The Role of Environmental Health Literacy When Developing Traffic Pollution Fact Sheets for Puerto Rican Adults

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ABSTRACT

Environmental health literacy is particularly relevant to racial/ethnic and linguistic minority populations who are likely to live near major roadways and highways. We conducted exploratory research to develop ways to communicate the risks of traffic-related air pollution to Puerto Rican adults living in and near Boston, Massachusetts. We held two initial focus groups with Spanish-speaking Puerto Rican adults ($N=16$) enrolled in the Boston Puerto Rican Health Study (BPRHS). Most had only a high school education or less and earned a low income. We used thematic analysis of transcripts to suggest ways to improve three fact sheets designed to communicate BPRHS findings to the community. Based on these results, we made substantial revisions. We then conducted a second set of two focus groups with the same participants to assess revisions. Participants viewed the revised fact sheets more favorably and indicated that they found them easier to read. Lessons learned about improving readability and relevance included increasing text size, adding more graphics, chunking text, and providing more technical details. Designing successful environmental health communication tools that retain scientific accuracy is not a simple task. There is need for systematic attempts to evaluate and report on health literacy and community engagement processes for developing materials that are easy to read, culturally relevant, and that communicate complex environmental health information and concepts in ways people can understand and act on.

Keywords: environmental health literacy, Puerto Rican, traffic-related air pollution, ultrafine particles, fact sheets, focus group

INTRODUCTION

AIR POLLUTION POSES a threat to public health in areas close to dense traffic where there are high levels of pollutants, including ultrafine particles

(UFPs).¹ The implications of elevated levels of UFPs in air near highways and major roadways are not well known or understood by the public. To convey this risk,

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¹Stephen S. Lim, *et al.* "A Comparative Risk Assessment of Burden of Disease and Injury Attributable to 67 Risk Factors and Risk Factor Clusters in 21 Regions, 1990–2010: A Systematic Analysis for the Global Burden of Disease Study 2010." *Lancet (London, England)* 380 (2012): 2224–2260; Neal Fann, *et al.* "Estimating the National Public Health Burden Associated with Exposure to Ambient PM_{2.5} and Ozone." *Risk Analysis: An Official Publication of the Society for Risk Analysis* 32 (2012): 81–95; Alex A. Karner, Douglas S. Eisinger, and Deb A. Niemeier. "Near-Roadway Air Quality: Synthesizing the Findings from Real-World Data." *Environmental Science & Technology* 44 (2010): 5334–5344; R. Ghosh, *et al.* "Near-Roadway Air Pollution and Coronary Heart Disease: Burden of Disease and Potential Impact of a Greenhouse Gas Reduction Strategy in Southern California." *Environmental Health Perspectives* 2015. DOI:10.1289/ehp.1408865

environmental researchers must communicate in ways that are clear, relevant, and actionable.² Environmental health literacy is an approach that holds promise to more effectively communicate complex environmental health issues and promote an understanding of the link between environmental exposure and human health.³ Ideally, communication leads to engagement of communities in critical dialogues and problem solving.⁴

We found little research on environmental health literacy for Puerto Ricans, who are distinct from other U.S. Hispanic populations.⁵ National data show Hispanics in the United States among those with lowest health literacy skills.⁶ Prior research has explored how to best communicate health information in Latino populations in a general way.⁷ These studies suggest language-concordant educational interventions that are culturally relevant and in plain language and can improve knowledge, understanding, and action.⁸ However, methods for tailoring information to language, culture, and literacy levels are not developed for traffic-related air pollution.

Puerto Ricans are a distinct population that has higher prevalence of cardiovascular and respiratory disease than, for example, Mexican immigrants.⁹ While His-

panics are disproportionately represented among those with below basic English literacy skills, Puerto Ricans display higher literacy rates.¹⁰

The Community Assessment of Freeway Exposure and Health (CAFEH) has documented elevated levels of UFPs near highways and major roadways in Boston communities with significant Puerto Rican populations.¹¹ CAFEH and other studies suggest that UFPs are linked to risk of cardiovascular illness.¹² Because there is no federal regulation of UFPs, it is especially important to communicate this risk to residents so that they can promote mitigation strategies at the personal and community levels.¹³

To our knowledge, there are no published reports about how to communicate the risks of traffic-related air pollution to Puerto Ricans living in urban areas,¹⁴ which is the focus of this study. One very recent article suggested that Hispanics living in Houston perceived higher air pollution health risk than white residents, but did not develop communication tools.¹⁵ In this study, we take into consideration the complexity of the information, language preference, and sociocultural background. This work is a collaboration between CAFEH¹⁶ and the Boston Puerto Rican Health Study (BPRHS),¹⁷ a longitudinal cohort with follow-up at 2 and 5 years that focuses on cardiovascular health risk factors.

