

Increasing Temperatures and the Occupational Health of Hispanic/Latino Agricultural Workers: A Review

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Background: Hispanic/Latino workers are overrepresented in the United States agricultural sector. This group of workers has been recognized as a particularly vulnerable population because of commonly reported demographic and cultural characteristics. While this group of workers has been extensively studied over past decades, there are limitations in what is understood about the group's vulnerability to climate change, which has become an increasingly serious threat to outdoor workers across the globe. The overall purpose of this review was to assess the extent to which the effects of intense heat and extreme heat events have been presently examined among populations of Hispanic/Latino farmworkers in the United States.

Methods: A literature search was conducted in PubMed using the search terms (((heat) AND Hispanic) OR Latino) AND farmworkers) AND health over the years from 2000 to 2020. Strict inclusion and exclusion criteria were used to screen and select full-text articles to accomplish the present review's proposed objective.

Results: A total of seven full-text articles were included in the final review. Articles focused primarily on heat-related illnesses and related symptoms.

Conclusion: While heat-related illnesses have been studied in populations of Hispanic/Latino farmworkers in the United States, there are gaps in existing literature and research surrounding the effects of climate change on this population. Future studies should expand on what is currently understood about increasing temperatures and health outcomes to provide a more comprehensive overview of the effects of increasing temperatures on Hispanic/Latino agricultural workers health.

Keywords. Agricultural workers, Climate change and occupational health, Heat-related illness, Hispanic/Latino agricultural workers, Hispanic/Latino farmworkers

Increasing Temperatures and the Occupational Health of Hispanic/Latino Agricultural Workers: A Review

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Introduction

Hispanic/Latino workers are overrepresented in the United States agricultural sector.^{1,2} This group of workers has been recognized as a particularly vulnerable population because of commonly reported demographic and cultural characteristics.^{1,2} While this group of workers has been extensively studied over past decades, there are limitations in what is understood about the group's vulnerability to climate change, which has become an increasingly serious threat to outdoor workers across the globe.³

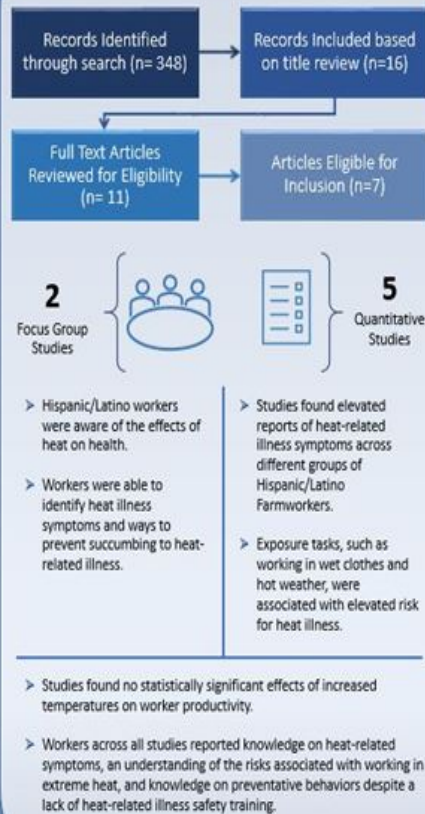
Objective

To assess the extent to which the effects of intense heat and extreme heat events have been presently examined among populations of Hispanic/Latino farmworkers in the United States.

Methods

- > Preliminary searches were conducted in order to develop an adequate search strategy aimed at capturing the widest breadth of relevant literature.
- > Preliminary literature searches utilizing google scholar, Environment Complete, and PubMed were conducted using the search terms (((heat) AND Hispanic) OR Latino) AND farmworkers) AND health.
- > PubMed returned the greatest number of relevant results, and as such was deemed the most effective database for literature extraction.
- > Studies eligible for inclusion were limited to those:
 - (1) Whose population of interest consisted of Hispanic/Latino farmworkers operating in the United States.
 - (2) Established a link between extreme or intense heat and the health outcome of interest under study.
- > All health outcomes previously associated with extreme heat events, including heat-related illnesses, cardiovascular diseases and related conditions, as well as respiratory conditions were considered.

