

‘Raising Environmental Awareness for Community Health’: The Implementation and Evaluation of an Environmental Science Outreach Program for Elementary Students

Authors: Ariyani Challapalli BA¹, David Chen BS¹, Ekshika Patel BS¹, Aimee Pugh-Bernard PhD²

¹School of Medicine, University of Colorado Anschutz Medical Campus, Aurora, CO

²School of Medicine, Department of Immunology and Microbiology, Aurora, CO

Introduction: The environment has a large impact on public health, from food availability to respiratory and cardiovascular health. This is especially true for communities of color and low-income communities, who are disproportionately exposed to pollution and have fewer means to minimize risks associated with rising temperatures. Despite these consequences, a 2016 nationally representative survey of middle and high school teachers found the median amount of time spent on climate change over an academic year to be only 1 to 2 hours. Given this educational gap, REACH (Raising Environmental Awareness for Community Health) was created and taught by medical students at the University of Colorado to increase youth knowledge of environmental challenges and empower them to engage in health advocacy.

Methods: REACH was offered as a 5-week after-school program for fourth and fifth graders at two public schools where the predominant population is students historically underrepresented in STEM fields. 93% of students are identified as economically disadvantaged. Session topics included biodiversity, energy, pollution, solar oven building, and a trivia review game. Students learned through a combination of interactive lessons and hands-on activities with a distinct focus placed on the human health implications of each topic. Upon program completion, students completed an anonymous post-pre survey to assess how their perception of environmental topics changed before and after the program. The questions were rated on a 1 to 10 Likert scale and analyzed using a Wilcoxon Signed Rank test.

Results: While the first program had a consistent group of students that were largely present for the entire 5-weeks, the second program was more variable with some difficulties in attendance. For example, some students joined partway through the program while others had to stop attending due to scheduling conflicts. School 1 had an average of 9.6 students at each session while School 2 had an average of 6.6. The completed surveys from both schools were analyzed in combination (n = 15). The four students at School 2 that did complete the final survey attended a similar percentage of sessions on average as the eleven students that completed the survey at School 1, allowing for analysis of results. The average percentage of sessions attended amongst all survey respondents was 71%. Before the program, the average rating for the perceived impact of biodiversity on human health was 5.0 compared to 9.5 afterwards (p = 0.0012). Student opinions on the importance of renewable energy sources to human health and the impact of pollution on health increased from 6.1 to 9.4 (p = 0.0078) and 4.9 to 9.7 (p = 0.00035), respectively. The average rating for how likely students were to tell others about climate change increased from 5.5 to 9.0 (p = 0.00079). The average rating for how likely students were to get involved in efforts to protect the planet increased from 5.7 to 9.9 (p = 0.0019).

Conclusion: REACH increased students' perceived importance of several major environmental topics while simultaneously increasing students' perceived likelihood to speak up or act on these issues. As such, programs like REACH may hold promise in improving public health through the promotion of awareness and advocacy. Since the REACH program was held in a school district that primarily serves students from backgrounds underrepresented in STEM, this early opportunity for exposure may be especially influential. Future work will include expanding to other schools to increase impact, offering more materials in Spanish, and working with school administrators to schedule the program at a time where other extracurricular conflicts are minimized.