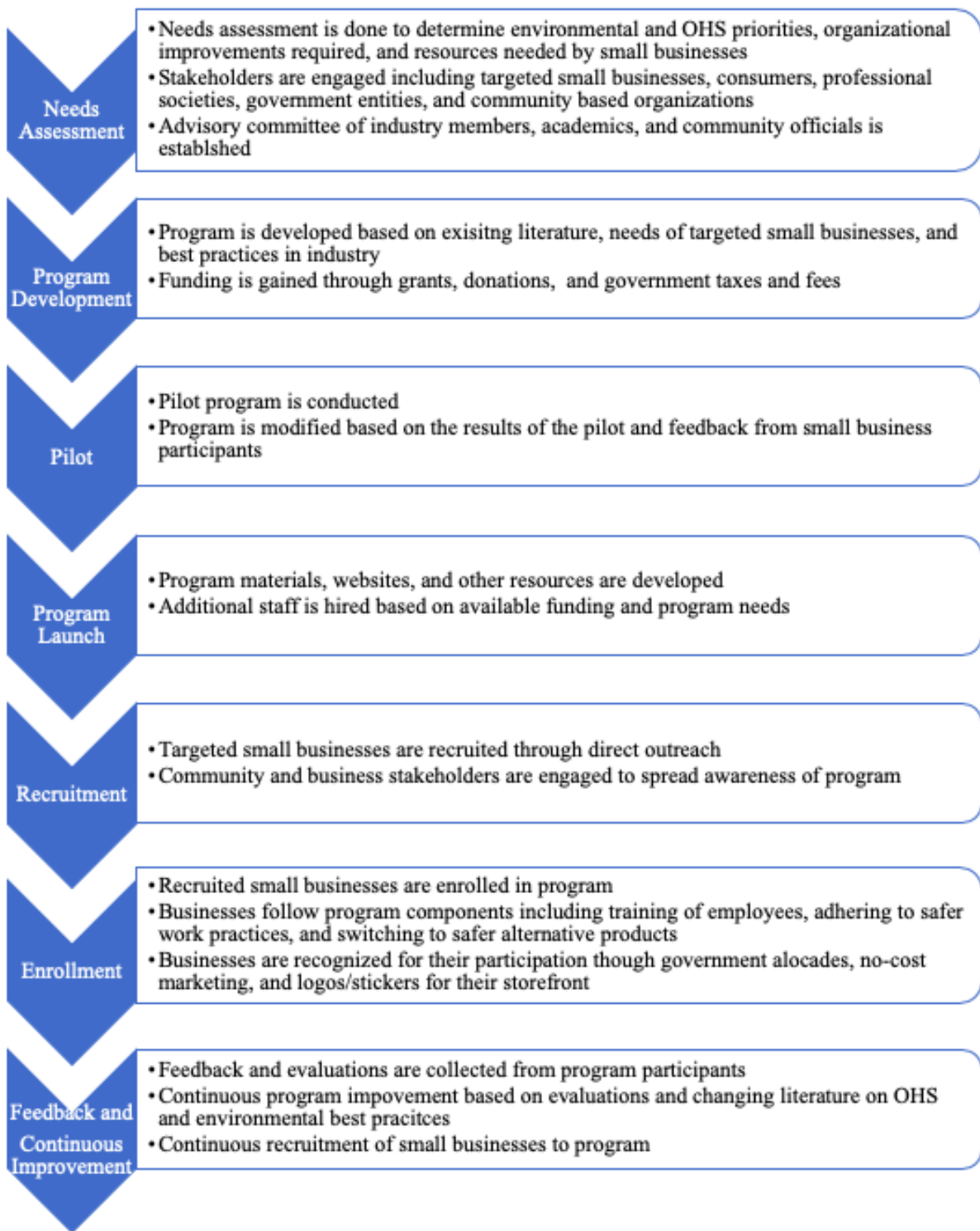


Figure 4.1: Conception and execution of OHS recognition programs.

Table 4.2: Small business participant (SBP) demographics.

Participant	Business Type	Position	US Region	Years in program
SBP1	Nail salon	Owner	Northeast	3
SBP2	Autobody	Manager	Pacific Northwest	3
SBP3	Grocery store	Manager	West	1

These themes provided insight to the study aim of exploring the perspectives, challenges, and approaches of OHS recognition programs.

4.4.1.2 Theme 1: Needs Assessment and Feedback

Regarding why their organizations started their programs, program coordinators discussed seeing a need in their community for OHS and environmental education and awareness. One program coordinator acknowledged the OHS challenges faced by small businesses.

“They of course want to protect their employees from these (workplace) hazards, but they have to meet their bottom line, and there is a cost to being a healthy nail salon.” (PC2)

Program coordinators emphasized performing needs assessments with their target small business populations to fully determine priorities, how to make organizational improvements, and where to allocate resources.

“We always have done check-ins with the industry. We had a business advisory group and we went out and asked people, what would be meaningful to you? You know, do you want certificates? Do you want a logo? Do you want presentations and articles or whatever?” (PC1)

“It’s really driving home the importance of that needs assessment component, not only knowing where the salons are, but how we can serve their needs. We’ll go out and we’ll talk to all of them and collect that information, because we want to serve their needs as best as possible.” (PC1)

In addition to a preliminary needs assessment, program coordinators also discussed the importance of continuous feedback from their target population. Program coordinators felt

that feedback from small business participants was needed to adjust and improve current and future programming elements.

“We do focus groups. So our program’s done quite a few focus groups just on getting businesses’ feedback on what’s working, what’s not working.” (PC3)

“The trainings are kind of evolving and updating as we go, and as we learn more about the industry.” (PC4)

“We do get anecdotal feedback when we’re doing outreach, if we’re realizing that something isn’t working right, or it could be working better or something, then we’ll tweak our system.” (PC4)

“We hired a consulting agency to help develop questionnaires and surveys. And realizing that asking some blankly, how is this working, can get you very different responses depending on how you ask those questions. So we’re working with professionals and developing those questions. And then, yeah, so we’re getting feedback from focus groups and surveys.”(PC6)

4.4.1.3 Theme 2: Small Business Relationship Building and Engagement

All program coordinators stressed the importance of relationship building with small businesses and engaging the consumers of their services in the program development process. They discussed how they felt that the success of their programs was attributed to direct outreach and relationship building. To encourage a business to be a part of their recognition programs the coordinators indicated that it required continuous visits to worksites engaging with both management and employees. These visits included providing information such as safety or environmental documents relevant to the needs of the business and employees. Program coordinators acknowledged the difficulty and time required for outreach as a major challenge.

“You have to come to the salon many times to make them feel comfortable and build trust. Outreach is difficult, and it takes time, there is lots of rejection but have to keep coming back.” (PC5)

“They can shut the door in our faces any time they want, and they do. We very much are

used to getting no's. We try to build relationships with shops, so it can take time, it really depends, shop to shop.” (PC4)

All program coordinators indicated that face to face encounters were the best approach for sharing information and recruiting businesses for their certification/recognition programs.

“We found what technique works best is going door to door and talking to them in person.” (PC2)

One program coordinator stressed the importance of being fully prepared when approaching potential small business participants: *“When we go into the salon usually we have a binder, and it has pictures, and the steps of the program, and we ask if the owner's available, or if the manager, and if we can speak with them.” (PC3)*

Program coordinators noted that engagement not only with the businesses themselves but also with community members and consumers was an integral part of their process. Consumer engagement was an important thread throughout all of the interviews. Program coordinators felt that consumer buy-in was a necessity in pushing forth their programs.

“We also did a lot of community events. We went to the Vietnamese New Year events. We set up a booth. We talked to some nail salons. We talked to a lot of people within the Vietnamese community about getting the word out to nail salons about this program that we had and how we'd get out and help them.” (PC1)

“We've done consumer residents surveys over time since the beginning of the program and continue to have a pretty high response rate of people saying they want to support environmentally responsible businesses.” (PC4)

“I think if it's a customer-driven kind of program, then salons and auto shops will want to deliver that kind of service to customers, because it will make them stand out and be a business that they would like to pay for services.” (PC5)

On the importance of consumer impressions to potential small business participants, one program coordinator noted that *“a huge reason why [these] salons are joining is to get more customers” (PC5)*. Another commented on the perception of joining such a program: *“it's good for businesses to do from a marketing and PR standpoint” (PC8)*.

4.4.1.4 Theme 3: Partnerships and Collaborations

All program coordinators acknowledged the importance that partnerships and collaboration with other organizations that supported businesses had on the success of their programs. Recognizable industry contacts, government entities, and community-based organizations were the most commonly sought out partnerships and collaborations. Partnerships were important because information would not be shared without collaboration with other professional organizations. These partnerships were an additional pathway that program coordinators used to outreach to small businesses.

“Partner organizations that have helped us get the word out. Some of them are industry specific like Automotive Club and the Automotive Services Association.” (PC1)

“We developed a relationship with a nonprofit that had community contacts within the Vietnamese community.” (PC2)

“We also actually get a lot of referrals from our partner programs. Like the PG&E Energy Watch Program will recommend a business, or someone from our zero waste division will recommend a business.” (PC1)

“The way that we do outreach and get businesses through the process is, a lot of it, I would say, is word of mouth at this point.” (PC6)

“We do outreach. We have a lot of strategic partnerships set up with universities” (PC8)

Partnerships often extended beyond outreach to include research assistance, funding, and community organizing.

4.4.1.5 Capacity

Lack of financial and administrative capacity to realize the full potential of their recognition programs was a theme that emerged with program coordinators. Program coordinators discussed having varying avenues of funding for their recognition programs ranging from government grants and taxes to donations. Most program coordinators (N=7) highlighted funding and small staff sizes as a major challenge that they were facing. They expressed

concern over wanting to reach and provide many businesses with the services they offer but lacking the staff size and budget to do so.

“It’s a really tough situation that’s kind of frustrating for me, just because I know that there are active ways that we could be doing better in reaching our population, but we can’t always get there due to budget constraints.” (PC5)

“Within our program we have three staff members. All our staff members focus on - are helping out on creating standards, doing outreach, setting up site visits, doing the site visit follow-up reports.” (PC7)

“There are 200 nail salons and 500 auto shops. And then there’s four of us.” (PC4)

4.4.1.6 Language

Language was identified as a key factor by program coordinators for affecting change within their programs. All program coordinators worked with immigrant populations that had difficulty accessing environmental and safety information in their native language.

“One thing, unfortunately, that isn’t translated are data safety sheets.” (PC4)

Program coordinators found the ability to have information translated was a great asset. In addition having bilingual staff that could engage both on during outreach and trainings was key to enrolling businesses in their programs.

“Our outreach staff is bilingual in something, or at least working proficiency in some sort of language, and we also translate our materials into the most common language or languages.” (PC2)

“All the trainings are translated. The application form, the registration application forms. We created a ventilation factsheet and translated into Vietnamese.” (PC3)

“We have a Vietnamese contractor who does Vietnamese trainings, and also outreach working with owners. She’s also a technician, so she knows the industry very well.” (PC7)

“We train everyone, so when we go into the salon, we train the owners as well as technicians, receptionists - so everyone knows about the program, and we come into their salon to

train them. Sometimes in different languages, multiple times, because everyone has different schedules.” (PC6)

In contrast program coordinators without funding (N=2) to translate documents and bilingual staff were frustrated in their lack of ability to conquer language barriers.

“We just don’t have the capability to do that. That’s a whole other budget. Because we have a lot of documents and to translate all of them? And then to not just to translate them in paper form, but we actually physically go out there and do the assessment.” (PC8)

4.4.2 Small Business Participants

The results of the analysis of small business participant interviews revealed two emergent themes related to the context and circumstances through which businesses became acquainted with the OHS recognition programs and their experiences as participants. The two main overarching themes that emerged were: value of program and consumer expectations.

4.4.2.1 Theme 1: Value of program

A common theme from small business participants was the value proposition of the OHS recognition program. The value for them was being part of a program that validated and recognized that they had environmental-and occupational health-conscious practices.

“We’re part of the program because of the issues. This is the kind of quality of life issues that people care about — the environment, protecting people.” (SBP1)

“I’m shooting for the safety and health of my workers and myself.” (SBP2)

While small participants indicated that the OHS recognition programs were an investment they felt that the overall good was worth the initial cost of changing products and behaviors. The investment came in forms of changing some of their products to safer alternatives and taking time to train employees.

“It cost me more, but I’m proud to say that I join the environmentally friendly and I try

to implement it all, even the products, or anything, is — is related to my business here I try to buy products that's less harmful chemically.” (SBP1)

4.4.2.2 Theme 2: Consumer expectations

Small business participants talked about consumers having peace of mind when seeing the OHS and environmental certifications and logos on their business.

“Some of them (customers) do come to me and say, I’m — I’m glad that your shop is, you know, ecofriendly shop” (SBP3)

“A lot of folks that live directly right here, up against the water, are extremely green, and like to see things done that way.” (SBP2)

The small business participants admitted that becoming part of the OHS recognition program was not easy, but the recognition had highlighted their efforts to consumers and other key stakeholders.

“The process wasn’t easy.’ When they came in, it’s pretty strict. But as far as answers, the answers were pretty direct on what needed to be done. And so, that portion, that part of it was easy to work with. It’s just getting it done.” (SBP2)

“Having a decal, you know, upon our window or showroom, or when people come in, it’s almost a relief to some of these folks, understanding that we’re dealing with a lot of hazardous materials, and that we’re on the list of one of the people that know how to deal with that kind of stuff. And how to take care of that kind of stuff.” (SBP2)

4.5 Discussion

4.5.1 OHS Recognition Program Coordinators

To address the needs of small businesses in their communities, program coordinators discussed performing in depth needs assessments with key stakeholders. This was a prominent theme that emerged throughout the interviews with all program coordinators. These assess-

ments were integral in understanding what OHS and environmental services small businesses in their communities needed. Focus groups, advisory groups, and industry collaborations were tools used to understand the needs of target populations. Through this study we found that engagement between small businesses and intermediaries relied heavily on relationship building and community engagement. Face to face communication with businesses was identified as the best outreach strategy to engage potential small business participants. Program coordinators in our study also discussed the importance of continued outreach but expressed the difficulty in time spent and rejection received.

Community outreach differs by populations and should consider cultural aspects. While minority and Hispanic business owners make up a small share of all U.S. business owners of small businesses, their share has been on the rise. Black business owners made up 49.9 percent of all minority owners in 2012, while Asians made up 29.6 percent [Lic14]. Several program coordinators in this study worked with small businesses that had cultural and language differences. For example, the nail salon industry in certain parts of the US is staffed by majority immigrant Vietnamese women. To address these potential barriers, program coordinators enlisted translators, developed culturally competent materials, attended community events, engaged key community partners, and collaborated with other neighborhood and professional organizations.

Integrated into cultural competency is language and access. Existing literature has shown the impact and benefits of translating health promotion materials [AB07]. Translation of safety information into native languages of small businesses was an asset that several program coordinators felt their organizations had. Program coordinators also expressed frustration about the lack of translation of chemical safety documents and not having the in-house capacity to translate them. Capacity was another main theme that emerged from the interviews with all program coordinators. Public health organizations and smaller nonprofit organizations face capacity issues relating to funding, staff, and overwork [DFT01]. Program coordinators discussed budget constraints and small staff sizes as limiting factors for them reaching a greater number of small businesses. It is evident from the interviews that funding streams play a pivotal role in allowing program coordinators to provide the necessary

resources needed by the small businesses they interact with. Financial and administrative capacity allows program coordinators to fulfil what many describe as a crucial need for their business communities. Future research on development of OHS recognition programs must address funding as many small businesses are not likely to be in the financial position to pay for consultancy services.

4.5.2 Small Business Participants

Within small businesses, the manager (oftentimes owner-manager) is emphasized as the key stakeholder. Attitudes, personal values, and priorities of these stakeholders reflect heavily on the culture of their businesses. Research suggests that upper management commitment is a contributing factor in the OHS attitudes and performance of employees [CB03]. The manager nature of small businesses means that a certain responsibility for employees is assumed. Understanding the position of these small business managers is key in the development of occupational health and safety intervention programs. In our study managers discussed how being a part of an OHS recognition program validated their own environmental- and safety-conscious practices. To them this was a perceived value of the OHS recognition programs. This value led them to make changes in their respective businesses that required some financial investment including purchasing safer alternative products and taking staff time to train employees.

Understanding the values of managers in small businesses may lead to greater engagement in health promotion programs. This may require tailored approaches to engaging each small business and additional capacity from intermediaries. One program coordinator discussed owner values when approaching potential small businesses: “The businesses that’ll see the benefit of it are the businesses that already have those values. Doing the right thing for the environment is good business practices. Not all business owners are going to have that perspective.” (PC7). The facilitation of focus groups and engagement with business communities are examples of how recognition programs gauge the values of small business managers. Strategic approaches that take into account owner values can potentially lead to

targeted marketing, better resource allocation, and increase in small business participation. Knowledge of these dynamics may allow for OHS promotion programs in small businesses that move past regulatory compliance and to an investment in safety.

Consumer perceptions were a significant overarching theme in interviews with small business participants. Small business participants felt that customers were delighted when finding out that they were part of a program focused on the environment and OHS. Consumers are increasingly more aware of environmental and corporate social responsibility practices of businesses [NV15]. This emerging trend has led larger businesses to change their corporate structures and provide services/products that are eco-friendlier. In addition consumers are increasingly aware of workplace safety and labor issues that are facing many high hazard small businesses. Investigative reporting and amplified research on vulnerable populations has brought forth many of these OHS concerns [Nir15]. In addition, research has shown that ecolabeling and “green” marketing has an impact on the purchasing behavior of consumers [YHM10]. Capitalizing on consumer behavior trends can be a way for intermediaries to enhance the OHS and environmental practices of small businesses. Program coordinators in this study stressed the importance of offering consumer-facing incentives that highlighted the safe work practices of participating businesses to the greater public. Further studies on the benefits of engaging consumers in health and safety promotion programs can help guide the creation of incentives for future OHS recognition programs. Conversely, research on the impact of consumer perceptions on workplace health and safety is limited. This is an area that can be further explored as a driving factor for small businesses to adopt safer practices.

Intermediaries play a key role in providing health and safety resources to small businesses. OHS recognition programs as intermediaries are a way to engage small businesses in adopting safer practices and sharing those accomplishments in a public forum. These programs rely heavily on addressing the needs of key stakeholders and engaging them in every step of the process. Future research should focus on the evaluation of these programs and the development of recognition programs as a health and safety intervention method.

4.6 Study Limitations

This study involved a small number of participants from OHS recognition programs and businesses who engaged in their programs. There are limitations to the generalizability of the findings including transferability of the findings to other OHS programs and businesses. Additionally, only managers and not employees from participating businesses were interviewed. Employee experiences participating in OHS recognition programs can provide further insights into the impact of these intervention methods. Nonetheless, the results provide a rich source of contextualized data from the standpoint of those studied. Future research is needed to explore the impact of these programs on injury and illness rates of participating small businesses. It is hoped that more study on this topic will impact policies and programs to improve occupational health and safety in small businesses.

4.7 Conclusion

The use of qualitative methodologies used in this study added to our understanding of the barriers and benefits of implementing small business OHS recognition programs. Program coordinators identified issues relating to capacity and language as the main barriers to implementing their OHS recognition programs. Benefits included engaging with their community and providing a solution to a community identified need. Small businesses viewed their participation in the OHS recognition programs as a value added that was recognized by their customers. The no-cost incentives set them apart from other small businesses in their field and brought about a sense of pride in that their businesses were working towards safer practices. The promotion of safety and environmental practices using not-for profit intermediaries and no-cost incentives for small businesses has highlighted the need for and benefit from comprehensive approaches to solving occupational health challenges. Findings from this study can be used to further develop a framework for OHS recognition programs tailored to small businesses. Findings can also be used to develop a recognition program focused on the occupational hazards faced by Black cosmetologists.