²Cynthia Baur. "New Directions in Research on Public Health and Health Literacy." *Journal of Health Communication* 15 Suppl 2 (2010): 42–50; Tee L. Guidotti. "Communication Models in Environmental Health." *Journal of Health Communication* 18 (2013): 1166–1179.

³Simma Finn and Liam O'Fallon. "The Emergence of Environmental Health Literacy—From Its Roots to Its Future Potential-ehp.1409337.acco.pdf." *Environmental Health Perspectives*, 125 (2017): 495–501.

⁴Emee Vida Estacio. "Health Literacy and Community Empowerment: It Is More than Just Reading, Writing and Counting." *Journal of Health Psychology* 18 (2013): 1056–1068; Meredith Minkler, et al. "Sí Se Puede: Using Participatory Research to Promote Environmental Justice in a Latino Community in San Diego, California." *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 87 (2010): 796–812; Don Nutbeam. "Health Literacy as a Public Health Goal: A Challenge for Contemporary Health Education and Communication Strategies into the 21st Century." *Health Promotion International* 15 (2000): 259–267.

⁵Irma N. Ramos, Qiang He, and Kenneth S. Ramos. "Improvements in Environmental Health Literacy along the Texas-Mexico Border Following Community-wide Health Education." *Environmental Justice* 5 (2012): 32–37.

⁶U.S. Department of Education. "National Assessment of Adult Literacy (NAAL)." *Institute of Education Science, National Center for Education Statistics* 2003, <https://nces.ed.gov/naal/health_results.asp> Accessed November 22, 2017.

⁷John P. Elder, et al. "Health Communication in the Latino Community: Issues and Approaches." *Annual Review of Public Health* 30 (2009): 227–251.

⁸Dennis P. Andrulis and Cindy Brach. "Integrating Literacy, Culture, and Language to Improve Health Care Quality for Diverse Populations." *American Journal of Health Behavior* 31 Suppl 1 (2007): S122–S133; Julia Puebla Fortier and Dawn Bishop. "Setting the Agenda for Research on Cultural Competence in Health Care" (OMH and AHRQ, 2004), <http://www.imiaweb.org/uploads/docs/Setting_the_Agenda_for_Cultural_Competence_in_Health_Care_AHRQ.pdf> Accessed November 22, 2017.

⁹Katherine L. Tucker, et al. "The Boston Puerto Rican Health Study, a Longitudinal Cohort Study on Health Disparities in Puerto Rican Adults: Challenges and Opportunities." *BMC Public Health* 10 (2010): 107.

¹⁰S White, J Baer, and J Sabatini. "Basic Reading Skills and the Literacy of America's Least Literate Adults: Results from the 2003 National Assessment of Adult Literacy (NAAL) Supplemental Studies" (U.S. Department of Education, 2009), <<https://nces.ed.gov/pubs2009/2009481.pdf>> Accessed November 22, 2017.

¹¹Allison P. Patton, et al. "Transferability and Generalizability of Regression Models of Ultrafine Particles in Urban Neighborhoods in the Boston Area." *Environmental Science & Technology* 49 (2015): 6051–6060; MC Simon, et al. "An Hourly Spatial and Temporal PNC Model for Residential Locations in Boston, Massachusetts (USA)." (ISEE 2015 27th Conference of the International Society for Environmental Epidemiology, Sao Paulo, Brazil, 2015).

¹²Kevin J. Lane, et al. "Association of Modeled Long-Term Personal Exposure to Ultrafine Particles with Inflammatory and Coagulation Biomarkers." *Environment International* 92–93 (2016): 173–182; Bart Ostro, et al. "Associations of Mortality with Long-Term Exposures to Fine and Ultrafine Particles, Species and Sources: Results from the California Teachers Study Cohort." *Environmental Health Perspectives* 123 (2015): 549–556.

¹³Doug Brugge, et al. "Developing Community-Level Policy and Practice to Reduce Traffic-Related Air Pollution Exposure." *Environmental Justice (Print)* 8 (2015): 95–104.

¹⁴Jennifer D. Parker, et al. "Linkage of the 1999–2008 National Health and Nutrition Examination Surveys to Traffic Indicators from the National Highway Planning Network." *National Health Statistics Reports* (2012): 1–16.