Results



Discussion

As outdoor workers, Hispanic/Latino farmworkers are among the highest exposed to environmental effects resulting from climate change, principally increasing temperatures and more frequent heat events. Populations of Hispanic/Latino farmworkers are at increased risk for the onset of heat-related-illnesses and symptoms compared to the general population. Studies have limitedly explored the ways in which climate change poses direct threats to the health and safety of Hispanic/Latino agricultural workers. Existing research has focused on risk factors and the immediate consequences of repeated exposure to extreme heat. Studies have followed workers for short periods of time or collected cross-sectional data which has provided meaningful insight into the prevalence and incidence of heat-related symptoms. Findings across studies suggest that modifiable work behaviors, like shaded rest and water breaks, younger age, and receiving compensation based on piece-rate were associated with self-reported heat-related illness symptoms in the population under study.

Directions for Future Research

- > Future research should work to identify health outcomes and conditions associated with increases in temperature beyond heat-related illness and symptoms, as literature has suggested various health hazards associated with these exposures.
- > Studies should work to better establish and explain the ways in which climate change threatens the occupational safety of agricultural workers through a growing number of threats, like increasing instances of drought and extreme weather events in addition to increased temperatures.
- > Future studies should work to better define the ways in which worker characteristics potentially exacerbate risk for adverse health outcomes associated with climate change.

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Methodologies Used to Estimate Traffic Related Air Pollution and Associations with Maternal and Birth Outcomes: A Literature Review

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Background: Studies have shown associated risks between elevated air pollution levels and adverse health outcomes during pregnancy. Traffic-related air pollution (TRAP) is a combination of pollutants from exhaust, tire wear, and volatile organic compounds (VOCs) that may affect human health. In pregnant women, TRAP has been associated with preterm birth, hypertension, gestational diabetes, and low birth weight. While many studies have found associations between TRAP and maternal and birth health outcomes, studies differ in how they measure exposure to pollution. This literature review includes documents and common methodologies used to estimate TRAP and associations with maternal and birth health outcomes.

Methods: We conducted a literature review using PubMed search terms from the Health Effects Institute Traffic Review Protocol. Key search terms included maternal health, traffic, air pollution, and study design. We excluded studies that did not measure relevant health outcomes, and ones that broadly examined ambient air pollution.

Results: All 7 studies found used a form of TRAP modeling. Monitors were used to estimate specific exposures to pollutants such as NO₂ and black carbon. Models combined monitoring data from the closest stationary monitor to the residential addresses and roadways of participants to estimate pollutant exposures. Some studies used traffic densities as a proxy for TRAP.

Conclusion: There is no gold standard method for measuring TRAP. Often, data from stationary monitors, traffic records, and meteorology monitors are used to create air quality models which can be paired with maternal and birth data to estimate associations with TRAP.



Methodologies Used to Estimate Traffic Related Air Pollution and Associations with Maternal and Birth Outcomes

A Literature Review



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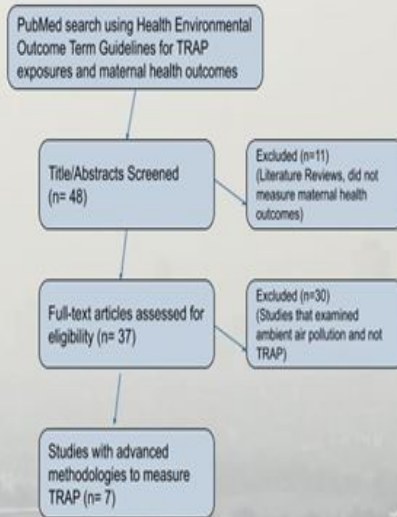
Background

- > Traffic related air pollution (TRAP) is a combination of pollutants from car exhaust, tire wear, and volatile organic compounds
- > TRAP has been associated with maternal health outcomes such as gestational diabetes mellitus, hypertension, preterm birth, and low birth weight

Methods

- > Our literature review used PubMed search terms from the Health Effects Institute Traffic Review Protocol. Key search terms included maternal health, traffic, and air pollution
- > Literature reviews, studies that did assess TRAP exposures, and studies that did not measure maternal and birth outcomes were excluded