This study highlighted key features for intervention program development that can be used in the to build a framework. These key features include: needs assessment, program development, recruitment and enrollment, and continuous improvement. Expanding on these features to create a detailed, yet flexible, framework can allow OHS practitioners to develop recognition programs that address the needs of their small business populations.

CHAPTER 5

Black Cosmetologists and Personal Protective Equipment Use: Results from a pilot intervention study

5.1 Abstract

Cosmetologists are exposed to number of hazards at work. Preliminary survey data collected by our research group in salons that provide hair care for Black clientele found a substantial lack of workplace health and safety knowledge in the field. In addition to the lack of health and safety knowledge was lack of personal protective equipment use among cosmetologists who specialize in hair care.

The goal of this study was to improve workplace health and safety for Black hair care cosmetologists. The aims were to develop, pilot and evaluate a training program focused on use of personal protective equipment.

We started with a series of focus groups to better understand barriers, attitudes and behaviors related to usage of personal protective equipment among cosmetologists. Next, we convened an advisory committee to develop a PPE intervention program based on published literature and findings from the focus groups. Twenty-nine cosmetologists were trained using the developed intervention program. The cosmetologists were assessed for behavior change and knowledge regarding PPE use pre-intervention, and at 3- and 6-month post-intervention follow-up.

Post intervention we found increased PPE use and salon safety knowledge in cosmetologists. Study findings suggest that using a community-engaged approach to develop a work-

place intervention program may have facilitated change in the personal protective equipment use practices of Black cosmetologists

5.2 Introduction

The beauty industry is lucrative, fast growing, and resistant to economic downturns [Dia15, LL13b, Too16, McC18]. The number of businesses providing beauty care services has grown substantially over the past decade [OM15, Too16]. The Bureau of Labor and Statistics projects that employment of cosmetologists will grow 13 percent from 2016 to 2026 [Lab16]. This is faster than the average for all occupations which are expected to grow only 7 percent. Women represent over 95% of cosmetologists in the field with over 20% of salons owned by Black or African Americans beauty professionals [Sal14, Lab11, STA13].

There are a number of occupational health and safety risks associated with working in the beauty care industry. Cosmetologists are exposed to high concentrations of many toxic and potentially hazardous chemicals such as formaldehyde, toluene, and styrene [ARL06, CBG97, KRZ97, KBB09]. Hair dyes, chemical straighteners, and other salon products have been linked to dermatitis, asthma, cancer and reproductive harm [SMK13, WF98, GMG10]. In addition, the number of occupational skin diseases that occur in hair care professionals constantly increases [WWM12, LTP99]. The most common contributing factors to skin damage include water, shampoos, conditioners, hair dyes, bleaches, permanent wave solutions, and the components of gloves [LL13a]. Hair salon workers work with many chemicals that are known to cause adverse effects on the respiratory system [CSH01]. Chemicals such as formaldehyde, ammonia, and bleaching agents have been known to lead to breathing difficulties such as coughing and wheezing, heightened sensitivity, and in some cases occupational asthma [LTP99].

Research studies focusing on the health of salon workers have been few, and published research focusing on Black hair salons and employees is virtually nonexistent. Black women make up a substantial portion of beauty product consumers, spending an estimated 2.7 billion dollars annually [JB14, Har05, Win08]. Many hair and beauty products marketed to black

women and girls, such as hair relaxers and skin lightening creams, contain toxic chemicals that have not been assessed for their safety [Mal07, Dav17, BFA18, Ola16]. A report by the Environmental Finance Center, Region XI found that beauty product complaints to the Food and Drug Administration (FDA) were largely composed of hair relaxers and straighteners [Bla07]. The adverse symptoms reported to the FDA included skin irritation, eye irritation, burning, drying of eyes, and drying of skin. Despite the numerous complaints, relaxers represent 21 percent of the hair care market with expenditures estimated at \$152 million [Opi14].

The products used and marketed for use by women with “ethnic” hair contain a number of chemicals and mixtures that have not been fully assessed for adverse health impacts [Ree19, BFA18, LRB17, ASD15, Wil18] . Black hair salon workers are a vulnerable population at the forefront of the Black haircare industry and face unique occupational exposures [IEO16, AAU19, AFN16, DAA15].

Removal of the products causing adverse effects would be the most ideal solution but research on which specific products and formulations to remove is lacking. Stylists must also use these products to please their clients and continue earning an income. The use of personal protective equipment may help reduce exposures and possible health risks faced by cosmetologists [SVB16, DAA15]. Personal protective equipment (PPE) is equipment that protects users against certain workplace health or safety hazards [OBK17, Zoh80, Ell96]. These items can include gloves, respiratory protection, eye protection, safety footwear, helmets and more [HPP17, AMP18, SDA17]. Preliminary survey data completed by our research team found a substantial lack of workplace health and safety knowledge by cosmetologists [APF18]. Apron, glove, and eye protection use varied with many of the cosmetologists not using any PPE. Skin, eye, and nose irritation were prevalent among those we interviewed. Similar studies have found limited use of protective equipment in salons and hypothesized lack of knowledge, cultural and language factors, and inaccessibility to PPE as possible reasons.

Health and safety trainings in cosmetology schools do not adequately address the occupational and environmental exposures that occur in the salon. Many salons are small businesses which face occupational health and safety challenges as they may not have the

resources to hire occupational health and safety personnel [NKP15, HBG10, Lam14]. Work organization for cosmetologists varies with some being self-employed independent contractors not employees and, therefore, not protected by the Occupational Safety Health Act of 1970 [HHS16]. There has been an increase in local public health organizations and community groups advocating for programs in which small businesses can opt into and receive much needed training and resources around occupational and environmental health [QAA01, OSN11, RSS10, QVV13]. These industries include auto body shops, dry cleaners, and hair and nail salons among others. The promotion of safety and environmental practices using community partnership has highlighted the need for and benefit from comprehensive approaches to occupational health issues.

Research into intervention methods for mitigating occupational health exposures for cosmetologists is limited [SMK13, MOG16, WKL15]. Studies have discussed intervention methods, but few have conducted exploratory intervention studies [NKG15, AFN16, PSO19]. There are no published intervention studies specifically addressing occupational hazards faced by Black cosmetologists. The goal of this study was to use a community-engaged approach to develop and pilot a training program with Black hair care cosmetologists focused on increasing personal protective equipment use.

The Health Belief Model (HBM) was used as the theoretical framework for this study. The framework is often used to explain and predict why individuals change or maintain certain health behaviors [Ros74b, Cha84, STC15, HSA08]. It also can be used to guide development of occupational health and safety interventions. The HBM contains the following constructs: perceived susceptibility, perceived severity/seriousness, perceived benefits, perceived barriers, cues to action, and self-efficacy [SA96]. Table 5.1 depicts the HBM framework.

5.3 Methods and Results

The study consisted of two phases. In phase one, we conducted a series of focus groups with Black cosmetologists in the Los Angeles region. Focus group findings were instrumental in

Table 5.1: Health belief model constructs and study application.

Concept	Definition	Study Application
Perceived Susceptibility	One's opinion of chances of getting a condition	Salon workers believe that their health is at risk
Perceived Severity	One's opinion of how serious a condition and its consequences are	Salon workers believe that the consequences of health hazards are significant enough to try to avoid
Perceived Benefits	One's belief in the efficacy of the advised action to reduce risk or seriousness of impact	Salon workers believe the recommended action will benefit/protect them from workplace injuries
Perceived Barriers	One's opinion of the tangible and psychological costs of the advised action	Salon workers identify barriers to using PPE and explore ways to eliminate or reduce these barriers
Cues to Action	Strategies to activate "readiness"	Salon workers are confident in using PPE correctly in all circumstances

shaping the development of a personal protective equipment use intervention program, which was administered in phase two of the research to a pilot group of Black cosmetologists.

An advisory group consisting of an industrial hygienist, salon advocate, and a representative from a community-based organization was created to provide guidance, advice, and to keep community engaged and rooted throughout the study. Advisory group members received a \$100 gift card for their participation throughout the study phases.

5.3.1 Phase One

5.3.1.1 Methods

The aim of phase one was to collect information on PPE use among Black cosmetologists who provide hair care services. This was done through focus groups aimed at gathering information on knowledge, attitudes and practices related to PPE use. The data gathered would then be used towards the design and implementation of an appropriate PPE workplace intervention and assessment of its effectiveness in phase two of the study.

The focus group questions were informed by previous occupational health qualitative interviews and research on cosmetologists published in peer-reviewed literature. The questions were designed with the intention that they may be modified or discarded in view of emerging findings. The Health Belief Model was used as a guiding theory to explain and predict health behaviors. The final focus group prompt was a 6-question guide that included questions on services provided, past safety training, and PPE use. Prior to the focus groups, all participants completed a questionnaire on demographic variables including age, gender, education, and years in the cosmetology field. Survey participants received a \$50 gift card for their participation.

The inclusion criteria for participation in the focus groups were: Black hair salon workers; currently working in a Los Angeles salon; minimum age of 18; and English speaking. The Los Angeles region was chosen because of the density of Black salons in the area and the relationships community organizations have built with the community.

Focus group participants were recruited by outreaching directly to salons, over social media, and through a community partnership with community-based organization Black Women for Wellness (BWW). BWW staff accompanied researchers during outreach as their relationships with community members were helpful in recruiting participants.

Two focus group sessions were held Fall 2017 and Spring 2018. The focus groups were held at the Black Women for Wellness office which was situated in a convenient location in Los Angeles for many of the participants. A total of 14 Black female cosmetologists participated in the focus group sessions. Prior to the start of each focus group, participants were provided information regarding the purpose of the study and voluntary participation. Verbal consent and permission to audio record was given by participants before the focus group sessions. The focus groups were moderated by the PI, lasted two hours and were audio recorded. The research protocol was reviewed and approved by the Institutional Review Board at University of California, Los Angeles.

5.3.1.2 Data Analysis

Data from the focus groups were transcribed verbatim from digital recording, all personal identifiers were removed to preserve anonymity and given a personal identifier number (ex. P1, P2). Transcription, handling and analysis of data all followed IRB protocol and qualitative data methods. The qualitative research software Dedoose (Version 7.6.) was used to support coding, management, and analysis of data.

An inductive thematic analysis was used to identify themes or patterns within the data. Repeated reading of the entire data set was done to enable familiarization with data. The data was then organized into initial codes. The codes were sorted into potential themes using identification of meaningful patterns across all codes. Themes were identified capturing underlying beliefs that motivate and impede safety behaviors in cosmetologists relating to PPE use.

5.3.2 Results

Participant demographics are listed in the Table 5.2. Data themes were organized based on the HBM constructs and are listed in Table 5.3.

Key themes included lack of cosmetology school training, balancing client beauty demands, career longevity, lack of ease of PPE use, and health impacts of chemical services. The themes generated from each HBM theoretical construct were used in understanding the health behaviors of cosmetologists relating to PPE and in the development of the intervention program in phase two.

5.3.3 Phase Two

5.3.3.1 Methods

Using results gathered from the phase one focus groups, current occupational safety literature, and insights from the advisory committee; a PPE intervention program was developed. A draft of the intervention program was created by the PI and given to each advisory committee member for review. After review and editing by the advisory committee the final intervention training program was established. The final training program consisted of a PowerPoint presentation, trainee guidebook, safety knowledge assessment quiz, PPE use document, and several hands-on activities. The knowledge quiz consisted of 13 questions regarding hazards and safety measures in the salon. The PPE questionnaire asked cosmetologists to detail on a scale of 0-100 the percentage of apron, glove, eye-wear, face, and respiratory protection used in the past 30 days.

The inclusion criteria for participation in the pilot intervention program were: Black hair salon workers; currently working in a Los Angeles salon; minimum age of 18; and English speaking. Cosmetologists who participated in the phase one focus groups were excluded from the intervention study.

Intervention study participants were recruited similar to focus group participants by outreaching directly to salons, over social media, and through community partnerships with

Table 5.2: Demographics of focus group participants ($n = 14$).

Demographic	<i>n</i>	%
Race		
Black/African American	14	100
Gender		
Male	0	0
Female	14	100
Age		
Mean \pm stdev: 35.3 \pm 10.6		
Primary cosmetology education		
Cosmetology school	8	57.3
Family/friends	4	28.5
Online	0	0
Self-taught	2	14.2
Years in industry		
>5 y	2	14.2
5–10 y	3	21.6
11–20 y	5	35.7
>20 y	4	28.5
Hours worked weekly		
<30	2	14.2
30-40	3	21.6
>40	9	64.2

Table 5.3: Major data themes and select quotes from focus group participants based on the Health Belief Model constructs.

HBM Construct	Major data themes	Select quotes
Perceived susceptibility	Lack of cosmetology school training	<p>“A lot of steps in school were skipped. And I did well in cosmetology school, so I'm thinking I'm prepared. And then you get into the real world and you see they were giving the minimum”</p> <p>“They want chemical hair services, but I don't think they are safe.”</p>
	Balancing client beauty demands	<p>“We work with all of these products. We do this all day. They're coming in for every once in a while, but we do this all day every day”</p> <p>“Of course, we're going to be impacted. We're breathing this in every day we work here”</p>
	Likelihood of getting ill	<p>“I worry about some of the things we put in our hair, how we absorb it and how it isn't safe”</p>
Perceived severity	Chemicals are life threatening	<p>“There are toxic products out there actually making us get asthma and really sick. It's really scary”</p> <p>“I'm ruining myself and health just for some aesthetic”</p>
Perceived benefits	Personal health benefits	<p>“Protective measures, if they work, are good then our work won't actually be detrimental to our health”</p>
	Career longevity	<p>“I've been working for over 20 years. If my health is good, I can keep working longer. I love working with my clients”</p>
Perceived barriers	Lack of ease of PPE use	<p>“It's hard to do anything in someone's hair with gloves on”</p> <p>“It doesn't look stylish. I have a smock now, but if I don't have to wear it, I'm not going to.”</p>
	Aesthetics	<p>“If it [PPE] doesn't look good. People don't want to wear it because it looks silly.”</p>
	Client comfort	<p>“I don't wear gloves. I don't want to offend them. All they want is their hair done. They want to be beautiful. They've got a certain look in their mind and what they want, they want.”</p>

Black Women for Wellness (BWW).

Three intervention training sessions were held during Spring 2018. The training sessions were held at local community centers which were situated in convenient locations for many of the participants. A total of 29 Black female cosmetologists participated in the initial training sessions. Participant demographics are shown in Table 5.4. Prior to the start of each training session participants were provided information regarding the purpose of the study, detailed follow up timelines, voluntary participation, and verbal consent. Participants were also asked to complete a demographic form, safety knowledge quiz and questionnaire on PPE use in the last month. The training sessions were conducted by the PI and lasted two hours. Participants received binders and additional training materials and resources to keep. The research protocol was reviewed and approved by the Institutional Review Board at University of California, Los Angeles.

Post training study participants were contacted individually and completed a 3-month and 6-month follow-up. Two cosmetologists withdrew from the study prior to the follow-up. During the follow-up sessions the remaining 27 participants completed a safety knowledge quiz and a questionnaire on PPE use in the last month. Follow up visits were conducted by the PI and were at the location of choice for each cosmetologist. Intervention study participants received up to \$125 in gift cards for their participation.

5.3.3.2 Data overview

Overall, the collected data falls into two categories: safety quiz scores, and PPE usage. Both were measured three times—once prior to the intervention, and twice afterwards—and so can be considered longitudinal repeated measures data. Quiz scores were numeric, and were measured on a scale of 0–13. PPE usage was self-reported as a percentage, rounded to the nearest 10%. Additionally, demographic information was available to analyze as potential predictive factors. These factors included age, type of education, and number of years in industry. Due to the small sample size, baseline data (n=29) included the two cosmetologists lost to follow up. All post-intervention analyses had a sample size of twenty-

Table 5.4: Demographics of intervention participants ($n = 29$).

Demographic	<i>n</i>	%
Race		
Black/African American	29	100
Gender		
Male	0	0
Female	29	100
Age		
Mean \pm stdev: 46.3 \pm 12.4		
Primary cosmetology education		
Cosmetology school	20	68.9
Family/friends	6	20.7
Online	1	3.5
Self-Taught	2	7.0
Years in industry		
>5 y	9	31.0
5–10 y	6	20.7
11–20 y	8	27.6
>20 y	6	20.7
Hours worked weekly		
<30	10	34.6
30-40	6	20.7
>40	13	44.8

Table 5.5: Baseline quiz scores and PPE usage for participants, by age group.

Age	n	Score (0–13)	Apron (%)	Face protection (%)	Eye (%)	Glove (%)
18–34	6	6.50	80.0	20.0	20.0	82.0
35–49	11	6.09	36.4	6.40	11.8	50.0
> 50	12	5.92	70.0	0.90	6.40	77.3

Table 5.6: Baseline quiz scores and PPE usage for participants, by education.

Education	n	Score (0–13)	Apron (%)	Face protection (%)	Eye (%)	Glove (%)
Family	6	6.86	65.0	16.6	16.6	68.3
School	20	5.90	62.0	4.21	10.5	67.9
Other	3	5.50	0	0	0	55.0

seven cosmetologists ($n=27$).

Quiz score distributions for all three observations are shown in Fig. 5.1. Shapiro-Wilk’s method was used to test the quiz scores for normality [GZ12]. This method tests if a distribution is not normal against a null hypothesis of normality. Table x shows the p-values from the test suggesting that the quiz scores at baseline and second follow up are normal. However, this test is not particularly powerful for small sample sizes. This is only a moderate indicator of these distributions being normal. PPE usage distributions are shown in Figs. 5.2–5.5. These distributions each have a large emphasis on extreme values (i.e. 0% and 100%), and do not appear to adhere to a parametric statistical distribution. This emphasis on extreme values could be inherent to the data (i.e. many salon workers either use PPE all the time, or never at all), or it could be caused by extreme response bias [SF08]. Because of the complex distribution and risk of response bias, PPE scores were retrospectively grouped into three quantiles. These quantiles were labeled ‘low’, ‘medium’, and ‘high’, and each contained a third of the responses.¹ These new measurements are ordinal in nature. Baseline quiz score and PPE usage statistics by these supplementary factors are provided in Tables 5.5–5.7.

¹Some data contained more than a third of responses at 0% or 100%. In these cases, the ‘low’ or ‘high’ quantiles contained only these extreme responses, and were larger than one third of the data out of necessity.

