



The Australian Prevention
Partnership Centre
Systems and solutions for better health

EVIDENCE
BRIEF

How has citizen science been used in prevention?

This evidence brief summarises the key findings from a scoping review of how citizen science approaches have been used and evaluated in chronic disease prevention.



Key messages

- Citizen science approaches, which actively involve members of the public in scientific research, are increasingly being recognised for their potential benefits in chronic disease prevention.
- We conducted a scoping review to explore how citizen science approaches have been used in chronic disease prevention to inform future work in this field.
- Citizen science in prevention is a rapidly growing field, and these approaches have been used most often in physical activity and nutrition research, to identify issues; generate and prioritise solutions; develop and evaluate interventions; and build community capacity for action.
- Most citizen science projects are led by researchers, and there is potential to better engage knowledge users, such as policy makers and practitioners, in developing and implementing projects.
- Citizen science approaches were found to be feasible, useful and can help bring about impacts for citizen scientists and policy and practice stakeholders.
- More investment is needed in funding mechanisms and building infrastructure to enable longevity and scalability of citizen science projects and support the use of citizen science as a tool for prevention research, policy and practice.

Marks L, Laird Y, Trevena H, Smith BJ, Rowbotham S. A scoping review of citizen science approaches in chronic disease prevention. *Frontiers in Public Health*. 2022:953.

Read the full review: <https://www.frontiersin.org/articles/10.3389/fpubh.2022.743348/full>

Background

Engaging the public in identifying and addressing issues that affect their health and wellbeing is crucial to ensure preventive actions are acceptable, pragmatic and equitable. Citizen science approaches, which involve members of the public (known as 'citizen scientists') as active collaborators in scientific research, are increasingly recognised for their potential to meaningfully engage the public in research and decision making in chronic disease prevention.

Review aim

To map how citizen science approaches have been applied in chronic disease prevention research projects and identify gaps and opportunities for future work.

Methods

We conducted a systematic scoping review to identify peer-reviewed articles reporting on the use of citizen science in prevention. We synthesised data on key characteristics of citizen science projects, including aims and level of involvement of citizen scientists as well as reported findings from evaluations of these projects.

Key findings

1. Citizen science is gaining popularity in prevention

We identified 76 peer-reviewed articles describing citizen science projects in chronic disease prevention between 2011 and January 2022.

There has been a steady increase in the number of published articles on citizen science in prevention over the last decade, with over half published in 2020 and 2021. These papers covered a range of health topics including physical activity, nutrition, health and sustainability, community health, chronic health conditions, mental health, drugs and alcohol and healthy work environments. Examples of citizen science approaches that have addressed these health topics are listed on page 3.

We found seven main aims of citizen science projects in prevention – several projects had multiple aims:

✓	To identify problems from the perspective of community members
✓	To generate and/or prioritise solutions
✓	To monitor or evaluate existing prevention interventions
✓	To develop or deliver interventions
✓	Community empowerment and capacity building
✓	To access novel sources of data
✓	To influence health knowledge, attitudes or behaviours

Citizen science approaches in the real world

Project	Topic	Research aim	Citizen science activities
Breast cancer prevention project¹ 	Drugs and alcohol	To examine the feasibility of using citizen science to understand the impact of alcohol advertising on Australian women.	This project involved 282 citizen scientists in data collection activities, including uploading and classifying screenshots of online alcohol advertising.
Case study of community policy research² 	Drugs and alcohol	To understand public perceptions of alcohol misuse to inform the development of policy recommendations and priorities for interventions to reduce alcohol-related harm.	This project involved seven citizen scientists in all stages of the research, including: <ul style="list-style-type: none"> • Brainstorming research questions • Co-designing research methods and recruitment • Conducting data collection with community members (interviews and focus groups) • Data analysis • Preparing and presenting the findings to policy makers.
Neighbourhood Eating and Activity Advocacy Teams (NEAAT) project³ 	Physical activity and nutrition	To train low-income older adults to be advocates for improved local food and physical activity environments and build capacity for action through community partnerships with local policy makers and organisations.	This project involved 9-12 citizen scientists who worked together in community action teams to define and address project goals, including: <ul style="list-style-type: none"> • Documenting local issues impacting the local food and physical activity environment via photos and audio recordings • Auditing food outlets, pedestrian and vehicle counts, and conducting surveys of fellow residents • Prioritising issues to address and solutions for action • Advocating for changes with local policy and practice stakeholders.

