

An exploration of citizen science for population health research in retail food environments

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ABSTRACT

Public engagement is an essential component of public health research, practice, knowledge exchange processes, and decision making. Citizen science was first documented in the early 1900s as an approach to public engagement and there is growing interest in how it can be used in health research. This commentary describes how citizen science approaches were incorporated into a public engagement activity as part of a population health intervention research project on the retail food environment, a workshop we hosted called *The Food In This Place* in St. John's, Newfoundland and Labrador. We used citizen science methods and approaches to train and support participants to critically analyze a sample of everyday local retail food environments.

KEY WORDS: Public health practice; environment and public health; community participation

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Can J Public Health 2017;108(5-6):e636–e638
doi: 10.17269/CJPH.108.6099

Public engagement is an essential component of public health research, practice, knowledge exchange processes, and decision making.^{1,2} Public engagement is not a novel concept, but is often “easier said than done”³ and can vary in practice. In health research, the extent to which members of the public, as a public, are engaged varies, and the effectiveness and inclusiveness of the engagement depends on researchers' intent and purpose.⁴ Particularly for research that involves experiences in the everyday, such as people's food shopping in retail settings, public engagement is a way to incorporate processes of democratic deliberation and collective decision making.⁵ In ideal situations, public engagement generates mutual benefit between researchers and non-researchers, but this might not always be the case. One approach to engagement that attempts to clearly define a productive relationship between researchers and the public is citizen science. We are especially interested in how focusing on the “citizen” in citizen science approaches can help to democratize science, enhance community capacity, and empower citizens to advocate for and act upon public health issues concerning their local environments,⁶ in contrast to public engagement approaches more oriented toward strengthening the practice of research, or related approaches such as patient engagement that focus on public involvement in health services decision making.

Citizen science is an umbrella term for a range of strategies that directly involve members of the public as active contributors to scientific processes.^{4,7} A 2013 European green paper on citizen science defined it as “the general public engagement in scientific research activities when citizens actively contribute to science either with their intellectual effort or surrounding knowledge or with their tools and resources”.⁸

Citizens have successfully advanced scientific projects for more than a century; one of the earliest documented projects to use citizen science is the Christmas Bird Count, a project running since

1900 in which thousands of volunteers across North America collect wildlife survey data.⁹ Citizen science has since been used to obtain large sets of data that would otherwise not be possible due to time and financial resource constraints for projects in areas such as conservation biology.¹⁰

In public health and related health and social science disciplines, literature on citizen science is lacking. Researchers hypothesize that citizen science approaches are often embraced but underreported¹⁰ or described using other terminology. Wooley and colleagues reflect on the level of citizens' participation, engagement and involvement, and consider “classic citizen science” to represent both participation and engagement, while “extreme citizen science” reflects participation, engagement and involvement.⁴ Further, Den Broeder and colleagues have explained how citizen science for public health can be classified according to its aims (investigation, education, promoting collective goods, and/or action); its approaches (extreme citizen science, where citizens *lead* the entire research process, versus participatory citizen science, where citizens *participate* in problem definition and data collection, distributed intelligence, and crowd sourcing); and its size (local versus mass).³

This commentary explores how citizen science approaches can be used as part of population health intervention research, through experiences in one of our retail food environment research projects in Newfoundland and Labrador (NL) called Healthy Corner Stores

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Conflict of Interest: None to declare.

NL (HCSNL). The retail food environment, including the availability, accessibility and affordability of food in retail settings, has emerged as an important contributor to population health and dietary behaviours.¹¹ We will speak to how citizen science concepts and methods demonstrate how everyday exposures in the retail food environment can be highlighted as a contributor to health.

THE FOOD IN THIS PLACE

HCSNL was a collaborative project led by the Food Policy Lab at Memorial University, with the regional health authority, Eastern Health, and a non-profit community food security organization, Food First NL, supported by Health Canada. At the outset of the research, we hosted a public workshop called *The Food In This Place* in St. John's, NL. The aim of the workshop was to introduce citizens and other key stakeholders to retail food environments, and increase their involvement in considering as a community how where we live, work and play influences our food choice opportunities.¹¹ The Office of Public Engagement at Memorial University runs an annual event series called *Engage Memorial*, a knowledge mobilization initiative intended to support researchers in showcasing collaboration between the university and the community, and to build capacity for public engagement. *Engage Memorial* presented an opportunity for us to augment our existing HCSNL knowledge exchange plan with *The Food In This Place*.

MPH students led the planning and organization of the workshop. Based on retail food environment instruments we were already using,^{12,13} we developed a brief environmental assessment tool. Workshop participants were invited to “sleuth the local food environment” through training and then using the tool to visit local retail food stores to collect observations. The goal was to engage participants in thinking about how features of the retail food environment, such as price, quality and merchandising, affect food purchasing and consumption, and through debriefing, about community actions to address this. The tool asked for observations on:

1. What type of business is it?
2. How did it appear visually?
3. What was the most appealing aspect of the business?
4. What types of food are placed near the cash register?
5. What healthy food or snack options are available?
6. What is the most common food available?
7. What are the three foods you would buy, their price, and the quality?