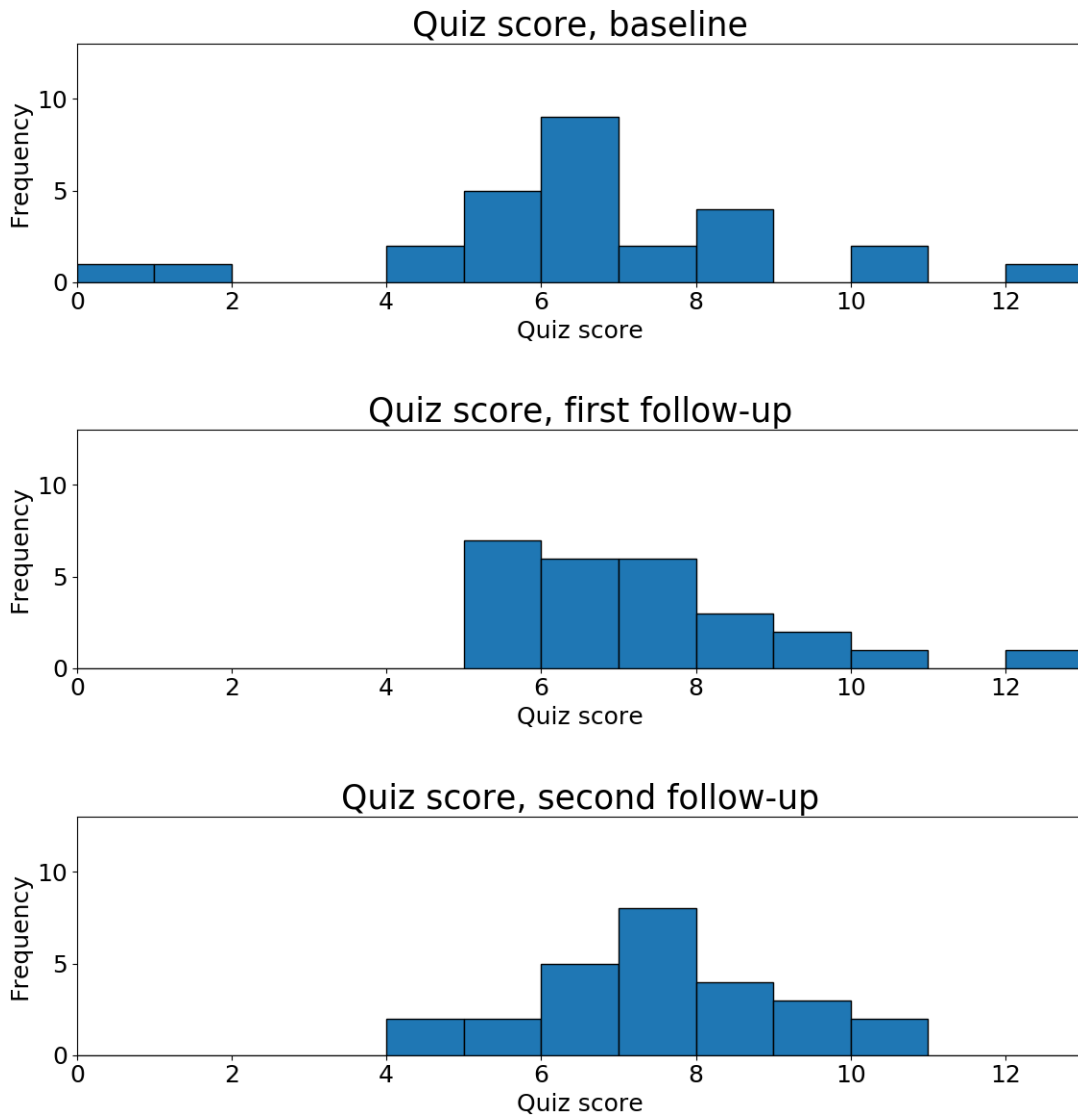


Figure 5.1: Quiz score distributions at baseline, and after each follow-up.

Table 5.7: Baseline quiz scores and PPE usage for participants, by industry years' experience.

Industry Years	n	Score (0–13)	Apron (%)	Face protection (%)	Eye (%)	Glove (%)
1–4	9	6.00	55.7	14.3	0	74.3
5–10	6	6.12	71.4	10.0	10.0	70.0
11–20	8	4.88	55.7	1.43	18.6	75.7
> 20	6	7.83	48.3	0	16.7	45.0

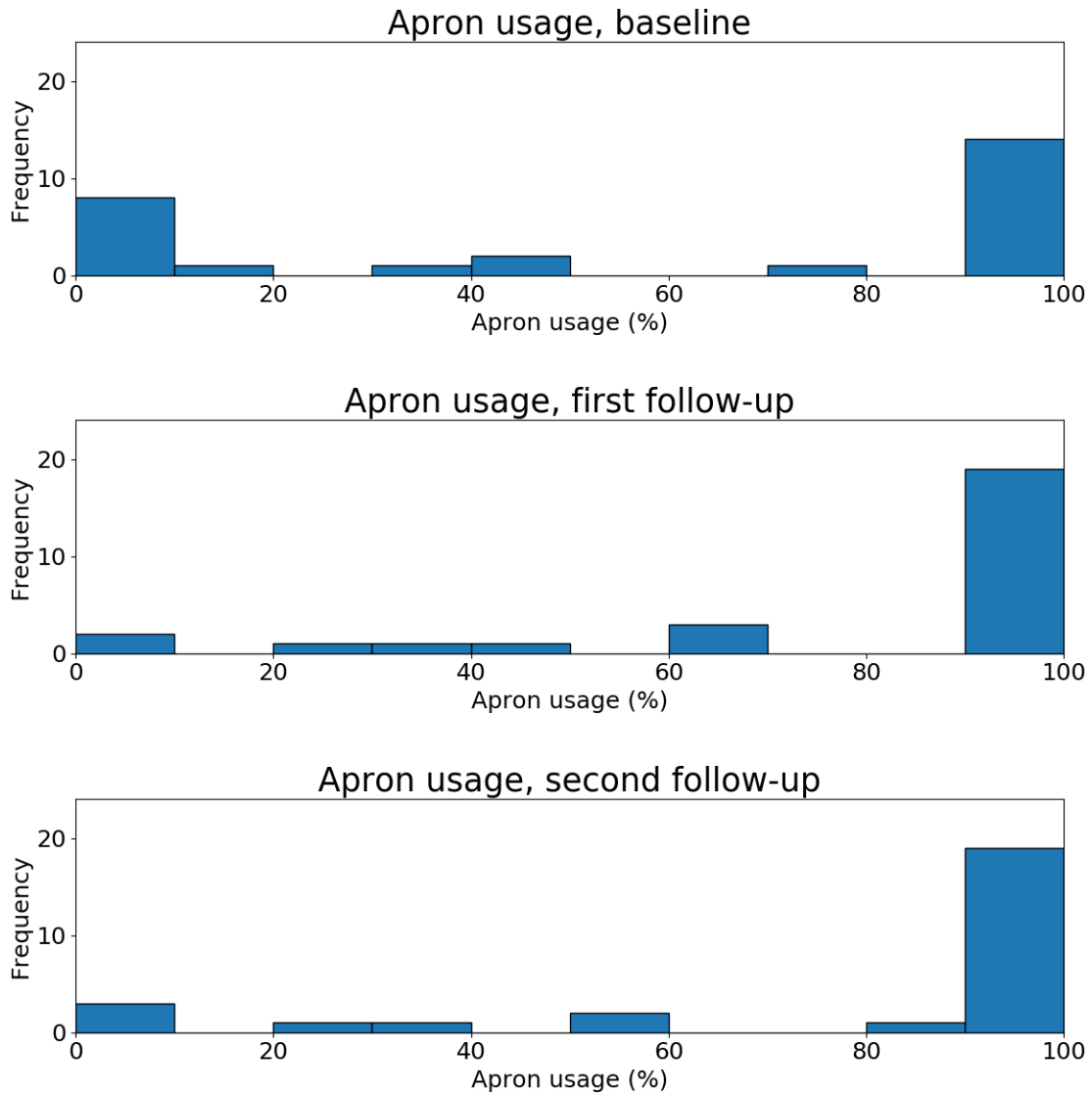


Figure 5.2: Apron usage distributions at baseline, and after each follow-up.

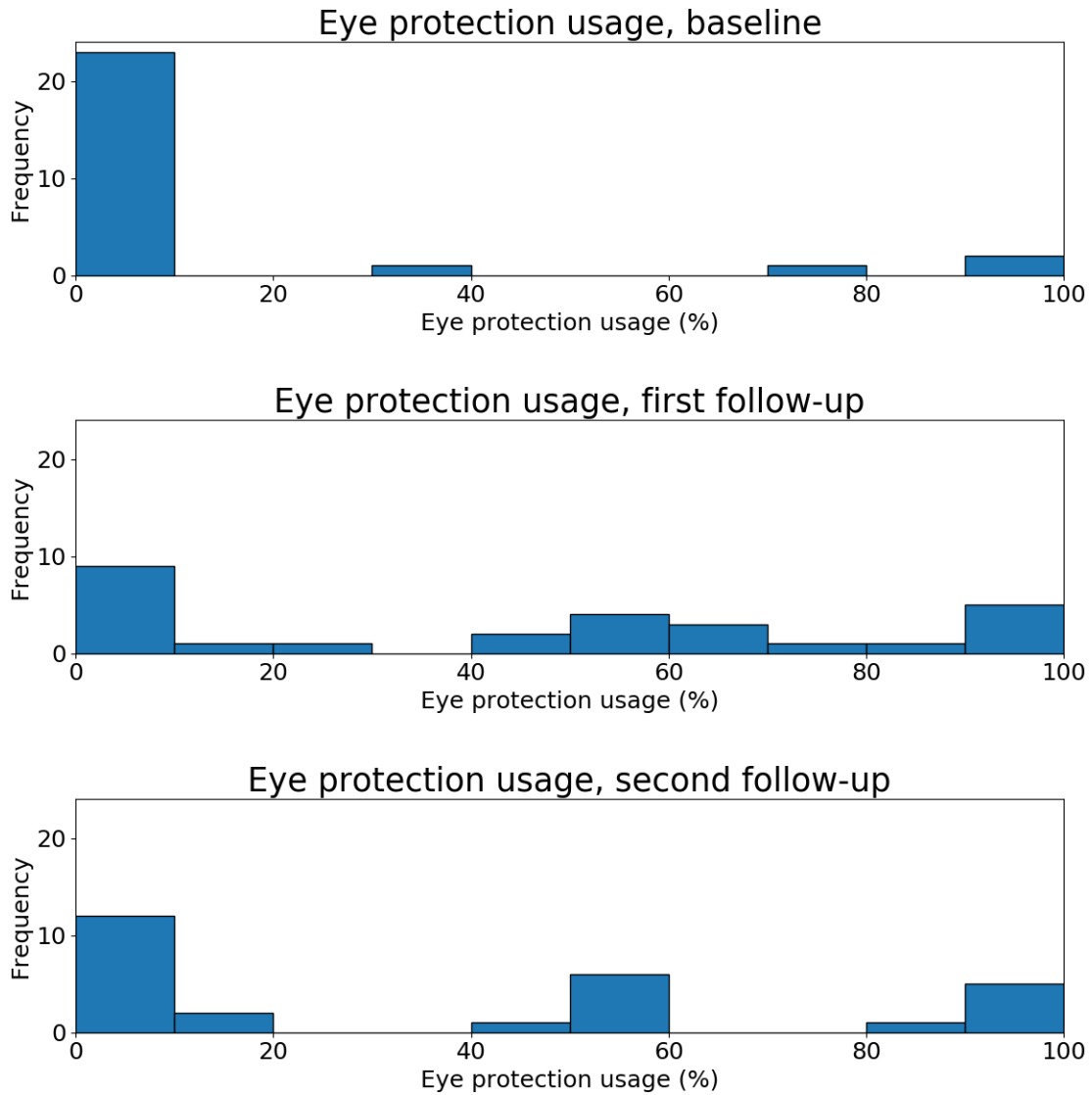


Figure 5.3: Eye protection usage distributions at baseline, and after each follow-up.

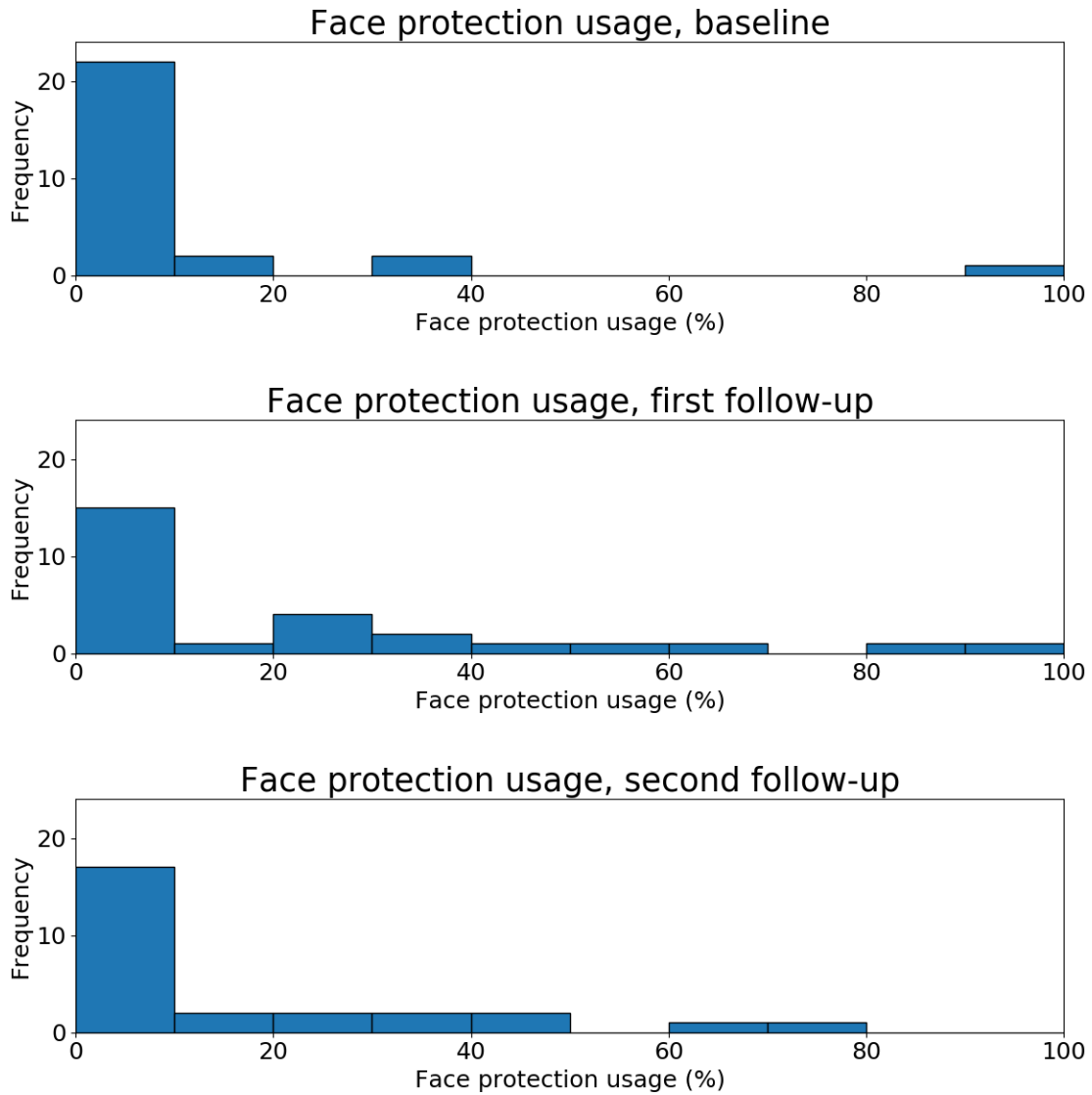


Figure 5.4: Face protection usage distributions at baseline, and after each follow-up.

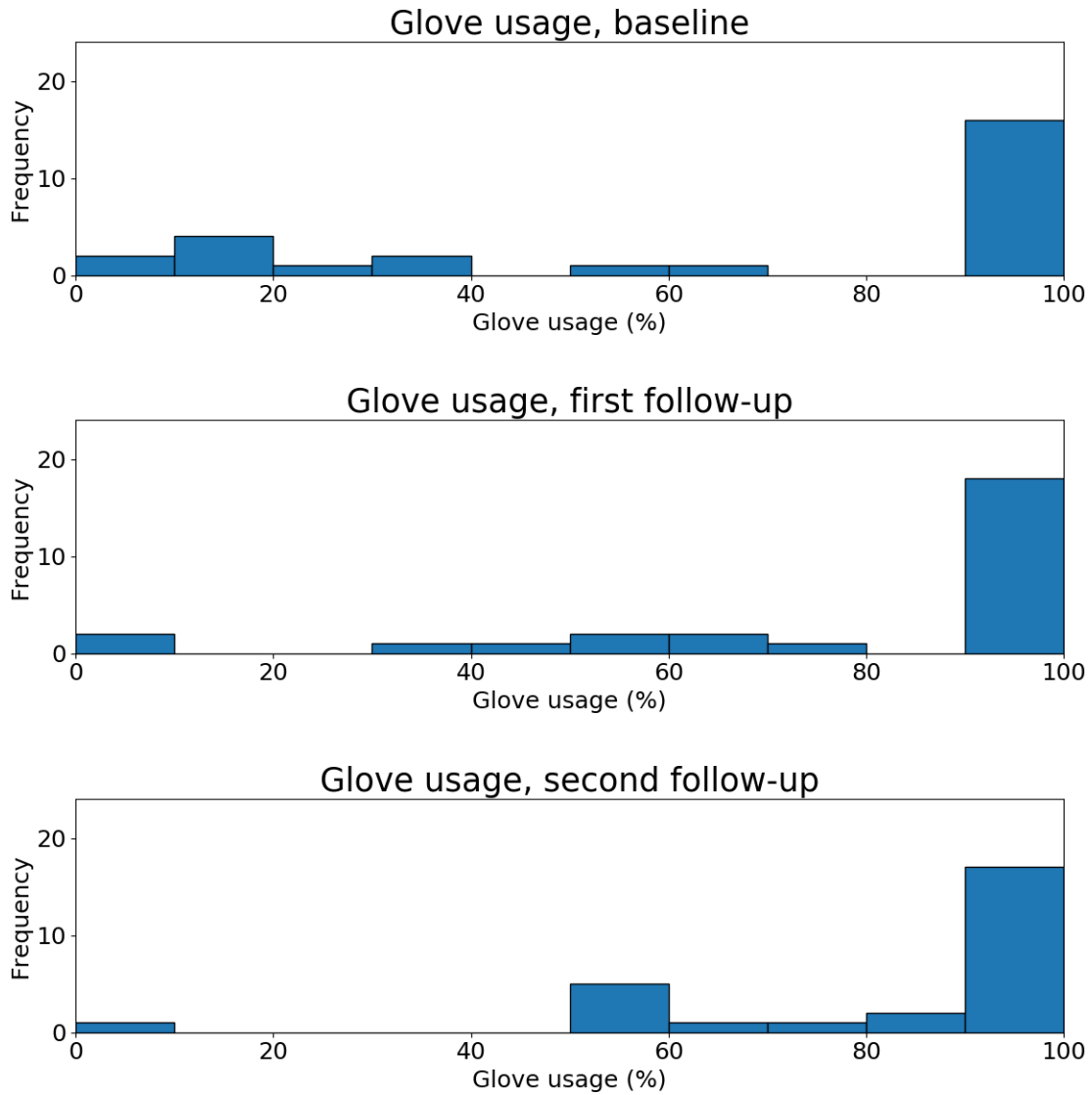


Figure 5.5: Glove usage distributions at baseline, and after each follow-up.

5.3.3.3 Statistical analysis methodology

The data contains longitudinal repeated measures observations with ordinal and numeric measurements. The quiz scores, which are numeric, are not necessarily normally-distributed. A good tool for analyzing such data are generalized estimating equations (GEE) [HH02], which have relaxed assumptions on data distributions and can accommodate repeated measures. In GEE analysis, a model is built to estimate the effect of predictive factors (e.g. intervention or age) on an outcome (e.g. PPE use or quiz scores). The statistical significance of these effects is considered. Because quiz scores were numeric, they were estimated using a linear regression model. Because PPE usage was ordinal, they were instead estimated using an ordinal logistic regression model.

Intervention was included as a variable of either 0 (before intervention) or 1 (after intervention). The supplementary predictive factors (age, type of education, and number of years in industry) were categorical variables.