2. Citizen scientists participated in multiple research activities, predominantly data collection

Most citizen science projects were small-scale, conducted within local areas (for example, within a neighbourhood or city) and recruited fewer than 50 citizen scientists. Almost all projects involved citizen scientists as data collectors (for example, through conducting observations or audits via photos, audio narratives, surveys or diary entries). A third of projects also involved citizen scientists in research design (for example, formulating research questions), data analysis and interpretation, and/or dissemination and advocacy activities. A fifth of projects provided education for citizen scientists (for example, research skills training workshops), and a third provided incentives for participation (for example, small financial payments, gift cards, or refreshments).

3. Most citizen science projects were led by researchers; just over half engaged policy and practice stakeholders

While most projects engaged key stakeholders such as practitioners, policy makers, or community organisations in the research process (for example, in study design, recruitment, discussing findings and recommended solutions and translation into practice), few were led by policy and practice stakeholders. Five projects were initiated or commissioned by stakeholders, and 14 projects were developed and conducted in partnership with stakeholders. Almost all projects that reported policy or practice impacts had been developed in collaboration with policy and practice stakeholders.

4. Citizen science approaches were demonstrated to be feasible and useful, with impacts for a range of stakeholders

Forty articles reported evaluations of citizen science projects, including evaluations of feasibility, the motivations of citizen scientists, and impacts for citizen scientists and policy and practice stakeholders. A summary of evaluation findings is below:

Researchers felt citizen science approaches were a feasible and useful way to:

- ✓ Generate rich and unique insights that may be otherwise inaccessible
- ✓ Identify and advocate for community-focused solutions and build community capacity for action
- ✓ Enhance engagement with existing interventions and develop new partnerships.

The main motivations for members of the public to engage in citizen science projects included:

- ✓ Personal health and wellbeing benefits
- ✓ Interest in the topic
- ✓ Social connectedness
- ✓ Contributing to a cause
- ✓ Learning new skills.

Citizen scientist impacts included:

- ✓ Improved scientific and/or health literacy
- ✓ Improved health attitudes and/or behaviours
- ✓ Increased empowerment and capacity for action
- ✓ Improved social connectedness.

Policy or practice impacts included:

- ✓ Successful implementation of policies or actions recommended by citizen scientists
- ✓ Findings used to inform policies, priorities, strategic planning or resource allocation
- ✓ Development of new programs, committees or grant funding to address locally identified needs.

Opportunities for citizen science in prevention

- Most citizen science projects to date have focused on monitoring physical environments, but there is considerable opportunity to broaden the scope of citizen science in prevention to address knowledge gaps in other areas (for example, digital advertising, social inclusion and discrimination, rural and remote health).
- There is untapped potential to apply large-scale and collaborative citizen science approaches in prevention to gather population-level data across multiple communities, states or territories and countries that allows for monitoring and evaluation of policies and programs.
- There is clear scope to better engage policy and practice stakeholders and other knowledge users in citizen science projects to maximise the capacity for translation of findings into policy and practice.
- Although almost a third of projects targeted specific population groups (for example, low-income, lower socioeconomic communities), greater consideration of diversity and inclusion in citizen science in terms of gender, culture, and socioeconomic status is needed to ensure diverse perspectives are captured.
- There is a need for more comprehensive evaluations of the processes and impacts of citizen science projects for the diverse stakeholders involved.
- If citizen science is to be more widely adopted in prevention, and conducted in a sustainable and cost-effective way, there is a need to develop funding mechanisms and infrastructure to enable longevity and scalability of projects.

Limitations

- Within this review we only included studies which explicitly defined their approach as 'citizen science'. As such, studies which used approaches similar to citizen science but did not explicitly use the term 'citizen science' were not identified by our search strategy.
- Our analysis was limited by the quality of reporting in included articles. We may have inadvertently missed aspects of citizen science projects or evaluation findings due to inconsistencies in reporting of citizen science methods and findings encountered.

Read the full review here: <https://www.frontiersin.org/articles/10.3389/fpubh.2022.743348/full>

References

1. Thomas JA, Trigg J, Morris J, Miller E, Ward PR. Exploring the potential of citizen science for public health through an alcohol advertising case study. *Health Promotion International*. 2022 Apr;37(2):daab139.
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