¹⁵Jayajit Chakraborty, et al. "Racial Differences in Perceptions of Air Pollution Health Risk: Does Environmental Exposure Matter?" *International Journal of Environmental Research and Public Health* 14 (2017): 116.

¹⁶Christina H. Fuller, et al. "A Community Participatory Study of Cardiovascular Health and Exposure to near-Highway Air Pollution: Study Design and Methods." *Reviews on Environmental Health* 28 (2013): 21–35.

¹⁷Katherine L. Tucker, et al. "The Boston Puerto Rican Health Study, a Longitudinal Cohort Study on Health Disparities in Puerto Rican Adults."

METHODS

Fact sheet development

We developed three fact sheets to communicate health risks associated with air pollution from traffic. The first fact sheet summarized previous research conducted by the CAFEH study on the health effects of long-term exposure to UFPs from motor vehicle traffic.¹⁸ The second fact sheet described the CAFEH project and its collaboration with the BPRHS. The third fact sheet was designed to communicate how researchers were evaluating the relationship of traffic-related UFP levels with risk of developing cardiovascular disease (see Supplementary Data for fact sheets).

Each fact sheet presented foundational knowledge deemed critical to understanding environmental exposure and the health risks associated with traffic-related air pollution. Critical knowledge was what UFPs are, how they might affect health, and the basic nature of our research. These fact sheets were originally written in English and then translated into Spanish. We assessed the reading grade level in English using the Flesch-Kincaid readability assessment tool in Microsoft Word. Flesch-Kincaid grade level scores ranged from 10.8 to 12.9. The Flesch-Kincaid readability formula is not validated for use with Spanish text, so we did not assess readability of the Spanish fact sheet before using them in focus groups. Later in the project, we added an assessment using the Fry readability graph, which is validated for use in both English and Spanish.¹⁹ This yielded results within two grade levels of the original assessment. There was virtually no change in reading grade level after revisions.

Focus group recruitment

The study protocol was approved by the Tufts IRB and all participants gave signed and informed consent. We recruited a convenience sample from the BPRHS cohort. We obtained a list of potential recruits from the cohort who had previously demonstrated a willingness to participate in research requests. We contacted prospective participants by phone and offered \$50 in cash and a light meal as compensation for their time and participation.

Focus group methodology

The focus groups were held at a community center in a Boston neighborhood that had a substantial Puerto Rican population. Each focus group lasted approximately one

and a half hours and took place in the early evening to accommodate those who worked during the day. The first two focus groups ($N=16$) were held in the summer of 2014. The second set of focus groups ($N=13$) were held in the spring of 2015 and included the same participants, minus three who were lost to follow-up.

We conducted the sessions in Spanish, but due to the bilingual nature of many participants, some conversation (10%–20%) took place in English. A member of the research team who was fluent in both Spanish and English facilitated all focus groups. A transcriber who was also a bilingual member of the research team audio recorded sessions and took notes.

Each fact sheet was discussed separately and participants were asked the same set of questions regarding each one (Table 1). The facilitator used these questions to guide the conversation, but left room for natural discussion. Participants were instructed to read each fact sheet individually at their own pace. The facilitator guide for the second set of focus groups was edited to reflect that revisions had been made to the fact sheets (Table 1).

Bilingual members of the researcher team transcribed focus group audio recordings verbatim in Spanish and, as needed, in English. After reviewing the transcripts, we estimated that about 5% was inaudible or indecipherable. Once a final transcription had been produced, the Spanish portion was translated into English by one bilingual member of the research team. Another bilingual team member verified the accuracy of the translations.

Revision of the fact sheets

A revised set of fact sheets was developed based on feedback from focus group discussions with BPRHS participants. Themes elicited from the first set of focus groups were used to guide the revision process. Bilingual members of the researcher team who attended the focus groups transcribed and translated the audio recordings, conducted the content analysis, consulted with each other, and agreed upon revisions for the fact sheets.

Revisions included changes to both the text and layout. We increased the size of the text, added more pictures and graphics, increased the amount of white space to each page, organized the information into chunks with subheaders, added more content, and used more local vocabulary and plain language. (Supplementary Data—revised fact sheets+translation).

Data analysis

We used an inductive approach to identify themes and then highlighted and categorized participant comments. A grounded theory framework allowed themes to emerge from the data. Two members of the research team reviewed each set of focus group transcripts separately, coding participant comments by theme. They then discussed discrepancies in their coding and agreed upon a final list of six themes (Table 2). Transcripts were hand coded using a different color marker for each theme.