For each target, models were built using intervention as the only predictive factor. Then, additional analyses were performed using each of the supplementary factors. Here, models were built with both intervention and the supplementary as predictive factors. Data was analyzed in R [BK13] using the *geepack* package [HHY06].

5.3.4 Results

Tables 5.8–5.9 provide the results for predicting each target using only intervention as a predictor. Table 5.8 details the linear regression (GEE) analysis of *intervention* as a predictor of quiz scores. Scores are between 0–13. The *intercept* provides the baseline score for the model, and the *estimate* provides the change in score after the intervention has taken place. Table 5.9 shows the ordinal logistic regression (GEE) analysis of *intervention* as a predictor of PPE usage. Usage was between 0–100% then categorized into 3 quantiles (low, medium, and high). The *estimate* is the change in the log odds of the dependent variable (equivalent to "increase in usage") after intervention has taken place, which demonstrates which PPE usages were most affected.

Table 5.8: Linear regression (GEE) analysis of *intervention* as a predictor of quiz scores. Quiz scores improved and intervention was statistically significant ($p < 0.05$).

Target	Range	Intercept	Estimate	Std. Err.	Wald stat.	p	$p < 0.05?$
Quiz score	0–13	6.14	1.00	0.41	5.93	1.5×10^{-2}	Yes

In almost all cases, the intervention received a positive coefficient estimate that was statistically significant ($p < 0.05$), indicating improved scores or PPE use following intervention. Results from face protection usage were not statistically significant.

Table 5.10 highlights the linear regression (GEE) analysis of quiz scores using both intervention and supplementary factors as predictors. The *estimate* provides the difference in model quiz score between the *value* and the *default*. None of the changes were statistically significant. The intervention coefficient changed negligibly from what was shown in Table 5.8.

Analysis with supplementary factors was difficult due to the number of categorical variables relative to the sample size, and the heavy skewing in the data. For example, for baseline eye protection use, 23 of the 27 respondents reported 0%, removing the possibility of analyzing several supplementary variable categories.

5.4 Discussion

The primary aim of this study was to develop and evaluate the effectiveness of a workplace intervention program designed to improve the personal protective equipment use behavior and related knowledge and attitudes of Black cosmetologists in the Los Angeles region. A community engaged-approach was used in the development of the intervention program using focus group data on health behaviors of cosmetologists relating to PPE use and an advisory committee of key stakeholders. Our intervention consisted of a combination of interactive activities, group discussion, and traditional lecturing. The intervention was statistically significant at improving quiz scores and most PPE usage. Further analyses fail to reject the null hypothesis that age, experience and education affects intervention responsiveness.

Table 5.9: Ordinal logistic regression (GEE) analysis of *intervention* as a predictor of PPE usage. All interventions, excluding face protection, had improved use and were statistically significant ($p < 0.05$).

Target	Term	Estimate	p	$p < 0.05?$
Apron usage	Intercept (low)	1.105	5.96×10^{-4}	Yes
	Intercept (med)	0.102	7.85×10^{-1}	No
	Intervention	0.646	3.15×10^{-4}	Yes
Eye protection usage	Intercept (low)	-0.651	8.05×10^{-2}	No
	Intercept (med)	-1.537	1.71×10^{-3}	Yes
	Intervention	0.784	9.81×10^{-3}	Yes
Face protection usage	Intercept (low)	-1.697	9.61×10^{-4}	Yes
	Intercept (med)	-2.683	3.16×10^{-4}	Yes
	Intervention	0.671	1.57×10^{-1}	No
Glove usage	Intercept (low)	0.962	8.34×10^{-3}	Yes
	Intercept (med)	0.046	9.09×10^{-1}	No
	Intervention	0.613	2.77×10^{-5}	Yes

Table 5.10: Linear regression (GEE) analysis of quiz scores using both intervention and supplementary factors as predictors. The intervention coefficient changed negligibly from what was shown in Table 5.8.

Factor	Default	Value	Estimate	<i>p</i>	<i>p</i> < 0.05?
Age	Age > 50	Age 18–34	−0.19	.80	No
		Age 35–49	−0.51	.53	No
		Intervention	1.00	.01	Yes
Industry years	> 20 y	1–4 y	−1.17	.25	No
		5–10 y	−1.50	.18	No
		11–20 y	−1.26	.28	No
		Intervention	1.00	.01	Yes
Education	Family	Other	−0.89	.28	No
		School	−0.51	.54	No
		Intervention	1.00	.01	Yes

5.4.1 Salon Safety Quiz

The safety quiz was administered to assess knowledge on hazards faced in the salon. Study participants completed the quiz prior to the intervention and at 3-month and 6-month follow up. The mean baseline quiz score was 6.10 out of 13. The 3-month and 6-month post intervention mean quiz scores were 7.04 and 7.26, respectively. The results of the quiz indicate that the intervention program was effective in increasing salon safety knowledge and maintaining this knowledge over six months of follow up.

Retaining information is difficult. It is estimated that roughly 70% of a memory is lost within the first 24 hours [MD15, Nea98, WB13]. Research studies on memory retention and safety knowledge have highlighted key strategies that can be used to increase the strength of memory [SAS97, Lie08, SJ04]. These strategies include using the learned skill immediately, consciously reviewing the material, utilizing microlearning techniques, and retraining programs [AGM11, Ric11, HW10, AGA13]. Favorable results in this study may be due to the

targeted development and execution of the training program. The program was informed by focus groups and key community stakeholders. The information shared was highly relevant for the cosmetologists participating in the pilot study and took into account the nuances in salon culture (i.e. barriers to safety related practices). Another advantage of our intervention was that study participants received personal binders with all of the course material and additional educational tools to take home. In this study, we did not determine whether the take home material improved safety knowledge since study participants did not have access to it while taking the salon safety quiz.

Studies have highlighted retraining as invaluable in memory retention, especially for safety related behaviors [LW80, BMH01]. In California, cosmetologists are not required to complete continuing education courses after they receive their license. Further studies should examine salon safety knowledge across a longer time span. Results make indicate need for safety related retraining programs for cosmetologists.

5.4.2 Personal Protective Equipment Use

Personal protective equipment uses among study participants increased post intervention for almost all PPE, excluding face protection. Studies on workplace PPE use have highlighted addressing barriers to compliance as a key predictor for increasing safety related behaviors in workers [Zoh80, HGB08, ABR95, LVB09]. Key barriers to PPE use discussed in the focus groups were ease of use, aesthetics, and client comfort. Each of these barriers were addressed in the intervention training program and discussed in a group dynamic. Addressing these key barriers may have led to favorable results and increased use of PPE. Face protection was the only PPE that did not yield statistically significant results. This may have been due to lack of access to appropriate face protection (i.e. dust or N95 mask). Face mask and respirator use often require additional fitting and testing to be used properly. None of the cosmetologists participating in the study had access to or knowledge of how to use respiratory protection. Respirator use was not included in this study for that reason.

Behaviors are most often the result of multiple factors. In this study, the constructs of

the health belief model were applied to focus group interviews to better understand and predict health behaviors of cosmetologists. These were then used in the development of the intervention program. Studies on HBM and safety related behaviors have highlighted that understanding and addressing the factors that influence behavior and potential for change can lead to favorable health outcomes [GS94, DeJ96, Kou09, pal]. This study did not focus on the last two stages of the HBM, cues to action and self-efficacy. Future studies should particularly focus on self-efficacy. Research has shown that a person's confidence in his or her ability to successfully perform a behavior may be directly related to the adoption of said behavior [SMB86, RSB94, SF96]. Support should be given to Black cosmetologists that builds confidence in safety related behaviors and increases self-efficacy.

Additional analyses were done to evaluate how much demographics may have had an affect on how likely cosmetologists were to change behavior after intervention. These analyses were not statistically significant. These results were likely due to the small sample size and pilot nature of study. Research on intervention adoption has demonstrated that demographics and modifying factors may play a key role in behavior change [SHH92, LHR99]. Future studies should look to these factors and others as they may help further develop targeted safety programs for cosmetologists.

5.5 Study Limitations

Several study limitations deserve mention. There are limitations to the non-randomized study design and generalizability of the study. A one group pretest-posttest quasi experimental study design was used, meaning no separate control group was used in the pilot study. Future larger replicate studies should consider the use of control groups to further evaluate the effectiveness of the intervention program. All the PPE use data was self-reported. In the questionnaires, the cosmetologists were required to recollect their PPE use over the past 30 days thus recall bias and reliability can be problems. Also, analyses for the use of PPE were limited in that additional predictive factors could not be included in the estimated models. The strengths of this study are that it engages the salon worker community in the

intervention development and that it generates preliminary insights to intervention methods for an understudied population.

5.6 Conclusion

Overall, the study findings suggest that using a community-engaged approach to develop a workplace intervention program may have facilitated change in the personal protective equipment use practices of Black cosmetologists. In addition, findings indicate an increase in salon safety knowledge and retention of knowledge post intervention. Further large-scale intervention research is needed to support these findings and to develop workplace intervention programs that address barriers to safety related behaviors.

CHAPTER 6

Conclusions

The average American spends over 1800 hours every year at their workplace. A significant portion of the adult life revolves around job tasks, interactions with coworkers, and the hazards exposed to at work both intentionally and unintentionally [Qui15]. The nature of one's employment dictates accessibility to OSHA protections, occupational safety professionals, and knowledge and training on how to mitigate workplace hazards [TS17, Har16, UQ11, WOM10, Kou10]. Unfortunately, there are a number of businesses (e.g. small businesses) and occupations that may never have an industrial hygienist or safety professional come to their workplace [Lam14, Qui15, GU12]. Employed in these occupations are some of the most vulnerable worker groups [BVA14, PGP10, LGL14]. Reaching these worker groups requires collaboration between occupational health professionals, government entities, community-based organizations, and the workers themselves [MLT10, FAZ13]. To understand and address the needs of these communities, researchers must engage openly and actively to build trust and partnerships. Research has shown that some of the most impactful interventions have come from open collaboration between academia and community [OFW14, LCL12, BBL].

6.1 Recapitulation of purpose and findings

Black cosmetologists represent an underserved worker population that has been generally overlooked by research and academia. The lack of research into the workplace safety of this specific group has meant little development in the mitigation of occupational hazards faced. This dissertation research was intended to provide insights into the occupational health and safety concerns faced by Black cosmetologists, understand approaches to small business

health and safety interventions, and to develop and pilot community-engaged intervention programs aimed at reducing workplace injuries and illnesses in the salon.

In this dissertation, these gaps were addressed through the following studies:

Chapter 3 detailed a health survey of workplace exposures and health outcomes of Black hair care workers in Los Angeles. The study was conducted by gathering the self-reported occupational exposures and health outcomes of salon workers. Through this study lack of proper health and safety training and personal protective equipment use within the salon worker community was found. Additionally, it was found that stylists had a willingness to learn more about workplace hazards and how to mitigate their risks. The findings indicated a need for additional community-based studies with Black salon workers on workplace health intervention methods. The study, published previously in the *Journal of Immigrant and Minority Health*, is the first published research on the occupational health status of Black cosmetologists.

Chapter 4 was an exploratory qualitative study examining the perspectives, challenges and approaches of program coordinators from voluntary OHS recognition programs and the experiences of small businesses that participate in the program. The research showed that small businesses were motivated to join OHS intervention programs by the value received from the program and expectations from consumers to be a safe/healthy establishment. Additionally, the study found that the process of developing and running a program required an understanding of the community being served, developing a relationship with the community, building partnerships, and addressing barriers to information such as language. This study highlighted the need for and benefit from comprehensive approaches to solving occupational health challenges. The key takeaway from this chapter was the use of community partnerships and intermediates in the promotion of safety and environmental practices.

Chapter 5 detailed the development and evaluation of a personal protective equipment intervention program targeted to Black cosmetologists. This third study was informed by lack of personal protect equipment use findings from Chapter 3 and impact of community engaged intervention findings in Chapter 4. In this third study a PPE intervention program

based on salon worker focus groups, current literature, and an advisory committee of key stakeholders was developed. The program was piloted among a group of Black cosmetologists and assessed workplace safety knowledge and PPE use over a period of six months. Post-intervention follow-up showed workplace safety knowledge and PPE use increased among the cosmetologists. The research highlights the potential positive impacts of using community-engaged approaches to occupational health solutions.

6.2 Themes and Insights

The following section summarizes the overarching themes, insights, and recommendations for future studies that arose from this body of work. Although the work presented focuses on Black cosmetologists, the lessons learned provide valuable information for occupational intervention program development for other underserved worker populations.

6.2.1 Building community in occupational health interventions

This dissertation offers evidence for involving community in the mitigation of occupational risks faced by vulnerable and underserved worker populations [Gio16, MHH14, VAS11, DHD12, BWS14]. Community work is iterative in that the answers to a question can provide more questions and hypotheses than answers [ICC10, Meu11, CM08]. In Chapter 3, the workplace exposure and health status of Black cosmetologists in Los Angeles was examined. This research was driven by Black Women for Wellness, who had been working with the salon population in the area for several years. A detailed health survey of the salon community had not yet been done. The survey provided a snapshot of the occupational safety concerns of salon workers in the area. The prevalence of work-related health issues and lack of health and safety knowledge led to questions on how to develop intervention programs that would be tailored to the needs of this group.

Although the work presented focused on Black cosmetologists, the insights gained have broader applications. This research was initiated and driven by community advocates. They saw potential adverse health impacts in their community and worked with academia to

develop a way to gather this information. There are other communities with vulnerable and underserved worker groups that can look to this study on Black cosmetologists as a model to pilot a health survey in their areas. In Chapter 4, ways in which environmental and community organizations interact with small businesses to address workplace safety and health concerns was observed. These direct perspectives and insights are the first look into why and how these programs were created. Much of what was gathered from the study described in chapter 4 was the need to work with various worker communities and develop collaborations with stakeholders to aid in the development of intervention programs. These insights informed the research in Chapter 5 where the impacts of a community engaged intervention program were observed. The lessons learned through chapter 5—understanding the unique needs of worker groups, developing tailored OHS interventions, and working with community stakeholders—are relevant for many occupations.

6.2.2 Occupational health and behavior change

Behavior change is defined as the transformation of human behavior focusing on individual, community, and environmental influences [Mas18, Cho14, LLH15]. In occupational health, it is a method for encouraging employees to behave in ways considered safer, in the case of Chapter 5 using personal protective equipment in the salon [ZI12, Ant17, KAA13]. As discussed in Chapter 2 there are several health behavior change methodologies that can be used to guide employees to make both short-term and long-term health and safety changes. Using more than one methodology or approach, even just as a guiding framework, can have a potentially positive outcome in changing behavior as seen in the outcome of the PPE intervention program. In the PPE intervention study, the health belief model was used on a macro level as a guiding theory. In future studies on cosmetologists and workplace behavior change should look to using the HBM model on a micro level and incorporating the constructs in each aspect of the study. Future studies on underserved worker groups can look to combining community engaged-research and behavior change methodologies to address occupational health challenges in the workplace.

6.3 A personal note from the researcher

The community engaged format of this work meant that as the researcher I worked directly alongside key stakeholders throughout the research process. Many hardships that could have been encountered in this research (i.e. lack of engagement with salon workers) were mitigated through the partnerships and collaboration with community-based organizations. Through this work I had the good fortune of meeting community advocates, beauty care professionals, and researchers with genuine interest in addressing the health and safety concerns faced by Black salon workers. The community buy-in was essential in the co-development and organization of this research. From this I learned many valuable lessons in the power of listening to community voices and developing interventions that are grown by the community and cultivated by academia. The success of this research stems from hearing stories, acknowledging the expertise communities provide and using feedback from salon workers to directly guide my research steps. It is my hope that this work provides future researchers key insights into this under researched group and that it aides decision makers in future occupational health and safety legislation that incorporates the most vulnerable.

APPENDIX A

Supplementary material to *A Preliminary Community-Based Occupational Health Survey of Black Hair Salon Workers in South Los Angeles*

This appendix contains the original Healthy Hair Initiative Survey document, which was discussed in in Chapter 3. This survey was conducted to understand the prevalence of workplace physical, mechanical and chemical hazards, worker knowledge of these hazards, and related health outcomes of Black hair salon workers.

This survey follows in the next 11 pages.



BLACK WOMEN FOR WELLNESS

Healthy Hair Initiative Survey

By completing this survey, you help Black Women for Wellness (BWW) identify how to best meet your needs and the needs of your community when it comes to black hair products. Completion of this survey will also help address your possible occupational safety needs as a hair stylist.

We thank you in advance for your time and cooperation!

1. Complete Salon Address:

2. Hair Stylist Code Number. Please write in the boxes the following information.

Salon's Name	FIRST LETTER of your First Name	Your Month of Birth	Your Day of Birth

3. What is your gender? Please circle one.

Male

Female

Transgender

Other: _____

I do not wish to answer

4. How old are you? Please check one.

18 or younger

19-24 years

25-29 years

30-44 years

Black Women for Wellness. 4340 11th Avenue, Los Angeles California 90008

- 45 or older
- refuse to answer

5. How long have you been a stylist? _____

6. Where did you learn how to perform your job as a stylist? Please check one.

- Cosmetology school
- Family or friends
- On the job
- Other: _____

7. How many hours a week do you work? Please check one.

- 9 hours/week or less
- 10-20 hours/week
- 21-30 hours/week
- 31-40 hours/week
- 41-50 hours/week
- 51 hours/week or more

8. Which of these services you provide? Please check all that apply.

	How many times a week do you provide these services			
Check all that apply	Services	1-3 times	4-7 times	8 or more
	Permanent waves and texturizers			
	Permanent Straighteners or Relaxers (non-lye or lye relaxers)			
	Hair dyes			
	Hair extensions (i.e. weaves, clip ins, etc)			

	Press and curl (chemically treated hair)			
	Brazilian blowout			
	Nails			
	Spa			
	Other: _____			

9. Which of the following natural hair services do you provide? Please check all that apply.

Check all that apply	Services	How many times a week do you provide these services		
		1-3 times	4-7 times	8 or more
	Twists			
	Sister Locs			
	Locs			
	Afros			
	Braids			
	Short natural			
	Press and curl (not chemically treated hair)			
	Curly styles			
	Other: _____			

10. List 5 products that you frequently use. Include type of product, brand and/or manufacturer (i.e. Nexxus Pro. Mend Conditioner).

- 1.
- 2.
- 3.
- 4.
- 5.

Black Women for Wellness. 4340 11th Avenue, Los Angeles California 90008

11. On a scale of 1-4 how safe do you think the products are that you use. Please circle one.

1	2	3	4
Not safe	Somewhat safe	Safe	Very safe

12. How important are the following when making a decision about purchasing a product?
Please rank them from 1 to 8, 1 being the most important.

	Rank
Price	
How well it works	
Recommendations from others	
Product ingredients	
Health effects on stylists	
Accessibility	
Fragrance	
Product packaging	

13. Do you make your own products? Please check one.

Yes

No

a) Why or why not?

b) If yes, what ingredients do you typically use?

c) How often do you use those ingredients?

d) Where do you get your product information, when it comes to making your own?

14. How often do you take any of the following precautions when handling chemical products at work? Please check one for each of the following.

	Never	Rarely	Often	Always
I wear a protective apron				
I wear goggles				
I wear gloves				
I wear a face mask				
Other: _____				

15. How often do you take any of the following precautions when applying chemical products on your clients? Please check one for each of the following

	Never	Rarely	Often	Always
I use protective creams				
I put an apron on them				
Other: _____				

16. Have you received any training on the potential health effects of chemical hair products? Please check one.

- Yes
- No

a) If so, where did you receive this training?

b) What kind of information was provided?