Identification
Screening
Eligibility
Included



Results

- > All 7 studies used a form of TRAP modeling
- > Monitors were used to estimate specific exposures to pollutants such as NO2 and black carbon
- > Models combined monitoring data from monitors closest to the residential addresses and roadways of participants to estimate pollutant exposures
- > Some studies used traffic densities as a proxy for TRAP

Conclusion

- > There is no gold standard method for measuring TRAP
- > Data from stationary monitors, traffic records, and meteorology monitors are used to create air quality models which can be paired with maternal and birth data to estimate associations with TRAP

Traffic Related Air Pollution. (2014). Retrieved from <http://www.purifier.wang/index.php/new/index/g/e/id2.html>
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GAMBIA Case Study: Trachoma Intervention and Lessons for COVID-19 in the United States

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Purpose: This study will explore the environmental aspects of trachoma transmission and prevention. Trachoma is a deadly bacterial disease that affects the eyes and spreads rapidly in communities that lack healthcare and access to basic sanitation. The lessons learned may be applied to the current COVID pandemic due to the behavioral characteristics of people and community spread of the virus. The research will draw from many examples and studies conducted around the world that has or had trachoma. The field portion of the research was performed in the Gambia with the author in The Gambia from December 2019 to February 2020.

Methods: Field observations through an ethnographic approach in conjunction with a literature review was conducted in The Gambia. The author stayed with a host family in Kanuma, Gambia of the Fula ethnic group for almost three months. It was a family of ten with two little boys approximately three and five years of age. The author dressed, slept, washed and ate identically to the host family. During this period, the author wrote down observations of habits of behavior, hygiene and health every night on a notepad.

Results: The author observed approximately five incidents of public defecation by the two young boys with the feces left uncovered. The author also observed approximately a dozen water outages which lasted into the next day during the three months. The family compensated by storing water in old buckets from the well beforehand suggesting regular occurrence of water outages. On numerous occasions, the water ran out before the water from the well was turned back on. The author also observed washing of clothes once a week with family members wearing the same clothes for consecutive days. There were two latrines; one was a hole in the ground and the other was a toilet commonly used in the U.S. The latrine with the hole in the ground did not have a cover and there were gaps in the construction that allowed flies to enter. No toilet paper was used, and a kettle to hold water was used to clean after defecation using one hand.


Traditionally this was the left hand as locals ate with the right hand per Islamic tradition. During meals, the members of the family ate out of one communal dish. They washed their hands for approximately three seconds with soap which was mixed into the water held in the dishpan. Every member of the family washed their hands in the same dish pan before and after they ate and ate with their hands. From the literature, it is shown The Gambia and other countries used environmental/behavioral intervention strategies to sustain the reduction of trachoma. Toilet construction, vector control and increased access and use of clean water helped slow down transmission of trachoma.

Conclusion: The United States can take these lessons and implement them to slow down transmission while scientists make a vaccine for COVID-19. The literature and observations suggest that access to clean water, hand washing and corrective environmental construction reduces the burden of trachoma. Parts of this strategy coincidentally can help prevent COVID-19 which is a disease that spreads similarly to trachoma. Close contact and poor hygiene practices increase the transmission in both cases. Hand washing and stay at home practices has consistently been proven to help reduce community spread of disease. Masks serves as a barrier of protection for COVID-19 just like a properly constructed latrine helps protect against trachoma.

Gambia Case Study: Trachoma intervention and lessons for covid-19 in the United States

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PURPOSE

To find past methods of intervention strategies to prevent covid-19 in the United States

World Health Organization SAFE Strategy- Surgery, Antibiotics, Facial cleansings, and Environmental improvement

METHODS

- Literature review with ethnographic study approach
- In Kanuma North bank, Gambia from December 2019 to February 2020
- Observed host family and community health behaviors
- Wrote down behaviors observed.
- Sample size studied was host family interaction with guests, N=15



RESULTS

- Sustained proper hygiene and improved environmental barrier practices helped stop spread of disease
- Medicine like antibiotics did not stop spread as a sole treatment method.
- Medicine in conjunction with increased hygiene and environmental improvement produced the best results