¹⁸Kevin J. Lane, *et al.* “Effect of Time-Activity Adjustment on Exposure Assessment for Traffic-Related Ultrafine Particles.” *Journal of Exposure Science & Environmental Epidemiology* 25 (2015): 506–516; Allison P. Patton, *et al.* “Transferability and Generalizability of Regression Models of Ultrafine Particles in Urban Neighborhoods in the Boston Area.” *Environmental Science & Technology* 49 (2015): 6051–6060.

¹⁹B Gilliam, SC Pena, and L. Mountain. “The Fry Graph Applied to Spanish Readability.” *The Reading Teacher* 33, (1980): 426–30; Alan N. Crawford. “A Spanish Language Fry-Type Readability Procedure: Elementary Level. *Bilingual Education Paper Series* 7 (1984). <<https://eric.ed.gov/?id=ED273119>> Accessed November 22, 2017.

TABLE 1. MODERATOR GUIDES FOR DISCUSSIONS OF FACT SHEETS 1, 2, AND 3

	<i>Questions from first round of focus groups</i>	<i>Revised questions from second round of focus groups</i>
First Fact Sheet	What did you like about this Fact Sheet? What did you not like about this Fact Sheet? Were there any technical terms that you found difficult to understand? This Fact Sheet briefly discusses the Puerto Rican Health Study. Was this well communicated? If not, how can this be clearer?	What did you like about this Fact Sheet? What did you not like about this Fact Sheet? This fact sheet contains a brief description of something called UFPs. Could you please tell us, in your own words, what these are?
Second Fact Sheet	What did you like about this Fact Sheet? What did you not like about this Fact Sheet? This Fact Sheet goes into a bit more detail regarding our research on Puerto Rican adults and how air pollution from traffic affects their risk of developing heart disease. Looking at how the information is presented, would you present it differently?	What did you like about this Fact Sheet? What did you not like about this Fact Sheet? This fact sheet briefly discusses the Puerto Rican Health Study. Was this well communicated? If not, how can it be clearer?
Third Fact Sheet	What did you like about this Fact Sheet? What did you not like about this Fact Sheet? Let us discuss—in your own words, could you briefly describe how you understand some of the health risks of living close to highways? In your own words, could you tell us how air pollution affects those who are already ill with diabetes or obesity?	What did you like about this Fact Sheet? What did you not like about this Fact Sheet? Let us discuss—in your own words, could you briefly describe how you understand some of the health risks of living close to highways?

The prompts in the left-hand column acted as a catalyst for discussion among the participants in the first round of focus groups. The prompts in the right-hand column were revised versions of these questions and were used to guide discussion at the second round of focus groups.

UFPs, ultrafine particles.

RESULTS

Focus groups: first round

Table 2 shows the demographics of focus group participants. They were older adults, predominantly female, and earned a low income with only a high school education or less. A frequent theme (Table 3) from the first round of focus groups was that the content of the fact

sheets was complicated and overwhelming. However, participants also said they wanted more information, particularly information about what the Puerto Rican community could do to lessen the dangers of exposure to UFPs. Other common themes were the severity of the problem and participants asking why the fact sheets focused only on Puerto Ricans.

Some participants expressed being overwhelmed by the information in the fact sheets. One participant stated, “I was really lost ... I think it was just too much for me.” Another said, “I don’t want to say that I didn’t understand anything, but for me to read it I would need more time.” Other comments reflected understanding and satisfaction with how the information was explained. One participant said, “Speaking of the graphic, I like what they did and what is here is explained very, very well.”

There were frequent comments expressing confusion and difficulty understanding the fact sheets. One participant said, “What do you mean to say with 2.5?” referring to fine particulate matter or PM_{2.5}. Another participant said, “I didn’t like [the fact sheet] because in a sense I read it, but I did not understand it well.” Yet another participant said she understood the fact sheet, adding, “The text needs to be more simple and the words could be more clear.”

TABLE 2. DEMOGRAPHICS

<i>Variables</i>	<i>Mean (SD)/%</i>	<i>N</i>
Age	60 (7)	15
Female	81	13
Income	17,000 (10,000)	15
BMI	31 (6)	15
Education level—high school or less	63	14
Below poverty level	50	15
Place of birth		14
Puerto Rico	93	
Massachusetts	7	
Language		
Mostly/only Spanish	71	14
Mostly/only English	14	
About the same	14	

TABLE 3. CODED THEMES

Coding categories reflecting major themes

Comments reflecting a desire for specific suggestions regarding ways to mitigate the effects of air pollution.