17. On a scale of 1-4, how concerned are you about the effects of chemical products on your health? Please circle one.

1	2	3	4
Not concerned	Slightly Concerned	Moderately Concerned	Very concerned

18. On a scale of 1-4, how concerned are you about the health effects of chemical products on the health of your clients? Please circle one.

1	2	3	4
Not concerned	Slightly Concerned	Moderately Concerned	Very concerned

19. What would prompt you to use less toxic hair care products?
Please rank them from 1 to 7, 1 being the most important.

	Rank
Price	
Accessibility	
Effectiveness	
Reliability of the product	
Product ingredients	
Health improvements for the stylists	
Other: _____	

20. Do you recommend healthy hair products to your clients? Please check one.

Yes

No

a) If yes, what healthy hair recommendations do you make?

21. Do you have health insurance? Please check one.

Yes

No

a) If yes, are you covered through (please check one)

Covered California

Private Coverage

Dependent Coverage

Other: _____

b) If no,

I looked and it was expensive

I haven't looked but I think it might be expensive

I don't look where to find information about health insurance

Other: _____

22. How would you rate your health? Please circle one.

1	2	3	4
Poor	Fair	Good	Excellent

23. Have you experienced any of the following health symptoms while working in the salon?
Check all that apply.

	Check all that apply
Skin irritation	
Nose irritation	
Eye irritation	
Nausea	
Fatigue/tiredness	
Headaches	
Migraines	
Difficulty breathing	
Dizziness	
Stress	
Anxiety	
Chronic pain Please indicate what body parts:	
Other:	

24. Have you experienced any of the following physical injuries while at work?
Check all that apply.

	Check all that apply
Chemical burn	
Pain in wrists	
Pain in fingers	
Pain in hands	
Cuts	
Loss of function in wrists	
Loss of function in fingers	
Loss of function in hands	
Back pain	
Leg/ foot problems	
Other	

25. Have you ever worked at a hair salon while you were pregnant? Please check one.

- Yes
- No
- Not applicable

26. Do you have a medical history of any of the following health related problems?
Check all that apply.

	Check all that apply
Asthma	
Carpal tunnel	
Chronic dermatitis	
Breast cancer	
Cancer Please indicate type(s):	
Uterine fibroids	
Difficulty conceiving	
Miscarriage	
Low birth weight	
Premature birth	
Birth defect in child	
Other:	

27. Have you experienced any other health symptoms that you suspect might be related to your work? Check one.

- Yes
- No

a) If yes, please explain.

28. Have you heard of any stylist who have experienced miscarriages, infant death or have given birth to low birth weight, premature babies?

Yes

No

a) If yes, can you tell us more about what you have heard?

29. Does the salon have any of the following forms of ventilation? Check all that apply.

Table fan

Salon ventilation system

Ceiling fan

Window

Second door that opens

30. Are you interested in learning more about a safer and healthier workplace?

Please check one.

Yes

No

31. Are you interested in meeting other workers or owners to share and talk about a safer and healthier workplace?

Please check one.

Black Women for Wellness. 4340 11th Avenue, Los Angeles California 90008

Yes

No

32. Would you be interested in possible air monitoring at your workplace?
Please check one.

Yes

No

33. What additional information or training would you want related to the topics in this survey and your overall health. Check all that apply.

Health impacts of hair care products on stylists

Protective measures stylists can take when handling chemical products

A list of dangerous product brands

Health impacts of hair care products on clients

Information on safer alternative products

A fact-sheet on the chemicals in hair care products and their effects

Information about health insurance

Other: _____

Black Women for Wellness sincerely thanks you for your time and cooperation!

Black Women for Wellness. 4340 11th Avenue, Los Angeles California 90008

APPENDIX B

Supplementary material to *Voluntary occupational health and safety recognition programs for small businesses: an exploratory qualitative study*

This appendix contains the Small Business Health and Safety Recognition Programs interview guide, which was discussed in Chapter 4. This guide was used to examine perspectives, challenges and approaches of program coordinators from voluntary OHS recognition programs and experiences of small businesses that participate in the program. Factors that influenced small business to elect participation in OHS programs were also explored.

This interview guide follows in the next 4 pages.

Small Business Health and Safety Recognition Programs: Participant Interviews
Interview Prompt (PI Copy)

Opening

Good Morning/Afternoon/Evening, I want to thank you for taking the time to meet with me today. My name is Teniope Adewumi and I would like to talk to you about your experiences working in the _____ program. I have done some research on your program and I am interested in developing something similar. The interview should take less than an hour. I will be taping the session because I don't want to miss any of your comments. If you do not wish to be recorded, I will be taking notes manually. All responses will be kept confidential. For your time you will receive a \$25 gift card to _____. I will now go over the study information sheet and I will be providing you a copy. Please let me know if you have any questions about the study I have just described. Are you willing to participate in this interview?

Community Based Organization/Public Health Org

1. Can you tell me more about your organization and program?
 - a. Program description
 - b. Organizational structure
 - c. Components
2. What started you (or your organization) thinking about creating this type of program?
 - a. How was the issue/need identified?
 - b. Initial conception process
3. After identifying this issue, what were the next steps that your organization took?
 - a. Program development
 - b. Community engagement in the process
 - c. Evidence based models
 - d. Funding/external support
 - e. Policy maker engagement
 - f. Cultural/SES impact
 - g. Staff development/training/hiring
4. Once your program was developed what was your next step?
 - a. Outreach process
 - b. Timeline
 - c. Eligibility (inclusion/exclusion)
 - d. Avenues of communication
 - e. Numbers reached (number of eligible businesses, number of businesses outreach to)
 - f. Program implementation
 - g. Material development
5. What are some of the key components of your program? (If not answered earlier)
 - a. Training
 - b. Education
 - c. Industrial Hygiene methodology

- d. Site Visits
 - e. Equipment use
 - f. Evaluation
6. What are your (or your organization's) next steps in continuing the program?
 - a. Evaluation process
 - b. Updating materials
 - c. Availability of materials
 - d. Recruiting new businesses
 7. What worked well? Please elaborate. What would you do differently next time? Please explain why.
 - a. What is working (improved worker health?education?)
 - b. What would you change?
 - c. Feedback from evaluation process
 - d. Suggestions for improvement/recommendation (What recommendations do you have for future efforts such as these?)
 8. Is there anything more you would like to add?
 9. Demographic info
 - a. Name
 - b. Years with organization
 - c. Title

Thank you for taking the time to answer my questions. Your answers were insightful and helpful. As promised here is your gift card to _____.

Policy Maker

1. Can you tell me more about your position?
 - a. Location in decision making chain
2. Can you tell me how you heard about the program?
 - a. Community engagement
 - b. Avenues of communication
 - c. Lobbying/advocacy efforts
3. What interested you in supporting/advocating for this program?
 - a. Community engagement (issue brought by the community)
 - b. Avenues of communication
 - c. Lobbying/advocacy efforts
4. What are some of the key components of the program?
 - a. Training
 - b. Education
 - c. Industrial Hygiene methodology
 - d. Site Visits
 - e. Equipment uses
 - f. Evaluation
5. What has worked well? Please elaborate. What would you do differently? Please explain why.

- a. Feedback from community
 - b. What is working (improved worker health? education?)
What would you change/have you changed anything
Feedback from evaluation process
 - c. Suggestions for improvement/recommendation (What recommendations do you have for future efforts such as these?)
6. What effect do you feel the program has on the community in which you represent?
 7. Is there anything more you would like to add?
 8. Demographic info
 - a. Name
 - b. Years with organization
 - c. Title

Business Owner

1. Can you tell me more about your business?
 - a. Business/industry type
 - b. Organizational structure
2. Can you tell me how you heard about the program?
 - a. Recruitment process
 - b. Avenues of communication
 - c. Community engagement
 - d. Health and Safety programming before the program
3. What interested you in participating in this program?
 - a. Workplace safety history
 - b. Benefits hoping to gain
4. What are some of the key components of the program?
 - a. Training
 - b. Education
 - c. Industrial Hygiene methodology
 - d. Site Visits
 - e. Equipment use
 - f. Evaluation
5. What has worked well? Please elaborate. What would you do differently? Please explain why.
 - a. What is working (improved worker health? education?)
 - b. What would you change/have you changed anything?
 - c. Feedback from evaluation process
 - d. Suggestions for improvement/recommendation (What recommendations do you have for future efforts such as these?)
6. What effect do you feel the program has on the community in which you work?
7. Is there anything more you would like to add?
8. Demographic info
 - a. Name

- b. Years with organization
- c. Title

Worker

1. Can you tell me more about your job?
 - a. Job task, requirements
 - b. Organizational structure
2. Can you tell me how you heard about the program?
 - a. Recruitment process
 - b. Avenues of communication
 - c. Community engagement
 - d. Manager-worker communication
3. What was the Health and Safety programming at this business before the program?
 - a. H&S culture
4. What interested you in participating in this program?
 - a. Workplace safety history
 - b. Benefits hoping to gain
5. What are some of the key components of the program?
 - a. Training
 - b. Education
 - c. Industrial Hygiene methodology
 - d. Site Visits
 - e. Equipment uses
 - f. Evaluation
6. What has worked well? Please elaborate. What would you do differently? Please explain why.
 - a. What is working (improved worker health? education?)
 - b. What would you change/have you changed anything?
 - c. Feedback from evaluation process
 - d. Suggestions for improvement/recommendation (What recommendations do you have for future efforts such as these?)
7. What effect do you feel the program has on the community in which you work?
8. Is there anything more you would like to add?
9. Demographic info
 - a. Name
 - b. Years with organization
 - c. Title

APPENDIX C

Supplementary material to *Black Cosmetologists and Personal Protective Equipment Use: Results from a pilot intervention study*

This appendix contains the PPE use focus group prompt, PPE usage self-assessment document, and salon safety quiz which were discussed in Chapter 5. The focus group prompt was used to gather information on knowledge, attitudes and practices related to PPE use in Black cosmetologists. The PPE usage self-assessment document was used to identify how often in the previous 30 days did cosmetologist use a particular PPE item. Finally, the salon safety quiz was used to assess knowledge on salon safety hazards.

These documents follow in the next 4 pages.

Development and Implementation of a Personal Protective Equipment Training Program for Cosmetologists

Focus Group Prompt (PI Copy)

Hello, my name is Teni Adewumi with UCLA Environmental Health Sciences Department. Thank you for taking the time to participate in a focus group on Black cosmetologists in Los Angeles. This focus group is part of the development and implementation of a Personal Protective Equipment training program for cosmetologists

During this focus group I will ask questions and facilitate a conversation about your experiences as cosmetologists with a focus on workplace health and safety. Please keep in mind that there are no “right” or “wrong” answers to any of the questions I will ask. The purpose is to stimulate conversation and hear the opinions of everyone in the room. I hope you will be comfortable speaking honestly and sharing your ideas with us.

Please note that this session will be recorded (or [name] will be taking notes during the focus group) to ensure we adequately capture your ideas during the conversation. However, the comments from the focus group will remain confidential your name will not be attached to any comments you make. Do you have any questions before we begin?

1. Let’s do a quick round of introductions. Can each of you tell the group your first name only and how long you have been a cosmetologist
2. What are the types of services you have or are currently providing in your salon?
3. What are the types of services clients are requesting that you provide?
4. What type of health and safety training did you receive from cosmetology school?
5. What are some obstacles or reasons you think cosmetologists might be hesitant to wear personal protective equipment
6. Now imagine that you are part of a committee of people designing a safety program for salon workers
 - a. What are the factors that you will make sure your committee considers in designing this program?
 - b. What are the things that you are sure would attract cosmetologists to such a program?

Personal Protective Equipment Use (Past month) ID Number _____ Date _____

Instructions: Read each question below and circle the number showing how you would rate the percentage of times this past month you used the corresponding personal protective equipment (PPE). A month is a period of four weeks or 30 days. If you do not know, use your best guess.

Use of Personal Protective Equipment:	Percentage of times PPE was used:										
In the past month, I used apron:	0 (never)	10	20	30	40	50	60	70	80	90	100 (always)
In the past month, I used gloves:	0 (never)	10	20	30	40	50	60	70	80	90	100 (always)
In the past month, I used a respirator:	0 (never)	10	20	30	40	50	60	70	80	90	100 (always)
In the past month, I used face protection:	0 (never)	10	20	30	40	50	60	70	80	90	100 (always)
In the past month, I used eye protection:	0 (never)	10	20	30	40	50	60	70	80	90	100 (always)

Notes:

Salon Safety Quiz

ID Number _____ Date: _____

Instructions: Read each question carefully and choose the best answer to each one.

- 1. Name the four must-have items in your hair salon to ensure the health and safety of hairdressers and clients.**
 - a. Chemical products, first aid kit, hair dryers, PPE
 - b. PPE, fire extinguishers, hair straighteners, SDS
 - c. First-aid kit, power sockets, PPE, fire extinguishers
 - d. SDS, first aid kit, PPE, fire-extinguishers
- 2. What are the forms that a chemical can take?**
 - a. Gases, solids, liquids
 - b. Liquids, mist, vapors, gases
 - c. Solids, liquids, gases, vapors
 - d. Vapors, liquids, mist
- 3. What should you consider when determining how hazardous a chemical is?**
 - a. If you are allergic to the chemical
 - b. Heredity, age, gender, general health
 - c. Toxicity, concentration, length of time, individual sensitivity,
 - d. interaction, route of exposure
 - e. All the above
- 4. What are the three main routes of exposure in a shop or salon?**
 - a. Eating, drinking, smoking
 - b. Breathing, skin and eye contact, swallowing
 - c. Injecting, inhaling, infection
 - d. Spilling, spraying, shaking
- 5. What governmental agency in California sets the Permissible Exposure Limits (PELs) of chemicals?**
 - a. The Board of Barbering and Cosmetology
 - b. U.S. Food and Drug Administration
 - c. U.S. Department of Labor
 - d. California Occupational Safety and Health Administration
- 6. What should you watch for to determine if chemical exposure is occurring?**
 - a. Smell, taste, touch, sight, hear
 - b. Symptoms, residue, smell, irritation
 - c. Odor, taste, particles, surfaces, symptoms
 - d. Dust, formaldehyde, acetone vapor, gas
- 7. What is dermatitis?**
 - a. Dry hands and arms

- b. An inflammation of the skin
 - c. Irritated and watery eyes
 - d. Flaky scalp
- 8. How can you get information about the chemicals in a product?**
- a. Chemical reference books
 - b. Safety Data Sheets
 - c. Asking your employer/Consulting a state agency
 - d. All of the above
- 9. Which of the following are ways to reduce chemical hazards?**
- a. Use vented manicure tables
 - b. Transfer chemical products to smaller bottles to limit exposure
 - c. Mix chemicals in an area away from others
 - d. A and C
 - e. All of the above
- 10. What does "breakthrough time" refer to?**
- a. The length of time it takes a fire to spread from one point to another
 - b. The length of time protective gloves will work well
 - c. The length of time it takes a chemical to breakdown and produce vapor
 - d. The length of time that chemicals take to absorb into your skin
- 11. The exclamation mark icon indicates:**
- a. A chemical is combustible under high temperatures
 - b. A chemical is toxic when swallowed, inhaled, or absorbed through the skin
 - c. A chemical may cause cancer, target organ toxicity, and aspiration toxicity
 - d. A chemical may cause irritation, dizziness, or allergic reaction
 - e. All of the above
- 12. Which of following types of gloves does OSHA recommend for salon workers handling chemicals?**
- a. Latex
 - b. Vinyl
 - c. Nitrile
 - d. Any of the above
- 13. Which of the following types of mask is NOT recommended for salon workers?**
- a. Paper dust mask
 - b. N95 dust mask
 - c. Surgical mask
 - d. Air-purifying respirators

REFERENCES

- [AAU19] Godson R Ana, Abosede S Alli, Daniel C Uhiara, and Derek G Shendell. “Indoor air quality and reported health symptoms among hair dressers in salons in Ibadan, Nigeria.” *Journal of Chemical Health and Safety*, **26**(1):23–30, 2019.
- [AB07] Dennis P Andrulis and Cindy Brach. “Integrating literacy, culture, and language to improve health care quality for diverse populations.” *American journal of health behavior*, **31**(1):S122–S133, 2007.
- [ABR95] Farhang Akbar-Khanzadeh, Michael S Bisesi, and Ruben D Rivas. “Comfort of personal protective equipment.” *Applied ergonomics*, **26**(3):195–198, 1995.
- [Act70] An Act. “Occupational Safety and Health Act of 1970.” *Public Law*, **91**:596, 1970.
- [AD14] Robert Asher and Mary Lee Dunn. “Organized labor and the origins of the Occupational Safety and Health Act.” *NEW SOLUTIONS: A Journal of Environmental and Occupational Health Policy*, **24**(3):279–301, 2014.
- [AF80] Icek Ajzen and Martin Fishbein. “Understanding attitudes and predicting social behaviour.” 1980.
- [AFN16] Wilfred A Abia, Richard Fomboh, Epolle Ntungwe, Eucharia A Abia, Walters A Serika, and Markjovert T Ageh. “Assessment of occupational health hazards awareness and common practices amongst barbers and hairdressers in Cameroon.” *Journal of Public Health in Developing Countries*, **2**(1):94–101, 2016.
- [AGA13] Laila M Akhu-Zaheya, Muntaha K Gharaibeh, and Ziad M Alostaz. “Effectiveness of simulation on knowledge acquisition, knowledge retention, and self-efficacy of nursing students in Jordan.” *Clinical Simulation in Nursing*, **9**(9):e335–e342, 2013.
- [AGM11] Gregory S Anderson, Michael Gaetz, and Jeff Masse. “First aid skill retention of first responders within the workplace.” *Scandinavian journal of trauma, resuscitation and emergency medicine*, **19**(1):11, 2011.
- [Aka17] Folasade O Akande. *National Overview of Cosmetology Training on Occupational Hazards Among Hairdressers*. The University of Oklahoma Health Sciences Center, 2017.
- [ALM10] Stacey Anderson Bosch, Kirsten Leong, Karl Musgrave, Jenny Powers, and David Wong. “Zoonotic disease risk perception and use of personal protective measures among wildlife biologists: An application of the health belief model.” *Human Dimensions of Wildlife*, **15**(3):221–228, 2010.

- [AMP18] Frances Alston, Emily J Millikin, and Willie Piispanen. *Industrial Hygiene: Improving Worker Health Through an Operational Risk Approach*. CRC Press, 2018.
- [AN10] Pablo Arocena and Imanol Núñez. “An empirical analysis of the effectiveness of occupational health and safety management systems in SMEs.” *International Small Business Journal*, **28**(4):398–419, 2010.
- [Ant17] Stian Antonsen. *Safety culture: theory, method and improvement*. CRC Press, 2017.
- [APF18] Teniope A Adewumi-Gunn, Esmeralda Ponce, Nourbese Flint, and Wendie Robbins. “A preliminary community-based occupational health survey of black hair salon workers in South Los Angeles.” *Journal of immigrant and minority health*, **20**(1):164–170, 2018.
- [App17] Eileen Appelbaum. “What’s Behind the Increase in Inequality?” In *conference on the Many Futures of Work: Possibilities and Perils*, 2017.
- [ARL06] Anna Axmon, Lars Rylander, Linnéa Lillienberg, Maria Albin, and Lars Hagmar. “Fertility among female hairdressers.” *Scandinavian journal of work, environment & health*, pp. 51–60, 2006.
- [AS05] Charles Abraham and Paschal Sheeran. “The health belief model.” *Predicting health behaviour*, **2**:28–80, 2005.
- [ASD15] SA Aryiku, A Salam, OE Dadzie, and NG Jablonski. “Clinical and anthropological perspectives on chemical relaxing of afro-textured hair.” *Journal of the European Academy of Dermatology and Venereology*, **29**(9):1689–1695, 2015.
- [ASH12] Emily E Anderson, Stephanie Solomon, Elizabeth Heitman, James M DuBois, Celia B Fisher, Rhonda G Kost, Mary Ellen Lawless, Cornelia Ramsey, Bonnie Jones, Alice Ammerman, et al. “Research ethics education for community-engaged research: A review and research agenda.” *Journal of Empirical Research on Human Research Ethics*, **7**(2):3–19, 2012.
- [BBL] Sherry Baron, Sharon Beard, Amy K Liebman, Migrant Clinicians Network, Laura Punnett, Matthew Groenewold, John Myers, Virginia Ruiz, Farmworker Justice, and Andrea Kidd-Taylor. “The Health of the Low-Income Workforce: Integrating Public Health and Occupational Health Approaches An Issue Paper for Discussion at the Eliminating Health and Safety Disparities at Work Conference, Chicago, Illinois, September 14 and 15, 2011.”.
- [BC18] California Board of Barbering and Cosmetology. “Examination Information.”, 2018.
- [BCL04] TJ Ballard, Laura Corradi, Laura Lauria, Clelia Mazzanti, Giulia Scaravelli, Federica Sgorbissa, Patizia Romito, and Arduino Verdecchia. “Integrating qualitative methods into occupational health research: a study of women flight attendants.” *Occupational and Environmental Medicine*, **61**(2):163–166, 2004.

