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Considering the Environmental Impact of Practice-Based Research

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Abstract

Introduction: Practice-based research networks (PBRNs) improve primary care by addressing issues that matter to clinicians. Building trust between researchers and care teams is essential to this process, which often requires visiting practices to cultivate relationships and perform research activities. However, in a recent study using practice facilitation to improve the delivery of a preventive service, the COVID-19 pandemic prompted us to convert all planned facilitation from

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an in-person to virtual format. This eliminated the need to commute by automobile to and from practices across the state, greatly reducing the carbon footprint of the study.

Methods: From practice facilitator field notes that detailed practice locations and number of sessions, we calculated the total number of driving miles averted by virtual facilitation. We then determined metric tons of carbon dioxide we avoided producing using the Environmental Protection Agency Greenhouse Gases Equivalencies Calculator. During post-intervention interviews, we assessed practices' perspectives and experiences with the virtual format.

Results: Three practice facilitators provided an average of 3.4 sessions for 64 practices. Virtual facilitation averted 32,574.8 drive miles and prevented the release of 12.7 metric tons of carbon dioxide, an offset equivalent to growing 210 trees for 10 years. Practices reported that virtual facilitation fostered greater engagement and allowed more clinicians and staff to attend sessions.

Discussion: Climate change poses a significant threat to the health of people and communities. Given their commitment to improving population health, it may be time for PBRNs to routinely assess their environmental impact and minimize preventable environmental costs.

Keywords

Climate Change; Population Health; Practice-based Research; Practice-based Research Networks

Introduction

Practice-based research networks (PBRNs) connect researchers, clinicians, patients, and communities to create real-world laboratories that study topics important to primary care. Practice-based research is grounded in longitudinal trusting relationships. Historically this has been achieved with “windshield time”—driving to visit practices, meet clinicians and staff, understand needs and context, and complete research tasks such as workflow coaching, data collection, and electronic health record support.¹ The COVID-19 pandemic required a major shift in the conduct of PBRN research, abandoning windshield time, converting to virtual formats, and rethinking how to build partnerships.

In January 2020, our research team started recruiting for a traditional practice facilitation study to implement US Preventive Services Task Force recommendations on alcohol screening, including traditional in-person recruitment.² The protocol was previously published.³ We planned to recruit 125 primary care practices throughout Virginia and host up to 7 in-person training sessions apiece. The pandemic precluded in-person practice visits and as health care moved toward a virtual approach, we made a similar transition.

Concurrently, there is a growing body of evidence revealing climate change as a major threat to health. While PBRNs have begun studying the intersection of health and climate change, their own contribution to climate change as a byproduct of conducting research has not been a core consideration. This manuscript reports on the carbon emission savings of replacing in-person with virtual practice facilitation.

Methods

Using a structured template to systematically capture data elements, practice facilitators kept detailed field notes for each training session including attendees, type of interaction, purpose, progress, challenges, and outcomes.³ For each session held virtually, we calculated round-trip distance from facilitator address to practice address for estimated miles that facilitators would have driven given in-person sessions. Total mileage was converted to metric tons of carbon dioxide using the Environmental Protection Agency (EPA) Greenhouse Gases Equivalencies Calculator.⁴ In field notes and postintervention interviews, we assessed practice engagement including use of virtual formats.

Results

Of the 76 practices enrolled, 64 completed all sessions. Between September 2020 and May 2023, facilitators delivered 216 sessions at an average of 3.4 per practice and 190 (88%) were virtual. Facilitators often conducted several sessions per day with different practices, which would not have been feasible in person. Out of 64 practices, 62 made positive statements about using the virtual format for practice facilitation.

The virtual format saved practice facilitators from driving 32,574.8 miles, which would have released 12.7 metric tons of carbon dioxide. Per the EPA calculator,⁵ this is equivalent to 1,429 gallons of gasoline consumed, 1.6 homes' energy use for a year, and 1,544,862 smartphones charged. If these sessions were conducted in person, we would have had to recycle 550 trash bags of waste instead of using a landfill, switch 481 incandescent bulbs to LED, plant and grow 210 trees for 10 years, or support 15.1 acres of forest for 1 year to offset the carbon dioxide (Figure 1).

Discussion

The use of virtual practice facilitation fostered high study engagement while saving over 12 metric tons of carbon emissions. In addition, the virtual format potentially led to more extensive and meaningful practice engagement due to more flexible scheduling and the ability to digitally disseminate study materials. Keeping in mind the importance of fostering trust between PBRNs and practices, a hybrid model with at least 1 face-to-face meeting may be most effective. Further research is needed to understand the appropriate balance of in-person and virtual facilitation. The environmental impact of conducting practice-based research is not often considered, despite the significant environmental costs of driving to practices, printing and mailing surveys and research materials, wasting leftover food after meetings, use of electricity for maintaining servers and web sites, and more. Family medicine educators have started studying how their field can and should address climate change through training of future family physicians, interaction with patients, practice transformation such as enhanced telehealth services, and local and national advocacy.⁶ While research will never have zero environmental cost, PBRNs have a responsibility to routinely assess the impact of these activities and minimize preventable environmental costs.

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Figure 1. Greenhouse gas equivalencies for carbon dioxide production prevented by virtual practice facilitation.

Notes: Pivoting from in-person to virtual practice facilitation due to the COVID-19 pandemic, practice facilitators held 190 virtual sessions from September 2020 to May 2023, which avoided driving 32,574.8 miles and emitting 12.7 metric tons of carbon dioxide. The graphic shows selected equivalencies sourced from the Environmental Protection Agency (EPA) Greenhouse gases equivalencies calculator.