Comments regarding the severity and potential danger of air pollution in their neighborhoods.

Comments expressing confusion regarding the meaning of the text and content of the fact sheets.

Comments of a complementary or positive nature regarding clarity, length, or photos in the fact sheets.

Other comments expressed a desire for more information. One participant said, “I think...of course, I know that this is a study...but, a little more in-depth information, you understand?” When asked about the information in the fact sheets on illnesses that may be caused or exacerbated by exposure to UFPs, one participant said, “We want something more complete,” and “I do not think this is complete. I think that it needs more information.” A participant, after reading about UFPs, asked, “Are these particles visible, or do you need a microscope to see them?”

Another theme was the severity and potential dangers of air pollution within participants’ neighborhoods. One participant said, “I knew that carbon dioxide was affecting me, in fact, when I lived on a major avenue.” Others said, “More traffic is bad for us,” and “I don’t like the traffic because of this [content described in the fact sheets]. Because the smoke is harmful to you.”

Another topic was why the study focused on Puerto Ricans. For example, one participant remarked, “This is good but, I don’t understand this—here where it says Puerto Ricans have worse health and less access to health care. But why? I don’t understand this part.” Other comments revolved around the perspective of how they as people of a lower socioeconomic status were not able to escape these conditions. For example, one participant said, “It is that poor people live—not only Hispanics, but poor people. This is what affects us because we cannot buy a house where there is not traffic. Do you understand me? Like in the suburbs.”

Many comments in the first round of focus groups reflected a desire for more information on ways to mitigate the effects of air pollution. One participant said, “I like the way chemicals like these are explained, especially if they live in areas close to where there is a lot of traffic, like a highway. One breathes in all this smoke from cars and everything, and because of that people get sick from asthma and all the things that you know about. I am asking because it [the fact sheet] has details about this...what more are you going to do around here?” One participant said, “What is most important is the section that says, ‘What do we not know?’—that they have to research more things.” Another participant, after a discussion of the risks of living near highway pollution, said, “how do we avoid this thing?” A participant responded to her, “It [the fact sheet] can have more.”

Focus groups: second round

Fact sheets were revised based on themes identified in the first round of focus groups, specifically participants wanted the fact sheets to have both more relevant information and be easier to read (see Supplementary Data for revised fact sheets). Once the fact sheets were revised and reviewed by the research team, a second round of focus groups was used to assess their reception by members of the BPRHS cohort.

The revised fact sheets elicited comments that were more positive. When asked how these fact sheets compared with those that had been presented in the first round of focus groups, one participant said, “These are more clear...They have more information and more explanation.”

The increase in images, maps, and other visual aids in the fact sheets seemed to make a big difference in the participants’ understanding. One said, “It is much easier to read with more illustrations. There are more photos, which helps.” When asked why they liked the photos better in the second round, one participant responded, “because they tell us how it is, where it is. They give you a clear image of what the sheet is saying.” Another participant said, “The graphic in this photo calls my attention because I recognize the name of the street. The photos are very good.”

There remained, however, some confusion over the size of UFPs based on the visual comparison to a strand of hair in the revised fact sheet. Some participants mistakenly thought that this meant that UFPs could lodge in one’s hair.

Another change was the increase in comments related to understanding the severity and potential danger of air pollution. One participant commented that after reading the revised sheet, “we can understand these things more clearly: what can harm us, why we may have heart problems, where these problems come from. It has to do with the air, with cars, with gasoline which is very strong and not good for our lungs.” Another participant challenged the study by asking, “I would like to know how they can test or analyze if it is true that this [UFPs] is affecting someone. Are they doing this study on one person, medically, in order to know if they are being affected? That is what I want to know.” This participant also asked, “What is going to happen at the end of this study? They can’t clean the air.”

Like the first round of focus groups, the second round elicited specific suggestions for improvement. Regarding vocabulary, one participant suggested that we only use the Spanish word for blood rather than the more technical phrase—bloodstream. She commented, “In the blood. You’re using medical terms. Sangre to us. There you go.”