- [BFA18] Louise A Brinton, Jonine D Figueroa, Daniel Ansong, Kofi M Nyarko, Seth Wiafe, Joel Yarney, Richard Biritwum, Michelle Brotzman, Jake E Thistle, Ernest Adjei, et al. “Skin lighteners and hair relaxers as risk factors for breast cancer: results from the Ghana breast health study.” *Carcinogenesis*, **39**(4):571–579, 2018.
- [Big17] Francis Manyori Bigambo. *Occupational Health Hazard and Illnesses Awareness among Hairdresser and Nail Salon Worker’s: A Case of Kinondoni Municipality Dar Es Salaam, Tanzania*. PhD thesis, The Open University of Tanzania, 2017.
- [BK13] Andy Bunn and Mikko Korpela. “R: A language and environment for statistical computing.” 2013.
- [Bla94] Nick Black. “Why we need qualitative research.” *Journal of epidemiology and community health*, **48**(5):425, 1994.
- [Bla07] A Blake. “Health hazards of African American hair products.” *US EPA Region*, **9**, 2007.
- [BM11] L Kay Bartholomew and Patricia Dolan Mullen. “Five roles for using theory and evidence in the design and testing of behavior change interventions.” *Journal of Public Health Dentistry*, **71**:S20–S33, 2011.
- [BMH01] Michael J Bishop, Piotr Michalowski, John D Hussey, Lewis Massey, and S Lakshminarayan. “Recertification of respiratory therapists’ intubation skills one year after initial training: an analysis of skill retention and retraining.” *Respiratory care*, **46**(3):234–237, 2001.
- [Boo18] Malena Boome. *Cosmetics: Consumers’ Choice; Consumers’ Policy*. PhD thesis, The Evergreen State College, 2018.
- [Boy98] Richard E Boyatzis. *Transforming qualitative information: Thematic analysis and code development*. sage, 1998.
- [Bra01] JoAnn P Braxton. “Vocational education in cosmetology.” *The Clearing House*, **75**(1):4–5, 2001.
- [BVA14] Joan Benach, Alejandra Vives, Marcelo Amable, Christophe Vanroelen, Gemma Tarafa, and Carles Muntaner. “Precarious employment: understanding an emerging social determinant of health.” *Annual review of public health*, **35**:229–253, 2014.
- [BWS14] Diane E Bush, Carl Wilmsen, Timothy Sasaki, Dinorah Barton-Antonio, Andrea L Steege, and Charlotte Chang. “Evaluation of a pilot promotora program for Latino forest workers in southern Oregon.” *American journal of industrial medicine*, **57**(7):788–799, 2014.
- [ca2] “AB 2775: Professional cosmetics: labeling requirements (2017 - 2018).”.

- [CB03] Daniele Champoux and Jean-Pierre Brun. “Occupational health and safety management in small size enterprises: an overview of the situation and avenues for intervention and research.” *Safety science*, **41**(4):301–318, 2003.
- [CBG97] Sylvaine Cordier, Alain Bergeret, Janine Goujard, Marie-Catherine Ha, Ségolène Aymé, Fabrizio Bianchi, Elisa Calzolari, Hermien EK De Walle, Robin Knill-Jones, Silvia Candela, et al. “Congenital malformations and maternal occupational exposure to glycol ethers.” *Epidemiology*, pp. 355–363, 1997.
- [CBM80] K Michael Cummings, Marshall H Becker, and Maria C Maile. “Bringing the models together: an empirical approach to combining variables used to explain health actions.” *Journal of behavioral medicine*, **3**(2):123–145, 1980.
- [CC17a] Walter B Connolly Jr, Donald R Crowell, et al. *A Practical Guide to the Occupational Safety and Health Act*. Law Journal Press, 2017.
- [CC17b] John W Creswell and J David Creswell. *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications, 2017.
- [CCL10] Hsieh-Ching Chen, Cha-Mei Chang, Yung-Ping Liu, and Chih-Yong Chen. “Ergonomic risk factors for the wrists of hairdressers.” *Applied ergonomics*, **41**(1):98–105, 2010.
- [Cha84] Victoria L Champion. “Instrument development for health belief model constructs.” *Advances in Nursing Science*, 1984.
- [Cho14] Rafiq M Choudhry. “Behavior-based safety on construction sites: A case study.” *Accident Analysis & Prevention*, **70**:14–23, 2014.
- [CJH17] A Cooklin, N Joss, E Husser, and B Oldenburg. “Integrated approaches to occupational health and safety: a systematic review.” *American journal of health promotion*, **31**(5):401–412, 2017.
- [CM08] Margaret Cargo and Shawna L Mercer. “The value and challenges of participatory research: strengthening its practice.” *Annu. Rev. Public Health*, **29**:325–350, 2008.
- [CM18] John Havens Cary and Howard I Maibach. “Cosmetologists.” *Kanerva’s Occupational Dermatology*, pp. 1–11, 2018.
- [CMM17] Robert M Califf, Jonathan McCall, and Daniel B Mark. “Cosmetics, regulations, and the public health: understanding the safety of medical and other products.” *JAMA internal medicine*, **177**(8):1080–1082, 2017.
- [CS15] Thomas R Cunningham and Raymond Sinclair. “Application of a model for delivering occupational safety and health to smaller businesses: case studies from the US.” *Safety science*, **71**:213–225, 2015.

- [CSH01] Mario Castro, Kenneth B Schechtman, John Halstead, and Gordon Bloomberg. “Risk factors for asthma morbidity and mortality in a large metropolitan city.” *Journal of Asthma*, **38**(8):625–635, 2001.
- [CSP15] Sheila Cyril, Ben J Smith, Alpha Possamai-Inesedy, and Andre MN Renzaho. “Exploring the role of community engagement in improving the health of disadvantaged populations: a systematic review.” *Global health action*, **8**(1):29842, 2015.
- [DAA15] Kingsley Enyinnah Douglas, Joseph Ofure Agbi, Orevaoghene Akpovienehe, and Aniebiet Joe Etukudo. “Occupational hand dermatitis among hair dressers in a semi-urban community in Rivers State, South-South Nigeria.” *The Nigerian Health Journal*, **13**(3):125, 2015.
- [Dav17] Catherine Davenport. “Skin Deep: African American Women and the Building of Beauty Culture in South Carolina.” 2017.
- [DeJ96] David M DeJoy. “Theoretical models of health behavior and workplace self-protective behavior.” *Journal of Safety Research*, **27**(2):61–72, 1996.
- [DFR11] Xiuwen S Dong, Alissa Fujimoto, Knut Ringen, Erich Stafford, James W Platner, Janie L Gittleman, and Xuanwen Wang. “Injury underreporting among small establishments in the construction industry.” *American journal of industrial medicine*, **54**(5):339–349, 2011.
- [DFT01] Carol J De Vita, Cory Fleming, E Twombly, et al. *Building capacity in nonprofit organizations*. Urban Institute Washington, DC, 2001.
- [DHD12] Rachael Ann De Souza, Steven Hecker, AB De Castro, Hilary Stern, Araceli Hernandez, and Noah Seixas. “Novel Approaches to Development, Delivery and Evaluation of a peer-led occupational safety training for Latino day laborers.” *New solutions: a journal of environmental and occupational health policy*, **22**(3):387–405, 2012.
- [Dia15] Maria Fernanda Reis Gavazzoni Dias. “Hair cosmetics: an overview.” *International journal of trichology*, **7**(1):2, 2015.
- [Dor18] Stefano Dorato. “General Concepts: Current Legislation on Cosmetics in Various Countries.” In *Analysis of Cosmetic Products*, pp. 3–37. Elsevier, 2018.
- [DP97] Centers for Disease Control, Prevention, et al. “Principles of community engagement.” *Atlanta, GA: CDC/ATSDR Committee on Community Engagement*, p. 9, 1997.
- [Ell96] Michael J Ellenbecker. “Engineering controls as an intervention to reduce worker exposure.” *American Journal of Industrial Medicine*, **29**(4):303–307, 1996.
- [FAR10] Hiram E Fitzgerald, Angela Allen, and Peggy Roberts. “Campus-community partnerships: Perspectives on engaged research.” *Handbook of engaged scholarship: Contemporary landscapes, future directions*, **2**:5–28, 2010.

- [FAZ13] Linda Forst, Emily Ahonen, Joseph Zanoni, Alfreda Holloway-Beth, Michele Oschner, Louis Kimmel, Carmen Martino, Eric Rodriguez, Adam Kader, Elisa Ringholm, et al. “More than training: Community-based participatory research to reduce injuries among hispanic construction workers.” *American journal of industrial medicine*, **56**(8):827–837, 2013.
- [FC18] Dianne Feinstein and Susan Collins. “The Personal Care Products Safety Act.” *JAMA internal medicine*, **178**(5):601–602, 2018.
- [Fer16] Marisa Fernbach. “Cosmetology: A Beautiful Career.” *ESSAI*, **14**(1):18, 2016.
- [FK15] Rebecca A Ferrer and William MP Klein. “Risk perceptions and health behavior.” *Current opinion in psychology*, **5**:85–89, 2015.
- [FOC97] Petra N Fonteyn, Diana Olsberg, and Jean A Cross. “Small business owners’ knowledge of their occupational health and safety (OHS) legislative responsibilities.” *International Journal of Occupational Safety and Ergonomics*, **3**(1-2):41–57, 1997.
- [Foo12] Federal Food. “Drug, and Cosmetic Act (FFDCA).” *Chapter V, Sub*, 2012.
- [FY03] Martin Fishbein and Marco C Yzer. “Using theory to design effective health behavior interventions.” *Communication theory*, **13**(2):164–183, 2003.
- [GCY01] Manuela Gago-Dominguez, J Esteban Castelao, Jian-Min Yuan, Mimi C Yu, and Ronald K Ross. “Use of permanent hair dyes and bladder-cancer risk.” *International Journal of Cancer*, **91**(4):575–579, 2001.
- [GG10] Matt Gillen and Janie L Gittleman. “Path forward: emerging issues and challenges.” *Journal of safety research*, **41**(3):301–306, 2010.
- [GGM14] Gianluigi de Gennaro, Lucrezia de Gennaro, Antonio Mazzone, Francesca Porcelli, and Maria Tutino. “Indoor air quality in hair salons: Screening of volatile organic compounds and indicators based on health risk assessment.” *Atmospheric environment*, **83**:119–126, 2014.
- [Gio16] Maria Giovannone. *Vulnerable workers: health, safety and well-being*. CRC Press, 2016.
- [GMG10] Lisa Gallicchio, Susan R Miller, Teresa Greene, Howard Zacur, and Jodi A Flaws. “Health outcomes of children born to cosmetologists compared to children of women in other occupations.” *Reproductive Toxicology*, **29**(3):361–365, 2010.
- [GMG11] Lisa Gallicchio, Susan R Miller, Teresa Greene, Howard Zacur, and Jodi A Flaws. “Somatic symptoms among cosmetologists compared to women in other occupations.” *Journal of Women’s Health*, **20**(4):605–615, 2011.
- [Goe10a] David L Goetsch. *The basics of occupational safety*. Prentice Hall, 2010.
- [Goe10b] David L Goetsch. *Occupational safety and health*. Pearson India, 2010.

- [Gro04] Environmental Working Group et al. “Skin deep: a safety assessment of ingredients in personal care products.”, 2004.
- [Gro18] Elizabeth Grotewohl et al. “Cleaning Products Are Coming Clean.” *The University of the Pacific Law Review*, **49**(2):333–354, 2018.
- [GS94] Linda M Goldenhar and Paul A Schulte. “Intervention research in occupational health and safety.” *J. Occup. Med.*, **36**(7):763–778, 1994.
- [GS03] Andrea Carlson Gielen and David Sleet. “Application of behavior-change theories and methods to injury prevention.” *Epidemiologic reviews*, **25**(1):65–76, 2003.
- [GU12] Clare Gallagher and Elsa Underhill. “Managing work health and safety: recent developments and future directions.” *Asia Pacific Journal of Human Resources*, **50**(2):227–244, 2012.
- [GUR03] Clare Gallagher, Elsa Underhill, and Malcolm Rimmer. “Occupational safety and health management systems in Australia: Barriers to success.” *Policy and Practice in Health and Safety*, **1**(2):67–81, 2003.
- [GZ12] Asghar Ghasemi and Saleh Zahediasl. “Normality tests for statistical analysis: a guide for non-statisticians.” *International journal of endocrinology and metabolism*, **10**(2):486, 2012.
- [Hal15] Jacqueline A Halliday-Bell. *Pregnancy outcomes for women employed as hairdressers, cosmetologists and laboratory workers: systematic review of the literature and data-analysis of Finnish medical birth registry*. PhD thesis, University of Birmingham, 2015.
- [Hal16] Jacqueline Halliday-Bell. “P280 Pregnancy outcomes for women employed as hairdressers, cosmetologists and laboratory workers-systematic review of the literature and data-analysis of finnish medical birth registry.”, 2016.
- [Har05] Adia M Harvey. “Becoming entrepreneurs: Intersections of race, class, and gender at the black beauty salon.” *Gender & society*, **19**(6):789–808, 2005.
- [Har16] Renae Harding et al. “Occupational safety and health considerations in the workplace of the.” *Brief*, **43**(11):20, 2016.
- [HBG10] Peter Hasle, Bo Bager, and Lise Granerud. “Small enterprises—Accountants as occupational health and safety intermediaries.” *Safety science*, **48**(3):404–409, 2010.
- [HBZ17] David A Hofmann, Michael J Burke, and Dov Zohar. “100 years of occupational safety research: From basic protections and work analysis to a multilevel view of workplace safety and risk.” *Journal of Applied Psychology*, **102**(3):375, 2017.

- [HCD07] Yueng-Hsiang Huang, Jiu-Chiuan Chen, Sarah DeArmond, Konstantin Cigularov, and Peter Y Chen. “Roles of safety climate and shift work on perceived injury risk: A multi-level analysis.” *Accident Analysis & Prevention*, **39**(6):1088–1096, 2007.
- [Hea00] Brian Headd. “The characteristics of small-business employees.” *Monthly Lab. Rev.*, **123**:13, 2000.
- [HGB08] Chun-Yip Hon, Bruce Gamage, Elizabeth Ann Bryce, Justin LoChang, Annalee Yassi, Deirdre Maultsaid, and Shicheng Yu. “Personal protective equipment in health care: Can online infection control courses transfer knowledge and improve proper selection and use?” *American journal of infection control*, **36**(10):e33–e37, 2008.
- [HH02] James W Hardin and Joseph M Hilbe. *Generalized estimating equations*. Chapman and Hall/CRC, 2002.
- [HHS16] Jack Hood, Benjamin Hardy Jr, and Lauren Simpson. *Workers’ compensation and employee protection laws in a nutshell*. West Academic, 2016.
- [HHY06] Ulrich Halekoh, Søren Højsgaard, Jun Yan, et al. “The R package geepack for generalized estimating equations.” *Journal of Statistical Software*, **15**(2):1–11, 2006.
- [HL06] Peter Hasle and Hans Jørgen Limborg. “A review of the literature on preventive occupational health and safety activities in small enterprises.” *Industrial health*, **44**(1):6–12, 2006.
- [HLY99] Noni Holmes, Helen Lingard, Zeynep Yesilyurt, and Fred De Munk. “An exploratory study of meanings of risk control for long term and acute effect occupational health and safety risks in small business construction firms.” *Journal of Safety Research*, **30**(4):251–261, 1999.
- [HMG92] Joel A Harrison, Patricia D Mullen, and Lawrence W Green. “A meta-analysis of studies of the health belief model with adults.” *Health education research*, **7**(1):107–116, 1992.
- [HNB18] Jessica S Helm, Marcia Nishioka, Julia Green Brody, Ruthann A Rudel, and Robin E Dodson. “Measurement of endocrine disrupting and asthma-associated chemicals in hair products used by Black women.” *Environmental research*, 2018.
- [HNM10] Effat Hatefnia, Shamsaldin Niknami, Mahmoud Mahmoudi, Fazlollah Ghofranipour, Meinour Lamyian, et al. “The effects of health belief model education on knowledge, attitude and behavior of Tehran pharmaceutical industry employees regarding breast cancer and mammography.” *Behbood Journal*, **14**(1), 2010.
- [Hor18] Liran Horev. “Occupational Dermatitis in Nail Salon Workers.” In *Gender and Dermatology*, pp. 249–254. Springer, 2018.

- [How17] John Howard. “Nonstandard work arrangements and worker health and safety.” *American journal of industrial medicine*, **60**(1):1–10, 2017.
- [HPP17] Robert E Holler, Susan E Peters, Lawrence J Ptasienski, Neal A Rakow, and Cristina U Thomas. “Tracking compliance of personal protection articles.”, January 3 2017. US Patent 9,536,209.
- [HSA08] SM Hazavehei, SH Shadzi, T Asgari, S Pourabdian, and A Hasanzadeh. “The effect of safety education based on Health Belief Model (HBM) on the workers practice of Borujen industrial town in using the personal protection respiratory equipments.” *Iran Occupational Health*, **5**(1):21–30, 2008.
- [HTG97] N Holmes, Thomas J Triggs, Sandra M Gifford, and AW Dawkins. “Occupational injury risk in a blue collar, small business industry: implications for prevention.” *Safety Science*, **25**(1-3):67–78, 1997.
- [HW10] MF Hussin and Bin Wang. “Knowledge retention in basic offshore safety and emergency training.” In *The Lloyds Register Education Trust-Marine & Offshore Research Workshop, National University of Singapore, Singapore*, number 5-6, pp. 364–369, 2010.
- [ICC10] Barbara A Israel, Chris M Coombe, Rebecca R Cheezum, Amy J Schulz, Robert J McGranaghan, Richard Lichtenstein, Angela G Reyes, Jaye Clement, and Akosua Burris. “Community-based participatory research: a capacity-building approach for policy advocacy aimed at eliminating health disparities.” *American journal of public health*, **100**(11):2094–2102, 2010.
- [IEO16] Chukwujindu MA Iwegbue, Omotekoro S Emakunu, Grace Obi, Godwin E Nwajei, and Bice S Martincigh. “Evaluation of human exposure to metals from some commonly used hair care products in Nigeria.” *Toxicology reports*, **3**:796–803, 2016.
- [IOI18] OG Igharo, MA Okungbowa, EL Igharo, and OM Ezegbogu. “Essential Metal Levels in Cosmetologists, Heavy Cosmetic Users and Cosmetic-Naive Individuals in Benin City, South-South, Nigeria.” *Nigerian Journal of Pharmaceutical and Applied Science Research (ISSN 1485-8059)*, **7**(1):29–33, 2018.
- [IOO18] OG Igharo, HB Osadolor, PI Omusi, JO Osunbor, AO Igiebor, and I Ikekhua-men. “Variation in liver enzymes in cosmetologists, heavy cosmetic users and cosmetic naïve individuals in Benin City, Nigeria.” *Annals of Biomedical Sciences*, **17**(2):91–98, 2018.
- [JB84] Nancy K Janz and Marshall H Becker. “The health belief model: A decade later.” *Health education quarterly*, **11**(1):1–47, 1984.
- [JB14] Tabora A Johnson and Teiahsha Bankhead. “Hair it is: Examining the experiences of Black women with natural hair.” *Open Journal of Social Sciences*, **2**(86-100), 2014.