DISCUSSION

- Hand washing, access to clean water with soap and physical barriers like latrines helped reduce burden of trachoma.
- The United States needs to enforce strict handwashing.
- Hygiene practices learned need to be sustained for the near and long term future even with a vaccine.
- Barriers to disease spread like social distancing is important but not as important as hand washing due to social customs

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Leveraging Personal Exposure Data with Ambient Air Monitoring Data to Estimate Traffic-Related Air Pollution in the DC Metro Area

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Background: The health effects of Traffic-Related Air Pollution (TRAP) are not fully understood, but recent evidence suggests TRAP may be more detrimental than other sources of air pollution. Estimating exposure to TRAP is difficult because TRAP is highly spatially heterogeneous and personal TRAP exposures can vary from ambient TRAP measurements.

Methods: A personal exposure study measured 16 fine particulate matter chemical components for 48 women commuters in the DC metro area across two days in 2018-2019. For comparison, ambient concentrations of these 16 pollutants were obtained from two U.S. EPA monitors in Washington, DC. To estimate TRAP, two common source apportionment models were applied: Positive Matrix Factorization (PMF) and Absolute Principal Component Analysis (APCA). Using the profile and contribution plots from these models, TRAP compositions were visually compared between PMF and APCA as well as between the personal and ambient data.

Results: In the personal exposure study, we identified tailpipe emissions dominated by black carbon, and non-tailpipe emissions dominated by sodium, calcium, and chloride using both PMF and APCA. In the ambient data, we also identified tailpipe emissions, which were dominated by elemental and organic carbon. The sources in the personal exposure study and the ambient data were highly similar between PMF and APCA.

Conclusion: The source profiles for tailpipe emissions were similar between the personal exposure study and ambient data, indicating that both types of data could inform studies of TRAP. Ambient monitors do not capture individual variation in personal TRAP exposures, but our results will guide methods integrating complex ambient and personal data. Understanding exposure to TRAP will inform policymakers and the public on how to mitigate the environmental and human health impacts of TRAP.



Leveraging Personal Exposure Data with Ambient Air Monitoring Data to Estimate Traffic-Related Air Pollution in the DC Metro Area

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ABSTRACT

Over 200,000 deaths occur each year in the US due to air pollution. Traffic-related air pollution (TRAP) may be more detrimental to health than other sources of air pollution. Particulate matter 2.5 (PM_{2.5}) is a type of pollution that contributes to TRAP. To estimate exposure to TRAP, source apportionment methods, Positive Matrix Factorization (PMF) and Absolute Principal Component Analysis (APCA), were applied to data on 16 PM_{2.5} chemical components. Two PM_{2.5} datasets were used: one from a study investigating the personal exposure to TRAP by 48 commuters in the DC metro area and one from US EPA Air Quality System (AQS) monitors located in DC that measure ambient air pollution. To develop methods to better estimate personal exposure to TRAP, we compared results between PMF and APCA and compared results between personal exposure data and ambient air data.

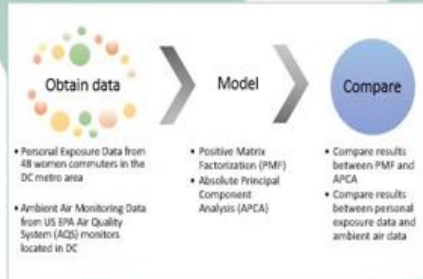


Figure 1. TRAP consists of exhaust emissions and non-exhaust emissions (left). Size of PM particles is directly linked to their potential for causing health effects (right).

OBJECTIVE

The objective of this project was to perform source apportionment on personal exposure data and ambient air monitoring data and to compare the results. The source apportionment models, PMF and APCA, were also compared.