Participants were recruited through a poster campaign, social media outlets, and several community- and university-based newsletters and listservs. The event brought together a diverse group of individuals, including students, a schoolteacher, a journalist, a lawyer, researchers, members from non-governmental organizations, and the general public.

Following three short presentations by researchers involved with HCSNL, we assigned participants in groups of 3–4 to visit one retail store per group. Stores were pre-selected to capture a variety of retail settings, and included major chains (gas station and supermarket) and independents (convenience store, ethnocultural food store, health food store, meat market/variety store). The event concluded

over lunch with a facilitated debriefing and a short written evaluation. Participants offered positive feedback describing the opportunity to rapidly develop core knowledge and skills to observe their local food environments, form an opinion, and subsequently discuss their results and recommendations.

We found that participants were keen and observant. One group went beyond the basic instructions and came back with a floor-plan style drawing of the store they had visited. During the debriefing, participants called attention to the amount of unhealthy foods that surrounded the store checkout, which they reported as a new perspective on their own food environments. This finding also helped intensify our focus in HCSNL on health-promoting checkout areas.

Participants appeared to be motivated by their findings and were eager to discuss opportunities for action to change their food environments. Definitions of *food deserts* and *food swamps* intrigued several participants. They noted looking forward to communicating about their experience with family, friends and colleagues. One participant suggested that we host a similar event in a rural setting, where they reported experiencing far poorer access to affordable, nutritious food compared to in urban areas.

Participants reported strong motivation to advocate for health-promoting change within the retail food sector – an indicator of potential for citizen science to positively influence other areas within public health. They also reported approval that the event was not heavy in academic jargon, reflected in the following comment: “Thank-you for making this accessible to and digestible for the general public.” Together, these spoke to the underlying goal of the event and also emphasized the potential for citizen science within population health research. Indeed, the journalist who had joined the event reported on her positive experience in a local alternative newspaper.¹⁴

Strengths of the approach

Workshop participants were engaged in scientific practices of data collection and used their own life experiences to interpret the results through the concluding discussion and evaluation. Employing principles of citizen science in this public engagement activity worked well in our context. The tool we used in the workshop was based on our existing research, low-cost, and relatively straightforward to implement. We provided citizens a unique opportunity to critically probe familiar environments using structured scientific practices of direct observation. We engaged citizens in the process of refining their capacity to identify individual, community, built-environment, and societal needs, as recommended by previous research.¹⁵ We enabled citizens to conduct brief forms of food environment assessment and prompted them to consider how local environmental data could be used by them as advocates and change agents.

Limitations of the approach

There are a few limitations to the findings we present here. Although citizen science methods have the potential to empower disadvantaged populations and address health equity, we did not ask participants at our event to self-identify about their social group identities and vulnerability, beyond introducing briefly their personal and professional interest in food environments. To recruit a more diverse group of participants, future citizen science

approaches could incorporate methods that we have used in past research to engage specific ethnocultural and neighbourhood subpopulations, such as the promotora approach.^{13,15} In addition, the stakes were relatively low for both researchers and participants from the field activity, since this was a capacity-building event and not formal data collection; it would be important to test how a similar event could be used in formal fieldwork training.

CONCLUSION

Although citizen science has been in use for over a century, it is only recently increasing in popularity across multiple disciplines of research as a method of public engagement.⁹ Citizen science certainly has potential for diverse applications in public health,³ and we present this commentary as a way to prompt further dialogue about its application in food environment research.

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Received: January 30, 2017

Accepted: May 28, 2017

RÉSUMÉ

L'intéressement du public est un élément essentiel de la recherche, de la pratique, des processus d'échange des connaissances et de la prise de décisions en santé publique. Les sciences citoyennes ont été décrites pour la première fois en tant que stratégie d'intéressement du public au début du 20^e siècle, et leur utilisation dans la recherche en santé suscite un intérêt croissant. Notre commentaire décrit comment des démarches issues des sciences citoyennes ont été intégrées dans une activité d'intéressement du public dans le cadre d'un projet de recherche interventionnelle en santé des populations portant sur l'environnement alimentaire de vente au détail : un atelier que nous avons tenu à St. John's (Terre-Neuve-et-Labrador) intitulé *The Food In This Place*. Nous avons utilisé les méthodes et les démarches des sciences citoyennes pour former les participants et les aider à faire l'analyse critique d'un échantillon d'environnements alimentaires quotidiens de vente au détail locaux.

MOTS CLÉS : pratique en santé publique; environnement et santé publique; participation communautaire