DISCUSSION

We conducted exploratory research on how to communicate complex environmental health information and the risks of traffic-related air pollution to Spanish-

speaking Puerto Rican adults. A primary lesson learned was that while we thought the first set of fact sheets was easily accessible, feedback from study participants indicated that we were wrong. It is difficult to state this strongly enough. While we thought the fact sheets were informative and clear, from the perspective of the focus group participants, they were not. In fact, the most commonly coded topic of conversation in the first round of focus groups was confusion regarding the content of the fact sheets. To us, this suggests that even well-meaning public health professionals and researchers can easily make assumptions about the clarity of their writing for a nonprofessional audience. Minkler *et al.* explain that when working in the community, researchers need to balance statistics and stories.²⁰ To communicate environmental health risk to our community, we needed to hear their stories to understand the problem through their own words and then add to that understanding with new information.

Another finding was that the participants wanted more information. This was not what we anticipated. We had thought that a primary way to make materials easier to read was to reduce the amount of information. Participants particularly wanted more information about what to do. They also wanted that information to be easier to understand. We attempted to address both of these concerns in the revised fact sheets. Finn and O'Fallon note that images and icons used to communicate health risks may be interpreted differently across cultures.²¹ We were surprised by the confusion and number of questions focus group participants asked about the meaning of one image in particular, a single strand of hair placed as a reference point to demonstrate the small size of ultrafine particulates.

By the second round of focus groups, there were fewer comments reflecting confusion, even though the reading grade level of the fact sheets did not improve. This finding suggests that changes we made to the design may have a greater impact on reading ease than reading grade level. Strategies we used included increasing font size, adding more graphics (including photographs from participant's neighborhoods), organizing information into blocks of texts with headers (also called chunking), allowing for ample white space, and using local terms and language.

Our approach was empirical rather than theoretical, so we modified the fact sheets based on the feedback we received from our focus groups. We then consulted expert recommendations for document design. A substantial body of literature on health literacy among older adults suggests that large font size, lay language, headers,

and graphics should be used.^{22,23} Our findings are consistent with previous research suggesting that both content and design influence readability.²⁴

Strengths and limitations

The main strength of this study is that we engaged participants directly to identify what worked for them. Other strengths included that we addressed a highly specific topic with a narrowly defined population. This reduced uncertainty that would accompany a more general investigation. However, participants likely did not constitute a representative sample due to recruitment of a motivated subset of participants who were mostly women from the BPRHS. Future research on communicating complex environmental health information to Puerto Ricans should strive to reach a broader cross section.

Another potential limitation is that we used the same participants in both the first and second sets of focus groups. Some participants may have had a residual understanding of the topic that would make it easier for them to understand the revised fact sheets. Leaving three-quarters of a year between the first and second focus groups may have reduced this potential problem. On the other hand, we would have been open to an alternate critique if the second group of participants were new recruits. In that case, there would be a doubt as to whether the differences in response were due to changing the fact sheets or changing the participants.

Most participants were more fluent in Spanish than in English. Using both English and Spanish is a common practice in this population. Thus, another limitation is that some participants may have missed what was said in English, while others missed what was said in Spanish. However, this limitation is mitigated because this English/Spanish dynamic reflects how they speak in daily life.

CONCLUSION

We conducted a qualitative investigation aimed at finding ways to communicate traffic pollution risks to Puerto Rican adults. We found that participants wanted more information that was both actionable and easier to understand. There is a need for more research on environmental health literacy that looks at communicating complex environmental health information and engaging communities in meaningful ways for improved health.

²⁰Meredith Minkler *et al.* "Sí Se Puede: Using Participatory Research to Promote Environmental justice in a Latino Community in San Diego, California." *Journal of Urban Health-Bulletin of the New York Academy of Medicine* 87 (2010): 796–812.

²¹Siyemma Finn and Liam O'Fallon. "Emergence of Environmental Health Literacy-From Its Roots to Its Future Potential." *Environ Health Perspective* 125 (2015): 495–501.

²²Carolyn I. Speros. "More than Words: Promoting Health Literacy in Older Adults." *OJIN: The Online Journal of Issues in Nursing* 14 (2009). DOI:10.3912/OJIN.Vol14No03Man05

²³Barbara Billek-Sawhney and Anne E. Reicherter. "Literacy and the Older Adult: Educational Considerations for Health Professionals." *Topics in Geriatric Rehabilitation* 21 (2005): 275–281.

²⁴Suzanne L. West, *et al.* "Communicating Quantitative Risks and Benefits in Promotional Prescription Drug Labeling or Print Advertising." *Pharmacoepidemiology and Drug Safety* 22 (2013): 447–458.

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ETHICAL STATEMENT

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed

consent was obtained from all individual participants included in the study.

AUTHOR DISCLOSURE STATEMENT

No competing financial interests exist.

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