METHODOLOGY



RESULTS

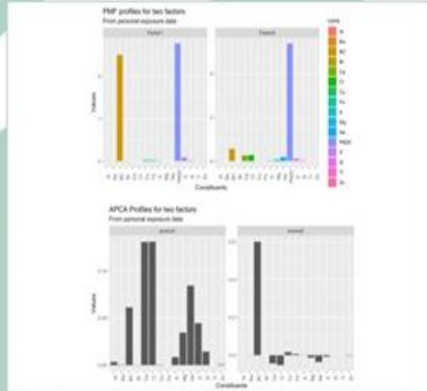


Figure 2. Two source factors were identified in the commuter personal exposure data: tailpipe emissions (left in the top and right in the bottom) and non-tailpipe emissions (right in the top and left in the bottom). This assessment was based on the presence and proportion of PM_{2.5} components.



Figure 3. The contributions by the participants is shown above. Notice the three potential outliers in one of the source factors (Factor2 in the top and source1 in the bottom). An analysis excluding these outliers was also performed.

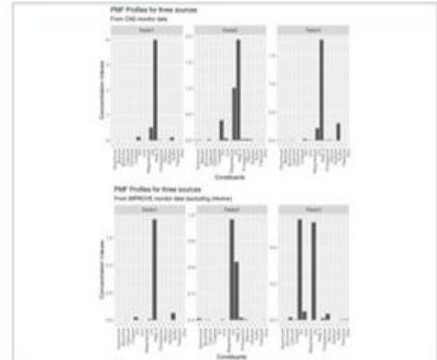


Figure 4. The PMF profiles for the DC ambient air data. We identified tailpipe emissions (left above, center below), secondary pollution (center above, right below), and industrial pollution (right above, left below) as source factors. Contributions to these source factors by date were also determined from PMF and APCA.

DISCUSSION/CONCLUSIONS

Based on the source apportionment results, PMF and APCA determine similar PM_{2.5} profile and contribution solutions. These models can be used in the future to verify developing methods that leverage personal exposure data with ambient air monitoring data. Although the profiles of the PM_{2.5} source factors and the contributions to these source factors were determined for the DC monitor data, further analysis needs to be done regarding the comparison between this dataset and the commuter exposure dataset. Ambient monitors do not capture individual variation in personal TRAP exposures, but our results will guide methods integrating complex ambient and personal data such as Bayesian source apportionment models. Understanding TRAP and continuing to investigate its environmental and health impacts will inform policymakers on how to improve public health as well as the general public on how to make daily choices to reduce their exposure to TRAP.

ACKNOWLEDGEMENTS

Special thanks to Dr. Krall and Dr. Pollack for their leadership and guidance throughout this project and to my team members, Zuzanna and Shreshth, for their support and collaboration. This work was supported by a multidisciplinary seed grant from George Mason University and The Thomas F. and Kate Miller Jeffress Memorial Trust, Bank of America, Trustee.

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Perception of Bikeability and Walkability in Low Health Opportunity Index (HOI) Communities in Chesapeake, Virginia

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Background: According to the Robert Wood Johnson Foundation, the City of Chesapeake ranks 99th out of 123 cities for its physical environment. The physical environment of a city impacts citizens' ability to engage in active lifestyles. The walkability and bike-ability of a place are the degrees to which environmental features affect walking and biking. Even though walkability and bike-ability are not the only factors considered in the designation of a healthy neighborhood, they are significant components. Active lifestyle habits contribute to the reduction of adverse health outcomes, such as obesity, cardiovascular disease, and diabetes. According to the Greater Hampton Roads Dashboard, 35.6% of adults and 29% of children living in Chesapeake, Virginia, are obese. This project aims to assess sidewalks, bike routes, exercise opportunities, and the perceptions of community members on how these opportunities or the lack thereof affect their active lifestyle.

Methods: During Summer 2019, Healthy Chesapeake Inc. implemented a series of surveys in four low Health Opportunity Index communities in Chesapeake in collaboration with the Center for Global Health at Old Dominion University. In total, 197 people responded to the surveys using paper and pencil.

Results: Based on the data trends, at least 77.60% of the respondents indicated that bike lanes and sidewalks are very important for their communities. Results showed they would be more inclined to walk or bike in a walkable neighborhood if these opportunities are available to them.

Conclusion: The results indicated the need for more sidewalk and bike lanes in all the communities. This study is very significant and can serve as a roadmap for other community coalitions and city leaders looking for strategies to address population health challenges.