- [JK15] Myung-Won Joo and Sung-Nam Kim. “Aanalysis on the working environment and health· safety awareness of beauty workers.” *Journal of the Korea Academia-Industrial cooperation Society*, **16**(3):1725–1731, 2015.
- [JLT17] Matthew Johnson, David Levine, and Michael Toffel. “Improving regulatory effectiveness through better targeting: Evidence from OSHA.” Technical report, Mimeo. Accessed at [https://drive.google.com/file/d ...](https://drive.google.com/file/d...), 2017.
- [JRN18] Chuanjing Ju, Steve Rowlinson, and Yan Ning. “Contractors’ strategic responses to voluntary OHS programmes: An institutional perspective.” *Safety science*, **105**:22–31, 2018.
- [JSS94] Esther M John, David A Savitz, and Carl M Shy. “Spontaneous abortions among cosmetologists.” *Epidemiology*, pp. 147–155, 1994.
- [KAA13] Pete Kines, Dorte Andersen, Lars Peter Andersen, Kent Nielsen, and Louise Pedersen. “Improving safety in small enterprises through an integrated safety management intervention.” *Journal of safety research*, **44**:87–95, 2013.
- [KBB09] Stella Koutros, Dalsu Baris, Erin Bell, Tongzhang Zheng, Yawei Zhang, Theodore R Holford, Brian P Leaderer, Ola Landgren, and S Hoar Zahm. “Use of hair colouring products and risk of multiple myeloma among US women.” *Occupational and environmental medicine*, **66**(1):68–70, 2009.
- [Kes15] Rebecca Kessler. “More than cosmetic changes: taking stock of personal care product safety.” *Environmental health perspectives*, **123**(5):A120, 2015.
- [KHC15] Laura Veng Kvorning, Peter Hasle, and Ulla Christensen. “Motivational factors influencing small construction and auto repair enterprises to participate in occupational health and safety programmes.” *Safety science*, **71**:253–263, 2015.
- [Kir74] John P Kirscht. “The health belief model and illness behavior.” *Health Education Monographs*, **2**(4):387–408, 1974.
- [KMS16] Dmitry Khodyakov, Lisa Mikesell, Ron Schraiber, Marika Booth, and Elizabeth Bromley. “On using ethical principles of community-engaged research in translational science.” *Translational Research*, **171**:52–62, 2016.
- [Kou09] Dongo Rémi Kouabenan. “Role of beliefs in accident and risk analysis and prevention.” *Safety Science*, **47**(6):767–776, 2009.
- [Kou10] Theoni Koukoulaki. “New trends in work environment–New effects on safety.” *Safety science*, **48**(8):936–942, 2010.
- [Kra15] Taylor L Kraus. “Caring About Personal Care Products: Regulation in the United States, the European Union, and China in the Age of Global Consumption.” *Wis. Int’l LJ*, **33**:167, 2015.
- [KRZ97] Wendy M Kersemaekers, Nel Roeleveld, and Gerhard A Zielhuis. “Reproductive disorders among hairdressers.” *Epidemiology*, pp. 396–401, 1997.

- [KSC17] Marta Kieć-Świerczyńska, Dominika Świerczyńska-Machura, Dorota Chomiczewska-Skóra, Beata Krecisz, and Jolanta Walusiak-Skorupa. “Screening survey of ocular, nasal, respiratory and skin symptoms in manicurists in Poland.” *International journal of occupational medicine and environmental health*, 2017.
- [KWX17] Michael Kwa, Leah J Welty, and Shuai Xu. “Adverse events reported to the US Food and Drug Administration for cosmetics and personal care products.” *JAMA internal medicine*, **177**(8):1202–1204, 2017.
- [L B04] BRUCE L BERG. “Qualitative research methods for the social sciences.” 2004.
- [Lab11] Bureau of Labor Statistics. “Household data annual averages.”, 2011.
- [Lab16] Bureau of Labor Statistics (BLS). “Bureau of Labor Statistics (BLS) Incidence rates of total recordable cases of nonfatal occupational injuries and illnesses by quartile distribution and employment size, 2015.” <https://www.bls.gov/iif/oshwc/osh/os/ostb4748.pdf>, 2016.
- [Lam14] Felicity Lamm. “The challenges of researching OHS of vulnerable workers in small businesses.” *Small Enterprise Research*, **21**(2):161–179, 2014.
- [LCA12] Ms Lloyd Michener, Jennifer Cook, Syed M Ahmed, Michael A Yonas, Tamera Coyne-Beasley, and Sergio Aguilar-Gaxiola. “Aligning the goals of community-engaged research: why and how academic health centers can successfully engage with communities to improve health.” *Academic Medicine*, **87**(3):285, 2012.
- [LCL12] Hyeonkyeong Lee, Duckhee Chae, Kyongeun Lee, and Meenhye Lee. “Application of community-based participatory research principles: Preventing work-related musculoskeletal disorders among female Korean-Chinese migrant workers in Korea.” *Workplace health & safety*, **60**(7):313–320, 2012.
- [Lee94] P Lee. “The economic impact of musculoskeletal disorders.” *Quality of Life Research*, **3**(1):S85–S91, 1994.
- [Leo04] Leonidas C Leonidou. “An analysis of the barriers hindering small business export development.” *Journal of small business management*, **42**(3):279–302, 2004.
- [LGL14] Paul A Landsbergis, Joseph G Grzywacz, and Anthony D LaMontagne. “Work organization, job insecurity, and occupational health disparities.” *American journal of industrial medicine*, **57**(5):495–515, 2014.
- [LH01] Helen Lingard and Noni Holmes. “Understandings of occupational health and safety risk control in small business construction firms: barriers to implementing technological controls.” *Construction Management & Economics*, **19**(2):217–226, 2001.

- [LHR99] Sally L Lusk, Oi Saeng Hong, David L Ronis, Brenda L Eakin, Madeleine J Kerr, and Margaret R Early. “Effectiveness of an intervention to increase construction workers’ use of hearing protection.” *Human factors*, **41**(3):487–494, 1999.
- [Lic14] Jules Lichtenstein. “Demographic characteristics of business owners.” *Small Business Administration Office of Advocacy, Issue Brief,(2)*, 2014.
- [Lie08] Jay Liebowitz. *Knowledge retention: strategies and solutions*. Auerbach Publications, 2008.
- [LL13a] Ricky Langley and David Lipton. “Occupational issues related to respiratory irritants.” In *The Toxicant Induction of Irritant Asthma, Rhinitis, and Related Conditions*, pp. 219–230. Springer, 2013.
- [LL13b] Aleksandra Łopaciuk and Mirosław Łoboda. “Global beauty industry trends in the 21st century.” In *Management, knowledge and learning international conference*, pp. 19–21, 2013.
- [LLH15] Heng Li, Miaoja Lu, Shu-Chien Hsu, Matthew Gray, and Ting Huang. “Proactive behavior-based safety management for construction safety improvement.” *Safety science*, **75**:107–117, 2015.
- [LOL15] SJ Legg, Kirsten Bendix Olsen, IS Laird, and Peter Hasle. “Managing safety in small and medium enterprises.”, 2015.
- [LPC87] Ruth A Lowengart, John M Peters, Carla Cicioni, Jonathan Buckley, Leslie Bernstein, Susan Preston-Martin, and Edward Rappaport. “Childhood leukemia and parents’ occupational and home exposures.” *Journal of the National Cancer Institute*, **79**(1):39–46, 1987.
- [LRB17] Adana AM Llanos, Anna Rabkin, Elisa V Bandera, Gary Zirpoli, Brian D Gonzalez, Cathleen Y Xing, Bo Qin, Yong Lin, Chi-Chen Hong, Kitaw Demissie, et al. “Hair product use and breast cancer risk among African American and white women.” *Carcinogenesis*, **38**(9):883–892, 2017.
- [LTP99] Timo Leino, Kaija Tuomi, Harri Paakkulainen, and Matti Klockars. “Health reasons for leaving the profession as determined among Finnish hairdressers in 1980–1995.” *International archives of occupational and environmental health*, **72**(1):56–59, 1999.
- [LVB09] David A Lombardi, Santosh K Verma, Melanye J Brennan, and Melissa J Perry. “Factors influencing worker use of personal protective eyewear.” *Accident Analysis & Prevention*, **41**(4):755–762, 2009.
- [LW80] Neal S Latman and Kenneth Wooley. “Knowledge and skill retention of emergency care attendants, EMT-As, and EMT-Ps.” *Annals of emergency medicine*, **9**(4):183–189, 1980.

- [MAC91] PA McKinney, FE Alexander, RA Cartwright, and L Parker. “Parental occupations of children with leukaemia in west Cumbria, north Humberside, and Gateshead.” *BMJ*, **302**(6778):681–687, 1991.
- [Mac18] Norah MacKendrick. *Better Safe Than Sorry: How Consumers Navigate Exposure to Everyday Toxics*. Univ of California Press, 2018.
- [Mal07] Stacy Malkan. *Not just a pretty face: The ugly side of the beauty industry*. New Society Publishers, 2007.
- [Mas18] Pip Mason. *Health behavior change: a guide for practitioners*. Elsevier Health Sciences, 2018.
- [Mat18] Inc MathWorks. *MATLAB*. MathWorks, 2018.
- [MB74] Lois A Maiman and Marshall H Becker. “The health belief model: Origins and correlates in psychological theory.” *Health Education Monographs*, **2**(4):336–353, 1974.
- [MB14] Erika A Montanaro and Angela D Bryan. “Comparing theory-based condom interventions: health belief model versus theory of planned behavior.” *Health Psychology*, **33**(10):1251, 2014.
- [MBK13] Lisa Mikesell, Elizabeth Bromley, and Dmitry Khodyakov. “Ethical community-engaged research: a literature review.” *American journal of public health*, **103**(12):e7–e14, 2013.
- [MBM05] Antonio Majocchi, Emanuele Bacchiocchi, and Ulrike Mayrhofer. “Firm size, business experience and export intensity in SMEs: A longitudinal approach to complex relationships.” *International Business Review*, **14**(6):719–738, 2005.
- [McC18] Angela BV McCracken. “The global political economy of beauty.” In *Handbook on the International Political Economy of Gender*. Edward Elgar Publishing, 2018.
- [McN97] SH McNamara. “FDA regulation of cosmeceuticals.” *Cosmetics and toiletries*, **112**(3):41–46, 1997.
- [MD15] Jaap MJ Murre and Joeri Dros. “Replication and analysis of Ebbinghaus’ forgetting curve.” *PloS one*, **10**(7):e0120644, 2015.
- [Meu11] Emily Van der Meulen. “Participatory and action-oriented dissertations: The challenges and importance of community-engaged graduate research.” *The Qualitative Report*, **16**(5):1291–1303, 2011.
- [MGD18] Guido JL Micheli, Maria Grazia Gnoni, Diego De Merich, Guido Sala, Andrea Rosso, Fabiana Tornese, Giusi Piga, and Brunella Malorgio. “Barriers, drivers and impact of a simplified Occupational Safety and Health management system in micro and small enterprises.” In *International Conference on Applied Human Factors and Ergonomics*, pp. 81–90. Springer, 2018.

- [MHH14] Janet McLaughlin, Jenna Hennebry, and Ted Haines. “Paper versus practice: occupational health and safety protections and realities for temporary foreign agricultural workers in Ontario.” *Perspectives interdisciplinaires sur le travail et la santé*, (16-2), 2014.
- [Min14] Mintel. “Hair relaxer sales drop 26
- [MKG09] Aliye Mandiracioglu, Sukran Kose, Ayhan Gozaydin, Melda Turken, and Lutfiye Kuzucu. “Occupational health risks of barbers and coiffeurs in Izmir.” *Indian journal of occupational and environmental medicine*, **13**(2):92, 2009.
- [MKS10] Ellen MacEachen, Agnieszka Kosny, Krista Scott-Dixon, Marcia Facey, Lori Chambers, Curtis Breslin, Natasha Kyle, Emma Irvin, Quenby Mahood, et al. “Workplace health understandings and processes in small businesses: a systematic review of the qualitative literature.” *Journal of Occupational Rehabilitation*, **20**(2):180–198, 2010.
- [MLT10] Meredith Minkler, Pam Tau Lee, Alex Tom, Charlotte Chang, Alvaro Morales, Shaw San Liu, Alicia Salvatore, Robin Baker, Feiyi Chen, Rajiv Bhatia, et al. “Using community-based participatory research to design and initiate a study on immigrant worker health and safety in San Francisco’s Chinatown restaurants.” *American journal of industrial medicine*, **53**(4):361–371, 2010.
- [MM13] Stacey A McKenna and Deborah S Main. “The role and influence of key informants in community-engaged research: A critical perspective.” *Action Research*, **11**(2):113–124, 2013.
- [MOG16] Nora Munguia, Gloria Ozuna, BF Giannetti, and Luis Velazquez. “A more sustainable nail care service.” *Journal of Cleaner Production*, **133**:803–811, 2016.
- [MQB96] Claire Mayhew, Michael Quinlan, and Laura Bennett. *The effects of subcontracting/outsourcing on occupational health and safety*. Number 38. Industrial Relations Research Centre, University of NSW, 1996.
- [MSS14] Ms Kira McCoy, Ms Kaylan Stinson, Mr Kenneth Scott, Ms Liliana Tenney, and Lee S Newman. “Health promotion in small business: a systematic review of factors influencing adoption and effectiveness of worksite wellness programs.” *Journal of occupational and environmental medicine/American College of Occupational and Environmental Medicine*, **56**(6):579, 2014.
- [MTF95] Colleen A Mahoney, Dennis L Thombs, and Olinda J Ford. “Health belief and self-efficacy models: Their utility in explaining college student condom use.” *AIDS education and prevention*, 1995.
- [MTF18] Jasmine A McDonald, Parisa Tehranifar, Julie D Flom, Mary Beth Terry, and Tamarra James-Todd. “Hair product use, age at menarche and mammographic breast density in multiethnic urban women.” *Environmental Health*, **17**(1):1, 2018.

- [MVW11] Susan Michie, Maartje M Van Stralen, and Robert West. “The behaviour change wheel: a new method for characterising and designing behaviour change interventions.” *Implementation science*, **6**(1):42, 2011.
- [MW03] Meredith Minkler and Nina Wallerstein. “Part one: introduction to community-based participatory research.” *Community-based participatory research for health*. San Francisco, CA: Jossey-Bass, pp. 5–24, 2003.
- [Nak11] Akinori Nakata. “Effects of long work hours and poor sleep characteristics on workplace injury among full-time male employees of small-and medium-scale businesses.” *Journal of Sleep Research*, **20**(4):576–584, 2011.
- [Nea98] Ian Neath. *Human memory: An introduction to research, data, and theory*. Thomson Brooks/Cole Publishing Co, 1998.
- [Nir15] Sarah Maslin Nir. “The price of nice nails.” *New York Times*, **7**, 2015.
- [NKG15] Mohammad Nassaji, Shahin Kamal, Raheb Ghorbani, Mahnaz Moalem, Batool Karimi, Hossein Habibian, Abbas Daraei, Gholamreza Irajian, Masoud Bidokhti, Rahmane Fotohi, et al. “The Effects of Interventional Health Education on the Conditions of Hairdressing Salons and Hairdressers Behaviors.” *Middle East Journal of Rehabilitation and Health*, **2**(1), 2015.
- [NKP11] John C Norcross, Paul M Krebs, and James O Prochaska. “Stages of change.” *Journal of clinical psychology*, **67**(2):143–154, 2011.
- [NKP15] Kent Jacob Nielsen, Pete Kines, Louise Møller Pedersen, LP Andersen, and Dorte Raaby Andersen. “A multi-case study of the implementation of an integrated approach to safety in small enterprises.” *Safety Science*, **71**:142–150, 2015.
- [NSM15] Lee S Newman, Kaylan E Stinson, Dianne Metcalf, Hai Fang, et al. “Implementation of a worksite wellness program targeting small businesses: The Pinnacle Assurance health risk management study.” *Journal of occupational and environmental medicine*, **57**(1):14, 2015.
- [NV15] Anna Ni and Montgomery Van Wart. “Corporate Social Responsibility: Doing Well and Doing Good.” In *Building Business-Government Relations*, pp. 175–196. Routledge, 2015.
- [OBK17] Michael O’leary, Daniel Joseph Braun, and Choll Wan Kim. “Personal protective equipment and methods.”, April 6 2017. US Patent App. 15/285,191.
- [OFW14] Tom O’Connor, Michael Flynn, Deborah Weinstock, and Joseph Zaroni. “Occupational safety and health education and training for underserved populations.” *New Solutions: A Journal of Environmental and Occupational Health Policy*, **24**(1):83–106, 2014.

- [OGS16] Andrea H Okun, Rebecca J Guerin, and Paul A Schulte. “Foundational workplace safety and health competencies for the emerging workforce.” *Journal of safety research*, **59**:43–51, 2016.
- [Ola16] Olayinka A Olasode. “Chemical hair relaxation and adverse outcomes among Negroid women in South West Nigeria.” *Journal of Pakistan Association of Dermatology*, **19**(4):203–207, 2016.
- [OLS01] Andrea Okun, Thomas J Lentz, Paul Schulte, and Leslie Stayner. “Identifying high-risk small business industries for occupational safety and health interventions.” *American journal of industrial medicine*, **39**(3):301–311, 2001.
- [OM15] S Onsongo and Willy Muturi. “Factors influencing the growth of hair salon enterprises in Kenya: A survey of hair salon enterprises in Kisii Town.” *IOSR Journal of Business and Management*, **17**(3):1–15, 2015.
- [Opi14] Antonia Opiah. “The changing business of black hair, a potentially \$500 b industry.” *Huffington Post*, 2014.
- [OSN11] Joy Onasch, Paul Shoemaker, Hoa Mai Nguyen, and Cora Roelofs. “Helping small businesses implement toxics use reduction techniques: dry cleaners, auto shops, and floor finishers assisted in creating safer and healthier work places.” *Journal of Cleaner Production*, **19**(5):408–413, 2011.
- [pal]
- [PGP10] Gerasimos Papadopoulos, Paraskevi Georgiadou, Christos Papazoglou, and Katerina Michaliou. “Occupational and public health and safety in a changing work environment: An integrated approach for risk assessment and prevention.” *Safety Science*, **48**(8):943–949, 2010.
- [Pos01] Jane E Poss. “Developing a new model for cross-cultural research: synthesizing the health belief model and the theory of reasoned action.” *Advances in Nursing Science*, **23**(4):1–15, 2001.
- [PP12] Gabriele Prati and Luca Pietrantonio. “Predictors of safety behaviour among emergency responders on the highways.” *Journal of Risk research*, **15**(4):405–415, 2012.
- [PPL13] Victoria M Pak, Martha Powers, and Jianghong Liu. “Occupational chemical exposures among cosmetologists: risk of reproductive disorders.” *Workplace health & safety*, **61**(12):522–528, 2013.
- [PS14] Nam D Pham and Anil Sarda. “The Value of Cosmetology Licensing to the Health, Safety, and Economy of America.”, 2014.
- [PSO19] A Popalyar, J Stafford, T Ogunremi, and K Dunn. “Infection prevention in personal service settings.” *CCDR*, **45**:1, 2019.

- [QAA01] Sara A Quandt, Thomas A Arcury, Colin K Austin, and Luis F Cabrera. “Latino immigrants: Preventing occupational exposure to pesticides: Using participatory research with latino farmworkers to develop an intervention.” *Journal of Immigrant Health*, **3**(2):85–96, 2001.
- [Qui15] Michael Quinlan et al. *The effects of non-standard forms of employment on worker health and safety*. ILO Geneva, Switzerland, 2015.
- [QVT18] Thu Quach, J Von Behren, J Tsoh, P Reynolds, L Fu, T Nguyen, M Le, and TT Nguyen. “Improving the knowledge and behavior of workplace chemical exposures in Vietnamese–American nail salon workers: a randomized controlled trial.” *International archives of occupational and environmental health*, **91**(8):1041–1050, 2018.
- [QVV13] Thu Quach, Julia Varshavsky, Julie Von Behren, Erika Garcia, My Tong, Tuan Nguyen, Alisha Tran, Robert Gunier, and Peggy Reynolds. “Reducing chemical exposures in nail salons through owner and worker trainings: an exploratory intervention study.” *American journal of industrial medicine*, **56**(7):806–817, 2013.
- [RB15] Barbara K Rimer and Noel T Brewer. “Introduction to health behavior theories that focus on individuals.” *Health Behavior: Theory, Research and Practice 5th ed.* San Francisco, CA: Jossey-Bass, pp. 67–74, 2015.
- [Ree19] Jaleesa Reed. “Cosmetic Counter Connotations: black Millennial women and beauty.” *The Meanings of Dress*, p. 165, 2019.
- [Ric11] Angela Elizabeth Richard. “Development and implementation of a “counter-top” training program to increase retention of food safety knowledge, alter behavior, improve attitude, and increase skills of Spanish-speaking retail employees.” 2011.
- [RLN10] Lainie Friedman Ross, Allan Loup, Robert M Nelson, Jeffrey R Botkin, Rhonda Kost, George R Smith Jr, and Sarah Gehlert. “Nine key functions for a human subjects protection program for community-engaged research: Points to consider.” *Journal of Empirical Research on Human Research Ethics*, **5**(1):33–47, 2010.
- [Rob17] Nandi Robinson. “The Fight Against Breast Cancer: A Policy and Programmatic Approach.” 2017.
- [ROP13] Kristin A Riekert, Judith K Ockene, and Lori Pbert. *The handbook of health behavior change*. Springer Publishing Company, 2013.
- [Ros74a] Irwin M Rosenstock. “The health belief model and preventive health behavior.” *Health education monographs*, **2**(4):354–386, 1974.
- [Ros74b] Irwin M Rosenstock. “Historical origins of the health belief model.” *Health education monographs*, **2**(4):328–335, 1974.

- [Ros74c] Irwin M Rosenstock. “Historical origins of the health belief model.” *Health education monographs*, **2**(4):328–335, 1974.
- [RR05] Rajiv N Rimal and Kevin Real. “How behaviors are influenced by perceived norms: A test of the theory of normative social behavior.” *Communication research*, **32**(3):389–414, 2005.
- [RR11] Herbert J Rubin and Irene S Rubin. *Qualitative interviewing: The art of hearing data*. Sage, 2011.
- [RRR16] P Ravi, D Sudarshan Reddy, B Ramu, and B Rajkamal. “COMPARATIVE STUDY ON COSMETICS LEGISLATION IN INDIA US AND EU.” 2016.
- [RRV15] Denise Moreno Ramírez, Mónica D Ramírez-Andreotta, Lourdes Veá, Rocío Estrella-Sánchez, Ann Marie A Wolf, Aminata Kilungo, Anna H Spitz, and Eric A Betterton. “Pollution prevention through peer education: a community health worker and small and home-based business initiative on the Arizona-Sonora Border.” *International journal of environmental research and public health*, **12**(9):11209–11226, 2015.
- [RSB88] Irwin M Rosenstock, Victor J Strecher, and Marshall H Becker. “Social learning theory and the health belief model.” *Health education quarterly*, **15**(2):175–183, 1988.
- [RSB94] Irwin M Rosenstock, Victor J Strecher, and Marshall H Becker. “The health belief model and HIV risk behavior change.” In *Preventing AIDS*, pp. 5–24. Springer, 1994.
- [RSS10] Cora Roelofs, Paul Shoemaker, Tiffany Skogstrom, Persio Acevedo, Jumaane Kendrick, and Nancie Nguyen. “The Boston Safe Shops Model: an integrated approach to community environmental and occupational health.” *American journal of public health*, **100**(S1):S52–S55, 2010.
- [SA96] Paschal Sheeran and Charles Abraham. “The health belief model.” *Predicting health behaviour*, **2**:29–80, 1996.
- [SAC16] Laura Stiel, Paris B Adkins-Jackson, Phyllis Clark, Eudora Mitchell, and Susanne Montgomery. “A review of hair product use on breast cancer risk in African American women.” *Cancer medicine*, **5**(3):597–604, 2016.
- [Sal14] Professional Beauty Salon. “Economic Snapshot of the Salon and Spa Industry.”, 2014.
- [SAS97] Rita S Schlomer, Mary Ann Anderson, and Rebecca Shaw. “Teaching strategies and knowledge retention.” *Journal of nursing staff development: JNSD*, **13**(5):249–253, 1997.

- [Sch10] Dean Schillinger. “An introduction to effectiveness, dissemination and implementation research.” *From the Series: UCSF Clinical and Translational Science Institute (CTSI) Resource Manuals and Guides to Community-Engaged Research*, P. Fleisher, ed. *Clinical Translational Science Institute Community Engagement Program, University of California San Francisco*, **2**, 2010.
- [Sch12] Karen Schwartz. “Community engaged research: Student and community perspectives.” *Partnerships: A Journal of Service-Learning and Civic Engagement*, 2012.
- [SCK07] Jessica N Sapienza, Giselle Corbie-Smith, Sarah Keim, and Alan R Fleischman. “Community engagement in epidemiological research.” *Ambulatory Pediatrics*, **7**(3):247–252, 2007.
- [SCY19] Jin Young Seo, Ying-Yu Chao, Ka Man Yeung, and Shiela M Strauss. “Factors Influencing Health Service Utilization Among Asian Immigrant Nail Salon Workers in the Greater New York City Area.” *Journal of community health*, **44**(1):1–11, 2019.
- [SDA17] Mohammad Sharif Sharifzadeh, Christos A Damalas, and Gholamhossein Abdollahzadeh. “Perceived usefulness of personal protective equipment in pesticide use predicts farmers’ willingness to use it.” *Science of The Total Environment*, **609**:517–523, 2017.
- [Seo05] Dong-Chul Seo. “An explicative model of unsafe work behavior.” *Safety science*, **43**(3):187–211, 2005.
- [SF96] Ralf Schwarzer, Reinhard Fuchs, et al. “Self-efficacy and health behaviours.” *Predicting health behavior: Research and practice with social cognition models*, **163**:196, 1996.
- [SF08] Peter B Smith and Ronald Fischer. “Acquiescence, extreme response bias and culture: A multilevel analysis.” *Multilevel analysis of individuals and cultures*, pp. 285–314, 2008.
- [SGS17] Vasiliki Spanoudi, Emmanouel Garoufallou, Rania Siatiri, Georgia Zafeiriou, Stavroula Antonopoulou, and Christine Theodorika. “Use of Web 2.0 tools by Aestheticians and Cosmetologists and the use of mobile academic Library services.” In *5 th International Conference on Contemporary Marketing Issues ICCMI June 21-23, 2017 Thessaloniki, Greece*, p. 365, 2017.
- [SHB07] Ole Henning Sørensen, Peter Hasle, and Elsa Bach. “Working in small enterprises—is there a special risk?” *Safety Science*, **45**(10):1044–1059, 2007.
- [SHH92] James F Sallis, Melbourne F Hovell, and C Richard Hofstetter. “Predictors of adoption and maintenance of vigorous physical activity in men and women.” *Preventive medicine*, **21**(2):237–251, 1992.

- [SJ04] Margie Sutherland and Wilhelm Jordaan. “Factors affecting the retention of knowledge workers.” *SA Journal of Human Resource Management*, **2**(2):55–64, 2004.
- [SMB86] Victor J Strecher, Brenda McEvoy DeVellis, Marshall H Becker, and Irwin M Rosenstock. “The role of self-efficacy in achieving health behavior change.” *Health education quarterly*, **13**(1):73–92, 1986.
- [SMK13] Derek G Shendell, Ashley E Miller Mapou, and Sarah W Kelly. “Younger cosmetology workers and environmental and occupational asthma triggers at training sites and in salons.” *Journal of Asthma & Allergy Educators*, **4**(2):67–70, 2013.
- [SOF15] James F Sallis, Neville Owen, and E Fisher. “Ecological models of health behavior.” *Health behavior: Theory, research, and practice*, **5**:43–64, 2015.
- [SSG10] Molly Secor-Turner, Renee Sieving, Ann Garwick, Richard Spratt, and Naomi Duke. “Culturally sensitive community engaged research with African American young women: Lessons learned.” *Journal of community health nursing*, **27**(3):160–172, 2010.
- [STA13] US BUREAU OF LABOR STATISTICS. “Women in the labor force: A databook.” [http://: www. bls. gov/opub/reports/cps/women-in-the-labour-force-a-databook-2014. pdf](http://www.bls.gov/opub/reports/cps/women-in-the-labour-force-a-databook-2014.pdf), 2013.
- [STC15] Celette Sugg Skinner, Jasmin Tiro, and Victoria L Champion. “The health belief model.” *Health behavior: theory, research, and practice. 5th ed. San Francisco (US): Jossey-Bass*, pp. 75–94, 2015.
- [STD18] Natalie V Schwatka, Liliana Tenney, Miranda J Dally, Joshua Scott, Carol E Brown, David Weitzenkamp, Erin Shore, and Lee S Newman. “Small Business Total Worker Health: a Conceptual and Methodological Approach to Facilitating Organizational Change.” *Occupational Health Science*, **2**(1):25–41, 2018.
- [SU05] Stephen A Small and Lynet Uttal. “Action-oriented research: Strategies for engaged scholarship.” *Journal of Marriage and Family*, **67**(4):936–948, 2005.
- [SVB16] Tea Samardžić, Veda Marija Varnai, Marija Bakotić, Željka Babić, Richard Brans, Selma Cvijetić Avdagić, Darinka Štampar Šmaguc, Iva Kovačević, and Jelena Macan. “Skin health and safety at work in Croatian hairdressing apprentices.” *Contact dermatitis*, **75**(1):25–31, 2016.
- [TB18] Alec Tremblay and Adel Badri. “Assessment of occupational health and safety performance evaluation tools: State of the art and challenges for small and medium-sized enterprises.” *Safety science*, **101**:260–267, 2018.
- [TBD15] Steven J Taylor, Robert Bogdan, and Marjorie DeVault. *Introduction to qualitative research methods: A guidebook and resource*. John Wiley & Sons, 2015.

- [TGS05] Lara B Trifletti, Andrea C Gielen, David A Sleet, and Krista Hopkins. “Behavioral and social sciences theories and models: are they used in unintentional injury prevention research?” *Health Education Research*, **20**(3):298–307, 2005.
- [Tho16] Dorothy Thompson. *Development of functional apparel for cosmetologists in Lagos, Nigeria*. PhD thesis, 2016.
- [TMM17] Dede K Teteh, Susanne B Montgomery, Sabine Monice, Laura Stiel, Phyllis Y Clark, and Eudora Mitchell. “My crown and glory: Community, identity, culture, and Black women’s concerns of hair product-related breast cancer risk.” *Cogent Arts & Humanities*, **4**(1):1345297, 2017.
- [Too16] Mitra Toossi. “A look at the future of the US labor force to 2060.” *US Bureau of Labor Statistics*, 2016.
- [TS17] Molly Tran and Rosemary K Sokas. “The gig economy and contingent work: An occupational health assessment.” *Journal of occupational and environmental medicine*, **59**(4):e63, 2017.
- [TTH18] Kyla W Taylor, Melissa A Troester, Amy H Herring, Lawrence S Engel, Hazel B Nichols, Dale P Sandler, and Donna D Baird. “Associations between Personal Care Product Use Patterns and Breast Cancer Risk among White and Black Women in the Sister Study.” *Environmental Health Perspectives (Online)*, **126**(2), 2018.
- [UQ11] Elsa Underhill and Michael Quinlan. “How precarious employment affects health and safety at work: the case of temporary agency workers.” *Relations Industrielles/Industrial Relations*, **66**(3):397–421, 2011.
- [US] GENIE UNLEASHED and IN SALONS. ““Cruelty-free cosmetics are good for business, safe for humans, and don’t harm animals,” she said. The California Cruelty Free Cosmetics Act will bring the US state in line with over 30 countries and regions around the world which have already banned or restricted animal testing on cosmetics.”.
- [VAS11] Sylvia J Vermeulen, Johannes R Anema, Antonius JM Schellart, Dirk L Knol, Willem van Mechelen, and Allard J van der Beek. “A participatory return-to-work intervention for temporary agency workers and unemployed workers sick-listed due to musculoskeletal disorders: results of a randomized controlled trial.” *Journal of occupational rehabilitation*, **21**(3):313–324, 2011.
- [Ven07] Andrew H Van de Ven et al. *Engaged scholarship: A guide for organizational and social research*. Oxford University Press on Demand, 2007.
- [Ver] Dedoose Version. “4.5, web application for managing, analyzing, and presenting qualitative and mixed method research data (2013).” *Los Angeles, CA: Socio-Cultural Research Consultants, LLC (www.dedoose.com)*.

- [VTB13] Mojtaba Vaismoradi, Hannele Turunen, and Terese Bondas. “Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study.” *Nursing & health sciences*, **15**(3):398–405, 2013.
- [Was06a] Cynthia Washam. “Legislation: California Enacts Safe Cosmetics Act.” *Environmental Health Perspectives*, **114**(7):A402, 2006.
- [Was06b] Cynthia Washam. “Safe Cosmetics Act aims to lessen cancer risk.” *Journal of the National Cancer Institute*, **98**(20):1441–1442, 2006.
- [Wat14] Valerie J Watnick. “The missing link: US regulation of consumer cosmetic products to protect human health and the environment.” *Pace Environ. L. Rev.*, **31**:594, 2014.
- [WB13] Arthur Wingfield and Dennis L Byrnes. *The psychology of human memory*. Academic Press, 2013.
- [WD10] Nina Wallerstein and Bonnie Duran. “Community-based participatory research contributions to intervention research: the intersection of science and practice to improve health equity.” *American journal of public health*, **100**(S1):S40–S46, 2010.
- [WF98] ANH Weel and RJ Fortuin. “Design and trial of a new questionnaire for occupational health surveys in companies.” *Occupational medicine*, **48**(8):511–518, 1998.
- [Wil97] Tom D Wilson. “Information behaviour: an interdisciplinary perspective.” *Information processing & management*, **33**(4):551–572, 1997.
- [Wil18] April Williams. “My Hair Is Professional Too: A Case Study and Overview of Laws Pertaining to Workplace Grooming Standards and Hairstyles Akin to African Culture.” *S. Region Black Students Ass’n LJ*, **12**:141, 2018.
- [Win08] Adia Harvey Wingfield. *Doing business with beauty: Black women, hair salons, and the racial enclave economy*. Rowman & Littlefield, 2008.
- [WJX18] Jessica R Walter, Saya L Jacob, and Shuai Xu. “Better reporting needed for cosmetics and women’s health.” *American Journal of Obstetrics & Gynecology*, **218**(2):265–266, 2018.
- [WKL15] Hannah White, Khalid Khan, Christine Lau, Holden Leung, Dede Montgomery, and Diane S Rohlman. “Identifying health and safety concerns in Southeast Asian immigrant nail salon workers.” *Archives of environmental & occupational health*, **70**(4):196–203, 2015.
- [WOM10] Quintin Williams Jr, Michele Ochsner, Elizabeth Marshall, Louis Kimmel, and Carmen Martino. “The impact of a peer-led participatory health and safety training program for Latino day laborers in construction.” *Journal of safety research*, **41**(3):253–261, 2010.

- [WPR12] Lauren A Wise, Julie R Palmer, David Reich, Yvette C Cozier, and Lynn Rosenberg. “Hair relaxer use and risk of uterine leiomyomata in African-American women.” *American journal of epidemiology*, **175**(5):432–440, 2012.
- [WRW18] LA Wise, KJ Rothman, AK Wesselink, and EE Hatch. “Hair relaxer use and fecundability: a prospective cohort study.” *Fertility and Sterility*, **110**(4):e54, 2018.
- [WS06] Thomas L Webb and Paschal Sheeran. “Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence.” *Psychological bulletin*, **132**(2):249, 2006.
- [WT14] Martha A Walker, Scott Tate, et al. “Community Engagement.” 2014.
- [WWM12] Erin M Warshaw, Michael Z Wang, CG Toby Mathias, Howard I Maibach, Donald V Belsito, Kathryn A Zug, James S Taylor, Matthew J Zirwas, Anthony F Fransway, Vincent A DeLeo, et al. “Occupational contact dermatitis in hairdressers/cosmetologists: retrospective analysis of North American Contact Dermatitis Group data, 1994 to 2010.” *Dermatitis*, **23**(6):258–268, 2012.
- [XZZ17] Wenjing Xu, Weiqiang Zhang, Xuezheng Zhang, Taowei Dong, Huiqian Zeng, and Qiyun Fan. “Association between formaldehyde exposure and miscarriage in Chinese women.” *Medicine*, **96**(26), 2017.
- [YHM10] William Young, Kumju Hwang, Seonaidh McDonald, and Caroline J Oates. “Sustainable consumption: green consumer behaviour when purchasing products.” *Sustainable development*, **18**(1):20–31, 2010.
- [YKS18] Basak Yanar, Agnieszka Kosny, and Peter Smith. “Occupational health and safety vulnerability of recent immigrants and refugees.” *International journal of environmental research and public health*, **15**(9):2004, 2018.
- [ZGC19] Ami R Zota, Ruth J Geller, Antonia M Calafat, Cherie Q Marfori, Andrea A Baccarelli, and Gaby N Moawad. “Phthalates exposure and uterine fibroid burden among women undergoing surgical treatment for fibroids: a preliminary study.” *Fertility and sterility*, **111**(1):112–121, 2019.
- [ZI12] Sulastre Mat Zin and Faridah Ismail. “Employers’ behavioural safety compliance factors toward occupational, safety and health improvement in the construction industry.” *Procedia-Social and Behavioral Sciences*, **36**:742–751, 2012.
- [ZML18] Jingjing Zhang, Qiang Mei, Suxia Liu, and Qiwei Wang. “Study on the Influence of Government Intervention on the Occupational Health and Safety (OHS) Services of Small-and Medium-Sized Enterprises (SMEs).” *BioMed research international*, **2018**, 2018.
- [Zoh80] Dov Zohar. “Promoting the use of personal protective equipment by behavior modification techniques.” *Journal of Safety Research*, 1980.